

APRIL 2020

DATA FOR *PROGRESS*

# A GREEN MARSHALL PLAN:

America's Global  
Climate Compact

AUTHORS:

**Sagatom Saha, Narayan Subramanian, and Arianna Menzelos**



## ACKNOWLEDGMENTS

---

The authors extend their deepest thanks to everyone who reviewed and helped inform the paper for their insightful comments, as well as to the Data for Progress staff for their work editing and producing the final report.

## ABOUT THE AUTHORS

---

### **Sagatom Saha**

is an independent global energy and climate policy analyst based in Washington, D.C.

### **Narayan Subramanian**

is a Fellow with Data for Progress

### **Arianna Menzelos**

is a Junior Fellow with Data for Progress

# A GREEN MARSHALL PLAN: AMERICA'S GLOBAL CLIMATE COMPACT

The climate crisis presents an unprecedented global challenge. For many countries around the world, embarking on a clean energy transition and improving climate resilience remain, at best, a long-term goal amid a sea of immediate concerns such as poverty, terrorism, and the economy. Although clean energy technologies are cheaper than ever before, prices are not declining fast enough to limit warming to safe levels. Financing barriers and competing concerns stymie action. New, innovative technologies and international mobilization will be necessary to meet the challenge of global decarbonization.<sup>1</sup>

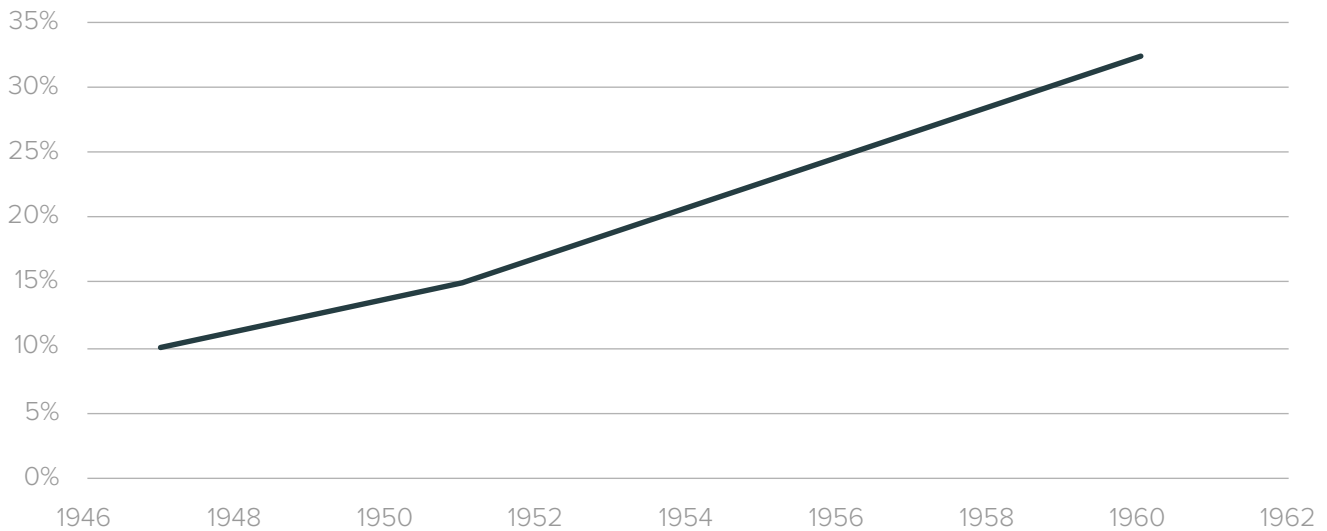
The United States can uniquely provide leadership on the climate crisis by taking inspiration from and building on the Marshall Plan, the last time American development assistance reshaped the global economy. Over the course of the Democratic primary campaign, presidential candidates put forward a range of proposals from Vice President Joe Biden's "Clean Energy Export and Climate Investment Initiative" to Senator Elizabeth Warren's "Green Marshall Plan." While these proposals vary in scale, they share a commitment "to promote American clean energy exports"<sup>2</sup> and provide assistance to "countries hardest hit by the climate crisis."<sup>3</sup> This report collectively addresses the shared goals of these proposals through the moniker adopted by Senator Warren to signal the highest level of ambition. At its core, a Green Marshall Plan seeks to provide aid to other countries for the purchase of American-made clean energy and climate-resilient infrastructure products, improve collaboration on clean energy innovation, and expand the global supply chain. In addition to its domestic benefits, a Green Marshall Plan can promote sustainable, inclusive development across the world and bridge the infrastructure gap that stymies international economic development. This report offers concrete recommendations for how a new administration can operationalize a Green Marshall Plan.

## THE 20TH CENTURY MARSHALL PLAN: A CARBON-INTENSIVE ENERGY PROJECT

When Western Europe needed assistance in the aftermath of World War II, America answered the call. Under the Truman administration's Marshall Plan, named after then-Secretary of State George Marshall, the United States provided unprecedented development assistance to sixteen European allies dispensing \$135 billion in today's dollars.<sup>4</sup> This Plan served three distinct purposes: serving European allies, maintaining diplomatic power in a region threatened by Soviet influence, and bolstering the American economy. The United States honored the shared sacrifice its allies made during the war by helping them rebuild their economies. Additionally, the Marshall Plan was a bold demonstration of American values amid geopolitical competition with Moscow. Finally, the Marshall Plan facilitated European purchases of American-made goods, giving a significant boost to U.S. manufacturing and agriculture.<sup>5</sup>

While also demonstrating international leadership amid a global crisis, the original Marshall Plan was fundamentally an energy project whose impact endures today. Oil, in particular, played a prominent role in Marshall Plan aid: the growing prominence of maritime shipping and aviation made oil an important fuel source in the aftermath of World War II, which had disrupted Western Europe's coal supplies. Europe's oil imports thus came from reserves controlled by American companies in the Middle East. Through the Marshall Plan, Western European countries directly received the currency they needed—dollars—to purchase this oil.<sup>6</sup>

Figure 1: **OIL AS A PERCENT OF WESTERN EUROPEAN ENERGY CONSUMPTION UNDER THE MARSHALL PLAN**



Source: *The Marshall Plan and Oil*<sup>7</sup>

The Marshall Plan not only revitalized Europe’s economies but also reshaped the continent’s energy consumption through increasing international oil dependence. More than ten percent of Marshall Plan aid financed the European purchases of crude and refined products. Oil accordingly jumped from ten percent of Western Europe’s energy consumption in 1947 to one-third in 1960 with the U.S. government footing half the bill. The Marshall Plan also financed tractor and aircraft purchases while making grants to French and Italian vehicle manufacturers, expanding European oil demand in the process.<sup>8</sup>

The Marshall Plan fueled Western Europe’s post-World War II economic recovery by enabling easy oil access, but that recovery proved carbon-intensive. It wouldn’t have been hard to predict that oil would become central to the European economy, but the United States deliberately reoriented global supply chains to speed Europe’s transition to oil while ensuring that the continent imported Middle Eastern rather than Soviet supply. The Marshall Plan significantly contributed to the rebuilding of the European economy after the destruction of World War II; however, it also locked in a fossil-fuel dependent economy, further contributing to climate change today.

## **A GREEN MARSHALL PLAN: RENEWING AMERICAN GLOBAL LEADERSHIP**

Since the original Marshall Plan, the world has grown even more dependent on fossil fuels, and rates of greenhouse gas emissions from the burning of coal, oil, and natural gas are ever-increasing.<sup>9</sup> The Green Marshall Plan is an opportunity for the United States to improve upon the fossil-fuel intensive legacy of its predecessor and once again marshal resources to stimulate global economic development. The impacts of the climate crisis necessitate that development assistance be sustainable and inclusive. The Green Marshall Plan, in the spirit

of its predecessor, should enhance global prosperity, U.S. diplomacy, and the welfare of the American people in three key ways:

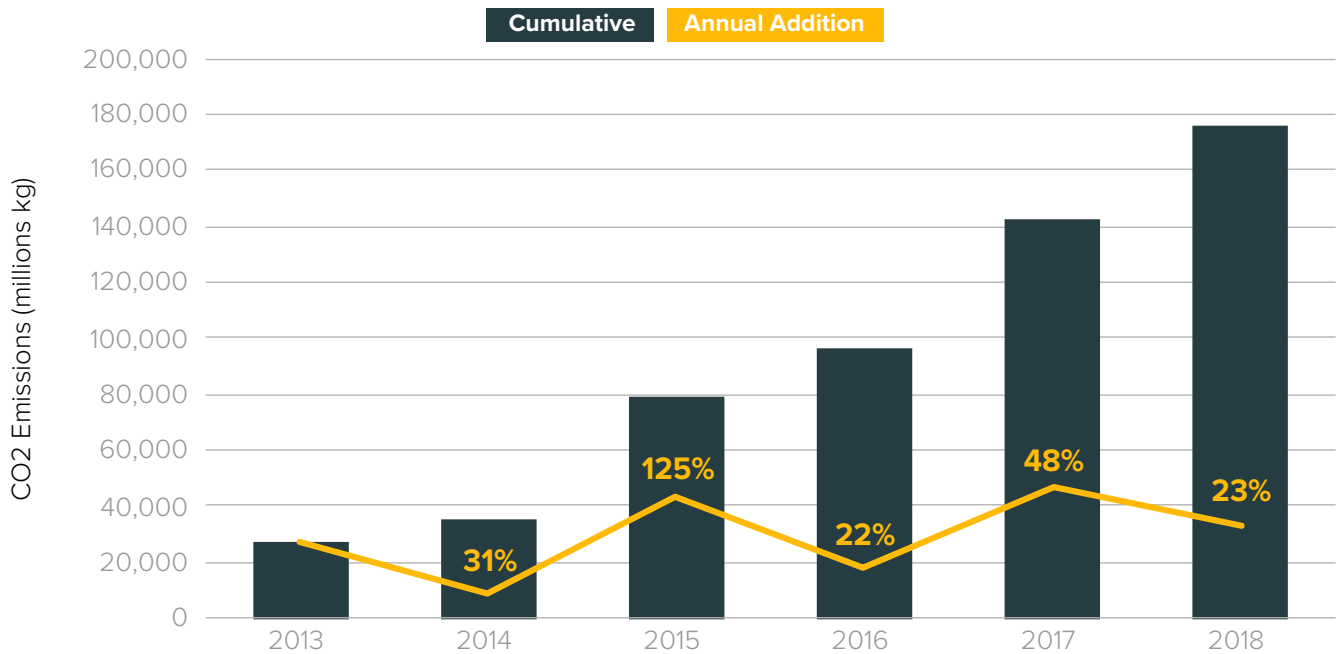
- ▶ **SET GREEN DEVELOPMENT STANDARDS:** Presently, no meaningful global standards for sustainable infrastructure development exist, let alone any that seek to address the climate crisis. The United States should establish global green development standards that encourage other large donors and multilateral banks to follow its lead. These standards should not only seek to minimize the environmental and carbon footprints of new development projects but also improve the climate resilience of newly-built infrastructure.
- ▶ **PROVIDE MITIGATION, RESILIENCE, AND ADAPTATION ASSISTANCE:** The world faces not only the climate crisis but also a widening infrastructure gap that impairs global development. This dual challenge—the global infrastructure gap paired with the climate crisis—means countries will need to 1) replace fossil fuels with zero-carbon alternatives; 2) ensure that new infrastructure from roads to communications systems can withstand more intense, frequent extreme weather; and 3) build entirely new types of infrastructure that can help communities withstand the rising sea levels and other ecological challenges. The Green Marshall Plan should provide targeted assistance for cleantech and resilience infrastructure projects to countries that face economic barriers to climate action while simultaneously promoting a domestic manufacturing sector that can export the infrastructure those countries need.
- ▶ **INVEST IN COLLABORATIVE INNOVATION:** In order to distribute new cleantech on an international scale, America should invest in research and development (R&D) with partners and allies in the supply chain. In tandem with the rapid deployment of existing cleantech, tackling the climate crisis will require innovation across the board from battery storage and grid management software to seawater resistant roads and regenerative carbon farming. In addition to leveraging the strength of its research institutions and national labs, the United States should collaborate with other partner countries in pursuit of the fastest path to decarbonization across the globe.

## SET GREEN DEVELOPMENT STANDARDS

Despite its vast economic and diplomatic resources, the United States cannot singlehandedly bridge the gap in global climate finance; Investments must total trillions annually to safely limit global warming. The United States, therefore, should leverage its influence on multilateral institutions, including the UN and World Bank, to lead a global wave of climate action through a Green Marshall Plan. Decades of efforts to establish multilateral norms and assistance funds peaked with the Paris Agreement but consistently fall short of stated aims and goals. In the meantime, Chinese investment in the Belt and Road Initiative (BRI)—a wide-reaching infrastructure project—risks undermining global environmental and social safeguards.

While Beijing has declared that the BRI would promote the Paris Agreement and UN Sustainable Development Goals, evidence abounds of BRI's global harm. Since its inception, the BRI has financed many carbon-intensive infrastructure projects around the world (see Figure 2).<sup>10</sup> BRI projects also regularly neglect to consult local communities in project implementation and construction, engage in noncompetitive contracts, and shun transparency in their loan agreements.<sup>11</sup> Many laborers complain of rights abuses including lack of fair pay and physically unsafe working conditions.<sup>12</sup> Beijing's alternative global infrastructure trajectory represents a dangerous consequence to the current lack of American leadership in sustainable infrastructure and low-carbon development.

Figure 2: **PROJECTED EMISSIONS FUNDED BY CHINESE DEVELOPMENT FINANCE**



Source: Boston University Global Development Policy Center

## Recommendations

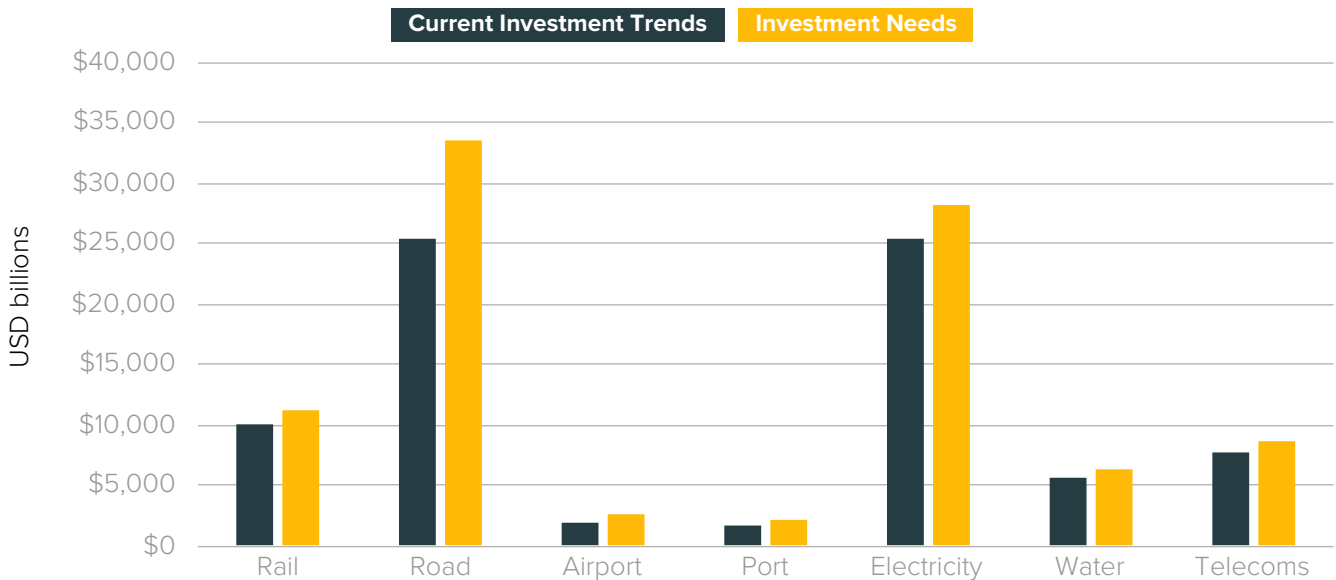
- **Raise climate change to the top of the global development agenda to pool funding for sufficient climate action.** The president should raise the climate crisis to the top priority within every relevant multilateral forum and international institution so that developing countries can meet and exceed their Paris Agreement pledges. Despite the massive threat posed by climate change to global peace and security, the state of global development assistance does not reflect the problem’s gravity. According to the Intergovernmental Panel on Climate Change, global annual investments in clean energy alone must reach \$2.4 trillion annually, significantly more than the \$1.7 trillion currently invested in all energy systems, including fossil fuels.<sup>13</sup> Current international pledges remain woefully insufficient, and few so far have been realized. The UN’s Green Climate Fund, created specifically to finance climate mitigation and adaptation projects, has only mobilized \$10.2 billion of the \$100 billion that developed countries pledged by 2020.<sup>14</sup> Simply put, neither nongovernmental organizations nor the private sector is sufficiently filling in the gaps.<sup>15</sup>
- **Advocate that climate change be mainstreamed in all assistance under the United Nations and World Bank.** A Green Marshall Plan should establish a new path forward for development, in which all growth is green. Development assistance that does not incorporate climate considerations is not truly assistance. Failing to incorporate climate concerns should be viewed as akin to foregoing cost-benefit analyses or environmental impact assessments for major infrastructure projects. Accordingly, the Treasury Department should push multilateral development banks to add climate considerations into every project going forward. The climate crisis calls for a revolution in infrastructure development, especially in terms of transportation, energy, water, and agriculture. Not only should fossil fuel projects be phased out, but new roads will also require heightened flood protection standards, upgrades to drainage systems, and other considerations specific to extreme weather events. Agricultural assistance can also encourage the creation of carbon sinks through sustainable farming practices.

- ▶ **Host a Climate Assistance Summit that would develop roadmaps and funding vehicles for donor countries.** The United States enjoys unparalleled convening power among nations that it has leveraged to improve global nuclear security, combat terrorism, and stabilize international financial markets. In a similar vein, America should convene its partners, allies, and multilateral donor institutions and encourage them to tie development assistance to sustainability and climate outcomes. Specifically, the State Department should host an annual Climate Assistance Summit that would develop roadmaps and funding vehicles for donor countries to best target the disparate streams of climate mitigation and adaptation aid. The Summit could feed into the annual UN climate conference and help break the climate finance logjam. The climate crisis requires an upending of traditional development assistance that benefits from embracing international collaboration.
- ▶ **Promote social and environmental safeguard policies that protect local communities and workers through all phases of project development and implementation.** The *Environmental And Social Policy Procedures* adopted by the newly created U.S. International Development Finance Corporation (DFC) should be mandatory for all projects financed under a Green Marshall Plan.<sup>16</sup> For example, project developers should systematically inform and consult local communities, screen for climate-related risks and vulnerabilities, and set emissions reduction and energy efficiency targets throughout project planning and implementation. All projects must also uphold other safeguard policies such as minimum labor and environmental standards stipulated by the DFC's guidelines. Where local labor and environmental standards are stronger than the DFC's guidelines, projects must comply with the local standards. The counterweight that a Green Marshall Plan provides against the BRI should not just be the mere price tag of investments, but also the promotion of endogenous growth in recipient countries.

## PROVIDE MITIGATION, RESILIENCE, AND ADAPTATION ASSISTANCE

While the United States should take advantage of its considerable international influence, assistance commitments should begin at home. The climate crisis is not the only dilemma that the world faces: Many countries face widening infrastructure gaps that inhibit economic prosperity, safety, trade, and travel. The World Bank estimates this shortfall at \$18 trillion by 2040 (see Figure 3).<sup>17</sup> Further, rapid population increase portends steep increases in worldwide energy demand despite infrastructure gaps stymying future growth.<sup>18</sup> Fortunately, climate investments and infrastructure investments go hand-in-hand. Climate investment opportunities total more than \$23 trillion in emerging markets alone.<sup>19</sup> That is, climate action could unlock trillions in investment opportunities for those countries that can provide the cleantech that best meets climate needs. Filling the infrastructure gap, despite its net benefits, could drive energy demand even higher. Accordingly, the United States should provide grants to low-income countries and concessional loans to middle-income ones based on vulnerability and need. That assistance can simultaneously mitigate emissions and increase global resilience to the impacts of climate change.

Figure 3: **GLOBAL INFRASTRUCTURE INVESTMENT FORECAST IN 2040 BY SECTOR**



Source: The World Bank

Roads and electricity account for more than half of the infrastructure gap needs worldwide, signaling that too many countries still lack reliable power and transportation.<sup>20</sup> Cutting emissions need not come at the expense of filling these needs. The Green Marshall Plan can provide green infrastructure investments, including zero-carbon power generation, climate adaptation infrastructure, and climate-resilient roads and railways, that fill the gap without subtracting from the world’s carbon budget, simultaneously providing societal co-benefits such as the reduction of local air pollution.

## Recommendations

- ▶ **Create a new Bureau for Climate Security within the U.S. Agency for International Development.** Such a Bureau would be tasked with targeting grants toward the most vulnerable countries to climate change impacts. USAID should be imbued with a structure designed to champion the importance of the climate crisis, serving as an example to foreign governments. In tandem, the DFC can prioritize financing climate mitigation and adaptation infrastructure in countries where political risk and lack of financial data impede such investments.
- ▶ **Establish a new Office for Cleantech Promotion within the Commerce Department.** This office should aggressively engage with less-developed countries on the commercial cleantech trade by offering grants and concessional loans for the purchase and deployment of American-made clean, renewable, and emission-free energy technology. This Office should also work with those countries through implementing international satellite locations so that local workforces integrate into the cleantech supply chain, promoting technology and knowledge transfers. As called for by Senator Warren’s Green Marshall Plan, in total, America should commit \$100 billion in grant- and loan-making capacity to assist emerging economies in purchasing American-made cleantech in order to leapfrog carbon-intensive development. While China has already committed \$200 billion through the BRI,<sup>21</sup> much of which finances fossil fuel projects, U.S. assistance



would provide targeted support that expands the American cleantech market while building local cleantech capacity abroad and most importantly, directly helping other countries combat the climate crisis.

- ▶ **Lower Financing Costs for Sustainable Infrastructure Projects.** Few U.S. firms have a risk appetite large enough to engage in building the myriad ports, roads, and railways to close the infrastructure gap, especially when there are safer returns in more familiar markets. Government agencies, including the DFC and U.S. Trade and Development Agency, should aim to fix this problem by insuring financing feasibility studies and pilot programs for sustainable infrastructure. The DFC also has the ability to make equity investments and to support projects with non-U.S. investors. The DFC should also insure and take equity stakes in sustainably designed Japanese-led and European-led projects to make them more attractive compared to cost-cutting, environmentally harmful competition. To this end, the Export-Import Bank can also increase its environmental export financing portfolio to well above its current \$3 billion level.
- ▶ **Prioritize the Climate Risk Disclosure Act.** This Act would direct the U.S. Securities and Exchange Commission, in consultation with climate experts, to issue rules that require public companies to disclose their risk to climate change at its current pace as well as their strategies to manage it. Such legislation could drive banks out of polluting businesses and give their investors greater insight into their exposure to climate risk. Further legislation could also leverage America's unique competitive advantage: deep capital markets that can privately finance projects and provide returns for American workers. For example, Goldman Sachs committed \$750 billion toward combating climate change and banned certain coal and drilling investments.<sup>22</sup> The U.S. government should push other banks and investment firms to do the same and ensure that these investments and promises yield significant market change.

## INVEST IN COLLABORATIVE INNOVATION

Even with the rapid deployment of existing technologies, rapid innovation in the cleantech sector is necessary to drive further emissions reductions.<sup>23</sup> In the absence of American leadership, China is likely to take the lead in this effort. Often, however, Chinese state-directed firms slow the pace of cleantech innovation.<sup>24</sup> Although Chinese firms have improved lithium-ion batteries, solar panels, and wind turbines, the improvements have only been incremental, signaling the need for a more ambitious leader able to produce innovative designs needed for this time-sensitive challenge. Chinese firms have also acquired a reputation for product-dumping in order to bankrupt competitors and create monopolies, therefore superficially decreasing domestic and international competition.<sup>25</sup> This practice could prove especially damaging in the energy sector, which requires radical transformation propelled by competition and collaboration.<sup>26</sup> Simply put, China is setting the path ahead for the global power sector, but it is going in the wrong direction. Through a Green Marshall Plan, America can work with its allies to boost global ambition on innovating new cleantech solutions.

### Recommendations

- ▶ **Revitalize and expand upon bilateral energy R&D partnerships.** Such partnerships encourage foreign governments and companies to work with U.S. counterparts to commercialize new cleantech through public-private partnerships. The Energy Department can rekindle cleantech cooperation like the U.S.-India Partnership to Advance Clean Energy Research, which mobilized up to \$125 million for joint research on smart grid and energy storage technologies.<sup>27</sup> Such an approach helps U.S. partners boost their clean energy prospects while including Americans in the supply chain. Further, the Energy Department and its national

labs should expand these efforts going forward to develop technologies that will ease decarbonization in unique markets. For example, the United States could work with Middle Eastern partners to develop heat resistant solar panels that would thrive in the region or collaborate with Southeast Asian countries to innovate efficient floating photovoltaics that take advantage of the myriad dams along the Mekong River.

- ▶ **Increase funding to the Advanced Research Projects Agency-Energy (ARPA-E) up to 100 times in value.** As recommended by Secretary John Kerry and Congressman Ro Khanna, such an increase scales the agency up to tens of billions in funding. The United States should also double funding to the Office of Energy Efficiency and Renewable Energy and Office of Science at the Energy Department.<sup>28</sup> Both offices support disruptive innovations in renewable energy research. To be sure, U.S. companies will not lead in all clean technologies. China, for example, already has an insurmountable lead in the manufacturing of conventional solar panels and wind turbines. However, technologies abound in which the United States can lead, from advanced battery storage and offshore wind to electric vehicles and efficiency software. The United States should invest in both “demand-pull” and “technology-push” policies that support the commercialization of nascent innovations and fund R&D that bring new technology out of the lab.<sup>29</sup>
- ▶ **Build a global supply chain to export cleantech that has reached maturity at home.** America has a long history of exporting critical technologies to emerging markets, such as semiconductors, partnering with them by providing technology and knowledge transfers, and leveraging their comparative advantage. Such an approach reduces costs and creates networks of economic alliances that reinforce American leadership. American workers and businesses should not fear losing out by ceding some market segments to U.S. allies. Instead, they should benefit from expanding the pie and lowering costs of intermediate goods while also spearheading advanced cleantech manufacturing that Americans can deploy at home and sell abroad.

## WHAT COMES NEXT?

The Green Marshall Plan provides an opportunity to any willing administration: it offers the chance for America to lead a global energy revolution—this time putting environmental imperatives front and center. The original Marshall Plan had the consequence of increasing global oil dependence and entrenching a fossil fuel-based global economy. The Green Marshall Plan, by funding sustainable infrastructure and zero-carbon power generation, can reverse these trends and address the climate crisis at its global scale while promoting long-term inclusive growth. This report outlines a blueprint for a new, greener American leadership by creating rules, partnerships, and financing mechanisms to facilitate decarbonization and sustainable development.

# ENDNOTES

1. Henbest, Seb, et al. "New Energy Outlook 2019." Bloomberg NEF, 2019, <https://about.bnef.com/new-energy-outlook/>.
2. Biden for President. "Climate: Joe's Plan for a Clean Energy Revolution and Environmental Justice." 2020, <https://joebiden.com/climate/>.
3. Warren for President. "Leading in Green Manufacturing." Medium, 2019, <https://elizabethwarren.com/plans/green-manufacturing>.
4. Steil, Benn. *The Marshall Plan: Dawn of the Cold War*. Simon & Schuster, 2018.
5. Garrett, Amy. "Helping Europe Help Itself: The Marshall Plan." American Foreign Service Association. <https://www.afsa.org/helping-europe-help-itself-marshall-plan>.
6. Painter, David S. *Oil and the American Century: The Political Economy of U.S. Foreign Oil Policy 1941-1954*. Baltimore, JHU Press, 1986.
7. Painter, David S. "The Marshall Plan and Oil." *Cold War History* 9.2, 20 May 2009, <https://www.tandfonline.com/doi/abs/10.1080/14682740902871851?journalCode=fcwh20>.
8. Painter, David S. *Oil and the American Century: The Political Economy of U.S. Foreign Oil Policy 1941-1954*. Baltimore, JHU Press, 1986.
9. Harvey, Chelsea. "CO2 Emissions Reached an All-Time High in 2018." *Scientific American*, 6 Dec. 2018, <https://www.scientificamerican.com/article/co2-emissions-reached-an-all-time-high-in-2018/>.
10. Saha, Sagatom. "China's Belt and Road Global Infrastructure Plans Are Dooming the Planet." *The National Interest*, 8 Sept. 2019, <https://nationalinterest.org/blog/buzz/chinas-belt-and-road-global-infrastructure-plans-are-dooming-planet-78326>.
11. "China: 'Belt and Road' Projects Should Respect Rights." Human Rights Watch, 29 Apr. 2019, <https://www.hrw.org/news/2019/04/21/china-belt-and-road-projects-should-respect-rights#>.
12. Halegua, Aaron and Cohen, Jerome. "The forgotten victims of China's Belt and Road Initiative." *The Washington Post*, 23 Apr. 2019, <https://www.washingtonpost.com/opinions/2019/04/23/forgotten-victims-chinas-belt-road-initiative/>.
13. "Global Warming of 1.5 °C." Intergovernmental Panel on Climate Change, 2018, <https://www.ipcc.ch/sr15/>.
14. "Resource mobilization." The Green Climate Fund, <https://www.greenclimate.fund/about/resource-mobilisation/irm>.
15. Saha, Sagatom. "The Paris Climate Agreement Needs a Bigger Piggy Bank." *World Politics Review*, 7 Feb. 2019, <https://www.worldpoliticsreview.com/articles/27379/the-paris-climate-agreement-needs-a-bigger-piggy-bank>.
16. U.S. International Development Finance Corporation. "Environmental and Social Policy and Procedures." Jan 2020, [https://www.dfc.gov/sites/default/files/media/documents/DFC\\_ESPP\\_012020.pdf](https://www.dfc.gov/sites/default/files/media/documents/DFC_ESPP_012020.pdf).
17. Heathcote, Chris. "Forecasting infrastructure investment needs for 50 countries, 7 sectors through 2040." World Bank, 10 Aug. 2017, <https://blogs.worldbank.org/ppps/forecasting-infrastructure-investment-needs-50-countries-7-sectors-through-2040>.
18. "OECD Green Growth Studies: Energy." OECD, 2011, <https://www.oecd.org/greengrowth/greening-energy/49157219.pdf>.
19. Kerr, Tom; Maheshwari, Aditi; and Sottong, John. "Climate Investment Opportunities in Emerging Markets: An IFC Analysis." International Finance Corporation, 7 Nov. 2016, [https://www.ifc.org/wps/wcm/connect/news\\_ext\\_content/ifc\\_external\\_corporate\\_site/news+and+events/news/new+ifc+report+points+to+%2423+trillion+of+climate-smart+investment+opportunities+in+emerging+markets+by+2030](https://www.ifc.org/wps/wcm/connect/news_ext_content/ifc_external_corporate_site/news+and+events/news/new+ifc+report+points+to+%2423+trillion+of+climate-smart+investment+opportunities+in+emerging+markets+by+2030).
20. Heathcote, Chris. "Forecasting infrastructure investment needs for 50 countries, 7 sectors through 2040." World Bank, 10 Aug. 2017, <https://blogs.worldbank.org/ppps/forecasting-infrastructure-investment-needs-50-countries-7-sectors-through-2040>.
21. Chatzky, Andrew and McBride, James. "China's Massive Belt and Road Initiative." Council on Foreign Relations, 28 Jan. 2020, <https://www.cfr.org/backgrounder/chinas-massive-belt-and-road-initiative>.
22. Marshall, Elizabeth Dilts. "Goldman Sachs pledges \$750 billion to environmental causes by 2030." Reuters, 16 Dec. 2019, <https://www.reuters.com/article/goldman-sachs-environment/goldman-sachs-pledges-750-billion-to-environmental-causes-by-2030-idUSL1N28Q0RL>.

23. Sivaram, Varun et al. "The Need for Continued Innovation in Solar, Wind, and Energy Storage." *Joule* Vol. 2, 2018, [https://www.cell.com/joule/pdf/S2542-4351\(18\)30336-2.pdf](https://www.cell.com/joule/pdf/S2542-4351(18)30336-2.pdf).
24. Kerry, John and Khanna, Ro. "Don't Let China Win the Green Race." *The New York Times*, 9 Dec. 2019, <https://www.nytimes.com/2019/12/09/opinion/china-renewable-energy.html>.
25. Sivaram, Varun. "Why Concentration of the Solar Industry in China Will Hurt Technology Innovation." *Greentech Media*, 29 Jul. 2015, <https://www.greentechmedia.com/articles/read/why-concentration-of-the-solar-industry-in-china-will-stunt-innovation>.
26. Sivaram, Varun and Kann, Shayle. "Solar Power Needs a More Ambitious Target." *Nature Energy* Volume 1.16036, 2016, <https://www.nature.com/articles/nenergy201636>.
27. "U.S.-India Partnership to Advance Clean Energy." U.S. Department of Energy, Jun. 2012, [https://www.energy.gov/sites/prod/files/PACEProgressReport\\_Final.pdf](https://www.energy.gov/sites/prod/files/PACEProgressReport_Final.pdf).
28. Kerry, John and Khanna, Ro. "Don't Let China Win the Green Race." *The New York Times*, 9 Dec. 2019, <https://www.nytimes.com/2019/12/09/opinion/china-renewable-energy.html>.
29. Sivaram, Varun and Kaufman, Noah. "The Next Generation of Federal Clean Electricity Tax Credits." *Columbia SIPA Center on Global Energy Policy*, May 2019, [https://energypolicy.columbia.edu/sites/default/files/file-uploads/NextGenTaxCredits\\_CGEP\\_Commentary\\_Final.pdf](https://energypolicy.columbia.edu/sites/default/files/file-uploads/NextGenTaxCredits_CGEP_Commentary_Final.pdf).