Environmental and Energy Study Institute

EESI

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The Honorable Kathy Castor
Chairwoman
Select Committee on the Climate Crisis
U.S. House of Representatives

The Honorable Garret Graves
Ranking Member
Select Committee on the Climate Crisis
U.S. House of Representatives

Dear Chairwoman Castor and Ranking Member Graves:

Thank you for the opportunity to comment on the Select Committee's critical work and share our priorities and recommendations for new policies to reduce greenhouse gas (GHG) emissions, stimulate innovation and new economic growth, ensure that no Americans are left behind in the transition to a decarbonized, clean energy future, and enhance the resilience of all communities to extreme weather and other climate change impacts.

The Environmental and Energy Study Institute (EESI) was founded in 1984 on a bipartisan basis by members of Congress to help educate and inform policymakers, their staff, stakeholders, and the general public about the benefits of a low-emissions economy that prioritizes energy efficiency, renewable energy, and new clean energy technologies. In 1988, EESI declared that addressing climate change is a moral imperative, and that has since guided our work. Today, we are fully engaged in the climate change policy dialogue and committed to working with the Select Committee and the relevant committees of jurisdiction to find solutions to the terrible problem of a rapidly warming planet.

In addition to the specific priorities and recommendations outlined in later sections, EESI respectfully encourages the Select Committee to consider three top-level principles throughout your process.

Principles for Select Committee on the Climate Crisis Recommendations

First, the urgency of climate change demands near-term actions as longer-term policies are developed and implemented. The timeline required for Congress to craft, negotiate, and pass legislation to set new climate change policies should not be an impediment to improved energy efficiency, greater deployment of renewable energy and distributed energy systems, investments in infrastructure and grid modernization, and new technology research and development in the interim. There are many valuable but smaller-scale and -scope proposals that enjoy bipartisan support available for Congress to pass now that would improve building sector energy efficiency, leverage private-sector financing to lower energy consumption in federal buildings, and help new technologies enter the market. EESI encourages the Select

Committee to recommend passage of legislation in these areas of work to deliver emissions reductions now and facilitate larger-scale, sector- and economy-wide policies that will follow.

Second, reducing risks of and adapting to the frequency, magnitude, and severity of the worst climate change outcomes will require a cohesive, coordinated set of policies that are complex and interconnected. EESI's priorities and recommendations should be considered as a package rather than separately to maximize the potential for emissions reductions. The Select Committee should carefully consider the staging and progression of policies with optimization in mind so investments reinforce policies, advancements in one sector contribute to progress in others, potential conflicts are prevented, and redundancies are avoided. In particular, Congress should prioritize solutions that address both GHG emissions mitigation and climate change adaptation, such as distributed energy resources and wetland restoration. We cannot afford to move forward in one area if it contributes to wasted resources elsewhere—or worse, lost time that can never be recovered. Holistic, systems thinking when crafting policy should be paramount.

Third, Congress should recognize and support efforts by state and local governments to reduce GHG emissions and implement measures for climate change adaptation. While the role of the federal government is paramount and the primary focus of the Select Committee, state and local governments must also be part of the overall strategy to avoid the worst outcomes of climate change. State and local governments have a more nuanced understanding of the strengths and needs of their constituents and are closer in proximity to those who most acutely feel the impacts of climate change—especially in communities on the front lines of drought, extreme heat, wildfires, flooding, sea level rise, and disappearing shorelines. Communities that have endured decades of detrimental planning and underinvestment in affordable housing, transportation, and other infrastructure should be a priority when Congress allocates resources to help communities adapt to new environmental challenges.

To take a recent example of policy advancements that will require these three principles, Congress made important changes to federal disaster policy last year by authorizing significantly more funding for pre-disaster preparedness and hazard mitigation, but it is now up to agencies such as FEMA and their state and local partners to implement the new law. Congressional oversight may be needed to ensure that federal agencies incorporate this policy change into grant criteria, technical assistance programs, and stakeholder outreach materials. Additional appropriations may be needed to improve coordination among federal, state, and local governments to ensure consistent goals and metrics and to maximize resources and beneficial outcomes.

Contents

Response to Questions: 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?

    a. Transportation

Transportation is the highest-emitting sector in the United States, having replaced the power sector for this dubious distinction in 2017.[1] Electric vehicle research, development, and deployment, along with smart development decisions that reduce commute times, improve urban walkability, and make public transportation more accessible, are key long-term GHG reduction strategies in this sector. However, more immediate steps can be taken to reduce emissions and improve sustainability in transportation while liquid fuel remains the primary energy source for most forms of transit.[2]

Congress should immediately restore the Corporate Average Fuel Economy (CAFE) standards previously set to take effect in 2022. CAFE standards and the use of high-octane, low-carbon fuel as the "lowest-cost CAFE compliance option available" for light-duty vehicles would deliver immediate emission reductions.[3] Taken another way, abandoning CAFE standards will needlessly contribute to higher GHG emissions that will be more difficult and costlier to make up for in other sectors. Biofuels can support efforts to meet the CAFE standards because

BENEFITS OF BIOFUELS

As the U.S. transportation sector undergoes a longer-term, zero-carbon transition, biofuels can be used to reduce GHG emissions while supporting rural economies and contributing to improved air and water quality throughout the country.

There are significant environmental advantages to the increased use of biofuels. Life-cycle carbon emissions from biofuels are about 80 percent lower than those from fossil fuels. Biofuel combustion also results in much lower levels of carbon dioxide (CO_2), carbon monoxide (CO), particulate matter, and nitro-derivate polycyclic aromatic hydrocarbon (NPAH) emissions than fossil fuel alternatives. Biofuels therefore provide a win for the climate, and a win for improved human health as air pollution is a key cause of asthma, heart disease, and other serious illnesses—particularly among low-income and elderly urbanites.

Improved soil and water quality are also positive benefits of biofuel production. Biofuel feedstocks, such as soybeans, can help enrich soil and sequester carbon without the need for nitrogen fertilizer, which pollutes waterways and causes harmful algae blooms. A strong market for biofuels will also help protect working farmlands from unsustainable suburban sprawl and other forms of development that harm soil and water quality. At the same time, growing and producing biofuels can stimulate rural economies and strengthen U.S. energy independence—without resorting to fossil fuel extraction.

[1] "Transportation Replaces Power in U.S. as Top Source of CO2 Emissions," Yale Environment 360. https://e360.yale.edu/digest/transportation-replaces-power-in-u-s-as-top-source-of-co2-emissions
[2] "The Benefits of Biodiesel," Green America. https://www.greenamerica.org/green-living/benefits-biodiesel
[3] "EESI Comments on Corporate Average Fuel Economy Standards," Environmental and Energy Study Institute. https://www.eesi.org/articles/view/eesi-comments-on-corporate-average-fuel-economy-standards

they are by far the lowest GHG-emitting, cleanest, and cheapest octane provider available. As long as the internal combustion engine is the predominant technology in cars and trucks, vehicle manufacturers will need higher octane fuels to achieve fuel economy and performance needs.

Commercial aviation propulsion technology requires a robust research and development (R&D) program to transition away from liquid fuels. In the transportation sector, commercial aviation presents the most challenging transition to net-zero emissions by 2050 because of the energy intensity of flight operations and predicted growth of air travel and air freight lines. The civil aviation industry has set aspirational goals for carbon-neutral growth in international aviation after 2020 and efficiency improvements of two percent per year through 2050. The industry strategy for reducing aviation sector emissions involves technology improvements in propulsion, aircraft design, and the use of composites to reduce weight; sustainable alternative fuels (SAF) that lower emissions by up to 80 percent and reduce particulates in jet engine exhaust; operational efficiency gains in air traffic control and airport operations; and carbon offsets for overall operations.

Congress should encourage the transition to sustainable alternative fuels that can be used in place of fossil fuel-based kerosene. Large passenger and freight aircraft that travel over long routes will require liquid fuels for decades. Therefore, the development and market deployment of SAF for commercial aviation is essential to rein in emissions from this fast-growing sector.[4] SAF can be created out of a variety of bio-based products (as is the case for biofuels for cars and trucks). Establishing a SAF market should be a priority for the transportation sector. To accomplish this, the federal government should work with SAF producers and the aviation sector to promote fuel conversion (i.e., from feedstock to fuel), test and evaluate fuels, and initiate new lines of R&D to meet scientific and technical challenges.

The greatest potential contribution to achieving a clean aviation sector will be the electrification of aircraft. Electric propulsion is unlikely for double-aisle, long-range heavy aircraft by mid-century. However, the electrification of single-aisle (up to 300 passengers) and smaller regional planes by 2050 is an achievable goal that Congress should prioritize. On a small scale, technology currently exists for battery-powered electric flight for small regional aircraft.[5]

Federal investments in R&D and a new partnership with commercial aircraft developers will be critical to making electric propulsion technologies a reality. The National Aeronautics and Space Administration (NASA) is currently undertaking R&D to develop new wing and airframe designs that have the potential to substantially lower energy requirements for medium to large passenger aircraft—a critical element to making electric propulsion technologically feasible.

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[4] "Beginners Guide to Sustainable Aviation Fuel," Air Transport Action Group. https://aviationbenefits.org/media/166152/beginners-guide-to-saf_web.pdf

[5] This was demonstrated earlier at the 2019 Paris Air Show. In Massachusetts, a regional carrier has announced plans to purchase at least 10 electric-powered aircraft capable of carrying nine passengers up to 650 miles. ("Your Next Flight Could be Electric-In a Good Way," Daily Kos. https://www.dailykos.com/stories/2019/7/4/1867720/-Your-next-flight-could-be-electric-in-a-good-way?detail=emaildkre)

Congress should approve legislation that would require NASA to focus its R&D on electric propulsion systems so as to facilitate the introduction of electric-powered regional and single-aisle aircraft.[6]

b. Electric power

Congress should establish a national energy efficiency resource standard (EERS) and a national renewable portfolio standard (RPS). The first step in reducing emissions from a complex system is to squeeze out the inefficiencies that waste energy. A national EERS will accelerate energy efficiency improvements in all sectors across all states, making it easier for states to meet more of their energy demand with renewable resources. RPS is a market-based mechanism that requires utilities to gradually increase the portion of electricity produced from renewable resources such as wind, biomass, geothermal, solar energy, incremental hydropower and marine energy. Thirty states and the District of Columbia have enacted an RPS, covering about 42 percent of the nation's electricity load. Another seven states have voluntary RPSs. In many states, including Kansas, North Carolina, Montana, Massachusetts and Maine, the RPS has helped decrease renewable energy prices, create thousands of clean energy jobs, and generate billions of dollars of investment. A national RPS will bring along other states and ensure national uniformity, although the policy should not prohibit states from enacting more ambitious standards.

d. Buildings

Federal policies—federal energy conservation standards, the research, development, demonstration and deployment (RDD&D) of building technology and materials, and support in the development of model building energy codes—have contributed to incremental yet steady gains in building sector energy efficiency over several decades. Yet despite these gains, the building sector still accounts for more than a third of greenhouse gas emissions.[7] The urgency of climate change and the need for cost-effective mitigation and adaptation strategies requires more emphasis on building sector energy efficiency as well as on the sector's role as a clean energy producer and integrator.

The complexity of the building sector requires dramatic progress on several fronts simultaneously. Policies that prioritize, enable, and reward best-practices for sustainable and resilient construction and renovations are critical. This effort should begin with an ambitious commitment of public-sector resources to incentivize private-sector investments that can help state and local governments accelerate efforts toward net-zero energy (NZE) and deep GHG emission reductions by mid-century.

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[6] Legislation such as S.2837, The Cleaner, Quieter Airplanes Act, which would amend title 51, United States Code, to require a National Aeronautics and Space Administration initiative on reduction of greenhouse gas emissions and noise pollution in aircraft, and for other purposes. https://www.congress.gov/bill/116th-congress/senate-bill/2837

[7] « Energy and the Environnent Explained, » Energy Information Administration. https://www.eia.gov/energyexplained/energy-and-the-environment/where-greenhouse-gases-come-from.php

Congress should establish a goal of net-zero energy (NZE) consumption in new buildings by 2050, while supporting efforts to reduce emissions from energy-intensive processes to make building materials like concrete and steel. The Department of Energy (DOE) defines an NZE building as one that "produces enough renewable energy to meet its own annual energy consumption, thereby reducing the use of nonrenewable energy in the building sector."[8] New construction is a small percentage of the building stock, but it is important not to construct low-efficiency buildings that will be in use for decades to come. To achieve this goal, Congress should increase resources available to state and local governments to adopt and enforce up-to-date model building energy codes, promote above-code standards, and incentivize retrofits of existing buildings. Additional R&D is also needed to reduce GHG emissions embodied in building materials. Embodied carbon will take more time to eliminate from the building sector, but there are promising new technologies that are able to do so.[9] Bio-based building products, such as cross-laminated timber, are even able to sequester emissions.[10],[11]

MASS TIMBER INNOVATION

An innovative class of structural building materials, mass-timber products such as cross-laminated timber (CLT) consist of lumber panels layered and joined together, creating a strong, safe, and sustainable building material.

The unique properties of mass timber differentiate it from light-frame construction and include fire safety, resistance to seismic and explosive forces, thermal performance, and aesthetics. A light, renewable material, its use not only lowers carbon emissions from the building sector but also provides long-term carbon storage—turning buildings into carbon sinks.

CLT and other prefabricated mass-timber products save construction time and can be either the predominant building material or combined with other building materials. Changes to U.S. building codes currently being considered could spur use of mass timber for taller buildings in compact urban areas. Mass timber could significantly change the fabric of our cities, offering unique environmental, performance and design attributes.

Dozens of mass-timber buildings are in the planning or building stages around the United States, and 12 CLT facilities or processing facilities are operational or in development in eight states.

One way to encourage state and local leaders to establish and meet milestones toward the goal of NZE is to increase the use of prizes and programs that encourage competition. Model building energy codes, which are developed on a regular cycle and adopted

[8] "A Common Definition for Zero Energy Buildings," Department of Energy. https://www.energy.gov/sites/prod/files/2015/09/f26/A%20Common%20Definition%20for%20Zero%20Energy%20Buildings.pdf

[9] "New Buildings: Embodied Carbon," Architecture 2030. https://architecture2030.org/new-buildings-embodied/

[10] "Mass Timber—A New Tool in Fight Against Climate Change," Environmental and Energy Study Institute. https://www.eesi.org/articles/view/mass-timber-a-new-tool-in-fight-against-climate-change

[11] "Wood: The Building Material of the Future?" Environmental and Energy Study Institute. https://www.eesi.org/briefings/view/102318timber

and enforced by state and local governments (depending on the jurisdiction) as well as standards to achieve above code performance, are a policy solution available now. Congress can accelerate this transformation with more funding to assist in the code development process. Building codes provide a pathway for consistent, sustained energy efficiency gains in buildings and enable effective integration of renewable energy technology. With supportive policies in place, the building sector can eventually become a clean energy producer, with buildings in educational and medical campuses, business parks, and neighborhoods serving as sustainable mini-power plants fueled primarily by renewable energy.

Congress should prioritize support for communities to upgrade existing buildings. Upgrading existing building is an even bigger challenge than updating codes for new construction, but is also a critical piece of the puzzle and huge opportunity to reduce emissions. Many existing buildings were built before modern building codes and will still be in use well past 2050. Therefore, retrofitting existing buildings—including federal facilities—to be more energy efficient, and even energy-generating, must be a priority to prevent unsustainable energy use for decades to come.

Congress should address a major barrier to improving building sector energy efficiency: Most consumers do not have easy and secure access to their energy-use data. Much of the information they do have is not at all user-friendly. The result is that consumers are making decisions every day about energy consumption without understanding how their decisions affect their economic well-being, health, and environmental impact. Better data access will make better-informed consumers who can make smarter decisions about energy. Congress should therefore promote energy-use disclosure with incentives and/or disincentives for energy utilities to provide consumers with more transparent and useful data about their energy use while ensuring data privacy and security.

Product energy-use labels and the government's Energy Star brand for enhanced energy efficiency have helped consumers understand the value of energy efficient appliances, but information about whole-house energy use is typically absent from real estate listings and mortgage lending criteria. Congress can help prioritize the value of energy efficiency in federal regulations on mortgage banking; real estate insurance; and criteria used by the government-sponsored enterprises (GSEs) like Fannie Mae and Freddie Mac to secure mortgage loans. Robust funding for DOE, the national labs and industry partnerships to accelerate R&D and investment for grid modernization and improved building-grid integration will also facilitate and enhance energy knowledge.

Congress can encourage home/building owners to undertake energy efficiency retrofits by facilitating access to affordable financing such as utility on-bill financing. Funding and technical assistance to communities and building industry stakeholders is also important. Current legislation would help signal the value of energy efficiency homes to potential homebuyers as well. Funding should also be increased for DOE's Weatherization Assistance Program (WAP),

which improves the energy efficiency of homes for low-income families to reduce their monthly energy bills while reducing energy consumption, pollution, and greenhouse gas emissions.

Congress should dedicate resources to ensuring a qualified building workforce and ensure federal education policy aligns with and supports this effort. An immediate strategy is to expand WAP. In the process, WAP is cultivating the skilled workforce needed for the huge task of retrofitting existing homes and buildings to reduce building sector energy use. The program provides training based on the latest building science and best practices to ensure WAP contractors and technicians are qualified to install energy efficient heating and cooling equipment, and whole house improvements like insulation, air sealing, and duct sealing.

As a long-term strategy, architecture and engineering school curricula should prioritize sustainable and resilient design. Other curricula and disciplines will also play a role in transforming the building sector: business management, financial services, real estate development, marketing, psychology, health care, teaching, and many others. Equally important are investments in technical training and certificate programs in sustainable construction management and building trades (including digital skills training), advanced manufacturing, and programs that develop other technical skills that might require a high school diploma, but not necessarily a four-year college degree.[12] Above all, policies must ensure that low-income students have access to the same opportunities. We need everyone's talent and motivation to achieve the 2050 goal.

MILITARY INSTALLATIONS UNDER CLIMATE THREAT

The consequences of climate change will likely heighten the risk Department of Defense (DOD) infrastructure already faces from severe weather events. DOD has expressed concern about how future conditions will affect the department's "ability to maintain both its built and natural infrastructure and to ensure military readiness in the future."

Beyond infrastructure damages, sea level rise and extreme weather could be particularly disruptive to training operations that rely on reliable access to land, air, and sea-based training facilities. To better understand these vulnerabilities, DOD has taken on a comprehensive internal assessment of climate impacts on its installations.

DOD retains one of the largest real estate portfolios in the U.S. government, encompassing 562,000 buildings and structures distributed across 4,800 sites worldwide. This includes 293 active installations across the Army, Navy, and Air Force, in addition to numerous Coast Guard installations under the Department of Homeland Security.

Extreme weather events could also hinder acquisition and supply chain operations that maintain these facilities, potentially influencing the types of equipment DOD acquires and the ways goods are transported, distributed, and stored.

From EESI Issue Brief: The National Security Impacts of Climate Change

[12] "Middle Skills," Harvard Business School. www.hbs.edu/competitiveness/research/pages/middle-skills.aspx

Congress should immediately pass legislation to reduce emissions in federal buildings toward the goal of NZE by 2050. Federal building energy efficiency is a near-term, achievable source of emissions reductions. Pending legislation would set new, forward-looking energy intensity reduction targets for federal buildings, harness and leverage even more private sector capital, and create a stronger market for workers who install, maintain, and manage the new equipment in improved facilities.[13] [14]

Military installations are particularly important area of focus as half of all bases worldwide are threatened by climate change.[15] Improving energy efficiency and renewable energy generation on these bases would strengthen security in the case of a power outage and reduce overall atmospheric emissions. Considering the Department of Defense's global real-estate portfolio has an estimated replacement value of roughly $850 billion, spread across 555,000 buildings, on 28 million acres of land, it is crucial to lower installation emissions and thereby help protect these tremendous assets.[16]

Congress should invest in technology that allows buildings to generate energy. While millions of existing homes and buildings across the country are in dire need of energy efficiency upgrades, others are being designed or updated with energy efficiency as an essential underpinning. They are also integrating technology to charge electric vehicles, generate their own power, and store energy. Congress should ramp up support for RDD&D on building-grid integration to address the challenge of "collectively controlling these resources, optimizing them, and integrating them on the power grid as an energy asset."[17]

As part of a comprehensive grid modernization strategy, building-grid integration will accelerate and maximize the building sector's potential role in GHG reduction. DOE's work in this area recognizes the societal benefits of systems integration that is too risky for the private sector to develop on its own. The Department's *2015 Quadrennial Technology Review* notes that investments in RDD&D are needed to help accelerate grid modernization for several reasons—national security, infrastructure resilience, clean energy goals, and catalyzing private sector innovation—and identifies core research needs, noting: "Seamless integration of advanced technologies will also require the convening power of the federal government to ensure interoperability across different regulatory structures and organizational boundaries."[18]

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[13] "Performance Contracting Measuring Success," Federal Energy Management Program. www.energy.gov/sites/prod/files/2018/11/f57/22-fupwg_fall_18_vallina.pdf

[14] S. 1857, the Federal Energy and Water Management Performance Act of 2019, https://www.congress.gov/bill/116th-congress/senate-bill/1857

[15] "Climate-Related Risk to DoD Infrastructure Initial Vulnerability Assessment Survey Report," Department of Defense. https://climateandsecurity.files.wordpress.com/2018/01/tab-b-slvas-report-1-24-2018.pdf

[16] "Issue Brief: The National Security Impacts of Climate Change," Environmental and Energy Study Institute. https://www.eesi.org/papers/view/issue-brief-the-national-security-impacts-of-climate-change

[17] "Building-Grid Integration: Connecting Buildings and the Power Grid," Pacific Northwest National Laboratory. https://www.pnnl.gov/building-grid-integration

[18] "Quadrennial Technology Review: An Assessment of Energy Technologies and Research Opportunities," Department of Energy. https://www.energy.gov/sites/prod/files/2017/03/f34/quadrennial-technology-review-2015_1.pdf

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

Investments in clean energy R&D and domestic manufacturing are prime opportunities to stimulate the U.S. economy, grow high-quality American jobs, provide for greater international trade opportunities, protect American intellectual property, and establish the United States as a world leader in technology innovation. As of 2018, about 900,000 Americans were employed in jobs directly or indirectly related to renewable energy.[19] Most of these jobs are difficult to send overseas and many are well paid. For example, solar industry employees earn above the national median wage of $17.04 an hour.[20] There are even more jobs in the energy efficiency sector—over 3 million in 2018. Energy efficiency workers are dispersed across the country, with workers employed in all but seven U.S. counties.[21]

Congress should invest in programs that provide students with a full range of career possibilities and grow an in-demand vocational workforce. Workforce development policy should aim to further U.S. leadership in manufacturing innovative clean energy technologies and support workers affected by the transition to a decarbonized economy. Approaches to addressing these two challenges can be mutually supportive, but are distinct.

An essential component of filling renewable energy and energy efficiency positions is a skilled workforce. Frequently, these skills can be obtained outside of a college setting. High school students who wish to pursue a career in trades or obtain skills without attending college should be supported and given opportunities to do so. Federal officials and legislators can set the tone by promoting vocational training as a socially and economically valuable alternative to four-year college degrees and incentivize private-sector apprenticeships. Although there is tremendous room for expansion and innovation in this area, several programs already exist in a few states at small scales, which could be worth replicating throughout the country.[22,23]

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[19] "Fact Sheet - Jobs in Renewable Energy, Energy Efficiency, and Resilience," Environmental and Energy Study Institute. https://www.eesi.org/papers/view/fact-sheet-jobs-in-renewable-energy-energy-efficiency-and-resilience-2019

[20] "Going Green in 2017: The Business Case for Renewable Energy," Environmental and Energy Study Institute. https://www.eesi.org/articles/view/going-green-in-2017-the-case-for-renewable-energy

[21] "Fact Sheet - Jobs in Renewable Energy, Energy Efficiency, and Resilience," Environmental and Energy Study Institute. https://www.eesi.org/papers/view/fact-sheet-jobs-in-renewable-energy-energy-efficiency-and-resilience-2019

[22] CareerWise Colorado brings together federal, state, and business support to five different pathways (advanced manufacturing, information technology, financial services, business operations, and healthcare) for students in over 70 Colorado high schools to pursue. https://www.careerwisecolorado.org/

[23] The Department of Energy-funded "Find Your Power" program in Philadelphia presents a case study for high school training in solar installation, a burgeoning field as the city works to reach a goal of 100 percent renewable energy by 2035. https://www.eesi.org/articles/view/1.25-million-doe-grant-supports-philadelphias-renewable-energy-goals-and-high-school-job-training

As communities decarbonize, policymakers should be cautious about assuming new jobs must necessarily be in the renewable energy field. While a transition to a decarbonized economy is essential for GHG emission reductions, this switch can have a devastating effect on communities dependent on the fossil fuel industries (i.e., coal, oil, and natural gas), as workers are laid off from good paying, community-sustaining jobs. Efforts should be made to present a wide range of alternative career options to those who have lost their jobs. There are a few exemplary models of career transition programs that could inspire national policy.[24,25,26] It should be emphasized, however, that providing early career training to high school students and young adults for alternative career paths outside of fossil fuel industries is essential to avoid further devastation as carbon-intensive jobs are lost.

Congress should act to clean up coal mines and surrounding areas to improve the health and quality of life in areas impacted by decarbonization. Even as communities transition away from fossil fuel extraction, mines and other extractive sites that are no longer operating frequently still pose environmental and health hazards to surrounding areas, further impacting local people's ability to learn, work, or enjoy everyday life. Cleaning up these closed mines would have tremendous benefits for communities impacted by those hazards, benefits such as improved health and job opportunities. Current legislation has been introduced that would extend fees collected on mine operators for clean-ups to 2037.[27] Another current piece of legislation would provide mining communities and tribes with access to funds for restoring these mining sites and revitalizing local economies.[28]

Renewable energy advancements provide a prime opportunity to revitalize American manufacturing. Manufacturing can provide high-quality career opportunities in a wide variety of American communities. Technological advancements created in the United States should help put Americans to work. This can be done by strengthening requirements for, and enforcement of, U.S. Manufacturing Plans for companies given awards through federal R&D programs.[29] Keeping American-funded technological manufacturing in the United States also

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[24] The Partnerships for Opportunity and Workforce and Economic Revitalization (POWER) initiative supports projects and partnerships that diversify local jobs and economies and work towards increasing capacity and technical assistance for economic growth. https://www.eesi.org/briefings/view/040516coal

[25] Initiatives such as the Rising Sun Center for Opportunity and the Green Door Initiative are examples of programs that facilitate decarbonization with the support of workforce development opportunities in marginalized communities. https://www.eesi.org/briefings/view/073119jobs

[26] "A Rural Colorado Coal County Was Struggling. Then A Tech Company Brought New Jobs," NPR. https://www.npr.org/sections/health-shots/2018/10/19/657496648/a-rural-colorado-coal-county-was-struggling-then-a-tech-company-brought-new-jobs

[27] H.R.4248 - Surface Mining Control and Reclamation Act Amendments of 2019. https://www.congress.gov/bill/116th-congress/house-bill/4248/

[28] H.R.2156 - Revitalizing the Economy of Coal Communities by Leveraging Local Activities and Investing More Act of 2019. https://www.congress.gov/bill/116th-congress/house-bill/2156

[29] "Workforce Development and Emissions Reduction Explored in House Select Committee on the Climate Crisis Hearing," Environmental and Energy Study Institute. https://www.eesi.org/articles/view/workforce-development-and-emissions-reduction-explored-in-house-select-committee-on-the-climate-crisis-hearing

helps protect American intellectual property, which is frequently stolen when companies choose to manufacture products overseas.

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

Environmental justice considerations should be integrated into all decision-making processes relevant to the climate crisis. Many communities, especially low-income communities and communities of color, have experienced disproportionate environmental harms and risks for decades. Now, these communities are increasingly affected by climate change—including stronger hurricanes, frequent flooding, and more intense heat. Comprehensive strategies to decarbonize the transportation, electric power, industrial, and buildings sectors will be more effective when principles of environmental justice are at the center of the planning, decision-making, and implementation processes.

Congress should compel federal agencies to include environmental justice factors in decision-making and program development, implementation, management, and evaluation. All federal agencies should be required to identify and address the ways in which existing and proposed programs impact low-income communities and communities of color.[30] It is particularly important that federal agency permitting processes consider the direct and indirect impacts of proposed development on marginalized communities, and include those communities in stakeholder discussions throughout the project planning process. Some agencies are already developing programs that help include environmental justice considerations in policymaking decisions; the Environmental Protection Agency's EJSCREEN is one example.[31]

Stakeholder engagement, especially as it pertains to low-income and minority communities, has historically been a weak point in planning for both private and public developments and programs. However, there are several programs underway that have proven to be effective in this endeavor.[32,33]

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[30] One model to follow could be Executive Order 12898 on environmental justice. The 1994 Executive Order directed each federal agency "to identify and address the 'disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations' to the greatest extent practicable and permitted by law." https://www.epa.gov/laws-regulations/summary-executive-order-12898-federal-actions-address-environmental-justice

[31] "Mapping Environmental Justice: How Can You Use EPA's EJSCREEN Tool?," Environmental and Energy Study Institute. https://www.eesi.org/briefings/view/051916ejscreen

[32] An example is LA SAFE, an initiative addressing community resilience holistically by integrating risk planning with planning for stormwater management, housing, transportation, economic development, education, recreation, and culture: https://www.eesi.org/briefings/view/110619lasafe

[33] "Statement of Principles for Environmental Justice Legislation," House of Representatives Natural Resources Committee. https://naturalresources.house.gov/imo/media/doc/Statement%20of%20Principles%20for%20Environmental%20Justice%20Legislation.pdf

Congress should include climate considerations, and climate justice-specific considerations, into the budgeting and appropriations processes. Access to financing is a substantial barrier to climate action in low-income communities as grant and loan application processes are often long, complicated, and require special expertise to find, understand, and complete. Congress should prioritize integration of these environmental justice considerations into federal agency grant and loan programs. This is an area where federal actors can learn from state efforts to build climate justice considerations into grant- and loan-making processes.[34]

Congress should increase appropriations for the Rural Energy Savings Program (RESP) each year through at least 2022. The Rural Energy Savings Program (RESP), a funding opportunity through the Department of Agriculture's Rural Utility Service, provides zero-interest loans for rural electric cooperatives and other utilities.[35] These utilities then "re-loan" the funds to customers for energy efficiency retrofits and renewable energy systems that lower monthly energy bills for their homes and businesses. This program is particularly critical for low-income rural households, which spend a higher proportion of their income on utility bills—up to 40 percent more—than families in suburban and urban areas.

LIGHTENING RURAL ENERGY BURDENS

Rural residents face higher energy burdens than their metropolitan counterparts. Energy efficiency is a key strategy for alleviating these energy burdens.

But utilities serving rural communities often face challenges funding and/or delivering these services for their members, and the upfront costs of energy upgrades are often unaffordable for their rural customers.

RESP can help fill this funding gap for rural utilities by providing no-interest loans to fund cost-effective projects, which can be repaid by customers on their utility bills over time. Such projects include efficiency retrofits, on- and off-grid renewables, energy storage, and beneficial electrification.

These programs are part of a broader effort by many co-ops and other rural utilities to play a greater role in rural economic development by providing their member-customers with a wider range of services, delivered equitably to members at all income levels.

From EESI Briefing: Equitable Solutions to Rural Energy Burdens

RESP allows rural utilities to use an "on-bill financing" mechanism to offer loans and collect repayments. Financing programs provide a critical solution to the problem of up-front costs of

[34] The Massachusetts Environmental Justice Policy of the Executive Office of Environmental Affairs and the Executive Order on Environmental Justice (EO No. 552) provide a possible model for this process. As stated in the EO 552, "the Executive Office of Energy and Environmental Affairs continues to ensure that environmental justice is an integral consideration in the development and implementation of all state programs, including but not limited to, the grant of financial resources in the form of grants, loans, or other forms of economic assistance." https://www.mass.gov/executive-orders/no-552-executive-order-on-environmental-justice

[35] "Rural Energy Savings Program," Environmental and Energy Study Institute. https://www.eesi.org/Rural-Energy-Savings-Program

whole-house energy efficiency retrofits and clean energy upgrades. On-bill financing programs, authorized by legislation in more than 12 states, uniquely leverage the relationship between a utility and its customers, which can involve alternative approaches to underwriting that emphasize bill repayment history instead of traditional consumer creditworthiness as well as transferability of the loan to subsequent owners and tenants.[36]

RESP was first authorized by the 2014 Farm Bill, and later reauthorized for up to $75 million in 2018 through 2022. Congress appropriated $12 million in Fiscal Year (FY) 2019, which could leverage $100 million in no-interest RESP loans. House and Senate appropriators have tentatively approved $15 million for RESP in FY2020.

Eligible RESP measures include energy efficiency measures, on-and-off grid renewable energy systems, permanently-installed battery storage devices, electric vehicle charging stations, water efficiency improvements, irrigation efficiency measures, beneficial electrification projects, and replacement of manufactured homes. Appropriating additional funds to these programs would provide broader access for energy efficiency and clean energy projects across the country. In turn, this would lead to reduced energy consumption and lower GHG emissions.

Congress should establish a national climate bank that prioritizes environmental justice. A national climate bank would invest capital in climate mitigation and adaptation initiatives.[37] Multiple state climate banks are currently working to integrate environmental justice into their investments, and can be used as models for crafting federal policy.[38] A federal-level climate bank should have environmental justice as one of its core principles. Current legislation on climate banks does include prioritization for investment in projects that provide jobs, reduce greenhouse gas emissions, and support low-income communities, communities of color, or rural communities.[39] National climate bank legislation should include these provisions in order to ensure environmental justice communities have access to capital for decarbonization and adaptation.

[36] "Financing Energy Improvements on Utility Bills: Market Updates and Key Program Design Considerations for Policymakers and Administrators," State and Local Energy Efficiency Action Network. https://www4.eere.energy.gov/seeaction/publication/financing-energy-improvements-utility-bills-market-updates-and-key-program-design

[37] S.2057 - National Climate Bank Act, https://www.congress.gov/bill/116th-congress/senate-bill/2057

[38] States with climate banks are Colorado, Connecticut, Florida, Hawaii, Maryland, Michigan, Nevada, New York, and Rhode Island as well as Washington, D.C.

[39] S. 2057: Section 5245H, Projects and Investment Attributes, specifically states that priority for investment shall go to projects that "provide jobs; mitigate greenhouse gas emissions; and serve low-income, minority, and distressed neighborhoods...or low-income, minority, and rural consumers."

Response to Questions: 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 price on carbon should be an important element of any comprehensive set of climate policies considered by Congress. But, by itself, it would not be sufficient to adequately address the scale of the climate crisis. A carbon price should be carefully coordinated with sector-specific policies that provide incentives for clean energy investments that generate lower GHG emissions, which should in turn lead to higher carbon prices over time to encourage deeper decarbonization.

A price on carbon must avoid creating new burdens on already vulnerable communities. Care must be taken to reduce the impact of increased energy cost on those who are already struggling to make ends meet. One of the many ways Congress can do this is by channeling additional resources to reduce overall energy use in low-income households—thereby reducing or eliminating the impact of higher energy bills. For example, Congress could increase appropriations for programs that provide energy efficiency improvements for low-income households through initiatives like the Weatherization Assistance Program.[40]

A carbon price policy should generate revenue. A price on carbon presents a significant opportunity to generate revenue to support further climate mitigation and adaptation initiatives. Several bills that have been introduced in the House have proposed a range of uses for the revenue. Revenue could be channeled to climate-smart infrastructure projects like nature-based solutions; a climate justice fund to direct funding towards communities facing climate impacts first and worst; weatherization and energy efficiency; and research and development for renewable energy technology and energy storage.[41,42] However the revenue is allocated, its use should be clearly communicated to increase the durability of the policy.

A border tax adjustment should be included in carbon pricing legislation. A border tax adjustment would insulate domestic manufacturers of carbon-intensive goods from similar

[40] "How Do Communities Ensure Federal Energy Programs Help Those Most in Need?" Environmental and Energy Study Institute. https://www.eesi.org/briefings/view/091619efficiency

[41] "Fact Sheet: Nature as Resilient Infrastructure – An Overview of Nature-Based Solutions," Environmental and Energy Study Institute. https://www.eesi.org/papers/view/fact-sheet-nature-as-resilient-infrastructure-an-overview-of-nature-based-solutions

[42] "Pennsylvania Takes a Step Toward Joining Northeast Carbon Cap-and-Trade Program —Regional Greenhouse Gas Initiative Could Serve as Model for Federal Authorities," Environmental and Energy Study Institute. https://www.eesi.org/articles/view/pennsylvania-takes-a-step-toward-joining-northeast-carbon-cap-and-trade-program

goods being imported into the United States from countries without a price on carbon. This is known as "carbon leakage" and would have a negative impact on U.S. economic growth. A border tax adjustment reduces the incentives for companies to relocate, as it would increase the price of the goods manufactured abroad. Not only would this bolster the domestic economy compared to foreign competitors, it could also reduce industry opposition to a carbon tax, dramatically lowering the possibility of policy reversal.

A border tax adjustment would also incentivize other countries to adopt a carbon pricing policy to remain competitive with the United States. The border tax adjustment should only be placed on countries without their own carbon price. If the border tax adjustment tariff is larger than the set carbon price, then countries with a large amount of exports may have a greater economic incentive to place a price on their carbon emissions. Incentivizing other countries—especially the largest emitters that also happen to be large exporters of manufactured goods (i.e., China and India)—to adopt a carbon price may be the most important part of the border tax adjustment rationale, since the more countries adopt a carbon pricing mechanism with a border tax adjustment, the more expensive it will be for countries without a carbon price to export carbon-intensive goods.

Congress should eliminate fossil fuel subsidies. The public subsidies provided to the fossil fuel industry serve as a kind of negative carbon price, artificially decreasing the cost of fossil fuel production and consumption. State, local, and federal tax payers are often the ones who foot the bill for costly negative fossil fuel extraction externalities in the form of air, water, and soil pollution and attending harm on human health. Low-income and minority communities, which are more likely to live near facilities that produce high amounts of pollutants, such as ports, airports, highways, and petrochemical refineries, suffer a disproportionate amount of harm from these externalities.

Conservative estimates put U.S. direct subsidies to the fossil fuel industry at roughly $20 billion per year, with 20 percent currently allocated to coal and 80 percent to natural gas and crude oil. At the same time, there are many kinds of costs associated with fossil fuel use, resulting from their greenhouse gas emissions and other pollution from the extraction and burning of fossil fuels. These negative externalities have adverse environmental, climate, and public health impacts that are estimated to have totaled $5.3 trillion globally in 2015 alone.[43] Eliminating these subsidies would be the first step in internalizing the costs of fossil fuel use.

[43] "Fact Sheet: Fossil Fuel Subsidies: A Closer Look at Tax Breaks and Societal Costs," Environmental and Energy Study Institute. https://www.eesi.org/papers/view/fact-sheet-fossil-fuel-subsidies-a-closer-look-at-tax-breaks-and-societal-costs

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.

Congress should fund R&D on renewable sources of baseload power. While it is important to continue investments in wind and solar energy technologies, more R&D is needed to advance other energy forms that are suitable to more diverse geographies and regional assets, such as biogas; biofuel; hydropower; geothermal; wave, tidal, and marine energy; concentrating solar power (CSP) with thermal storage; and other emerging renewable technologies. These technologies have the advantage of providing a consistent source of power accessible during all hours of the day and in any weather. [44]

For example, CSP plants with thermal storage are currently capturing solar energy in the southwest, storing it in tanks of molten salt, and generating clean baseload power for utilities. Additional CSP plants will enable the United States to utilize more of its significant solar resource (one of the largest in the world). New policies are needed to ensure proper siting for minimal environmental impact; improve access to capital for utility-scale projects; and build high-voltage transmission lines to efficiently move electricity to population centers.[45]

Investments must also be made in recovering battery and renewable energy technology components. Perhaps the most important area of investment is in expanding access to a sustainable domestic supply of rare earth minerals, including through recycling. Debris from mining and coal power plants often contain rare earth metals that the United States normally imports from China, which poses a risk to national energy security. More and better recycling facilities will lessen U.S. dependence on foreign mineral imports and encourage more renewable energy generation by making the supply chain for minerals more dependable. Encouraging easier disassembly of technology that uses rare minerals will allow easier harvesting of those minerals at the end of that technology's useful life, and allow users to more easily repair, rather than replace, broken technology, further saving minerals.

"Innovation" should not only be forward-looking. The past is ripe with lost knowledge, technologies and modes of building that are worth dusting off and exploring. Often, they are inherently low-impact and sustainable. For example, cable cars, urban planning designs that are pedestrian-friendly, and buildings designed for the climates they are built in, are time-tested

[44] "The Growing Role of Renewable Energy in the U.S. Energy Mix," Environmental and Energy Study Institute. https://www.eesi.org/briefings/view/111519cetsa

[45] According to the Solar Energy Industries Association (SEIA), "much of the existing transmission infrastructure in the Southwest is at full capacity and new transmission is urgently needed." https://www.seia.org/initiatives/concentrating-solar-power

technologies and practices that policymakers and builders can learn from as we work towards a clean energy future.

A challenge of climate change, however, is the fact that the past is no longer prologue in many cases. What was once a good place to site buildings and other infrastructure may now be vulnerable to flooding, wildfire, or other hazards. Past design standards for wind resistance and structural integrity may be outdated, so innovative thinking and processes are also crucial in a changing world.

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

While private companies can provide tremendous financial and human capital resources to clean energy projects, it should be emphasized that the public part of public-private partnerships (P3s) is critical; this is where the government can set public-interest criteria that ensure projects are climate resilient, sustainable, and equitable as well as profitable.

Congress should approve long-term extensions of the production tax credit, investment tax credit, and Clean Renewable Energy Bonds and parity for master limited partnerships. These tax credits will help reassure investors, attract additional capital, and create jobs to implement projects. They should also be fully refundable or transferable, which would allow companies to make investments even during future economic downturns when taxable profits are scarce. Additionally, these credits should be equalized among all renewable technologies, including geothermal power, hydropower, and biomass used in co-firing at existing plants, which are currently excluded. This is particularly important because these are all baseload sources of power.

Congress can incentivize more private investment in clean energy innovation through prizes or competitions for companies that are able to reach a certain clean energy goal. A national prize to reward innovation and creativity would leverage private investment and focus industry on critical technology challenges to solve. For example, a company could receive a large financial prize for significantly extending the storage capabilities of batteries or decreasing vehicle emissions. In addition, prizes can be structured to make up for potential lost revenue from stolen intellectual property—a major problem in America's green energy innovation.[46,47]

Congress can further incentivize P3s by streamlining access to public lands and waterways for energy innovation. The 2015 Sage Grouse protection plans, for example, highlighted areas of most concern for sage grass ecosystems and identified areas where energy development would have

[46] "Wind industry has lost billion to IP infringements and trade secret theft, finds IntelStor, Windpower Engineering and Development," Wind Power Engineering. https://www.windpowerengineering.com/wind-industry-has-lost-billion-to-ip-infringements-and-trade-secret-theft-finds-intelstor/

[47] "One in Five U.S. Companies Say China Has Stolen Their Intellectual Property," Fortune. https://fortune.com/2019/03/01/china-ip-theft/

the least environmental impact and could proceed. These plans, repealed by executive action but later temporarily reinstated by court ruling, allow for faster permitting of projects in areas already approved for energy development, and smooth differences in regulation between state and county lines that may have caused further construction delays. Current bipartisan legislation expands upon these good governance practices and also creates a green fund from energy developments to finance local community environmental stewardship programs. [48,49,50]

11. What policies should Congress adopt to help communities become more resilient in response to climate change?

Congress should enact legislation to reform the National Flood Insurance Program (NFIP). Established by Congress in 1968, NFIP provides affordable, government-administered flood insurance to property owners, renters, and businesses. However, the NFIP is more than just an insurance program, it is also intended to be a floodplain management and flood risk mitigation program. NFIP requires participating communities to adopt and enforce minimum construction and land use regulations that make them less vulnerable to flooding. NFIP has 5.1 million policies in over 22,000 communities, with $1.3 trillion in coverage.

NFIP faces a solvency crisis because premiums do not reflect actual risk. This could be improved through updated flood maps utilizing advanced technology and data analysis tools. There is no consistent methodology for developing flood maps across the country, so many areas have maps that are outdated.[51]

Congress should set policies that require, enable, or reward investments in emergency preparedness and resilience before disaster strikes and ensure that climate risk disclosure is evaluated when making project decisions. All federal funding criteria must include requirements for resilience and sustainability. In addition, policies that enable or reward unsustainable development practices should be eliminated or amended to attain more sustainable and resilient outcomes. There are many examples of policy disincentives, from federal disaster relief funding that can be used to rebuild in hazard-prone areas or to outdated codes and standards, to federal procurement, bill scoring, and grant criteria that prioritize low-upfront-cost spending over smart, long-term investments.

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[48] "Bipartisan Legislation Would Streamline the Development of Renewable Energy on Public Lands," Environmental and Energy Study Institute. https://www.eesi.org/articles/view/bipartisan-legislation-would-streamline-the-development-of-renewable-energy-on-public-lands

[49] "Sage-Grouse Habitat Protected by Historic Obama Administration Plans," Pew. https://www.pewtrusts.org/en/research-and-analysis/articles/2015/09/22/sage-grouse-habitat-protected-by-historic-obama-administration-plans

[50] "Court Order Protecting Sage Grouse Impedes Auction for Drilling Leases," Bend Bulletin. https://www.bendbulletin.com/localstate/7564610-151/court-order-protecting-sage-grouse-impedes-auction-for

[51] "The National Flood Insurance Program: Critical Issues and Needed Reforms," Environmental and Energy Study Institute. https://www.eesi.org/briefings/view/050719nfip

Congress should encourage coordination among federal agencies and provide robust funding for federal programs that are promoting the use of nature-based solutions. Natural infrastructure like wetlands and mangroves can reduce impacts of storm surges and flooding. Green infrastructure such as vegetated roofs can reduce the urban heat island effect and help reduce storm water run-off that pollutes waterways and ecosystems. These nature-based are often more effective and less costly than traditional, gray infrastructure. [52] They also have the co-benefit of reducing greenhouse gas emissions, especially coastal ecosystems (i.e., marshes and mangroves) and sustainably-managed agricultural land, all of which can sequester carbon. Further, combining gray infrastructure and nature-based solutions, often referred to as a hybrid approach, can also provide a favorable avenue for rethinking and remodeling our nation's infrastructure.

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?

INVESTING IN NATURE

Natural infrastructure solutions are generally cost-effective. For many locations along the Gulf of Mexico, wetland and reef restoration have been found to save $7 in "flood reduction benefits" for every $1 spent on restoration. Nature-based solutions could help "avert more than 45 percent of the climate risk over a 20-year period, saving the region more than $50 billion in flood damages."

Across the U.S., coastal wetlands are estimated to provide $23.2 billion in storm protection annually. In one case study about Hurricane Sandy, coastal wetlands prevented an estimated $625 million in property damages.

Annually, in the northeast, coastal wetlands provide a 16 percent reduction in flood damages. Another study found that combining gray infrastructure with nature-based solutions was the most effective method for mitigating flooding while providing the greatest co-benefits, saving $225 million in damages for a 100-year storm at Howard Beach, Queens, New York.

Initial costs for nature-based solutions can be less than for gray infrastructure alternatives. As of June 2019, living shorelines, which last longer and do not require as many or as intensive repairs, on average cost $361/linear foot, which is a third of the cost for concrete bulkheads.

From EESI Fact Sheet: Nature as Resilient Infrastructure

The whole of U.S. disaster policy must be turned on its head: project costs must be front-loaded to ensure important resilience strategies are well integrated and cannot be eliminated to reduce project cost. Thoughtful community planning and design based on life-cycle costs will favor investments in quality and long-term value, which will yield the most dividends. Benefit-cost analysis tools must consider the impact federally-funded projects will have on public health, safety, public

[52] "Fact Sheet: Nature as Resilient Infrastructure – An Overview of Nature-Based Solutions," Environmental and Energy Study Institute. https://www.eesi.org/papers/view/fact-sheet-nature-as-resilient-infrastructure-an-overview-of-nature-based-solutions

welfare, and the environment in addition to more easily quantifiable economic benefits. This requires that all cost impacts are factored in, such as healthcare costs from energy pollution and repeated funding for disaster relief.

Congress should ensure that federal funding for disaster recovery and rebuilding results in increased resilience without creating additional carbon emissions. Efforts should support state and local endeavors to discourage building, or rebuilding, in areas prone to flooding and other hazards such as wildfires. A major existing need that must be addressed is additional R&D and technical assistance for energy infrastructure upgrades. For example, state and federal funding has enabled utilities to underground their transmission lines and install microgrids that can disconnect from the main power grid and operate independently in the case of a power outage. R&D is needed to cost-effectively incorporate renewable energy power and battery storage technologies to replace diesel generators that are predominately used for microgrids.

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?

Congress should prioritize funding for disaster preparation and mitigation projects; infrastructure upgrades; building code inspections; home retrofits for improved energy efficiency, affordability, and durability; community renewable energy installations; and other investments in front-line communities. This would be an important and overdue public acknowledgment that development practices and policies common after World War II had a negative impact on the character, cohesiveness, and resources of many communities of color and low-income neighborhoods. Highways were built through well-established communities and created difficult-to-traverse barriers between residents and the churches, stores, and other destinations once within walking distance. Many have never recovered. After years of deferred maintenance, homes and infrastructure in these areas are more vulnerable to wind and water damage from severe storms. Outdated and inefficient buildings contribute to high energy bills, uncomfortable or unsafe indoor environments, and poor protection from extreme heat and cold, and many are sited in low-lying areas prone to flooding. These communities have also been the preferred place to locate power plants and other industrial facilities, and residents are paying for the cost of toxic waste and pollution with their health.

Restoring these communities cannot be accomplished by policy fiat. Residents, business owners, community leaders, and social service providers must be fully involved in the priority-setting process. Local residents know their surroundings better than anyone else and deserve to be consulted to ensure mitigation and adaptation solutions will deliver maximum benefits to those most in need of relief.

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?

Congress should also ensure that the communities where federal buildings and federally-supported infrastructure are located have access to the same risk-assessment studies to inform their own code amendments and incentives. For example, communities could amend the model code to include requirements or incentives for enhanced flood management, and high-performance building standards, such as Fortified Home for stronger construction and Passive House for superior energy efficiency and indoor environmental quality. At the very least, Congress should support state adoption of the latest model building codes that federal buildings would also meet. It can also require federally-supported projects to meet above-code performance in certain respects, depending on the project goals and the hazards unique to its location. Similarly, Congress should ensure that federal grants for disaster mitigation and recovery, economic development, affordable housing, etc. require hazard risk assessments and strategies to ensure community resilience and sustainability.

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 decision-makers—and the American people—with the information they need? Where possible, recommend the scale of investment needed to achieve results.

Congress should provide robust funding for observations, monitoring, and research of climate change activities. This work is carried out by a wide range of offices across the entire executive branch: the Department of Agriculture, NASA, National Oceanic and Atmospheric Administration, Environmental Protection Agency, U.S. Geological Survey, National Academies of Sciences, and other federal agencies with a scientific mission. Academia is also a rich source of climate research and provides important thought-leadership in the development of mitigation strategies and technologies, and U.S. colleges and universities should be close partners with the federal government and supported with funding opportunities to advance priority inquiries.

Congress should appropriate funding to gather light detection and ranging (LiDAR) data for the entire country. LiDAR is the best available technology to make accurate digital elevation models, but the resources to carry out surveys are out-of-reach for many non-federal partners in climate resilience. These maps provide critical information that informs decision-making on flood insurance, Federal Emergency Management Agency buy-out programs, and other hazard mitigation programs.

Congress should require each executive department to create a branch responsible for using the research products of our government, academic, and international sources in developing mitigation, adaptation, and resilience strategies. It is the responsibility of the entire federal government to comprehensively apply climate science and climate-related research to its legal requirements and responsibilities. Federal policymaking should be based on sound science that adheres to the highest standards of objective investigation and integrity, and be fully protected from political interference. To help promote accountability, regular reports should be provided to Congress (and the public) that details each department's use of all available R&D resources to respond to the climate crisis in policy development.

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 must reestablish U.S. leadership in global efforts to reduce greenhouse gas emissions. For members of Congress concerned that the burden of efforts could fall unduly or unfairly on domestic interests, consider instead that the United States will have more authority to lead if we do ourselves what we ask of others. Taking international leadership during the transition to a low-carbon economy also offers immense opportunities to grow American expertise in the manufacturing of clean energy technologies, and benefit from the resulting economic gains. Further, exporting these goods and technologies to other countries expands the market for U.S. products while reducing GHG emissions, and protects American allies from undue influence from oil-producing countries like Russia.

Congress should pass a resolution that demonstrates on-going U.S. support of and commitment to the Paris Agreement. U.S. leadership is critical to address the climate crisis. Under the terms of the Agreement, the United States will remain in the Paris Agreement until November 4, 2020. The Paris Agreement has a unique structure—rather than all countries agreeing to a uniform set of greenhouse gas reduction targets, each country wrote its own, unique commitments which would be carried out upon ratifying the Agreement. These commitments are called Nationally Determined Contributions (NDCs). Congressional legislation, in combination with state, local, and private sector actions, can keep the United States on track to meet its NDC despite the White House's move to withdraw the United States from the Paris Agreement.[53]

[53] "U.S. Nationally Determined Contribution," United Nations Framework Convention on Climate Change. https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/United%20States%20of%20America%20First/U.S.A.%20First%20NDC%20Submission.pdf

Please include any other specific policies that Congress should adopt to solve the climate crisis and adapt to the impacts of climate change.

Regulation and Legislative Evaluation and Scoring

Congress should direct the Congressional Budget Office (CBO) and the Office of Management and Budget (OMB) to revise existing guidance used to evaluate and score proposed legislation and regulations to incorporate the full, long-term benefits and costs of climate change policy. Legislation and policy responses to the climate crisis cannot proceed unless they can be justified economically under existing scoring rules. Both CBO and OMB evaluate and score proposed legislation and regulations based on an approach which skews outcomes by favoring considerations that can be easily priced, such as benefits from industry and jobs, and omits difficult-to-measure benefits like healthy ecosystems and well-functioning social institutions.

This approach only makes sense for purely financial decisions. When applied to policy options and outcomes that are complicated or not easy to price, current practice favors present actions that cause cost impacts mainly in the future. This raises questions about intergenerational equity, since it assumes that a resource, an identical substitute, or a new technology will always be available and that future generations will be able to absorb the costs of policies implemented today.

There is precedent for giving value to long-term change that cannot be easily quantified. The Clean Air Act of 1963 authorized EPA to set some standards with explicit cost or economic considerations, and other key standards with no mention of cost considerations. This is what Congress determined was necessary to achieve an objective when specific benefits and costs could not be fully anticipated.

It will be increasingly difficult for CBO and OMB to inform climate change policymaking without addressing potential impacts on public health, expanded upon in the following section. Benefit-cost analysis and cost-effectiveness analysis guidance should be updated so that the likely outcomes better reflect a higher priority on human health and environmental considerations that affect communities for decades. Laws and regulations that require supporting economic analyses, such as Pay-as-you-go (PAYGO) and the Office of Information and Regulatory Affairs regulatory analysis for mandatory spending, should be updated and revised to ensure that the impacts of climate change are properly considered.

Congress should consider climate change policies based on the potential positive and negative effects on human health. Climate change is directly and profoundly affecting human health because it threatens the systems and natural cycles that contribute to a sustainable

environment.[54] Health organizations around the country concur that climate change is the greatest threat to human health in the 21st Century.[55]

Every climate impact will have health-related cost implications that must be considered and incorporated into economic and policy analyses. There are also ongoing health impacts associated with continued fossil fuel production and consumption. Phasing out fossil fuels will reduce GHG emissions thereby decreasing their negative impacts on human and environmental health. The increased severity or frequency of health problems affected by climate or weather, and the unprecedented or unanticipated health threats in places previously untouched, will both present a long-term challenge.[56] In addition to physical health, mental health and well-being is a heightened concern with climate change. Consequences range from stress and distress symptoms to clinical disorders, such as anxiety, depression, post-traumatic stress, and suicidality.[57]

While climate change will increasingly impact everyone, certain groups are disproportionately affected. Children are particularly vulnerable as impacts from climate change—such as excessive pollution and poor nutrition—can have life-long repercussions. The elderly and infirmed are at a much greater risk of dying from extreme temperatures, and more susceptible to pollution-triggered cardiac and respiratory impacts. And, they may be least able to evacuate in an emergency.

Low-income and minority communities are more likely to be impacted by climate change due to existing health disparities (e.g., higher rates of asthma) and geographic location (e.g., living in flood-prone, remote, or industrially-polluted areas). Limited access to healthy food and healthcare, and the inability to evacuate or relocate, heighten concerns about environmental justice.[58] Many communities in these areas have experienced these negative effects for generations. These impacts will increase as time passes unless action is taken to reduce GHG emissions and limit temperature rise.[59]

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[54] "Let's Talk Health and Climate: Communication Guidance for Health Professionals," ecoAmerica. https://ecoamerica.org/wp-content/uploads/2017/03/3_letstalk_health_and_climate.pdf

[55] "U.S. Call to Action on Climate, Health, and Equity: A Policy Action Agenda," Climate Health Action. https://climatehealthaction.org/media/cta_docs/US_Call_to_Action.pdf

[56] "The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment," U.S. Global Change Research Program. http://dx.doi.org/10.7930/J0R49NQX

[57] "Mental Health and Well-Being," National Climate Assessment. https://health2016.globalchange.gov/mental-health-and-well-being

[58] "Climate Vulnerability Monitor 2nd Edition. A Guide to the Cold Calculus of a Hot Planet," Fundación DARA Internacional.http://daraint.org/climate-vulnerability-monitor/climate-vulnerability-monitor-2012/

[59] The Health and Climate Resource Guide from the American Public Health Association highlights actions to make a difference today. This guide includes audience-specific resources, applicable to health professionals and systems administrators, business and government leaders, community planners, public health departments, and scientists. https://www.apha.org/-/media/files/pdf/topics/climate/health_and_climate_resource_guide.ashx.

Recycling and the Circular Economy

Congress should consider the role of petroleum-based products, namely plastics, in climate change policy. Right now, the economy is built around a linear cycle of using fossil fuels to make plastics which are then used and put into landfills (or worse in rivers, soils, and the ocean). To meet decarbonization goals, we will need to transition to a circular economy where goods are built to be reused for a prolonged period of time, and, at the end of the good's useful lifetime, its parts can be recovered for reuse in new goods. This would minimize the need to extract new resources and would reduce plastic pollution. A move to a circular economy will need to be driven by corporations which produce these goods, as consumer choices are constrained by the options companies choose to develop and sell. To encourage this transition, Congress could incentivize companies to only produce goods that meet a threshold for reuse and material recovery. Further, companies can be compelled to have comprehensive recovery and recycling programs here in the U.S. in order to ensure there is always a market for these materials. Bio-based alternatives for products traditionally produced using petroleum should also be among the suite of options used to decarbonize this sector.

There are significant consequences associated with plastic pollution including marine debris and microplastics in soils, animal stomachs, and human food. Given the enormous quantity of pollution already in our cities, neighborhood, and ecosystems, steps must not only be taken to move to a circular economy, but also to clean up the existing pollution. This is an areas where policy ideas can be drawn from proposed bills as well as state and local leadership in areas such as bag bills and bottle bills.[60]

[60] S. 2260 Save Our Seas 2.0: Improving Domestic Infrastructure to Prevent Marine Debris Act, https://www.congress.gov/bill/116th-congress/senate-bill/2260; DC Bag Bill, https://doee.dc.gov/page/bag-law-faqs; Bottle bills, https://www.eesi.org/articles/view/bottle-bills-and-curbside-collection-an-overview-of-recycling-policy-approa

Appendix: EESI Resources

This appendix provides recent EESI briefings, fact sheets, and reports organized by the RFI questions.

1. What policies should Congress adopt to decarbonize the following sectors consistent with meeting or exceeding net-zero emissions by mid-century?

Legal Pathways to Deep Decarbonization (November 2019), https://www.eesi.org/briefings/view/112219decarbon

a. Transportation

Fact Sheet: The Growth in Greenhouse Gas Emissions from Commercial Aviation (October 2019), https://www.eesi.org/papers/view/fact-sheet-the-growth-in-greenhouse-gas-emissions-from-commercial-aviation

Biogas: Pro-Economy and Pro-Climate: Growth in all shades of green (May 2019), https://www.eesi.org/briefings/view/052219biogas

Fact Sheet: Battery Electric Buses: Benefits outweigh costs (October 2018), https://www.eesi.org/papers/view/fact-sheet-electric-buses-benefits-outweigh-costs

Fact Sheet: High Speed Rail Development Worldwide (July 2018), https://www.eesi.org/papers/view/fact-sheet-high-speed-rail-development-worldwide

Biogas as a Waste Management Solution: Turning "waste" into resources (May 2018), https://www.eesi.org/briefings/view/052318biogas

b. Electric power

Report: Equitable Beneficial Electrification for Rural Electric Cooperatives: Electrifying Residential Space and Water heating in the Midwest (June 2019), https://www.eesi.org/papers/view/report-equitable-beneficial-electrification-for-rural-electric-cooperatives

Electrification: Options for consumers and the environment (March 2019), https://www.eesi.org/briefings/view/030519beneficial

Transmissions Benefits for Consumers and the Economy: What the Numbers Show (February 2018), https://www.eesi.org/briefings/view/021318wires

d. Buildings

What Can Congress do to Build Better Buildings? (April 2019), https://www.eesi.org/briefings/view/042919buildings

The Multiple Benefits of Federal Housing and Energy Programs (February 2019), https://www.eesi.org/briefings/view/020819housing

Wood: The building material of the future? (October 2018), https://www.eesi.org/briefings/view/102318timber

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?

Energy Efficiency Jobs are Green Jobs: Report shows employment potential of weatherizing affordable housing (July 2019), https://www.eesi.org/briefings/view/073119jobs

Fact Sheet: Jobs in Renewable Energy, Energy Efficiency, and Resilience (July 2019), https://www.eesi.org/papers/view/fact-sheet-jobs-in-renewable-energy-energy-efficiency-and-resilience-2019

Energy Efficiency: America's job-creation powerhouse (October 2018), https://www.eesi.org/briefings/view/102518efficiency

Growing Jobs and Rural Economics: The Farm Bill's Energy Title (April 2018), https://www.eesi.org/briefings/view/040418energytitle

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

How do communities ensure federal energy programs help those most in need? (September 2019), https://www.eesi.org/briefings/view/091619efficiency

Fact Sheet: Fossil Fuel Subsidies: A closer look at tax breaks and societal costs (July 2019), https://www.eesi.org/papers/view/fact-sheet-fossil-fuel-subsidies-a-closer-look-at-tax-breaks-and-societal-costs

Equitable Solutions to Rural Energy Burdens (July 2019), https://www.eesi.org/briefings/view/071619ruralenergy

Federal Program for Energy and Housing: A lifeline for America's low-income families (July 2018), https://www.eesi.org/briefings/view/073118housing

Farm Bill Program Helps Rural Communities Invest in Energy Savings: Cooperatives are investing in cutting-edge inclusive energy efficiency programs for their members (May 2018), https://www.eesi.org/briefings/view/052218coops

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.

The Growing Role of Renewable Energy in the U.S. Energy Mix (November 2019), https://www.eesi.org/briefings/view/111519cetsa

Hydropower – A New Look at Opportunities for America's First Renewable Energy Resource (April 2019), https://www.eesi.org/briefings/view/042419hydropower

2019 Sustainable Energy in America Factbook (April 2019), https://www.eesi.org/briefings/view/040119factbook

Fact Sheet: Energy Storage (February 2019), https://www.eesi.org/papers/view/energy-storage-2019

2018 Sustainable Energy in America Factbook (March 2018), https://www.eesi.org/briefings/view/030918bcse

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

2019 Congressional Clean Energy Expo and Policy Forum (July 2019), https://www.eesi.org/briefings/view/expo2019

2018 Congressional Clean Energy Expo and Policy Forum (July 2018), https://www.eesi.org/briefings/view/expo2018

11. What policies should Congress adopt to help communities become more resilient in response to climate change?

Delay and Pay or Plan and Prosper: Practical Solutions to Adapt to the Effects of Climate Change (November 2019), https://www.eesi.org/briefings/view/110119gca

Fact Sheet: Nature as Resilient Infrastructure – An Overview of Nature-Based Solutions (October 2019), https://www.eesi.org/papers/view/fact-sheet-nature-as-resilient-infrastructure-an-overview-of-nature-based-solutions

Climate and National Security Forum 2019: A Climate Security Plan for America (September 2019), https://www.eesi.org/briefings/view/092419security

Green Infrastructure: A blueprint for climate resilient communities (March 2019), https://www.eesi.org/briefings/view/030419asla

Making Military Bases and their Communities More Resilient (March 2019), https://www.eesi.org/briefings/view/030119defense

Fact Sheet: Strengthening Financial Resilience to Climate Change – The Role of Insurance (August 2018), https://www.eesi.org/papers/view/fact-sheet-strengthening-financial-resilience-to-climate-change

Climate and National Security Forum 2018: A responsibility to prepare (February 2018), https://www.eesi.org/briefings/view/022618security

Lessons in Resilience from America's Coastal Communities (February 2018), https://www.eesi.org/briefings/view/022218coastal

EESI Regional Resilience Briefing Series:

Resilience along the West Coast: Scientific and Policy Innovations Strengthening Communities and the Environment (Forthcoming December 2019), https://www.eesi.org/briefings/view/120419west

Improving Coastal Resilience in the Northeast: Innovative Solutions to Protect Communities, Property, and the Environment (October 2019), https://www.eesi.org/briefings/view/102319northeast

Nature-based Resilience for Gulf Coast Communities (June 2019), https://www.eesi.org/briefings/view/062519coastal

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 National Flood Insurance Program: Critical Issues and Needed Reforms (May 2019), https://www.eesi.org/briefings/view/050719nfip

Issue Brief: Congressional Action on Resilient Infrastructure – Areas of Progress and Future Needs (April 2019), https://www.eesi.org/papers/view/issue-brief-congressional-action-on-resilient-infrastructure-areas-of-progress-and-future-needs

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?

Community-Centered Resilience: Lessons from Louisiana (November 2019), https://www.eesi.org/briefings/view/110619lasafe

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?

Hidden in Plain Sight? Why Resilient Buildings are Critical U.S. Infrastructure (March 2018), https://www.eesi.org/briefings/view/032818resilience

Building Climate Resilience in the Real Estate Sector (March 2018), https://www.eesi.org/briefings/view/030618realestate

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.

Climate Change in the American Mind (March 2019), https://www.eesi.org/briefings/view/032819polling

How Climate Change Affects the United States: Exploring the NCA and IPCC Reports (February 2019), https://www.eesi.org/briefings/view/022519climate

Warning Signs: New report outlines the impact of proposed budget cuts to climate and environmental research (March 2018), https://www.eesi.org/briefings/view/031618budget

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?

The State of Germany's Energy Transition (June 2018), https://www.eesi.org/briefings/view/060818germany

How Businesses, Cities, and States are Leading Climate Action Efforts (October 2018), https://www.eesi.org/briefings/view/101218summit