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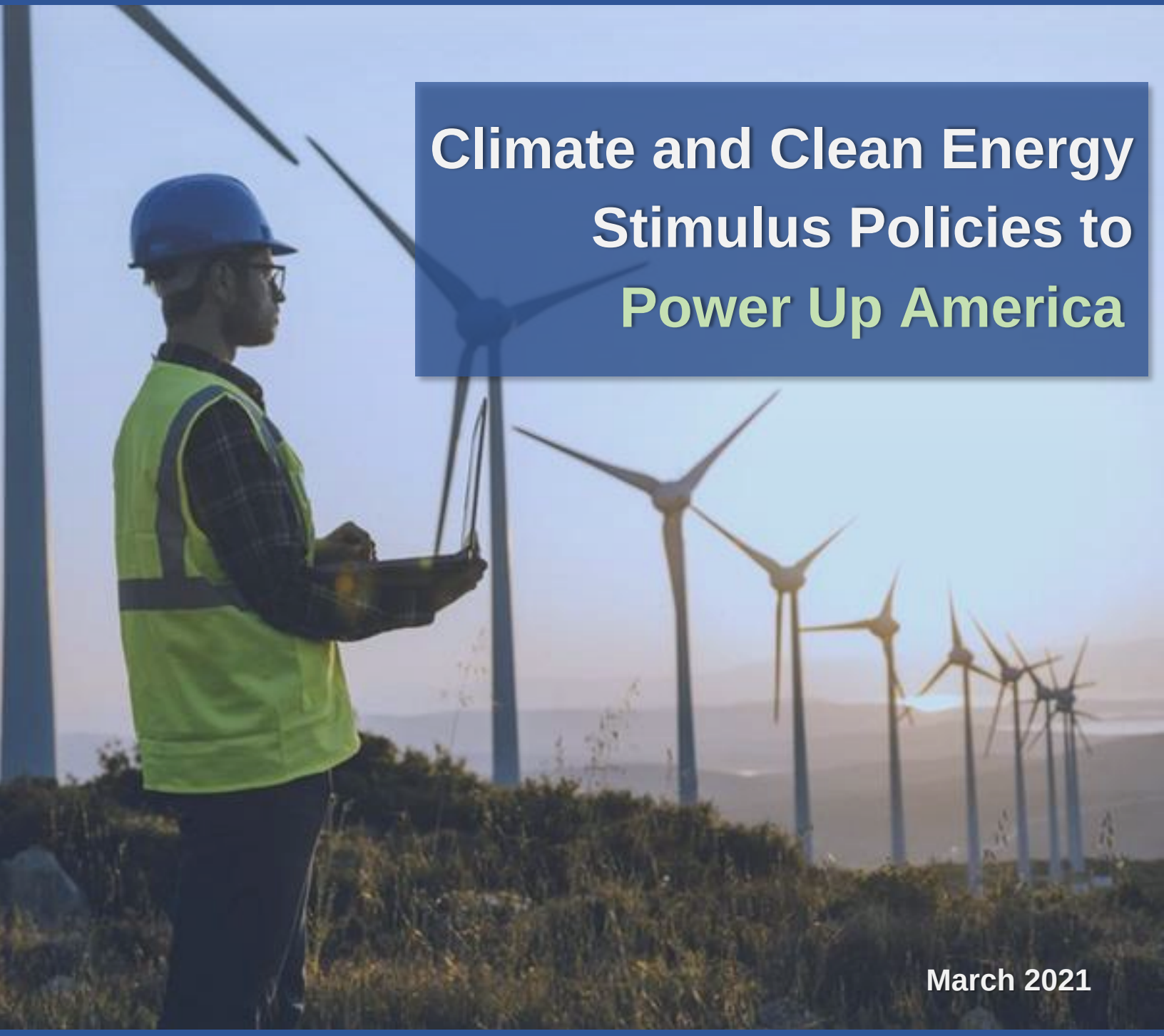

Climate and Clean Energy Stimulus Policies to Power Up America

March 2021

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Report Contact: Danielle Arostegui, darostegui@edf.org

Executive Summary

The United States is being hit by multiple crises. Even as COVID-19 has devastated communities from coast to coast—killing hundreds of thousands of Americans and putting tens of millions more out of work—the impacts of climate change have simultaneously threatened lives and livelihoods on an unprecedented scale, from hurricanes, heat waves, drought and wildfires over the summer and fall, to severe winter storms that left millions without power when they needed it most. Occurring during a period of heightened social vulnerability, these climate disasters act as threat multipliers, intensifying the health risks and economic strain of the pandemic, and are only expected to become more frequent and more intense over the coming years.[1]

These crises shine a spotlight on existing social inequities and systemic injustices. Low-income communities, people of color, women, and the elderly, bear the brunt of the burden of both COVID-19 and climate change. Sadly, many of these communities are facing yet another crisis—the cumulative burden of chronic exposure to higher-than-average levels of health-harming pollutants as a result of living in close proximity to industrial facilities, highways, ports, and other major sources of air and water pollution. These high-pollution regions are predominately home to low-income households, communities of color, and non-English speaking communities. The effect of this exposure on these frontline communities is devastating—exposure to conventional air pollutants is not only destructive to human health,[2] it also exacerbates the risks from COVID-19.[3]

As we embark on the road to recovery from the COVID-19 pandemic and the accompanying economic crisis, we have an opportunity to rebuild a stronger, more resilient economy, while simultaneously making investments that can help address the climate crisis and reduce health-harming pollution in overburdened communities. In March 2021, Congress passed a COVID relief package that included direct payments to Americans, funding for vaccinations, rental assistance, and more. This package provided the immediate support that Americans needed, but now, as Congress turns to longer-term stimulus measures designed to spur economic regrowth, it is critical that policymakers seize the moment to pursue win-win opportunities to create jobs and reduce climate-warming and health-harming pollution, especially in overburdened communities.

President Biden has committed to achieving net-zero greenhouse gas (GHG) emissions across the economy—emitting no more climate pollution than we remove—no later than 2050, a goal that is consistent with what the science tells us is necessary to avoid the worst impacts of climate change. That means cutting emissions 50% below 2005 levels by 2030 on the path to net-zero. Bold steps are needed to reach these goals, including robust investment in clean industries and technologies, new Congressional legislation that establishes enforceable limits on pollution across the economy, and robust regulatory action under existing law. While stimulus spending alone will not be sufficient, well-targeted investments can achieve near-term emissions reductions—saving hundreds of thousands of lives from reduced air and water pollution in the process[4]—and help lower the costs of bending the emissions curve dramatically

[1] Kaplan, "The Undeniable Link between Weather Disasters and Climate Change."
[2] Manisalidis et al., "Environmental and Health Impacts of Air Pollution."
[3] Wu et al., "Air Pollution and COVID-19 Mortality in the United States."
[4] Shindell, Lee, and Faluvegi, "Climate and Health Impacts of US Emissions Reductions Consistent with 2 °C."

downward in the long-term. Selecting cost-effective investments will increase the reach of this spending, enabling us to make the most progress towards meeting our goals.

Investing in clean energy will not only lead to healthier air and a safer climate, it can also dramatically expand employment opportunities for American workers. Investing in these growing industries today will help us rebuild a stronger and more resilient economy here at home, while also positioning the United States to be a leader in the rapidly expanding global clean energy market. By prioritizing investments that create jobs and deliver health benefits in frontline communities—including low-income households, communities of color, and communities transitioning out of reliance on the fossil fuel economy—we can help build a more equitable economy for all Americans. And by pairing these investments with high-road labor standards Congress can ensure that the new jobs are well-paying and can help sustain families and communities.

The most critical areas for climate and clean energy investment in a stimulus package center around:

- **Decarbonizing the power sector** by advancing deployment of existing clean technologies and modernizing the infrastructure needed to support the electric grid of the future; and
- **Electrifying transportation** by incentivizing adoption of electric cars and trucks, supporting domestic manufacturing, and expanding and electrifying mass transit.

Investments in power and transportation—sectors which together account for over 55% of total gross U.S. GHG emissions[5]—can secure significant near-term emissions reductions and are crucial for unlocking future emissions reductions. A clean power sector is essential to enabling further reductions in other sectors through electrification. Similarly, investment is needed today to accelerate deployment and further improve affordability of low-carbon transportation options so that the U.S. can begin to transition its massive fleet of fossil-fueled vehicles in time to meet mid-century climate goals. These two categories of investments are also significant job creators and have the potential to significantly lower emissions of health-harming pollutants from fossil fuel power plants and heavy vehicle traffic.

Targeted investments in the building and industrial sectors could also drive emissions reductions and job-creation, as could cross-cutting policies with high potential to accelerate emissions reductions across the economy. Opportunities include:

- Increasing research, development, and deployment (RD&D) funding for promising emerging clean technologies;
- Cleaning up orphaned oil and gas wells;
- Offering debt forgiveness in exchange for emissions reductions;
- Capitalizing a national green bank;
- Supporting state climate efforts; and
- Incentivizing the buildout of clean manufacturing capacity.

[5] EPA, "Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2018."

EDF assessed the landscape of stimulus policy options and evaluated potential performance according to the following criteria:

- **Near-term and direct emissions reductions:** How much will the policy reduce GHG emissions in the near term?
- **Future emissions reductions:** To what extent will the policy enable future GHG emissions reductions and a broader transition to a clean energy economy?
- **Job creation potential**: How many jobs is the policy likely to create or support?
- **Health and equity benefits**: Will the policy reduce human exposure to health-harming pollutants, particularly in the most overburdened and at-risk communities? Will the policy provide support and opportunity in the communities that need it the most?
- **Cost effectiveness:** How much will it cost to reduce climate emissions on a per-ton basis?

Based on the above criteria, the following policies stand out for inclusion in a stimulus package:

Priority Recommendations in Power and Transportation
Decarbonize Electric Power
• Reform, extend, and expand **clean energy tax credits** to accelerate clean electricity deployment. • Invest in **grid modernization and transmission infrastructure** to better accommodate more renewable generation and increased demand from electrification.
Electrify Transportation
• Provide incentives for **light-duty vehicle electrification** designed to lower barriers to adoption, accelerate stock turnover, and increase equitable access to clean vehicles. • Incentivize **medium-and-heavy-duty vehicle electrification**, focused on key market segments like commercial trucks and school buses, and particularly those operating in disadvantaged and pollution-burdened communities. • Support **domestic manufacturing and supply chains**, including production of batteries. • Support existing **mass transit** services, while investing in further expansion and electrification.
Additional Recommendations Across All Economic Sectors
• Steadily increase annual funding levels for **federal clean energy research, development, and demonstration (RD&D)** over the next five years, to at least double current levels. • Invest in **cleaning up orphaned oil and gas wells** to reduce harmful methane emissions and water pollution. • Institute a federal **debt forgiveness program** to companies and utilities conditioned upon verifiable emissions reductions. • Establish a **national green bank** or **technology deployment administration** to provide targeted public investment in, and accelerate the deployment of, emerging low-carbon technologies in sectors across the economy. • **Support the efforts of cities, states, and tribes** to reduce emissions in their jurisdictions by providing grant-based funding and technical assistance. • Incentivize the buildout of clean manufacturing capacity by reinstating the **Section 48C Advanced Manufacturing Tax Credit.**

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Introduction

The United States is being hit by multiple crises. Even as COVID-19 has devastated communities from coast to coast—killing hundreds of thousands of Americans and putting tens of millions more out of work—the impacts of climate change have simultaneously threatened lives and livelihoods on an unprecedented scale, from hurricanes, heat waves, drought and wildfires over the summer and fall, to severe winter storms that left millions without power when they needed it most. Occurring during a period of heightened social vulnerability, these climate disasters act as threat multipliers, intensifying the health risks and economic strain of the pandemic, and are only expected to become more frequent and more intense over the coming years.[6]

These crises shine a spotlight on existing social inequities and systemic injustices. Low-income communities, people of color, women, and the elderly, bear the brunt of the burden of both COVID-19 and climate change. In comparison to white workers, Black and Latino communities have suffered higher death rates due to COVID-19 and higher job losses, even while being overrepresented among essential workers.[7] Indigenous peoples have also been disproportionately harmed by the pandemic, though a lack of data makes it difficult to quantify the full impact.[8] The pandemic's outsized impacts on these communities has laid bare pre-existing inequities in U.S. society—inequities which are only poised to grow under a changing climate if steps are not taken to reverse these trends.

Sadly, many of these communities are facing yet another crisis—the cumulative burden of chronic exposure to higher-than-average levels of health-harming pollutants as a result of living in close proximity to industrial facilities, highways, ports, and other major sources of air and water pollution. These high-pollution regions are predominately home to low-income households, communities of color, and non-English speaking communities. The effect of this exposure on these frontline communities is devastating—exposure to conventional air pollutants is not only destructive to human health,[9] it also exacerbates the risks from COVID-19.[10]

As we embark on the road to recovery from the COVID-19 pandemic and the accompanying economic crisis, we have an opportunity to rebuild a stronger, more resilient economy, while simultaneously making investments that can help address the climate crisis and reduce health-harming pollution in overburdened communities. In March 2021, Congress passed a COVID relief package that included direct payments to Americans, funding for vaccinations, rental assistance, and more. This package provided the immediate support that Americans needed, but now, as Congress turns to longer-term stimulus measures designed to spur economic regrowth, it is critical that policymakers seize the moment to pursue win-win opportunities to create jobs and reduce climate-warming and health-harming pollution, especially in overburdened communities.

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[6] Kaplan, "The Undeniable Link between Weather Disasters and Climate Change."
[7] Gould and Wilson, "Black Workers Face Two of the Most Lethal Preexisting Conditions for Coronavirus—Racism and Economic Inequality"; Gould, Perez, and Wilson, "Latinx Workers—Particularly Women—Face Devastating Job Losses in the COVID-19 Recession."
[8] Wade, "COVID-19 Data on Native Americans Is 'a National Disgrace.' This Scientist Is Fighting to Be Counted."
[9] Manisalidis et al., "Environmental and Health Impacts of Air Pollution."
[10] Wu et al., "Air Pollution and COVID-19 Mortality in the United States."

Investment in clean energy will not just lead to healthier air and a safer climate, it can also expand employment opportunities for American workers. Prior to the start of the pandemic, American clean energy employment was growing rapidly—clean industries added jobs up to 70% faster than the overall economy between 2015 and 2019.[11] Then COVID struck, causing widespread layoffs in the clean energy industry and threatening to slow progress toward decarbonization.[12] While stimulus investment should be spread across many industries and opportunities, it is clear that the clean energy industry is a critically important target for investment due to its potential to support millions of jobs[13]and simultaneously reduce pollution and improve human health outcomes. Clean energy investments can also be leveraged to create new employment opportunities for workers in other fields that are experiencing high levels of job loss—for instance, by employing out-of-work oil and gas workers to cap abandoned oil and gas wells.

Investing in clean energy industries now will help us rebuild a stronger and more resilient domestic economy, all while positioning the United States to be a leader in the growing global clean energy market. By prioritizing investments that simultaneously create jobs and deliver health benefits in frontline communities—including low-income communities, communities of color, and communities transitioning out of reliance on the fossil fuel economy—we can help build a more equitable economy for all Americans. And by pairing these investments with high-road labor standards Congress can ensure that the new jobs are well-paying and can help sustain families and communities.

Criteria for Prioritizing Stimulus Policies and Programs

Within the realm of clean energy stimulus, there is a wide array of policies and programs that Congress could invest in. EDF assessed the landscape of stimulus policy options and evaluated potential performance according to the following criteria:

- **Near-term and direct emissions reductions:** How much will the policy reduce GHG emissions in the near term?
- **Future emissions reductions:** To what extent will the policy enable future GHG emissions reductions and a broader transition to a clean energy economy?
- **Job creation potential**: How many jobs is the policy likely to create or support?
- **Health and equity benefits**: Will the policy reduce human exposure to health-harming pollutants, particularly in the most overburdened and at-risk communities? Will the policy provide support and opportunity in the communities that need it the most?
- **Cost effectiveness:** How much will it cost to reduce climate emissions on a per-ton basis?

To develop the recommendations outlined below, we assessed dozens of discrete policy proposals, including bills introduced in Congress, the academic and policy literature, and current and former programs authorized under the American Recovery and Reinvestment Act of 2009 (ARRA) to evaluate their potential performance along the above criteria. Where available, we drew upon existing estimates of the performance of these programs to inform our analysis.

[11] E2, "Clean Jobs America 2020: Repowering America's Economy in the Wake of COVID-19."
[12] Jenkins, "The Clean Energy Workforce Was Projected to Grow 5.3% in 2020. Instead, It Has Shrunk 13.8%."
[13] Griffith, Calisch, and Laskey, "Mobilizing for a Zero Carbon America: A Jobs and Employment Study Report."

Where little or no data was available for a specific proposal, we estimated the potential based on reviews of similar programs or other relevant metrics (e.g. industry-specific employment multipliers).

Near-term and future emissions reductions are differentiated primarily by whether the reductions achieved are direct or indirect effects of the policy. Policies which score highly on near-term emissions are those which directly contribute to immediate emissions reductions (e.g., clean energy tax credits, cleaning up orphaned wells). Policies which are expected to unlock significant future emissions reductions include those that drive down technology costs or build supporting infrastructure necessary to scale up clean technologies but may or may not result in direct, near-term reductions (e.g., RD&D, grid modernization). Similarly, policies which are expected to directly reduce health-harming co-pollutants in pollution-burdened communities received higher rankings on health and equity than those whose emissions-reducing benefits are indirect or likely to be located further from population centers and highly burdened communities. Job impacts were assessed on the basis of gross job creation. Throughout this report, estimates of jobs supported include direct, indirect, and induced jobs.

The policies recommended below are expected to perform especially well across one or more of the above criteria, making them compelling choices for a clean energy stimulus package. In general, we have attempted to balance the selection of policies to ensure there is at least one high-performing policy in each criteria area with a view towards presenting a package of policies that together deliver widespread benefits across all criteria.

Climate and Clean Energy Stimulus Recommendations

President Biden has committed to achieving net-zero greenhouse gas (GHG) emissions across the economy—emitting no more climate pollution than we remove—no later than 2050, a goal that is consistent with what the science tells us is necessary to avoid the worst impacts of climate change. That means cutting emissions 50% below 2005 levels by 2030 on the path to net-zero. Slashing climate pollution will also save hundreds of thousands of lives by reducing exposure to health-harming co-pollutants.[14] Bold steps are needed to reach these goals, including robust investment in clean industries and technologies, new Congressional legislation that establishes enforceable limits on pollution across the economy, and robust regulatory action under existing law. While stimulus spending alone will not be sufficient, well-targeted investments can achieve near-term emissions reductions and help lower the costs of bending the emissions curve dramatically downward in the long-term. Selecting cost-effective investments will increase the reach of this spending, enabling us to make the most progress towards meeting our goals.

[14] Shindell, Lee, and Faluvegi, "Climate and Health Impacts of US Emissions Reductions Consistent with 2 °C."

The most critical areas for climate and clean energy investment in a stimulus package center around:

- **Decarbonizing the power sector** by advancing deployment of existing clean technologies and modernizing the infrastructure needed to support the electric grid of the future; and
- **Electrifying transportation** by incentivizing adoption of electric cars and trucks, supporting domestic manufacturing, and expanding and electrifying mass transit.

Investments in power and transportation—sectors which together account for over 55% of total gross U.S. GHG emissions[15]—can secure significant near-term emissions reductions and are crucial for unlocking future emissions reductions. A clean power sector is essential to enabling further reductions in other sectors through electrification. Similarly, investment is needed today to accelerate deployment and further improve affordability of low-carbon transportation options so that the U.S. can begin to transition its massive fleet of fossil-fueled vehicles in time to meet mid-century climate goals.

These two categories of investments are also significant job creators. Decarbonizing the grid will require labor-intensive grid modernization investments and a dramatic increase in the deployment of new clean energy technologies like wind and solar. And preparing for an electrified transportation sector requires a massive buildout of charging infrastructure across the country, as well as a huge increase in electric vehicle and battery manufacturing. Investing in the development and deployment of clean electricity and electric vehicles can play a key role in maintaining and strengthening the competitiveness of the American manufacturing industry, all while lowering emissions of health-harming pollutants from fossil fuel power plants and heavy vehicle traffic, which fall hardest on communities of color and low- income communities located in close proximity to sources.

In the following sections, we outline recommendations for stimulus spending in these two priority sectors, followed by additional recommendations for policies targeting other sectors as well as cross-cutting policies with high potential to contribute to economy-wide decarbonization goals.

[15] EPA, "Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2018."

Priority Recommendations in Power and Transportation

Decarbonizing the Power Sector

Tackling climate change will require a massive and rapid build-out of clean electricity to replace fossil-fueled power sources. A decarbonized power grid will be the cornerstone of a zero-carbon economy, ensuring that our increasingly electrified economy is powered with clean energy. With sustained investment, we can build on the progress that has already been made to reduce emissions from electricity and ensure the sector's emissions trajectory continues to bend downwards. Within the power sector, two high-priority areas for stimulus investment stand out based on their ability to catalyze emissions reductions while creating jobs: clean electricity deployment and grid modernization. Accordingly, Congress should:

- Reform, extend, and expand **clean energy tax credits** to accelerate clean electricity deployment.
- Invest in **grid modernization and transmission infrastructure** to better accommodate more renewable generation and increased demand from electrification.

Clean Energy Tax Credits

Federal clean energy tax credits have played a central role in the expansion of clean electricity generation and the creation of a robust U.S. clean energy workforce.[16] Several of these credits, including the solar investment tax credit (ITC) and the land-based wind production tax credit (PTC) were set to expire before being extended temporarily by the December relief and stimulus bill. This is a good step, but more is needed to carry these benefits forward and ensure that clean energy developers can leverage them more efficiently.

In the short term, Congress should **extend clean energy tax credit** commence construction deadlines through at least 2030 including those for land-based and offshore wind and solar. Congress should also **expand eligibility to standalone energy storage**.

In addition, Congress should **make clean energy tax credits refundable**. In the current economic climate, where tax liability is greatly reduced, credit refundability will ensure developers are able to receive the full benefits of existing tax credits and access the funding needed to continue projects already in the pipeline. Section 1603 cash grants in lieu of tax credits enacted as part of ARRA supported over 100,000 projects which cumulatively produced enough energy to power 8.5 million homes with clean electricity and helped to make these industries into the powerhouses they are today.[17]

In the long term, Congress should consider sunsetting the current array of disparate, technology-specific tax credits and **transitioning to a streamlined, technology-neutral, emissions-based clean energy tax credit**. The credit should include eligibility for both clean generation and supporting technologies, like energy storage. Including a built-in phaseout based on an objective metric, such as when pre-specified levels of emissions reductions are achieved,

[16] EDF, "Clean Energy Is Building a New American Workforce."
[17] U.S. Department of the Treasury, "1603 Program: Payments for Specified Energy Property in Lieu of Tax Credits."

would create significantly more certainty than the series of last-minute extensions, expirations, and retroactive extensions that clean energy industries have faced for the last twenty years. Senator Wyden's Clean Energy for America Act (S.1288) would accomplish these goals, while a similar proposal from the National Wildlife Federation would vary the size of the tax credit on a state-by-state basis according to the carbon intensity of each state's generation mix, which would enable funds to flow to the places where investment in clean energy will have the greatest emissions impact.[18]

Grid Modernization and Transmission Infrastructure

Upgrading our nation's aging power grid will be necessary to better accommodate high penetrations of renewable generation and the widespread electrification of end-uses needed to transition to a net-zero emissions economy. The Brattle Group estimates $7 billion in incremental annual transmission investment will be needed by 2030 in response to increasing energy demands due to electrification. At the same time, we will need to modernize and update local distribution systems to better accommodate the changing ways in which electricity is generated and distributed.[19]

Two critical policy changes should be made to kickstart this investment:

- Reinstating the **Smart Grid Investment Grant program** (SGIG) and directing funding primarily toward distribution and transmission system upgrades, including equipment and software to enable adoption and integration of clean distributed energy resources (DERs), grid-connected buildings, electric vehicles, and electrification of industrial processes.

- Expanding project eligibility under the Department of Transportation's **Transportation Infrastructure Finance Investment Act program** (TIFIA) to include transmission, as proposed by the World Resources Institute,[20] or establishing a similar program within the Department of Energy (DOE).

In addition, DOE should offer additional funds under new and existing programs, such as the **State Energy Program**, to states that quickly approve siting of interstate high-voltage transmission lines located in National Interest Electric Transmission Corridors or other high priority areas as designated by the Department.

While not expected to significantly reduce emissions in the near-term, these programs' potential to enable future emissions reductions makes them worth investing in today. Federal financing assistance through SGIG and TIFIA or a similar program could help to move needed investment forward and support tens to hundreds of thousands of jobs, depending on the scale of investment. For instance, under ARRA, $3 billion in public and matching private smart grid

[18] Harder, "Environmental Group Pushes New Clean-Energy Tax Credit."
[19] Weiss, Hagerty, and Castaner, "The Coming Electrification of the North American Economy: Why We Need a Robust Transmission Grid."
[20] Saha, "Grid Modernization: Creating Jobs, Cutting Electric Bills, and Improving Resiliency."

investments from 2009 to 2012 generated $6.8 billion in economic output and nearly 50,000 full-time jobs.[21]

Electrifying Transportation

As the largest source of greenhouse gas emissions in the United States, transportation is a prime target for innovation and investment. Cars, trucks, and buses are long-lived assets, resulting in slow turnover of the overall vehicle stock. Additionally, it takes time for new technologies to gain market share, as production scale must be built and fleet decision-makers must gain confidence in the ability of these technologies to perform. This makes it especially crucial that we deploy low-carbon alternatives to traditional fossil-fueled vehicles, especially electric vehicles, as rapidly as possible to provide sufficient time for these new technologies to permeate every corner of the market by 2050.

Alternative fuel vehicles also require significant buildout of new fueling infrastructure. Electric vehicles, for instance, require public charging infrastructure as well as charging stations in bus and truck depots, workplaces, and residences. Since many high-traffic refueling depots are currently located near low-income households and communities of color, replacing these services with cleaner alternatives can yield significant health and equity benefits from reduced local air pollution.

High-priority areas for stimulus investment in transportation include light-duty vehicle electrification, medium-and heavy-duty vehicle electrification, domestic manufacturing, and mass transit support and electrification. Congress should:

- Provide incentives for **light-duty vehicle electrification** designed to lower barriers to adoption, accelerate stock turnover, and increase equitable access to clean vehicles.
- Incentivize **medium-and-heavy-duty vehicle electrification**, focused on key market segments like commercial trucks and school buses, and particularly those operating in disadvantaged and pollution-burdened communities.
- Support **domestic manufacturing and supply chains**, including production of batteries.
- Support existing **mass transit** services, while investing in further expansion and electrification.

[21] ICF International, "Economic Impact of Recovery Act Investments in the Smart Grid."

Light-Duty Vehicle (LDV) Electrification

Passenger vehicles or LDVs are responsible for nearly 60% of U.S. GHG emissions from transportation.[22] Switching from gas-powered vehicles to electric vehicles (EVs) is the most promising strategy for reducing these emissions. Congress can accelerate this transition and create hundreds of thousands of jobs by enacting policies which lower barriers to adoption, accelerate stock turnover, and increase equitable access to clean vehicles. Specifically, Congress should enact policies to:

- **Lower barriers to adoption:**
  - Lower upfront purchasing costs by extending existing tax incentives for the purchase of EVs to apply to up to 600,000 vehicles per manufacturer (increased from 200,000 under current law).
  - Reduce range anxiety by investing in public charging infrastructure grants and extension of the 30C tax credit for alternative fueling infrastructure. Increasing access to charging stations will help customers feel more confident that they will be able to reach their destination without becoming stranded, which is a major barrier to adoption.
- **Accelerate stock turnover:** Provide point of sale rebates to consumers to trade in their gas-powered cars and buy an electric, plug-in hybrid or fuel cell electric vehicle.
- **Increase equitable access to clean vehicles:** Provide additional incentives to enable low-income households to purchase EVs and ensure equitable access to charging infrastructure. Involve community members and advocates in the decisions about investments made in their communities.

Together, these policies can enable future emissions reductions by further driving down the costs of EVs through economies of scale, increasing consumer comfort and familiarity with EVs, putting in place the infrastructure needed to reduce range anxiety, and stimulating domestic manufacturing. Senator Schumer's Clean Cars for America plan combines many of above policy elements into a single, comprehensive proposal, which, if implemented, is projected to replace approximately 25% of the U.S. gas-vehicle fleet—nearly 63 million cars—within 10 years.[23] Preliminary EDF analysis suggests that it could reduce cumulative emissions by up to 1 billion metric tons.

Care must be taken to ensure implementation of these policies does not exacerbate existing inequities in access to clean transportation. EVs are still significantly more expensive than conventional internal combustion engine vehicles. As a result, even with policy support, many low-income households may not be able to afford an EV. More work is needed to identify and test new solutions for deploying resources in ways that address, rather than exacerbate, existing inequities—such as by creating jobs, reducing pollution, enabling community decision-making, and improving access to mass transit and clean vehicles in low-income communities and communities of color.

[22] US EPA, "Fast Facts on Transportation Greenhouse Gas Emissions."
[23] U.S. Senator Charles Schumer, "Schumer Announces First Major Step to Help NYS Meet 2050 Carbon-Free Target [Press Release]."

Medium- and Heavy-Duty Vehicle (MDHV) Electrification

MHDVs are responsible for a quarter of U.S. transportation emissions and are a significant source of diesel pollution that negatively impacts the health and welfare of many American families. Globally, climate emissions from large vehicles are rising, at a time when we must be driving net emissions down to zero. To reverse this trend, the global fleet must complete a near-total transition to zero-emission trucks and buses. Domestic manufacturers are already investing billions of dollars and readying zero-emission models for the range of truck and bus applications.[24]

Because the MHDV market is diverse, a number of different policies will be necessary to electrify different portions of the sector and establish a critical level of vehicle demand upon which manufacturers and component makers can justify key investments that will further accelerate this market. By focusing first on the market segments with the strongest economic and public health case for electrification—including school buses and commercial delivery fleets—we can scale up production of batteries and other components, while also advancing our understanding of how to deploy sufficient charging infrastructure and design effective financing programs.

Congress should invest in the following key market segments:

- Commercial Trucks: Provide at least $2 billion over five years to fund a new **National Zero-Emission Voucher program** for commercial trucks, modeled on the many successful state voucher programs already in operation, to incentivize establishment of programs in all 50 states through federal matching grants. These vouchers would be intended to close the first-purchase price gap between zero-emission MHDVs and their diesel-fueled counterparts.

- School Buses: Provide at least $7 billion over ten years to fund a new **Clean School Bus Program** at DOE, as proposed by Vice President Harris and Representative Hayes (S. 1750, H.R.3973) which would award funding on a competitive basis to replace diesel school buses with zero-emissions vehicles, prioritizing districts serving low-income students and rural school districts. Diesel school buses are a major contributor to local air pollution, impacting not only the children riding the buses but their communities. This policy would target difficult to displace existing sources of GHG emissions, due to the high costs to often cash-strapped school districts.

- Transit Buses**:** Provide at least $3 billion over five years to provide grants for the purchase of zero- and low-emission transit buses and infrastructure through DOT's **Low-No Emission Vehicle Program**. This could be paired with a requirement for all new transit buses to be zero-emissions by 2029.

[24] Sharpe et al., "Race to Zero: How Manufacturers Are Positioned for Zero Emission Commercial Trucks and Buses in North America."

- Drayage Trucks: Drayage trucks are heavy-duty, diesel-fueled trucks used to transport containers to and from ports and railyards. Electrifying these vehicles will have significant health and equity benefits for nearby communities, which are exposed to heavy concentrations of diesel pollution surrounding these facilities. Congress should create a program that provides at least $1.5 billion in **grants for small business owners** and an additional $1.5 billion in **low-interest loans** to transition the fleet completely by 2030.

In addition, Congress should support the transition to zero-emissions MHDVs by:

- Investing at least $10 billion over ten years to support the build-out of **charging infrastructure**. A program that provided a 50% cost-share with participating states could leverage more than $20 billion.

- Expanding and modernizing the **Diesel Emissions Reduction Act (DERA)** administered by EPA to reward the replacement of old diesel engines with newer low-polluting engines, with funding accelerators for zero-emission replacement vehicles.

- Eliminating the **excise tax** for zero-emission heavy-duty trucks at least through 2025.

Taken together, these investments represent a significant down-payment on the ultimate transformation of the MHDV fleet to zero-emissions.

Vehicle Manufacturing

In order to achieve the level of ambition needed to transform the transportation sector, manufacturing facilities for vehicles and batteries must be expanded. The transition to zero-emission vehicles offers a unique opportunity to rebuild the American auto industry and support good-paying jobs. There should be an emphasis on domestic manufacturing of vehicles and component parts and the expansion of manufacturing and tax credit programs to cover larger zero-emission vehicles, component parts, and infrastructure– paired with research and development to ensure that battery quality continues to improve, costs continue to decline, and batteries are sourced and made with the highest environmental and human rights standards. Congress should:

- **Support domestic manufacturing and supply chains:** Provide incentives to support the production of American-made batteries and electric vehicles, bolster U.S. manufacturing supply chains, and incentivize building or re-tooling manufacturing facilities to support EVs production. Pair these incentives with requirements for strong labor standards to ensure jobs created are high-quality and pay well.

- Launch a heavy-duty version of the **Advanced Technology Vehicles Manufacturing Direct Loan Program** (ATVM) funded at roughly $3 billion to provide direct loans for vehicle manufacturers to produce fuel efficient MHDVs. The existing ATVM program, which supports light-duty vehicle production, has supported the production of over 4 million advanced technology vehicles, created 35,000 direct jobs, and invested $8 billion

into American auto manufacturing.[25] A similar program for MHDVs would enable manufacturers to expedite bringing zero-emission trucks to market.

- As discussed in the Additional Recommendations section below, reinstate the **48C Advanced Energy Project Tax Credit**, which provides a 30 percent investment tax credit for any qualifying advanced energy project that re-equips, expands, or establishes manufacturing facilities for the production of clean energy technologies. The manufacturing tax credit should be expanded to include MHDVs, infrastructure, and batteries.

Mass Transit

COVID has decimated transit system budgets across the nation. Preventing loss of *existing* transit systems or reductions in service must be our first priority, to prevent readily avoidable emissions increases. *Expanding* and *electrifying* mass transit will further reduce emissions and health-damaging co-pollutants while enabling greater mobility and affordability. These investments would particularly benefit low-income households, who are both significant users of mass transit and most likely to suffer from related air and noise pollution. Further, transit funding is highly stimulative, with a $150 billion investment over 10 years potentially supporting up to 3 million jobs when considering the high employment multipliers from investing in mass transit.[26] Another 2.8 million essential workers rely on public transit to get to their jobs, making the solvency of mass transit critical to both the public health response and the economic recovery.[27]

The March 2021 COVID relief bill included $30.5 billion in emergency funding for transit agencies, which will go a long way toward keeping existing systems up and running. Congress should build on this success by providing an additional $150 billion in long-term funding for the Federal Transit Administrations' transit grant programs and prioritizing investments in low-income and pollution-burdened communities. All new funds, especially general fund transfers, to the Highway Trust Fund should be split 50-50 between the highway account and the public transit account. These funds would support the continued operation of existing transit as well as fund expansions and electrification of existing services.

[25] DOE, "Advanced Vehicles Manufacturing Projects."
[26] Pollin, Heintz, and Garrett-Peltier, "The Economic Benefits of Investing in Clean Energy."
[27] TransitCenter, "Transit Is Essential."

Additional Recommendations Across All Economic Sectors

Although the electric power and transportations sectors are the highest priorities for investment as part of a stimulus package, significant investment is also needed in other sectors, including buildings and industry. In addition, some policies with the greatest potential for performing effectively across the criteria we examined are those not limited to a single sector, but rather cross-cutting across two or more sectors. With that in mind, Congress should:

- Steadily increase annual funding levels for **federal clean energy research, development, and demonstration (RD&D)** over the next five years, to at least double current levels.
- Invest in **cleaning up orphaned oil and gas wells** to reduce methane emissions and water pollution.
- Institute a federal **debt forgiveness program** to companies and utilities conditioned upon verifiable emissions reductions.
- Establish a **national green bank** or **technology deployment administration** to provide targeted public investment in, and accelerate the deployment of, emerging low-carbon technologies in sectors across the economy.
- **Support the efforts of cities, states, and tribes** to reduce emissions in their jurisdictions by providing grant-based funding and technical assistance.
- Incentivize the buildout of clean manufacturing capacity by reinstating the **Section 48C Advanced Manufacturing Tax Credit.**

Clean Energy Research, Development, and Demonstration (RD&D)

A major acceleration in clean energy innovation is needed to reach net-zero emissions targets.[28] Many of the technologies needed for full decarbonization require substantial investment to bring down costs, improve performance metrics, and accelerate commercialization and deployment. Given the long lead time needed to develop, improve, and bring new technologies to market, a robust increase in federal RD&D funding is needed to ensure these technologies are available in time to meet our climate goals.

Investment in clean energy innovation has additional benefits for U.S. competitiveness in the global clean energy market and is one of a short list of policy options with bipartisan support in both chambers of Congress. While the nature of RD&D is such that the short-term job creation is likely minimal, investing in RD&D today will help create a longer-term clean energy economy after the immediate stimulus policies have wound down.

A stimulus package should steadily increase funding for clean energy RD&D over the next five years to *at least double current levels*, reaching at least $25 billion[29] per year by 2025, so that we have the tools we need to achieve our deep decarbonization goals, and to support the ongoing growth of the clean economy. Within the RD&D budget for DOE, Congress should increase funding to at least $1 billion annually for **ARPA-E** to help companies commercialize

[28] IEA, "Clean Energy Innovation."

[29] This includes funding for the Department of Energy's applied energy programs, ARPA-E, and the Office of Science. A previous version of this report did not include funding for the Office of Science.

breakthrough energy technologies. Funding for the **Carbon Storage Assurance Facility Enterprise (CarbonSAFE) Initiative** should also be increased from $30 million to at least $150 million per year to develop geologic sites for the injection and safe permanent storage of carbon dioxide.

Orphan Well Plugging and Remediation

A century and a half of oil and gas development has left four million holes in the ground in the U.S., ranging between dozens and thousands of feet deep, many of which penetrate aquifers. However, insufficient government oversight and lack of private and public funding for the plugging and remediation of such wells to prevent methane emissions and groundwater contamination have led to as many as two million inactive but unplugged wells and unremediated well sites across the country, which are now public liabilities for states, tribes, and federal land management agencies. These "orphan" wells are located in and around populations centers across thirty oil and gas states, including many in communities already suffering from disproportionate pollution impacts.

A stimulus effort in the $5 billion range aimed at plugging and remediating these wells, starting with 100,000 documented and high risk sites, has broad political appeal, including support from the Biden-Harris Administration, and would create or retain tens of thousands of blue-collar, rural, and regional jobs for oilfield service workers across the country.[30] Funds could be disbursed over several years to states, tribes and federal land management agencies to contract with plugging servicers. Programs to plug orphaned wells can be complemented by incentives for states to modify forward-looking policies, including financial assurance, idle well management, and bonding to reduce the incidence of orphaned wells going forward.

Debt Forgiveness for a Sustainable Recovery

The Rocky Mountain Institute (RMI) has proposed an initiative that would link verifiable emissions reductions to federal debt forgiveness across the economy.[31] All recipients of federal loans from recovery and relief packages would be eligible. Since many of the companies most impacted by COVID are also large emitters, such as electric utilities and industry, this approach could stimulate private sector investment in green infrastructure and early retirement of high-polluting electricity generating facilities. Recipients of this funding would have to provide a plan for continuing the same level and quality of service, as well as a fair workforce transition plan. Only direct reductions, rather than offsets or renewable energy credits, would qualify.

RMI estimates that if debt were forgiven at $10 per ton of CO_2 equivalent (CO_2e) for 10 years, rapid decarbonization of the electricity sector could result, potentially saving two gigatonnes of carbon dioxide equivalent per year by 2030, while lowering electricity costs. This approach

[30] Raimi, Nerurkar, and Bordoff, "Green Stimulus for Oil and Gas Workers: Considering a Major Federal Effort to Plug Oprhaned and Abandoned Wells."
[31] Rocky Mountain Institute, "US Stimulus Strategy: Recommendations for a Zero-Carbon Economic Recovery."

would be technology neutral and economy-wide but could also be targeted at overburdened communities and difficult to decarbonize sectors of the economy.

In addition to offering contingent debt relief for new loans, Congress could provide debt forgiveness for existing federal loan programs, such as those administered by USDA, in exchange for emissions benefits. USDA's Rural Utilities Service has provided nearly $200 billion in guarantees and loans in rural areas. Congress could offer to forgive outstanding loans to rural electric cooperatives in exchange for early retirement and replacement of coal-fired power plants by clean energy.

National Green Bank

A federal institution to fund clean energy and low-carbon infrastructure deployment, such as a national green bank or technology deployment administration, could leverage state, local, and private investment in a diverse range of qualified projects, including deployment of renewables, electric vehicles and associated charging, building electrification and efficiency, industrial decarbonization, agricultural emissions reductions, and climate adaptation and resilience. In addition, a bank could provide technical assistance and capital to states to establish state green banks. One such approach has been proposed in the National Climate Bank Act (H.R. 5416 and S. 2057).

This proposal has the potential to accelerate deployment of promising technologies throughout the economy, while generating a potentially massive employment opportunity. One analysis found that a $35 billion public investment could leverage up to $500 billion in new public and private investment and support up to between 3.4 and 8.7 million new job-years over five years, employing individuals in every state in a wide range of professions.[32] Investments should be prioritized on the basis of emissions reduction potential and health and equity benefits. Prioritizing equity—for instance, by allocating a set percentage of funding toward investments that benefit underserved and pollution-burdened communities—could help focus investments where they are likely to have the greatest economic and health benefits.

Support for Local Governments

Cities, states, territories, tribes, and local communities have been on the cutting edge of climate action in recent years. Subnational governments have taken the lead in developing regionally appropriate policies and programs that reduce emissions, accelerate the deployment of clean energy, and employ local workers.[33] However, due to the current economic downturn, state and local governments are experiencing budget shortfalls that threaten their ability to develop and maintain these programs.[34]

[32] Vivid Economics, "Bounce Back Greener: The Economic Impact Potential of a Clean Energy Jobs Fund."
[33] Rosner, "How State and Local Governments Are Leading the Way on Climate Policy."
[34] Center on Budget and Policy Priorities, "States Grappling With Hit to Tax Collections."

Congress should enact policies that support local government efforts, while creating thousands of local jobs, including:

- Increasing funding for weatherization across DOE's **Weatherization Assistance Program** (WAP) and **Low Income Home Energy Assistance Program** (LIHEAP) to at least $10 billion. WAP and LIHEAP provide funding to states and tribes to deliver home energy efficiency retrofits, weatherization, and financial assistance to low-income households, resulting in an average energy savings of $283 per household per year for WAP recipients.[35] Expanding these programs to include funding for rooftop solar, energy storage, and building electrification in addition to weatherization and efficiency would further expand their climate and health benefits.

- Reinstating DOE's **Energy Efficiency and Conservation Block Grants** (EECBG) program at no less than $4 billion, in line with funding provided under ARRA. Under ARRA, EECBG enabled 25 million metric tons of emissions reductions by providing block grants to cities, counties, states, U.S. territories, and tribes to develop and implement energy efficiency and conservation projects.[36] Reauthorizing and expanding EECBG to promote building and transportation electrification—and municipal and commercial fleet electrification in particular—will expand the benefits of this program.

- Increasing funding to DOE's **State Energy Program** (SEP) to at least $4 billion over five years, in line with funding provided under ARRA. SEP provides states with funding and technical assistance to implement programs that reduce emissions, increase efficiency, and reduce energy costs. Every $50 million invested in SEP leverages $585 million for energy-related economic development.[37] This funding supports a wide range of state initiatives including energy audits, building retrofits, alternative vehicle purchasing, and emergency planning.

These programs would help to expand the capacity of state and local governments to implement more robust climate policies and expand access to local clean energy job opportunities.

Support for Clean Manufacturing

Manufacturing employs 13 million Americans, but COVID-19 is disrupting supply chains and forcing U.S. manufacturers to close facilities. A recent survey conducted by the National Association of Manufacturers shows that more than 78% of manufacturers anticipate COVID-19 will hurt their business financially, and 53% expect it to disrupt operations.[38] At the same time, the manufacturing sector accounts for 30% of U.S. electricity-adjusted greenhouse gas emissions, and high-emissions-intensity industrial materials like cement and steel will be in high demand as we work to rebuild the economy. Congress has a critical opportunity to invest now to support and expand U.S. capacity to produce lower-emissions goods and materials so we can build back in a way that creates new jobs in low-carbon industries, gives U.S. manufacturers a

[35] DOE, "Weatherization Assistance Program Fact Sheet."
[36] DOE, "Energy Efficiency and Conservation Block Grant Program: National Evaluation Summary of Results."
[37] NASEO, "U.S. State Energy Program In Brief."
[38] NAM, "Manufacturers' Survey Reveals Current Industry Impact of COVID-19."

competitive edge in the growing global market for clean products, and ensures that COVID-19 recovery does not exacerbate climate change.

Congress should reinstate the **48C Advanced Energy Project Tax Credit** for building and retrofitting facilities that manufacture clean energy technologies. Under the Recovery Act, the 48C tax credits were capped at $2.3 billion, but the Obama Administration requested an additional $5 billion after it became clear the program was oversubscribed by three to one. In 2010 House testimony, a DOE senior advisor called the tax credit program one of the most successful energy job creation and innovation programs, noting that it was particularly effective in getting money out the door quickly.[39] To ensure adequate funding is provided to meet anticipated demand, a reinstated 48C program should receive at least $8 billion in funding authority. The credit should be paired with a requirement ensuring a portion of funds go to low-income areas and those traditionally dependent on extractive industries like coal and oil.

Conclusion

As we embark on the road to recovery from the COVID-19 pandemic and the accompanying economic crisis, we have a chance to rebuild a stronger and more equitable economy, while taking steps toward addressing the climate crisis. Significant investment in American clean energy can create millions of jobs, while simultaneously reducing health-harming and climate-warming pollution in the most at-risk and overburdened communities. Prioritizing investments that address economic and environmental health inequities has the potential to deliver benefits that create a win-win for the economy and the environment, while building healthier and stronger communities across the country.

[39] Rogers, "Statement of Matt Rogers."

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