Hearing on "Building a 100 Percent Clean Economy: Opportunities for an Equitable, Low-Carbon Recovery"
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My name is Devashree Saha and I am a Senior Associate at World Resources Institute (WRI). I appreciate the opportunity to provide written testimony on "Building a 100 Percent Clean Economy: Opportunities for an Equitable, Low-Carbon Recovery." WRI is a nonprofit, non-partisan environmental think tank that goes beyond research to provide practical solutions to the world's most urgent environment and development challenges. We work in partnership with scientists, businesses, governments, and non-governmental organizations across the globe to provide information, tools and analysis to address problems like climate change, the degradation of ecosystems and their capacity to provide for human well-being. With my colleague, Joel Jaeger, I have been researching the economics of a low-carbon transition in the United States.

The United States is facing unprecedented challenges: a health crisis and an economic crisis due to COVID-19. More than 190,000 people have died and millions of Americans are unemployed, with the U.S. economy down by 11.5 million jobs from where it was in February when the pandemic hit. Racial and economic inequalities remain undeniable forces in American life and the pandemic has further exacerbated those inequalities.

At the same time, we are also facing a looming climate crisis. The evidence that climate change is underway and impacting our everyday lives is growing stronger each day, along with the evidence that human activities are largely contributing to it.

To avoid the worst effects of climate change, the United States and the world must dramatically reduce greenhouse gas emissions in the next 30 years. There is widespread consensus that in order to limit the increase in the global average temperature to 1.5^{O}C above pre-industrial levels, all regions of the world should reach net-zero emissions by 2050.

As we prioritize economic recovery and job creation, we can and must do so in a way that simultaneously makes progress on climate goals. While rebooting the U.S. economy from the coronavirus fallout, we are presented with an opportunity to rebuild the economy in a way that will be resilient to future shocks, including from climate change.

In our latest report, **"America's New Climate Economy: A Comprehensive Guide to the Economic Benefits of Climate Policy in the United States,"**[i] my coauthor Joel Jaeger and I found:

- Strong climate action and investments in low-carbon infrastructure can be an effective way to stimulate jobs and economic activity in the wake of COVID-19, as well as set the economy up for long-term success.
- On the other hand, delaying action on climate will further expose the United States to costly damage from climate impacts, air pollution, and other public health crises.
- While the investments needed for the low-carbon transition are significant, they will not break the budget and the returns—in economic opportunities, improved public health and avoided climate catastrophes—will far exceed the costs.

In what follows, we highlight the evidence from the latest economic and policy literature on how the United States stands to benefit economically from taking strong climate action. Deep decarbonization of the U.S. economy must be viewed as an investment in our collective future, which presents not just long-term benefits but also immediate, near-term opportunities. If the investment is made wisely, it will generate a wide range of opportunities for growth, development, and inclusion along the way.

Charting Progress Toward America's New Climate Economy: Where Are We Today?

There has been significant momentum in the past decade towards a low-carbon economy, but the COVID-19 outbreak will cause disruptions. In a post-COVID-19 world, U.S. policymakers must continue building upon the significant progress already made, and in forthcoming economic recovery and stimulus packages should prioritize climate-smart investments.

In recent years the United States has been growing its economy while reducing emissions, debunking the myth that economic growth and climate protection are incompatible. Forty-one states and the District of Columbia reduced their energy-related CO_2 emissions while increasing real economic growth between 2005 and 2017.[1] U.S. states, cities, and counties committed to climate action in line with the Paris Agreement now represent almost 70% of U.S. GDP and population and more than half of U.S. emissions.[2] The private sector, including the biggest asset managers like BlackRock, is also committing to making sustainability and climate risks central to their investment strategies. The U.S. Commodity Futures Trading Commission's report is the latest to warn that "climate change poses a major risk to the stability of the U.S. financial system and to its ability to sustain the American economy." The report, which included feedback from representatives from banks, investors, environmental groups, and a

[i] Devashree Saha and Joel Jaeger. (2020). "America's New Climate Economy: A Comprehensive Guide to the Economic Benefits of Climate Policy in the United States." World Resources Institute. https://www.wri.org/publication/us-new-climate-economy

major oil company, calls for Congress to impose a price on carbon and decisively work to address the looking economic damage from climate change.

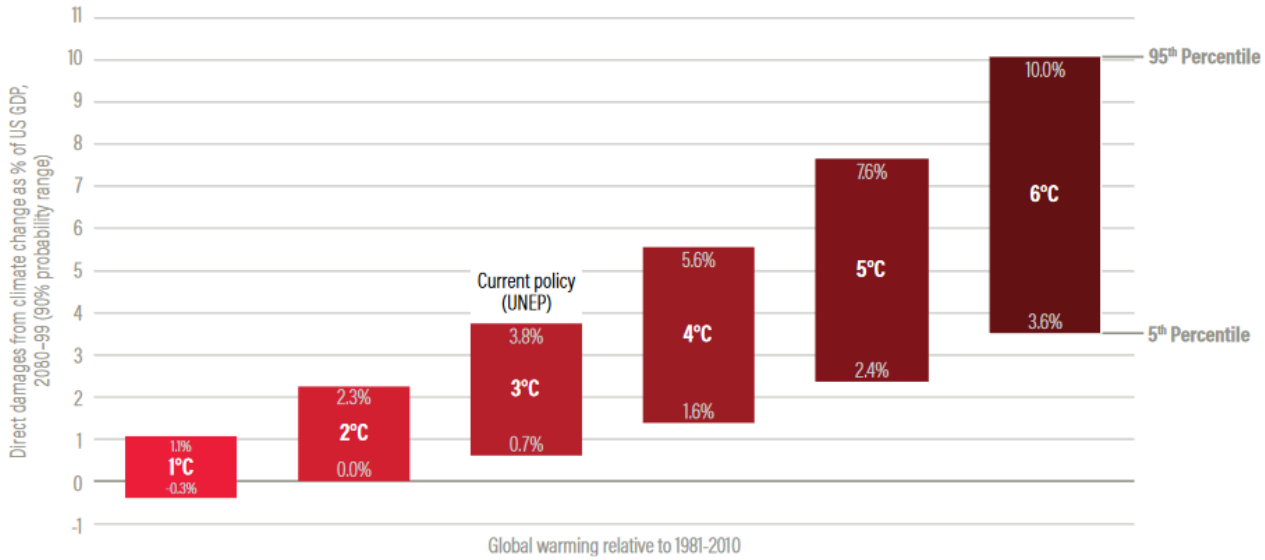
The United States, however, is not on track to meet the targets it agreed to under the Paris agreement or to keep within a carbon budget for 1.5^0 C warming, **and robust federal engagement and policies are required to achieve deeper, long-term emissions reductions**. U.S. emissions will have to decrease more than twice as fast from 2018-2030 as they did during 2005-2018.[3] Low-carbon investment needs to scale up significantly. However, under the Trump administration the U.S. federal government has not implemented any new climate policies is dismantling the limited policies that we have, which makes it difficult for the country to truly reach a low-carbon economy and costs American consumers money. The rollback of vehicle fuel efficiency standards alone is expected to cost American drivers more than $200 billion over the next 15 years.[4] A comprehensive effort to address climate change will require the federal government to promote the transition to America's new climate economy rather than sit on the sidelines or actively try to slow it down.

The economic downturn imposed by the COVID-19 pandemic presents a window of opportunity to scale up urgently needed climate action. At this critical juncture, channeling public investment into low-carbon infrastructure and adopting new climate policies can catalyze the shift toward the low-carbon economy. More importantly, it will NOT come at the expense of U.S. economic growth or a healthy job market. In fact, designed properly it will present both near-term and long-term economic benefits and opportunities. We must not miss this opportunity.

The Economic Case for a New Climate Economy

The costs of climate inaction are significant, with the impacts of climate change estimated to shave several percentage points off U.S. GDP every year. Like the COVID-19 pandemic, climate change is a threat multiplier, and the earlier we respond the easier it will be to limit the impacts. The cost of damage from extreme weather and climate disasters has been steadily increasing every decade as climate change makes them more frequent and intense.[5] The hurricane in Puerto Rico in 2017 caused more than $90 billion in damages, wildfires in California in 2018-2019 cost more than $40 billion, and flooding in the Midwest in 2019 cost more than $10 billion.[6] Without new policies, global mean temperature is expected to rise about 3.5°C above preindustrial levels by 2100, which would lead to annual damages from climate change equal to around 1-3% of U.S. GDP by the end of the century.[7] In the worst case scenario with rising emissions and limited or no adaptation, economic damages could reach 3.7-10% of GDP per year. [8,9] The South and parts of the Midwest will be the hardest hit, as will the poorest communities. Bringing down emissions could greatly reduce these costs for all regions of the country.

Figure 1: U.S. Economic Damages at Different Levels of Global Warming



Note: GDP = gross domestic product; UNEP = United Nations Environment Programme. Average global temperatures were already 0.63°C higher in 1981–2010 compared to preindustrial levels, which are generally used as the reference point for the Paris Agreement's goals (Climate Change Service. 2019. "Last Four Years Have Been the Warmest on Record—and CO_2 Continues to Rise." January 7. https://climate.copernicus.eu/last-four-years-have-been-warmest-record-and-co2-continues-rise).

Source: Hsiang, S., R. Kopp, A. Jina, J. Rising, M. Delgado, S. Mohan, D.J. Rasmussen, et al. 2017. "Estimating Economic Damage from Climate Change in the United States." Science 356 (6345): 1362–69.

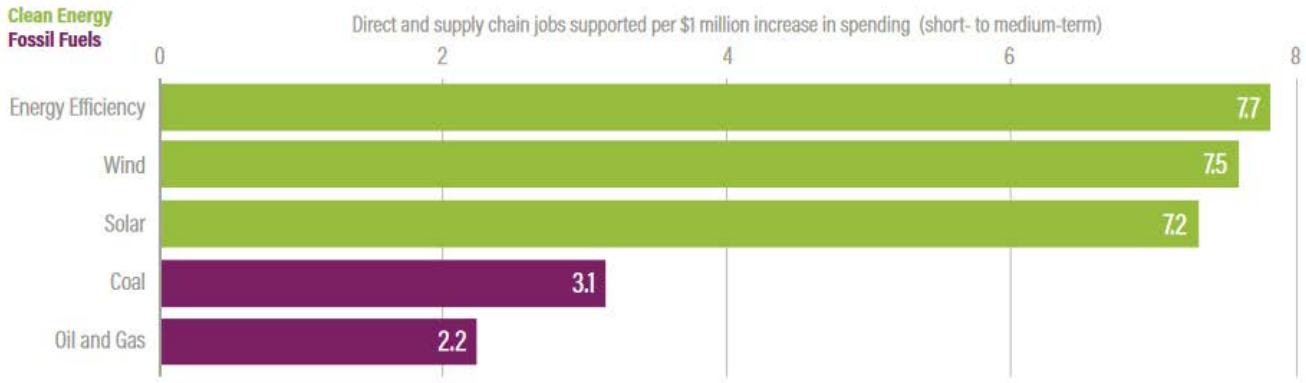
The clean energy industry has become a major U.S. employer, and while many of these jobs are threatened by the COVID-19 crisis, the sector is still set up for promising growth. In 2019 there were 3.6 million Americans employed in various clean energy jobs, with about 2.4 million U.S. jobs in energy efficiency, 248,000 in solar energy, 114,000 in wind energy, 108,000 in biofuels, 266,000 in electric and alternative fuel vehicles, and 66,000 in battery storage.[10] These jobs are well distributed all over the country and had been growing at a faster pace than overall employment. Clean energy jobs offer higher wages than the national average, and many are available to workers without college degrees, though there are some concerns about the duration of the jobs and access to benefits.[11]

Although the impacts of COVID-19 are still uncertain, over half a million clean energy workers had lost their jobs by the end of July.[12] There are signs though that the renewable energy industry is weathering the crisis far better than fossil fuels, but there is still a need to extend and make all renewable energy tax credits refundable so that the industry can sustain the momentum it has built for the past decade .[13]

With high unemployment, investing in clean energy and other low-carbon sectors as part of the economic recovery from COVID-19 can be an effective way to create jobs in the near-term. An increasing body of literature shows that investments in clean energy and other segments of the low-carbon economy create more jobs than similar levels of investment in carbon-intensive sectors of the U.S. economy. $1 million spent on renewable energy or energy efficiency generates about 7-8 full-time equivalent jobs, while $1 million spent on fossil fuels in the U.S. generates about 2-3 jobs).[14]

Investments in transit, pedestrian, and cycling projects have bigger employment impact than investments in roads. For example, as part of the American Recovery and Reinvestment Act, each dollar spent on public transit projects created 70% more job-hours than a dollar spent on highways.[15] Every $1 billion invested in public transportation creates nearly 50,000 jobs and returns $5 billion in economic activity.[16] Investments in restoration and sustainable forest management, EV charging infrastructure, and biofuels have also been identified to have high employment multipliers.[17] Every $1 billion of electricity transmission investment can generate 13,000 full-time-equivalent years of employment and every $1 invested creates $2.40 in economic benefits.[18]

Figure 2: Clean Energy Supports More Jobs Than Fossil Fuels Per $1 Million of Spending



Source: Garrett-Peltier, H. 2017. "Green versus Brown: Comparing the Employment Impacts of Energy Efficiency, Renewable Energy, and Fossil Fuels Using an Input-Output Model." Economic Modelling 61 (February): 439–47.

Strong climate action is also consistent with long-term economic growth and a healthy job market. Decades of empirical evidence debunk the simplistic narrative that environmental protections are bad for the economy. Given that growth or contraction of the U.S. economy is driven by broad macroeconomic factors, the net effects of climate policies on GDP and employment are likely to be relatively small compared to the size of the economy. A range of economic models have found that with strong climate action, U.S. GDP will be between 0.6% lower and 0.7% higher compared to the baseline in 2030, and employment will be between 0.25% lower and 0.6% higher compared to the baseline in 2030.[19] These models likely underestimate the benefits of climate action because they do not include the air quality benefits of climate action, the risks of economic damages without action, and the potential benefits of disruptive change. While these models were conducted before the COVID-19 crisis began and unemployment rose, there has been some early research on the economic impacts of new U.S. green stimulus spending (see Table 1). These new reports have identified substantial job opportunities from green investments and climate action post-COVID.

Table 1: 2020 U.S. Studies on the Jobs Potential of Climate Action and Investment

Source:	Proposal	Jobs	Emissions	Other Quantified Economic Benefits
ACEEE[20]	$83.5 billion present value investments in energy efficiency	660,000 more job-years through 2023 and 1.3 million added job-years over the lifetime of the investments and savings	900 million MMT of reduced carbon dioxide emissions	$120 billion in present value energy bill savings
E2[21]	$99.2 billion federal clean energy stimulus with investments in energy efficiency, renewable energy, and grid modernization	860,300 full time direct, indirect and induced jobs that will last for at least five years (a total of 4.3 million job-years)	Not quantified	$330 billion in GDP over the next 5 years, more than triple the amount of investment
Rewiring America[22]	An aggressive national commitment to electrify all aspects of our economy, with the government's share of overall costs about $300 billion per year for 10 years, mostly through loans	Up to 25 million good-paying American jobs over the next 15 years and 5 million sustained jobs by mid-century.	Rapid and total decarbonization of the economy as a whole	Up to $2,000 annual savings for the average household on energy costs and better health outcomes for American families
PERI/Sierra Club[23]	Public investments of $320 billion per year in clean energy and agriculture programs and $260 billion per year for upgrading infrastructure more broadly.	The clean energy and agriculture investments could create 4.5 million gross jobs every year for 10 years. The investments in infrastructure more broadly could create an additional 4.6 million gross jobs every year for 10 years.	On track to reduce emissions in line with the Paris Agreement	Not quantified

Past experience demonstrates that clean energy investments can be effective economic stimulus. In response to the Great Recession, the United States passed the 2009 American Recovery and Investment Act (ARRA). It included about $94 million for green measures, about 12% of the total package, which was the largest clean energy investment in U.S. history.[24] Looking back at these investments as a whole and sector-by-sector, a variety of research has found that the green investments created jobs (see Table 2).

Table 2: Ex-post analysis of green spending in the 2009 U.S. stimulus shows that it was effective at creating jobs[25]

Sector	Ex post evaluations
Overall green investments	• The American Recovery and Reinvestment Act (ARRA) supported 900,000 job-years (full time jobs over one year) in clean energy fields from 2009 to 2015.[26] • Each $1 million of green ARRA investments created 15 new jobs, which mostly arose from 2013-2017.[27] • The ARRA was successful in stimulating job creation in renewable and energy efficiency sectors.[28]
Renewable energy	• $25 billion in cash grants estimated to support 44,000-66,000 short-term jobs in wind energy and 8,300-9,700 short-term jobs in solar PV from 2009-2013, and 4,500-4,900 permanent jobs for wind and 610-630 permanent jobs for solar for the 20-30 year operational lifetime of the projects.[29] • $2.5 billion in loans estimated to support 8,000 short-term construction jobs and 500 permanent jobs. Helped fund the first five large utility-scale solar PV facilities in the country and one of the largest wind farms in the world.[30]
Energy efficiency	• In 2010, the Weatherization Assistance Program directly and indirectly supported 28,000 jobs and reduced carbon emissions 7.4 million metric tons.[31] • With $3.1 billion, the State Energy Program supported 51,000 job-years from 2009 to 2013, and expected to lead to GHG emissions reductions of 164 million metric tons from 2009-2050, equivalent to taking 35 million cars off the roads for a year. It resulted in $7.7 billion in energy bill saving.[32]
Public transit	• When U.S. states had the choice of where to spend ARRA transportation money, each dollar spent on public transit projects created 70% more job-hours than a dollar spent on highways.[33]
Coastal habitat restoration	• $167 million created about 17 job-years in the immediate term per $1 million spent, higher than other research has found for investments in fossil fuels. There are also longer-term benefits, including increased property values and future job creation from rebounded fisheries and tourism, and resilience to climate impacts.[34]

Reducing fossil fuel-based emissions to address climate change will also help address another public health scourge: air pollution. Fine particulate and ozone pollution are estimated to cause more than 100,000 premature deaths in the United States annually, with damages valued at around 4% to 5% of U.S GDP.[35] Recent research has indicated that people living in areas with poor air quality may be more susceptible to COVID-19, highlighting further interconnections between human and planetary health.[36] If the United States reduced emissions in a way consistent with the Paris Agreement, it would also decrease harmful air pollutants enough to prevent thousands of premature deaths per year, while reducing the impacts of future respiratory diseases on human health. In addition, natural climate solutions that preserve and restore natural and working lands have myriad benefits, including decreasing soil erosion and improving water availability and quality.[37]

Low-carbon technologies are becoming more efficient and affordable for households and businesses. In the past decade, the costs of solar panels, wind turbines, LED bulbs, and lithium-ion batteries have fallen dramatically while performance has improved.[38] As low-carbon technologies have matured, they have become increasingly competitive with fossil fuel technologies, even without subsidies. Building new clean energy portfolios for power generation is now cheaper than keeping most existing coal plants in operation and cheaper than building and operating most proposed gas-fired plants.[39,40] This has changed the calculus of many utilities. Utilities in Arizona, Colorado, and Florida have recently decided to close coal plants and replace them entirely with renewables, without building new gas-fired plants.[41] 68% of all customer accounts in the US are now served by utilities with carbon reduction goals, including 27 utilities with goals to be carbon-free or net-zero emission by 2050.[42] Significant room exists to further bring down the costs of various low-carbon technologies. Electric cars and SUVs are already cheaper to operate than gasoline or diesel vehicles — even with low gas prices due to the coronavirus — and are expected to reach purchase price parity in the mid-2020s.[43,44,45] At the same time, the adoption of many low-carbon technologies remains out of reach for low-income households, highlighting the need for an equitable transition to a low-carbon future.

The investments needed for low-carbon infrastructure are significant but manageable, and economic recovery in the wake of COVID-19 crisis presents an opportunity to speed up the low-carbon transition. Historic low-interest rates provide an opportunity to accelerate private investments in low-carbon technologies in the near-term. Over the longer-term, the most conservative estimates suggest that the United States will need to increase its spending on energy systems by the equivalent of 2% of its GDP to transition to a low-carbon economy.[46] Other estimates find that there may even be net savings since the savings on fossil fuel expenditures would outweigh the additional costs of low-carbon energy infrastructure.[47] Most estimates of the investment needs are using quite outdated technology cost assumptions, but clean energy costs are falling rapidly, making it even cheaper. Even if the additional spending for a low-carbon economy did reach the equivalent of 2% of GDP, that is well within the historical range; energy spending in the United States is at a low point now at around 6% of GDP but has fluctuated to as high as 13%.[48] For another comparison, in 2020 so far Congress has passed stimulus worth 14% of U.S. GDP.[49]

Renewing Economic Vitality in Key Sectors and Geographies

The United States can increase its competitiveness by innovating, engineering, and manufacturing low-carbon technologies. The domestic and global cleantech market has grown significantly in the last

decade and will continue growing. The U.S. advanced energy industry generated $238 billion in revenues in 2018 (about 15% of the global total), and the sector's 11% growth in 2018 was almost four times the growth of the U.S. economy overall.[50] A $23 trillion market for climate-smart investments is expected to be created by 2030 in 21 emerging markets as those countries work to meet the goals of the Paris Agreement.[51] COVID-19 has adversely impacted the U.S. manufacturing sector by shuttering factories and disrupting supply chains. Investment in low-carbon infrastructure as part of government-led stimulus can counteract some of the impact on manufacturing. Over the long run, it will enable U.S. manufacturing companies to incubate innovative products with massive growth potential at home and in emerging markets.

Opportunities to innovate and secure manufacturing preeminence exist for various technologies across sectors. Energy efficiency products are one such example. The global market for energy efficiency products and services generated $298.5 billion in revenue in 2018 and is increasing rapidly as climate targets and government regulations continue to drive adoption of efficient and intelligent building technologies.[52] The global demand for air conditioning units is going to explode over the next three decades, further providing opportunities for American manufactures of energy efficient air conditioners to tap into the market. Low-carbon hydrogen technology presents yet another business opportunity for American manufacturers. The United States can secure a share of the future global energy market—estimated to reach between $1 trillion to $2.5 trillion by the middle of this century[53]—by leading the development and commercialization of low-carbon hydrogen technology.

However, advancing low-carbon manufacturing in the United States requires the federal government to get serious about clean energy policy. Our competitors in other nations are already retooling their industries and infrastructure for a low-carbon future. China is the top country by far in terms of amount invested in renewables capacity during the last decade: $758 billion committed between 2010 and the first half of 2019, compared to $356 billion by the United States.[54] The European Union is planning to implement a border adjustment mechanism that would impose a carbon tax on products from other countries with less strict climate policies.[55] The United States risks being left on the sidelines if it cannot retool its economy to meet the needs of growing global cleantech market.

While climate change presents a tremendous challenge for rural America, climate solutions can provide several economic benefits to these communities, helping to reduce the rural-urban divide. Rural households across America often pay higher energy costs than urban areas, but energy efficiency retrofits could save the average rural household hundreds of dollars annually. Retrofitting the median rural household to be more efficient per square foot (by adding insulation and sealing air leaks, for instance) would result in a 25% reduction in overall rural energy burdens.[56] This translates into more than $475 in savings annually for rural households.

Renewable energy can diversify the economies of rural communities, adding to the tax base and providing new streams of income for farming and ranching communities that host wind turbines or solar panels. In 2018 wind farms paid $761 million in state and local taxes plus $289 million in lease payments to farmers and landowners who host wind turbines on their land.[57] In Adair County, Iowa, 10 new wind farms built over the last decade have added 30% to its tax base.[58] In Jackson County, Minnesota—one of the most active counties for wind farm development in the state—wind farms generated 16% of the county's operating revenues in 2017. [59] These revenues are being channeled into school districts and

community development projects, in the process having a significant impact on the quality and accessibility of public resources.

Natural carbon capture in farms and forests has the potential to enhance productivity, profitability, and resilience. According to a recent WRI study, restoring trees to the landscape represents the single largest near-term opportunity to deploy carbon removal at scale in the United States.[60] The study estimated that restoring trees to the American landscape can remove up to 540 $MtCO_2$ per year through 2050, without displacing agricultural production. In addition to carbon removal, tree restoration provides other economic benefits. One study has found that every $1 million invested in reforestation and sustainable forest management has the potential to support 40 full-time equivalent jobs.[61] An annual federal investment of $4 to $4.5 billion in tree restoration can thus create over 150,000 new jobs, three times as many jobs as logging currently supports in the country. It would also generate $6-12 billion per year in economic activity. Other benefits such as building soil health, improving water quality, creating recreational opportunities, and in some cases providing farmers with additional revenue streams through agroforestry projects help promote the well-being of rural communities.

Ensuring a Fair and Equitable Transition for All

Progress towards a new climate economy must be equitable and fair, ensuring that people are not left behind and are able to share the benefits of America's new climate economy. The low-carbon transition will be disruptive for some workers and communities, regardless of the overall, shared benefits of a low-carbon economy. If managed well, the transition to a low-carbon economy can help reduce the human, social, and economic costs of disruption from various climate policies. It can also create new jobs and opportunities in America's new climate economy, while producing sustainable and inclusive growth into the future. If poorly managed, U.S. decarbonization strategies will lead to stranded workers, communities, and assets, slowing the transition and contributing to instability.

There are a few things that need to be kept in mind though. Low-carbon jobs cannot directly replace every job lost in carbon-intensive industries due to skills, geography, and timing mismatch. This means that it will be important to provide opportunities for workers in all areas of the economy, not just in low-carbon areas. Second, even though workers in clean energy are expected to earn more than the average U.S. workers, wages and job quality issues remain of concern, especially in comparison with the fossil fuel industry. Many workers in fossil fuels earn more than workers in renewable energy, and the rate of union representation among the former is higher too. These challenges can make the delivery of fair transition complicated but not impossible to attain. The proposed Environmental Justice for All Act, which calls for the creation of a Federal Energy Transition Economic Development Assistance Fund to support fossil fuel workers and communities, among other things, represents a crucial step forward in incorporating fair transition issues into federal policies.

A second priority is to ensure that decarbonization policies do not unduly harm low-income and disadvantaged households and communities and that the benefits of low-carbon technologies are available to all individuals and communities. Doing so will require a range of policies that take economic inequality into consideration, including targeted subsidies for electric vehicles, funding for expansion of public transit in high-capacity routes and for adoption of clean energy technologies in underserved

communities, and agreements that enable communities hosting clean energy projects to receive a share of the project's benefits.

Policy Priorities for Congress

As the United States begins its recovery from the health and economic impacts of COVID-19, it is imperative that we address the next big global challenge. COVID-19 has exposed the danger of failing to plan ahead and the nation can ill afford to forget the lesson. Climate change presents serious risks to the U.S. economy and the ecosystems on which we depend, and it demands an urgent response from the federal government. American energy systems, transportation, industry, and land use will have to change at a fast pace and a massive scale, but a more prosperous and sustainable new climate economy is achievable.

Near-Term Priorities:

In the near term, additional stimulus and recovery packages provide a valuable opportunity to create jobs and stimulate economic activity by directing federal resources towards building low-carbon infrastructure. In the months ahead, the economic recovery process offers the chance to undertake energy efficiency building upgrades, roll out multigigawatt utility-scale solar and onshore and offshore wind projects at low costs, build high-voltage direct current transmission lines than can bring renewable energy from distant locations to major population centers, and modernize and electrify the nation's public transportation system, among other things. These initial investments would lay the foundation for a new climate economy.

Specifically, WRI has identified five priority areas where Congress can take immediate action that can help create jobs and boost economic recovery.

1. **Building Energy Efficiency and Energy Assistance**
    - Increase the funding allocated to the Low-Income Home Energy Assistance Program (LIHEAP) to $20 billion.
    - Increase the funding allocated to the DOE Weatherization Assistance Program to $5 billion annually.
    - Increase grant funding to states by $100 billion across the State Energy Program, the Energy Efficiency and Conservation Block Grant, and Community Development Block Grant to support upgrades of hospitals, schools, and public buildings to make these high-performance buildings, improve energy efficiency, improve indoor air quality, and lower capital, operating, and maintenance costs of these buildings.
    - Increase consumer incentives for appliance replacement, including the Nonbusiness Energy Property Credit and the State Energy Efficient Appliance Rebate Program.

2. **Public Transit and Transportation Infrastructure**
    - Increase funding to $25 billion annually to fill the budget gaps of local transit agencies and support their ongoing operating costs.
    - Reorient transportation funding toward "fix-it-first" principles that focus on maintaining and repairing existing roads, bridges, and transit systems over the expansion of new roads and

highways, and "complete streets" infrastructure projects that offer space for biking, walking, driving, and public transit
- Invest in electric vehicle (EV) charging infrastructure in every state across the country.
- Establish 'Buy Clean' incentives for the concrete used in transportation infrastructure projects.

3. **Manufacturing Electric School and Transit Buses**
   - Scale up the Clean Cities, Clean School Buses and Low and No Emissions Vehicle programs to provide $20 billion in grants to school districts and transit systems—enough to replace 60,000 school and transit buses, or about 10 percent of the national fleet.

4. **Grid Modernization**
   - Make existing renewable energy tax credits refundable.
   - Extend the federal renewable energy tax incentives for five years and make energy storage systems and transmission projects eligible for the Investment Tax Credit.
   - Reauthorize DOE's Smart Grid Investment Grant program and fund it at $20 billion to promote investments in smart grid technologies, tools, and techniques.
   - Expand low-cost loans and grants to rural electric co-ops to expand electricity transmission and broadband access through USDA's Rural Utilities Service (RUS).
   - Authorize the Department of Transportation to provide $5 billion annually over 10 years in Transportation Infrastructure Finance and Innovation Act (TIFIA) loans to transmission projects that emphasize the integration of renewable energy.
   - Leverage the DOE's Loan Guarantee Program to incentivize investment in transmission infrastructure.
   - Make strategic investments in energy storage deployment.

5. **Restoring Trees to the Landscape**
   - Add new dedicated funding for tree restoration to the Environmental Quality Incentives Program (EQIP).
   - Expand incentives for tree restoration projects on historically forested lands through the Conservation Reserve Program (CRP).
   - Issue grants to state and local governments to boost tree restoration using their own policy tools.
   - In total, across these programs Congress could dedicate $4–4.5 billion per year for tree restoration

Medium-Term Priorities:

During the next Congress, the United States will need bold, visionary policies to steer the country on a path that leads to carbon neutrality by 2050. During the last decade, U.S. states, cities, and private actors have emerged as leaders of the U.S. response to climate change. They will have to keep up their momentum and even ratchet up their climate ambition, and **the federal government will need to support and complement their actions** to create durable, uniform policies and regulations for the entire country. These should include a combination of sector specific investments and regulations as well as economy-wide climate policy. Here we outline just a few of the most important policies that will be needed as part of a comprehensive plan to solve climate change.

A carbon price is needed to embed climate change costs into economic decision-making while providing clear incentives for the development and deployment of low-carbon technologies and shifts in operations to reduce carbon emissions. **An economy-wide carbon price should be one of the central elements of a national climate policy** and paired with complementary policies can be designed to help achieve net-zero emissions by mid-century while also building a prosperous economy that offers good jobs, minimizes impacts on families and helps address environmental justice. Historical experiences in U.S. states and other countries that have implemented a carbon price shows us that it has been compatible with strong economic growth. Economic models find the same thing.

However, while carbon pricing is necessary, it is not a sufficient approach to achieve long-term climate goals in an economically efficient manner. Complementary measures will be needed to address market barriers and sector characteristics not addressed by a carbon price that could limit the adoption of mitigation measures. In the transportation sector, Congress should overturn EPA's action to undermine the vehicle standards established in 2012 with the agreement of the automobile industry, and could consider mandating standards consistent with the agreement that California reached with Ford, Honda, VW, and BMW. **For the period from 2026 through 2035 Congress should consider adopting a mandate that EPA set standards that progressively reduces allowable emissions from new cars to zero**. Congress should also invest in low-carbon research and development that could transform the electricity and transportation sectors, including in batteries, green hydrogen, and other technologies of the future. Finally, Congress can consider a range of voluntary, regulatory, tax, and fiscal policy options to address industrial sector emissions. As a first step, **Congress could pass the American Innovation and Manufacturing Act of 2019, which would shift American industry to HFC alternatives**, enhancing its competitiveness in a growing global market and catalyzing economic activity.

Concluding Remarks

The United States stands at a historical crossroads. If it acts now, America can look forward to a future that is pollution free, healthier, inclusive, and prosperous. Millions of Americans would be employed in the new climate economy, receiving competitive wages while producing goods and services with an environmental benefit. American businesses would be exporting innovative low-carbon technologies to the rest of the world. The United States would be generating abundant, cheap electricity from renewable energy and other clean sources. Communities, especially those that have historically suffered from pollution, would breathe clean air. American consumers, including those in rural areas, would save on energy costs with affordable low-carbon technologies. New buildings and cars would be all electric. Farmers would be rewarded for practices that capture carbon.

For people, the planet, and the economy, the transition to a new climate economy might be the best bargain of our time.

Endnotes

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