BROOKINGS

Report

The climate wolf at the door: Why and how climate resilience should be central to building back better

Robert E. Litan and John Fleming Thursday, February 18, 2021

The Biden administration's economic recovery strategy, widely known as "Build Back Better," is expected to vastly improve our national response to climate change. So far, virtually all attention on this subject has focused on *mitigation*—slowing the pace of climate change by reducing carbon dioxide emissions and taking existing carbon dioxide out of the air through "carbon capture" technologies. To the credit of the president and the vice president, their campaign platform's plan for climate change included measures to make our economy and society more resilient to the impacts of climate change.

Our purpose here is to make the case that whatever recovery plan emerges from Congress must give high priority to climate resilience because the "climate wolf at the door" is *already here*. There is clear linkage between climate change and more intense and thus more damaging hurricanes, wildfires, and intense heat. Of the nearly $2 trillion in weather related costs the U.S. economy has suffered since 1980, 47 percent have been incurred in just the past ten years.[1] Man-made climate change is a major reason behind the increased impact of severe weather events. Consider these extreme events experienced in the past year alone identified by the World Meteorological Organization:

- A record 30 named tropical storms and hurricanes in the Atlantic.
- Death Valley had the hottest temperature on Earth in the last 80 years.
- Record wildfires in the western U.S. and record heat in Australia.
- Record wildfires and a prolonged heat wave in the Arctic.
- Record low Arctic sea ice was reported for April and August, and the yearly minimum, in September, was the second lowest on record.

Much damage has already been done. Given the high ambient concentrations of carbon dioxide already in the atmosphere and continued increases in worldwide carbon dioxide emissions over at the least the next decade, the frequency and costs of climate-related weather events will grow worse, even if more aggressive mitigation efforts are undertaken immediately or in the near future.

In the meantime, climate-related costs—borne by property-casualty insurers, the federal government, and individuals and firms—will continue to stay high or even increase. In addition, exposure to climate-related costs is likely to diminish home values in large sections of the country, in the process impairing the balance sheets of the nation's two major residential mortgage agencies, Fannie Mae and Freddie Mac. As the federal bailout of both enterprises during the 2008-09 financial crisis confirmed, the federal government, and thus taxpayers, will be at risk if climate-related costs require another Fannie/Freddie rescue. And the purely financial costs do not include the high and rising human toll of climate events.

Accordingly, the Build Back Better recovery plan should provide policy incentives for resilience to be embedded in construction and engineering projects, and should allocate a significant percentage of total infrastructure spending—we propose 10 percent to start—specifically for initiatives dedicated to enhancing resilience. In a $2 trillion-plus, 10-year infrastructure plan, climate resilience expenditures would amount to $200 billion, or $20 billion annually.

Whatever climate resilience spending Congress ultimately authorizes, the Biden administration can also pursue the same objective through regulatory action and executive actions. Among the most important steps in this regard is to ensure that information about future cost savings from private sector investments in resilience is widely available so that insurers give appropriate premium discounts for such investments. The government should update hazard maps (though additional funding for this from Congress would help) so that insurance rates fully reflect current and future climate-related risks. Federal flood insurance, provided by the federal government, should reflect these risks, otherwise people and businesses will have wrong incentives to locate in areas where climate-related flood risks have risen. Risk-based insurance pricing for all climate-related

events would be less onerous for policyholders if the federal government were to make substantial investments in climate resilience infrastructure through the Building Back Better initiative because these undertakings could substantially lower the costs of future climate change-aggravated natural disasters.

Resilience can no longer be ignored in climate change policy

Climate policies generally fall into two broad camps: mitigation and resilience (also known as adaptation). Mitigation focuses largely on decarbonization: reducing emissions by accelerating the energy transition from fossil fuels to renewables, along with other emissions reduction approaches and carbon capture (taking carbon out of the atmosphere and putting it below ground). The goal of mitigation is to create a more sustainable economy in the long term. Resilience focuses on managing the changes that our warming climate is creating in our lives and infrastructure.

Up to now, virtually all policy attention toward climate change has focused on mitigation and fostering the transition to a low-carbon economy. Mitigation, through enhanced regulation of carbon emissions and increased federal expenditures and tax incentives for renewables, is at the heart of the Biden climate change legislative plan. The much publicized Green New Deal makes passing reference to resilience, but is largely focused on mitigation measures.

Why has improving climate resilience not gathered more attention from policymakers or climate activists? Several reasons appear to be at work:

1. *Resilience in the face of climate events can seem defeatist.* Resilience arguments can sound like we are settling for the status quo and throwing in the towel on decarbonization. It takes a psychological shift to accept that certain changes have already arrived and that better resilience and cost-effective mitigation must be pursued simultaneously.
2. *Improved resilience is not a global issue.* Resilience measures must largely be designed and implemented locally, as they deal with the vast, interwoven infrastructure of local communities, which is an advantage in dealing with immediate challenges. But

resilience has not gotten the attention it deserves from activists, who want action at the global and national levels.

3. *Resilience issues can be highly contentious.* Issues such as zoning and insurance pricing have substantial impact. People don't want to leave places they like or pay more for what they already have, even when catastrophes threaten their homes and businesses.

However, since the impact of climate change is already significant and is likely to grow worse, we can no longer ignore or give lesser weight to climate resilience policies. We must take steps now to invest in public works to better protect homes and businesses from storms, fire, and extreme heat that climate change aggravates. And we must adopt measures that will reduce exposure to these events—such as zoning changes and insurance pricing modifications that properly reflect heightened hazard risks—so people, structures, and economic activities are less in harm's way.

We need a national climate change resilience plan now

As it is now, our national climate resilience "plan" amounts to waiting for climate-related disasters to strike and handling the consequences afterwards. Insurers, private and public, pay claims to policyholders whose residences or businesses have been damaged or wiped out, whose owners are then often free to rebuild in the same places. This is an understandable outcome for disasters whose locational impacts are more or less random. But when facing the systemic risks posed by climate change, it makes no sense to rebuild in high hazard areas, including locations that have suffered substantially elevated risks because of climate change.

If private insurers are free to set rates according to actuarial risk, then the market will solve the rebuilding challenge, albeit in a financially and politically painful way absent major investments in resilience infrastructure (described in more detail shortly). Insurance rates for structures in high hazard areas are likely to be prohibitively expensive, leaving those who do not move to safer location exposed to potentially ruinous financial losses.

Rebuilding in flood zones, which are federally insured, is a different matter, since much of the risk from intensified climate-related flooding is borne by the federal government (meaning taxpayers). Here, policy can and should be responsive to the elevated risk by requiring anyone who rebuilds in a hazard area to meet updated hazard-based construction guidelines (such as putting structures on stilts above a certain minimum height, based on the flood maps) or otherwise accepting a buyout of the land at fair market value (taking account of the elevated risk).

But rebuilding restrictions that, by definition, are imposed only after disasters have already struck can be only one component of any national climate resilience plan. The nation needs investments to *prevent* future damage, such as seawalls, wetlands, green spaces, painting of surfaces (to minimize heat retention), and funds for preemptive buyouts of properties in high hazard locations if the costs of future disasters are to be substantially reduced. For example, as Australia is demonstrating, investments in drones are a highly cost-effective way of detecting and then preventing wildfires before they start or get out of control.

Based on what President Biden promised during the election campaign, the Biden administration is expected to ask Congress for at least $2 trillion in overall infrastructure investment over a ten-year period, or approximately $200 billion per year. Given that the cost of protecting just the U.S, coastlines from rising ocean levels alone would cost over $400 billion over the next 20 years, or $20 billion per year, it is reasonable to include a minimum down payment of at least $20 billion annually for the next ten years toward a climate resilience agenda that takes full account of all climate risks.

Allocate federal climate resilience funds based on need

A climate resilience plan of any amount will require a politically and economically acceptable way of allocating federal funds among the states, not just to protect the coastlines from flooding but also to protect interior locations from other hazards and for investments, including buy outs of properties in high hazard areas. In principle, there are three ways of doing this.

The first, and standard, way is to allocate funds based on population, so that each state receives the same per capita allocation. This approach is simple, mechanistic, and avoids political bias or interference, either from Congress or the executive branch. The major drawback is that per capita allocations take no account of differences of climate-related hazards, so this method does not devote additional resources to residents in states where risks loom especially large.

A second approach is to require limited state cost-sharing (e.g. 10 percent), which would allow a market-like system based on a state's willingness and ability to come up with the cost, to drive the overall allocations. This approach would disadvantage poorer states, an outcome that is especially problematic in light of the pandemic, which has wreaked havoc on the finances of many states and localities (although the pandemic shock may be mitigated or offset by the forthcoming pandemic economic rescue package).

A third approach is to distribute funds according to climate-related risk exposures. Some government body—an agency within the executive branch, or an independent bipartisan commission with scientific input from key federal agencies, principally National Oceanic and Atmospheric Administration (NOAA)—would be assigned this task.

Our preference is for the third, climate risk-based version. However, these approaches need not be mutually exclusive. For instance, a portion of the funds can be distributed by population and the balance by risk.

Regardless of how federal funds are distributed, the federal government and states will then have to decide how to prioritize individual projects. Since states are fiscally constrained, it may be more feasible to have states submit projects to a federal agency such as Federal Emergency Management Agency (FEMA), which can conduct assessments with contractor assistance and return them to states for their use in setting priorities. Projects should initially be ranked by benefit-cost ratios, or by absolute net benefits.

However, states and localities should not be guided solely by these calculations, since the impacts of climate change are distributed unevenly. Indeed, as with the pandemic, these costs tend to be disproportionately borne by individuals and families without the means to

live out of harm's way. As the federal government's 2018 National Climate Assessment put it:

Impacts within and across regions will not be distributed equally. People who are already vulnerable, including lower-income and other marginalized communities, have lower capacity to prepare for and cope with extreme weather and climate-related events and are expected to experience greater impacts. *Prioritizing adaptation actions for the most vulnerable populations would contribute to a more equitable future within and across communities.* (emphasis added)

In addition, state-level projects should not proceed without federal coordination of resilient infrastructure investments, since climate resilience projects can have spillover effects across state boundaries. A good example is a higher seawall built along one section of a river or the ocean that protects the land and structures immediately behind it from flooding. This resilient infrastructure can, in turn, funnel higher water volumes downstream, causing even greater damage than climate-related events themselves. State resilience plans thus should be coordinated so that projects that affect multiple states can be evaluated together. This will help maximize net benefits or the ratio of benefits to costs on a region-wide basis.

Provide incentives for climate risk sensitive zoning

The location and business activity of buildings greatly affects their exposure to climate related events and costs. Zoning regulations and local construction codes are two primary levers of local policy that can minimize the economic impact and costs associated with climate events. While better zoning or local construction codes can reduce the costs of

future disasters, they can also reduce the market value of existing properties, even above the costs that market forces may impose because of a wider appreciation of their climate risks.

Ideally, as part of any infrastructure plan, Congress should encourage localities to change their zoning rules to prohibit rebuilding or new construction in high hazard areas, especially after updated hazard mapping is completed. Yet under the regulatory takings doctrine, as developed in Supreme Court case law, zoning changes can be functionally equivalent to physical takings under eminent domain authority, and thus require fair market value compensation. Making federal aid available to localities to fund regulatory takings compensation will be critical if the necessary zoning changes at the local levels are to be taken, and thus these expenditures should be part of state resilience plans.

Prioritizing and paying for climate resilience

Since the impact of climate-related events vary by state or even by city, why should the federal government pay for climate resilience? There are at least two answers. First, the impacts of climate events do not stop at state boundaries. Hurricanes, fires, and other disasters usually affect multiple states. Second, and more importantly, residents everywhere suffer from prior federal inaction.

Congress has already taken the first step toward authorizing expenditures to reduce the costs of disaster in advance by passing the Disaster Recovery Reform Act in 2018, which updated the 1988 Stafford Act and set aside funds for communities to establish mitigation plans. What remains is a much more ambitious ten-year investment plan that translates aspirations into tangible results. This plan should be part of the economic recovery.

As conceived during the campaign, the cost of the Build Back Better strategy would exceed added tax revenues by more than $5 trillion over a ten-year period, according to a thorough analysis of the Biden administration's domestic initiatives. Given the impending passage of most of all the administration's $1.9 trillion economic rescue plan, any deficit-financing of the plan is likely to be politically untenable and macroeconomically risky.

It is possible that Biden's Build Back Better plan, which is coming next, will be fully paid for through additional tax revenues, including a substantial rollback of the Trump tax cut legislation and possibly other revenue-raisers. A critical question is whether moderate Democrats will go along with the size and composition of the expected tax package or will negotiate with the administration to cut back the overall size of recovery spending to fit within a smaller tax plan.

It is too early to predict how such negotiations might play out, specifically the size of the final package. Whatever the outcome, allocating at least 10 percent of that amount to climate resilience—ideally the full $200 billion over ten years recommended here—should be a high priority. The urgency of keeping the climate wolf from breaking through the door is simply too great, while the benefits of doing so in the form of reduced future disaster costs should be among the most immediately felt of all the climate change spending.

What can the Biden administration do on its own?

Even without legislation, there are steps the Biden administration can and should take, through the president's control of the executive branch, to reduce the costs of future disasters induced or enhanced by climate change.

Use available discretionary funds to enhance resilience

FEMA wants to take the first step by repurposing as much as $10 billion of its budget formerly devoted to rebuilding communities post-disasters toward helping them prevent or mitigate the costs of future climate events. This would be a good start toward meeting our suggested ten-year $200 billion climate resilience spending target, which only Congress can approve.

Ensure that catastrophe insurance is priced correctly and that information about cost reductions from investments in resilience is made widely available

In his campaign's Plan for Climate Change, Biden promised to work with the insurance industry to "identify ways to lower property insurance premiums for homeowners and communities who invest in resilience, expanding programs like the Community Rating System that FEMA currently administers across the country." This is important, and of course it should be politically popular.

But the politically more difficult task will be to accept, if not encourage, all of the outcomes of risk-based pricing for both fire insurance, which is underwritten by the private sector, and flood insurance, a program the federal government operates and for which it bears the risks.

Historically, premiums for flood insurance have not fully reflected the risks. Climate change—with its attendant increased flood costs—will intensify pressures to increase and subsidize flood insurance premiums. If the country is serious about reducing the costs of future climate events, these pressures must be resisted since otherwise underpriced flood insurance only will encourage people to move to places where climate-related flood risks will only grow worse.

Fire insurance presents similar issues. In California, historic fires and record damage have sent property insurance rates soaring in much of the states, especially in any properties close to forested areas. Homeowners are being priced out of their homes and continue to put pressure on the state's insurance commissioner to limit rate increases and on the legislature to prohibit insurers from dropping existing coverages. California's regulators have published measures homeowners can adopt to mitigate fire risks, but so far it is not clear how effective any of them can and will be in reducing insurers' future claims costs.

The hard and unfortunate fact is that many properties near forested areas in California may be uninsurable at any price, or at premiums that are prohibitively expensive for all but the wealthiest owners or buyers. State policy measures that avoid this reality are not only inconsistent with sound climate resilience policy but needless and dangerously permit

individuals and any businesses to expose themselves not only to future economically devastating fires, but to loss of life. Until and unless premiums for hazard insurance reflect the added and increasing climate-related disaster risks, policy will effectively subsidize these added risk exposures.

Apart from an advisory role played by the Federal Insurance Office within the Treasury Department, the federal government has limited involvement in insurance regulation. Consequently, the administration has limited options with respect to rates for private property and casualty insurance. That role does include, however, "monitoring all aspects of the insurance industry" and consultation "with States regarding insurance matters of national importance." Based on the campaign promise, the Biden administration presumably intends to promote ways to ensure that insurers are aware of the reduced costs from resilience investments, and accordingly let market competitive rates.

But even with premium discounts for homeowner investments in mitigation, the overall impact of climate change will be pushing fire and storm risks and premiums on insurance against these events upward. Resilience investments may only slow the overall rate of increase, though homeowners who take these steps should pay less for hazard insurance than they would otherwise. The best the administration can do is ensure that the cost-savings of resilience investments are quantified and made widely available, so that they are properly taken into account, through competition among insurers, in insurance premiums.

Update hazard maps

Any infrastructure plan must include efforts to update multi-hazard maps, which illuminate areas that are vulnerable to various natural hazards (hurricanes, flooding, landslides, wind, wildfires, tsunamis, etc.). Hazard maps are used by a wide range of parties —homeowners, businesses, insurers, policymakers, planners, developers, and engineers— to understand, manage and mitigate exposure and the impact of these hazards.

While executive agencies can undertake this project without congressional approval, additional funding from Congress would amplify the impact of hazard map updating. This would help households make informed choices about where to move, help state and local

governments update zoning plans and develop lists of potential projects that can enhance climate resilience, and help private insurers and the federal government price increased hazard risks into their insurance policies. In particular, Congress should give FEMA resources to update its existing flood maps so that the public can make more informed location and investment decisions that properly take account of current and future flood risks that are affected by climate change (and mitigation measures to reduce it).

Promote federal-state cooperation on controlled burns

Controlled burns are used as a way of preventing mega-fires in various parts of the country, especially the Southeast, which is heavily forested. Controlled burns have faced various state-based hurdles in California, especially claims that the smoke contributes to pollution, according to a thorough report by *ProPublica*. In August, California implicitly acknowledged its prior failures and entered into a Memorandum of Understanding with the U.S. Forest Service that in theory promises more cooperation in the future. The Biden administration should turn this theory into reality and allow controlled burns that the Forest Service recommends.

Consistently report investments in physical and human capital in the federal budget

The Biden administration should produce consistent reports of physical and human capital in each year's budget of capital investment. Climate resilience projects are a form of infrastructure and are as such investments in capital—promising continuing benefits over the long run. They are distinguishable, in principle, from the government's operating expenses, which include salaries of government workers, annual interest payments on federal debt, and the large volume in transfers entailed in entitlement programs such as Medicare, Medicaid and Social Security. While many states separately budget for capital and operating expenditures, the federal government does not make this distinction.

In 1997, President Clinton created a commission to consider whether the federal government should follow many of the states and adopt a capital budget, which in theory could explicitly allow deficit financing for capital expenditures. After public hearings and

internal deliberations, the Commission issued its report (which one of us, Litan, authored) in 1998.

Variation in the definition of "capital," along with other challenges, resulted in the Commission rejecting the adoption of a capital budget for the federal government. However, the Commission recommended the consistent *reporting* in each year's budget of capital investments—in physical capital, such as infrastructure, in human capital (education), and what would widely be called today intellectual capital (R&D)—broken out separately from operating expenditures.

We believe the Biden administration—and future administrations—should follow this recommendation. With respect to climate resilience, a capital spending report would make especially clear the comparisons in spending in this area versus other capital spending initiatives. That kind of transparency alone would ensure that a consistent spotlight on climate resilience, and thus may nudge at least future Congresses to make substantial additional investments for this purpose, even if the current Congress does not.

Develop standards for adaptation and resilience reporting

To facilitate future cost-benefit analyses and prioritization of projects, the federal government should work with the states to develop standards for reporting adaptation and resilience measures. While many state and local governments are actively working on resilient infrastructure projects, it is virtually impossible for the federal government to coordinate these projects due to the lack of common reporting systems.

As chapter 28 of the 2018 National Climate Assessment reported:

For instance, Miami-Dade County's Capital Improvement Program is addressing hazards related to sea level rise, as is San Francisco's 2015 Seawall Resiliency Project. It remains difficult, however, to tally the extent of adaptation implementation in the United States because there are no common reporting systems, and many actions that reduce climate risk are not labeled as climate adaptation. Enough is known, however, to conclude that adaptation implementation is not uniform nor yet common across the United States.

A common reporting system would allow the federal government to create a database of resilience projects from the ground up. A common reporting language could, in turn, allow states and localities to assemble their preferred projects, in order of priority, and submit them to one or more agencies of the federal government for cost-benefit assessments. (Such analyses have long been conducted for discretionary grants by the Department of Transportation.)

The Office of Management and Budget, working all relevant agencies, should compile the entire list of projects and come up with a total funding request, balancing the adaptation agenda along with other infrastructure needs as part of the overall Build Back Better spending package.

Conclusion

One of the best ways to assure Congressional action is to experience a crisis that forces a response. This has happened with the pandemic, which unfortunately looks to be with us for months to come. Yet our experience in 2020 also suggests that climate-related

catastrophes are already upon us, both in number and severity. The upward trend in climate events should be a call for action to substantially enhance our resilience to these events.

We can no longer afford to treat climate resilience as the stepchild of a more comprehensive set of policies that deal with climate change. The $200 billion we recommend here is part of a larger infrastructure package that will serve as an immediate down payment toward a smarter, more resilient infrastructure for America and should be given top priority in the consideration of the Build Back Better initiative.

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Footnotes

1. 1 According to figures compiled by the federal government, weather-related damage costs over the past 10 years have totaled $890 billion, representing 47 percent of the cumulative $1,875 billion incurred since 1980. See https://www.climate.gov/news-features/blogs/beyond-data/2020-us-billion-dollar-weather-and-climate-disasters-historical