Data for the Green New Deal

Summary Report:
International Components

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Introduction

This document is a summary of a larger report, currently under review, that proposes design components of a Green New Deal. It accounts for a few key realities that must be considered for guiding climate policy over the next 8 years and beyond:

1. **UN projections are far too optimistic**[1]—given observed climate feedback loops,[2] we may have less than a 5% chance of remaining under 2°C warming even with extant policy.[3]
2. **Roughly 85% of Greenhouse Gas emissions are generated outside** of the United States,[4] and that proportion will continue to rise given development in non-OECD states.[5]
3. **Counterintuitively, the COVID-19 crisis has likely made the climate crisis worse**.

Core problems to solve: the present international system may be the most challenging arena in which to implement and enforce any policy goal: participation is both legally complex and inherently voluntary. Climate change is a free-rider problem with a global scale. This report answers the following questions, and gives several policy and political recommendations for each:

- What international components are missing from prior Green New Deal platforms?
- How does COVID-19 change our approach to international climate policy?
- Long-term, what steps should we take, and in what order?

Methodology: the underlying report 1) presents a rather **expansive review of international climate policy literature**, with a focus on using the most up-to-date emissions data and climate projections throughout; there are 200+ unique references; 2) shares **a new, more granular dataset on global carbon pricing** as a rough proxy for global climate progress. For building the dataset, all emissions pricing initiatives reported in the World Bank Carbon Dashboard[6] were individually analyzed, using direct government data where available. The data reveals we are greatly underpricing CO_2, but even more substantially underpricing methane (CH_4) and nitrous oxide (N_2O), which are 28-86x and 264-298x as powerful as CO_2, respectively.[7] Fluorinated gases, which also need to be given more attention via strictly enforcing the Kigali Amendment, are 1300-7350x as powerful.[8]

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[1] Referring to the UN Intergovernmental Panel on Climate Change, 5th Assessment Report, 2014. This is inclusive of the 2018 Special Report, "Global Warming of 1.5ºC: An IPCC Special Report on the Impacts of Global Warming of 1.5ºC…," which was mostly based on the AR5 2014 update.

[2] YaleEnvironment360, "Melting Permafrost Releasing High Levels of Nitrous Oxide." 15 April 2019.

[3] Referring to the UN Intergovernmental Panel on Climate Change, 5th Assessment Report, 2014. This is inclusive of the 2018 Special Report, "Global Warming of 1.5ºC: An IPCC Special Report on the Impacts of Global Warming of 1.5ºC…," which was primarily based on the AR5 2014 data.

[4] Our World in Data, "Annual CO2 Emissions by Country," 2018.

[5] EIA, "Global Energy-Related Carbon Dioxide Emissions in IEO2019 Reference Case (1990-2050)," coverage of *International Energy Outlook 2019*, 30 September 2019.

[6] World Bank Group, "Carbon Pricing Dashboard," accessed on November 2019 update.

[7] See full report for summary tables and data visualizations.

[8] Values are based on GWPs in IPCC AR5. Ranges account demonstrate spread in a) uncertainty and b) timeframe over which the power of a greenhouse gas is calculated for its effect on planetary warming. The largest difference is methane (28-34 on 100-yr GWP / 84-86 on a 20-yr GWP). See AR5, Chapter 8, p. 714 for more detail.

Short-Term: COVID, Climate Change, and International Policy

There are two extremes in responses to the global COVID-19 pandemic, either: 1) the pandemic is a terrible yet temporary crisis, and the world will return to normal within a few years—meaning our collective policy response is only an emergency measure, or 2) the pandemic has fundamentally changed our economies and societies, and everything from this point forward must be modified—we have to throw out the book and create a new one. In reality, some middle-ground is likely the closest truth: while we must adapt to new circumstances and build capacity to prevent a similar recurrence in the future, our social systems—both their assets and flaws—are still mostly intact.

Unfortunately, the same is true for the climate crisis: it is still here, the situation is still desperate, and it will still require some of the same solutions proposed pre-pandemic. While the fall in greenhouse gas emissions due to social-distancing measures has been widely reported, that decline only represents -4% to -7% of *annual* CO_2 emissions—a tiny drop in the bucket, especially given the necessary reduction of 7.6% *each* year over the next decade. Moreover, while greenhouse gases like CO_2 have been declining, aerosol air pollution has as well. Despite some uncertainty in competing mechanisms, aerosol pollutants are generally thought to cool the planet through the albedo effects they generate—meaning we could be concurrently losing their cooling power. On net, social distancing measure thus might not even slow the planet's warming at all. Finally, even if the virus has in theory "bought more time" for mitigating emissions, it has also offset any near-term political will for meaningful climate policy, as governments globally are focused on the present emergency.

Environmentalists themselves have been debating how to respond to the crisis. Two competing concerns have emerged: 1) those that prefer to defer advocacy until after the crisis, fearing a backlash may undermine long-term wins, vs. 2) those that advocate for the present large-scale economic stimulus to be applied for climate-related ends (e.g. passing a Green New Deal). Many have also highlighted an ongoing rollback of environmental regulations for the perceived pursuit of economic stimulus during the crisis, while researchers are increasingly finding links between pollution, respiratory issues, and COVID risk-factors. How should these concerns be weighed?

There are three key realities: 1) the speed and scale of economic stimulus globally will likely not be repeated in the near-future—**creating a "use it or lose it" opportunity**. As global sovereign debt skyrockets, the ability for governments to pass additional stimulus in the next decade for other purposes will decrease—hurting already time-constrained climate efforts now and in the future. 2) A wide scientific consensus suggests strong links between climate change and disease-spread & novel disease emergence, meaning **any sensible policy seeking prevention of future disease outbreaks should make climate change a key priority.** 3) The inequalities between countries revealed in the current crisis (including widespread lack of PPE, inability to test at scale, inability to treat at scale) will again surface in a world impacted by climate change, just in different ways. Moreover, a warmed developing world with insufficient health infrastructure will only further increase the risk of novel disease emergence. While any crisis can evoke nationalist impulses to ensure protection for domestic constituencies, **failing to engage internationally and provide aid *now* will ensure millions of deaths *in the future*, both at home and abroad.**

Given these realities, how should climate policy operate on the international level, especially in a post-pandemic world? And how should environmentalists advocate for climate policy in the current crisis moment?

Again, some middle-path is likely optimal: climate advocates shouldn't throw out the book, given the global climate itself has not changed much; however, they should adapt to the new circumstances. With the present health and economic crisis, **now more than ever seems like the opportune moment for a Global Green New Deal,** on which many advocates have already been organizing for years. **Yet it should be modified and adapted to fit the current crisis**, and likely begin domestically in each state initially for the first few years. Below is a list of some potentially productive ideas for the climate-side of the equation:

1) **Green Innovation Grants (GIGs) for manufacturers:** with central banks attempting to provide additional economic stimulus through unprecedented monetary measures, interest-rates are at historic lows globally and liquidity is ample, making an ideal time for infrastructure and capital projects. Moreover, with many manufacturing facilities offline or operating at reduced-capacity, it opens a window for retrofitting production processes to reduce emissions. Governments globally should consider giving small cash grants for plant retrofitting, matched with low-interest loans, to provide cost-effective stimulus. Such a program could incentivize (socially-distanced) economic activity through construction activity, give much-needed liquidity directly to firms, and contribute to long-term firm value. **Grant programs could be paired with a carbon tax & border carbon adjustment that is phased-in after 5 years**, using future revenue to pay for current fiscal stimulus—making such a program budget-neutral overall. The pairing would also incentivize firms to make investments now rather than later, forcing short-term activity rather than saving. In short, it would serve as a concurrent carrot and stick approach for economic stimulus *and* climate progress.

2) **National Green Work Programs for grid transformation:** pending the speed of economic recovery, or resurgence of COVID-19 in later seasons, unemployment and economic contraction will likely persist as consumer demand and investor confidence remain cautious, if not fearful. A large number of businesses will also fail, likely permanently. Moreover, recent oil price volatility and OPEC price-wars have yet again proven that our oil supply-chains are exceedingly vulnerable, posing risks for utility companies that can cut both ways. Finally, temporary reductions in electricity-demand again open a unique window allowing for grid retrofits and modernization, including battery storage and smart-grid technology. **Building on the precedent of the original New Deal, governments should use this unique period to provide employment** in the short-term, reduce emissions in the medium-term, and build infrastructure that will pay dividends in the long-term.

3) **Short-term international aid should be focused on the virus:** as governments prioritize the health of their own citizens, political will for international aid is low: we should not be spending it on climate-related issues. Rather, we should use this moment as an opportunity to build more robust health infrastructure in the developing world—especially given novel disease emergence in these regions will increase in a warmed climate. **It is in every country's incentive to aid investments for health infrastructure** now, which will prevent a coronavirus "boomerang" in the present crisis, and provide a head-start for building necessary adaptation infrastructure in the later climate crisis.

Many of the proposals suggested in the rest of this report were drafted in a pre-pandemic time. In the present moment, they should be taken as long-term goals to work towards. However, the above list serves as ways to make climate goals politically feasible and economically productive for a world recovering from a global crisis, with little time before the next one.

Long-Term: 'Big Idea' Recommendations

A high-level list of the most important international policy objectives.

1. Lead Efforts to establish an IAEA for Emissions Verification

While climate policy itself is more transparent, implementation is much less so, and **there is little to no emissions verification** at a country or within-country granularity regularly conducted today. Functionally, we are flying blind, and few realize it. Current emissions data relies primarily on self-reported estimates based on economic activity (bottom-up),[9] combined with whole-atmosphere measurements (top-down).[10] Several instances of underreporting (intentional or unintentional) have been documented, and prior examples margins of error as high as entire industries or even countries have occurred.[11] A 2010 National Academy of Sciences report found that while "each country could estimate fossil-fuel CO_2 emissions accurately enough to support monitoring of a climate treaty, current methods are not sufficiently accurate to check these self-reported estimates against independent data (e.g., remote sensing, atmospheric measurements) or to estimate other greenhouse gas emissions."[12] To add further insult to injury, the most recent by-country emissions data we have for all gases is from 2015—a five year lag in data is unacceptable when we have roughly only 10 years to make dramatic reductions.[13] Clearly, more investment needs to be made here. There are many initiatives already active to improve emissions data, including multiple emissions-tracking satellites[14]—that information now needs to be centralized, published at a higher granularity, and released by a neutral third-party with much more frequency. While we know overall emissions levels, there is no way we can create an adequate international policy mechanism without knowing exactly who is emitting what and by how much.

[9] For a good overview, see Cheewaphonghan, Penwadee et al., "Exploring Gaps between Bottom-Up and Top-Down Emission Estimates Based on Uncertainties in Multiple Emissions Inventories: A Case Study on CH4 Emissions in China," *Sustainability*, 11, 2054. 6 April 2019.

[10] See NOAA, Greenhouse Gas Reference Network.

[11] For just two examples of many, see underreporting on coal extraction and burning in China (found to be 17% higher than previous, a margin of error equivalent to all U.S. coal consumption) or underreporting in fertilizer production methane emissions in the U.S. (found to be 100x higher than previously estimated).

[12] National Research Council (U.S.). "Verifying Greenhouse Gas Emissions: Methods to Support International Climate Agreements." National Academies Press, 2010.

[13] Crippa, M. et al, "Fossil CO2 and GHG emissions of all world countries - 2019 Report," EUR 29849 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-11100-9.

[14] For example, see NASA's OCO-2, Japan's GOSAT-2, or EDF's MethaneSAT.

While the role and effectiveness of international organizations (IOs) have been hotly debated within academia,[15] some have been more effective than others. Generally speaking, IOs can provide several types of services for states—centralized planning and coordination (WTO), negotiation and dialogue facilitation (UN Security Council), pooling of resources for joint goals (World Bank, UNICEF)—yet one of the most unique assets is the ability to be a neutral provider and verifier of information.[16] In particular, third-party monitoring can mitigate free-riding when there are strong incentives to cheat, such as is the case for reducing greenhouse gases in the international sphere. Crucially, such monitoring can help ensure *compliance effectiveness* with previously agreed goals—a strategy that has yet to leveraged in climate policy.[17] Stated more simply, we should name and shame more frequently.

The International Atomic Energy Agency (IAEA) has been one of the more effective monitoring organizations in recent memory, and serves as the perfect analogue to what is now clearly needed for the climate crisis. Founded in 1957, the organization's third-party investigatory status allowed it to apply credible pressure to states like North Korea and Iran, who despite expelling investigators at certain times, eventually opted to comply due to the intense political pressure the agency can leverage.[18] The organization has continued to influence state decision-making on nuclear safeguards, for which national governments must implement "to the letter," and has greatly expanded its legal mandate over time to include other nuclear security issues.[19] While its effectiveness partially stems from the gravity of nuclear issues, the agency's true mechanism of influence is its key: naming and shaming the actors whose activities pose a substantial threat to the rest.

We need to start treating greenhouse gas emissions just as we treat nuclear fissile material. Uranium and gaseous carbon—both chemical elements that can wreak widescale and irreversible damage if left unbated, just on different timescales. Yet while mutually assured destruction blunts the risk of state-to-state nuclear conflict, we have been quietly and willingly assuring our mutual destruction for the past several decades as climate policy continues to be trivial. Even with current Paris climate goals, we have an exceedingly low probability of remaining under 2°C.[20] Ironically, history is so far proving that a slow-moving disaster is much harder to stop than an instantaneous one—making it arguably more dangerous than we would care to admit. An IAEA for emissions verification may be the necessary mechanism to symbolically signal an equivalent importance, prevent or at least identify significant misreporting, and generate better international compliance.

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[15] See John J. Mearsheimer. 1994-95. ``The False Promise of International Institutions.'' International Security. 19(3): 5-49. vs. Robert O. Keohane and Lisa L. Martin. 1995. ``The Promise of Institutionalist Theory.'' International Security. 20(1): 39-51.

[16] Abbott, Kenneth W. and Snidal, Duncan., "Why States Act through Formal Organizations," *Journal of Conflict Resolution*, Vol. 24. No. 1, February 1998. pp. 3-32.

[17] Peterson, M.J., Chapter 5: "International Organizations and the Implementation of Environmental Regimes," in *Global Governance: Drawing Insights from the Environmental Experience*, ed. Young, Oran R. MIT Press (Cambridge, MA: 1997).

[18] BBC, "Profile: IAEA, the Nuclear Watchdog—Timeline," 9 February 2015.

[19] Hibbs, Mark, "Why does the IAEA Do What It Does?" Carnegie Endowment for International Peace. 6 November 2017.

[20] Adrian E. Raftery, Alec Zimmer, Dargan M. W. Frierson, Richard Startz, and Peiran Liu. "Less than 2°C Warming by 2100 Unlikely," *HSS Public Access*. 2017; 7: 637–641.

2. Lead Efforts to Establish a World Park for the Amazon Rainforest

Many are familiar with the importance of the Amazon Rainforest and other tropical ecosystems for helping to regulate the atmosphere. Historically, the Amazon sequestered about 2 billion tons of CO_2 per year—with warmer temperatures and deforestation killing vegetation faster than it can be replaced, the most recent studies show this has halved to about 1-1.2 billion tons per year, a smaller but still vital carbon sink.[21] Given that most mitigation pathways strongly rely on tropical forests as carbon sinks, these new findings alone necessitate even more aggressive global abatement than previously recommended.[22]

However, less widely discussed is the Amazon's potential to be a ticking carbon time-bomb, creating an additional justification for immediate protection. The Amazon is one of the world's largest carbon storage units—between above-ground vegetation (93 billion tons of carbon) and below-ground biomass (an additional 20-30%), the Amazon stores between 71-123 billion tons of carbon.[23] Other estimates suggest the number may be as high as 200 billion tons.[24] While the recent acceleration of Amazonian deforestation has been well-documented, scientists are increasingly warning of a "dieback" scenario, wherein the self-sustaining ecosystem of the Amazon Rainforest would collapse and revert to a savannah.[25] This scenario could possibly be triggered at 20-25% deforestation, and would rapidly unleash a significant portion of the stored carbon—turning the forest from a net sink to a net source.[26] The Amazon recently passed 17% deforestation,[27] and early signs of such a transformation are already being observed.

Under the Yellowstone National Park Protection Act, President Ulysses S. Grant established the world's first officially-recognized national park in 1872.[28] While following from some precedent in Europe and the preservation of Yosemite in 1864 under President Lincoln, the size and scale of the Act set a precedent for the world to follow.[29] An equivalently bold action now must be taken. The U.N. should establish the Amazon Rainforest as a World Park—a universally recognized and legally binding preservation—and purchase the land rights from the state of Brazil to do so. Such a purchase would compensate the people of Brazil for their resource, while better protecting the space for indigenous peoples to continue sustainable livelihoods without fear from loggers or ranchers.

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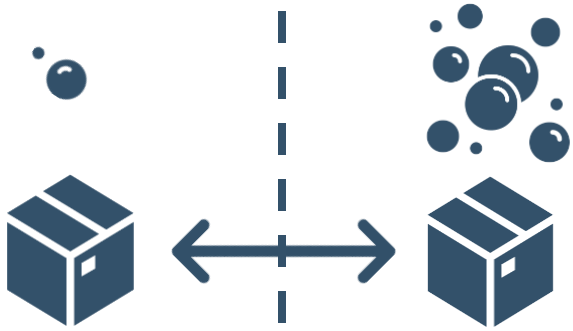
[21] Hubau et al., "Asynchronous carbon sink saturation in Africa and Amazonian tropical rainforests," *Nature*, 579, 80-87. 4 March 2020.
[22] Ibid., see coverage in Nature for detail.
[23] Malhi, Wood et. al., "The regional variation of aboveground live biomass in old-growth Amazonian forests." *Global Change Biology*, 12: 1107-1138. 22 May 2006.
[24] Brienen, R., Phillips, O., Feldpausch, T. et al. "Long-term decline of the Amazon carbon sink." *Nature* 519, 344–348 (2015).
[25] Oyama, M. D., and Nobre, C. A., "A new climate-vegetation equilibrium state for Tropical South America," *Geophys. Res. Lett.*, 30, 2199. 2003.
[26] Lovejoy, Thomas E., Nobre, Carlos, "Amazon Tipping Point," *Science Advances* 21 Feb 2018: Vol. 4, no. 2. 21 Feb 2018.
[27] World Wildlife Fund, "Deforestation and Forest Degradation," 2019.
[28] History, "National Park Service," 21 Aug 2018.
[29] Ibid.

While much land in the Amazon region is already designated as legal preserve, enforcement problems have persisted, and recently accelerated with the current administration's focus on promoting agriculture. The thesis here assumes the UN would be able to better enforce protection measures over time with consistency, vs. letting regulation be subject to dynamic domestic politics. Moreover, when considering the future value of ecological biodiversity (undiscovered species and compounds for new medicinal applications), economic studies suggest the forest is worth much more preserved ($8.2 billion / yr) than farmed ($422 million / yr),[30] making preservation a bargain. For one example, poor soil quality for agricultural cultivation may render farming a particularly inefficient use of the forest.[31] When considering the option-value and the economics, such an effort to ensure meaningful enforcement seems obvious.

3. Implement a Unilateral Border Carbon Adjustment

(but after a domestic carbon tax)



A border carbon adjustment may be the most effective mechanism to create enforcement through economic policy. By implementing a BCA, any private enterprise wishing to export to the United States would have a strong incentive to lower the carbon footprint of their products, no matter the location of production. By immediately covering products sourcing from any country, the chances of 'carbon leakage' are reduced. Moreover, a strategy primarily focused on a BCA could avoid the many political hazards in renegotiating individual trade agreements. Rather than relying on delicate diplomacy, the U.S. could leverage one of its greatest assets—market access to the American consumer market—to motivate meaningful action in reducing emissions. Additionally, to prevent the border adjustment from being regressive on developing countries, revenue from the tax should be devoted to funding climate-focused development and adaptation aid, transferring the proceeds back to developing countries. For ensuring consistency with sustainable and just development practices, funded projects should leverage or build local expertise for implementation, and be governed by an oversight mechanism comprised of local leaders from recipient countries.

A BCA would also *increase* competitiveness for American firms: to do so, the Federal Government should first pass a domestic carbon tax that gradually increases to at least $75 / ton of CO_2e over a 5-year period, which could begin after a 5-year delay to allow for full COVID recovery. A parallel BCA would first "level the playing field" for American companies competing with international firms for supplying the American consumer. Second, a delayed implementation period paired with innovation grants would allow domestic companies to adjust their manufacturing processes and prepare for a global landscape that inevitably penalizes emissions. With such incentives, American companies (many with global reach) would then become advocates for regulation, without needing corrective subsidies that only sustain high emissions and are more costly in the long-run.

[30] Strand et al., "Spatially explicit valuation of the Brazilian Amazon Forest's Ecosystem Services." *Nature Sustainability*, Vol. 1, 657-664, November 2018.
[31] Baird, Christopher S., "What makes the soil in tropical rainforests so rich?" 12 July 2013.

4. Mobilize the Department of Defense for Carbon Removal Research

The United States has historically emitted more cumulative CO_2 than any other individual country—more than all E.U. countries combined and double that of China.[32] From a global justice perspective, it is only fair that the U.S. contribute the most in solving the crisis we primarily created. From an international bargaining perspective, the U.S. will always have a weak symbolic hand at the climate table given this quite significant baggage—notwithstanding our already dismal record in domestic regulation and climate denialism. The only way to rectify this particularly egregious record, and in more practical terms, improve our long-run political capital, is to actively *remove* our disproportionally large historical carbon emissions. Reducing our current emissions to zero will simply not be enough. Moreover, given the poor track record of past international mitigation efforts, and the exceedingly dismal outlook of the most recent warming projections, carbon removal technology is at minimum a very necessary insurance policy in case other recommendations described here ultimately fail.

Such a research effort should build on past successes of U.S. government-led research—the best of which was conducted through the military or newly established, independent agencies such as NASA. The Manhattan Project, ARPANET, and the Apollo Program are all prime examples. Moreover, some analysis has suggested research conducted in other agencies (the Department of Energy) has had a less successful track-record.[33] Moreover, given the significant security risks of climate-induced impacts, it is only fitting a portion of the military budget should be dedicated to such purposes. The symbolic placement in the DoD could also be productive, further cementing the climate crisis as a serious security threat rather than a problem for charity. Regardless of the housing agency, such an initiative should assemble a collective of the nation's top scientists, provide sufficient pay and tenure for independent work, and most crucially, ensure mostly independent decision-making ability that would rest with the same scientific team, minimizing political interference. If successful and scaling is feasible, the United States should then add carbon removal commitments to its Nationally Determined Contribution.

[32] Our World in Data, "Who has contributed most to global CO_2 emissions?" 2019.
[33] Stine, Deborah D, "The Manhattan Project, the Apollo Program, and Federal Energy Technology R&D Programs: A Comparative Analysis," Congressional Research Service, 30 June 2009.



5. Mobilize the Army Corps of Engineers to Provide Technical Aid in Developing Countries

The mitigation and adaptation infrastructure needs in developing countries are particularly large. Estimates reviewed for this report roughly average USD $1 trillion for mitigation and USD $300 billion for adaptation per year. Building long-term human capital and institutional capacity should be the primary goal to ensure sustainable development rather than generating aid-dependency. Yet in the short-term, technical assistance from developed nations will be paramount to help build this capacity and transfer best-practices. This need is compounded by the fact that large-scale energy and transportation infrastructure typically demand significantly more capacity and support than other types of aid,[34] especially in the project scoping and planning stages. External aid for project scoping can also increase the likelihood of project success while minimizing cooption from corrupt actors.[35] Thus in addition to private investment, the U.S. should mobilize its existing capabilities as a part of larger aid efforts to expedite planning and construction of the necessary energy, urban, and adaptation infrastructure.

The U.S. Army Corps of Engineers could be particularly suited for such an initiative. With a combined workforce of 37,000 civilian and non-civilian positions, in addition to a present-day focus on environmental engineering and sustainability-related projects, the agency already has the existing technical- and people-capacity for such work.[36] Moreover, the Army Corps presently has a uniquely extensive international presence, which could be easily expanded and repurposed for such work.[37] Most importantly, the Army Corps should concurrently work on capacity building in the countries it would operate, enabling higher returns to aid versus an individual project focus. Moreover, as a U.S. public agency, there would be fewer intellectual property complexities constraining knowledge-sharing. In practice, Army Corps aid could be offered on a 'for-hire' basis, with recipient countries indicating interest or applying for assistance. Aid from the Corps could be paired with technical assistance for other domestic climate policy design, managed either through the State Department or E.P.A. Such arrangements would also generate a valuable biproduct of political capital for future collaboration, meaning any one-time assistance should work toward a larger goal of closer bilateral relations, without the controversial baggage of conditional financial aid.

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[34] Garnett et al., "Study on Aid Effectiveness in the Infrastructure Sector: Final Report," *Urban Institute,* January 2009.

[35] Sobjak, Anita, "Corruption Risks in Infrastructure Investments in Sub-Saharan Africa," *OECD Global Anti-Corruption and Integrity Forum*, February 2018.

[36] USACE Command Brief, 5 March 2019.

[37] Ibid.

Report Summary: Consolidated Recommendations

Cross-Category 'Big Ideas:'

1. Lead international efforts to establish an IAEA for global emissions verification.
2. Lead international efforts to establish a World Park for the Amazon Rainforest.
3. Implement a Unilateral Border Carbon Adjustment (following a staged domestic tax).
4. Mobilize the Department of Defense for carbon removal research.
5. Mobilize the Army Core of Engineers for climate aid in developing countries.

Using Emissions Data:

1. Use Hist. Cumulative Emissions accounting to advocate for why the United States and the EU-28 should focus on negative emissions technology in addition to emissions reduction.
2. Use Consumption Emissions accounting for evaluating Nationally Determined Contributions with better contextual information for UNFCC COP convenings.
3. Use Individual Gas emissions accounting to encourage greater focus for methane, nitrous oxide, and fluorinated gases. Relatedly, we need more emissions data overall.
4. Use By-Sector emissions accounting to ensure policy addresses gaps in international emissions, including aviation, shipping, and space travel.
5. Publicize detailed emissions projections to hold countries accountable to a public audience.
6. Reject emissions-intensity goals to hold countries more accountable to a public audience.
7. Improve granularity and frequency of emissions data to verify self-reported emissions inventories, identify leaks or under-reporting, and set better-informed domestic priorities.

Prior International Agreements:

- Antarctica Treaty
  - Adopt Annex 6 in the Antarctica Treaty.
  - Adopt safeguards to prevent geopolitical conflict over resources in the Arctic.
  - Fund research for climate feedback-loop mitigation in the polar regions.
- Aviation
  - Cover emissions before the 2020 baseline in CORSIA.
  - Add private-jets to CORSIA carbon offset requirements.
  - Ban nitrogen fertilizer in aviation biofuel (otherwise, stop counting biofuels).
- Oceans & Shipping
  - Add GHG offsets, cap-and-trade, or a GHG tax in IMO regulations.
  - Implement the Fish Stocks Agreement (UNFSA), or create a stronger program.
  - Create strict International Seabed Authority (ISA) deep-sea mining regulations.
- Greenhouse Gases (Paris)
  - Hard economic incentives: the framework must move beyond cooperation.
  - Standardized language in National Determined Contributions (NDCs).
  - Create a neutral entity for emissions verification, and publicize under-performers.

- Ozone Layer
    - Implement the Kigali Amendment for HFCs (14,000x more powerful than CO_2).
    - Enable third-party verification of HFCs and other fluorinated-gas emissions.
- Air Pollutants
    - Increase awareness of and account for the lost cooling effects from aerosol bans.
    - Create multilateral regulation in Africa, South America, and the West Pacific.
    - Dedicate climate-linked aid dollars for healthcare in developing countries.
- Review Lessons from the successes of saving the ozone layer
    - Communicate more severe individual impacts and readily available substitutes.
    - Work with E.U. policymakers bilaterally to improve and coordinate U.S. policy.
    - Incentivize industry so that they become political allies rather than opponents.

Carbon Taxes & Trade:

1. Track global carbon tax progress and prices by individual GHGs, instead of CO_2-equivalent.
2. Adopt a U.S. Cap & Trade, emissions trading system, or other carbon tax *as a first-step*.
3. Split tax revenue between energy infrastructure and an EITC for low-income earners.
4. Set expiration dates for banked credits, or change accounting practices to allow investment.
5. Pass a unilateral Border Carbon Adjustment (BCA) *to take effect after the carbon tax*.
6. Avoid renegotiating trade agreements as a primary strategy; instead, seek legal alignment.
7. Reform ISDS to enable environmental taxes and regulations to pass in global legislative bodies, while also supporting investors that fund mitigation and adaptation projects.

International Aid:

1. OECD countries should **provide $1 trillion per year** in emissions mitigation aid by 2030, with as much possible through public and private grants, increasing to even more by 2050.
2. OECD countries should **provide $300 billion per year** in climate adaptation aid by 2030, with as much possible through public and private grants, increasing to $500 billion by 2050.
3. UNFCC parties should agree to consistent accounting standards for climate financing.
4. Substantially increase staffing for the GFC and other funds for project review and scoping.
5. Create a global pool of experts for project selection, scoping, and technical assistance, equivalent in scale to the IPCC.
6. Update and expand the U.S.-based Global Climate Change Initiative.
7. Divert border carbon adjustment (BCA) revenue to developing countries to finance aid.

Suggested Timeline: 2-Year Benchmarks