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Responding to climate risk: Actions for US state and local leaders

Climate risk costs the United States billions each year. By acting now, state and local leaders can lessen the impact, invigorate economies, and steer the country to a prosperous low-carbon future.

This article was a collaborative effort by Sarah Brody, Tom Dohrmann, Zealan Hoover, Dickon Pinner, and Leah Pollack, representing views from McKinsey's Sustainability and Public & Social Sector Practices.

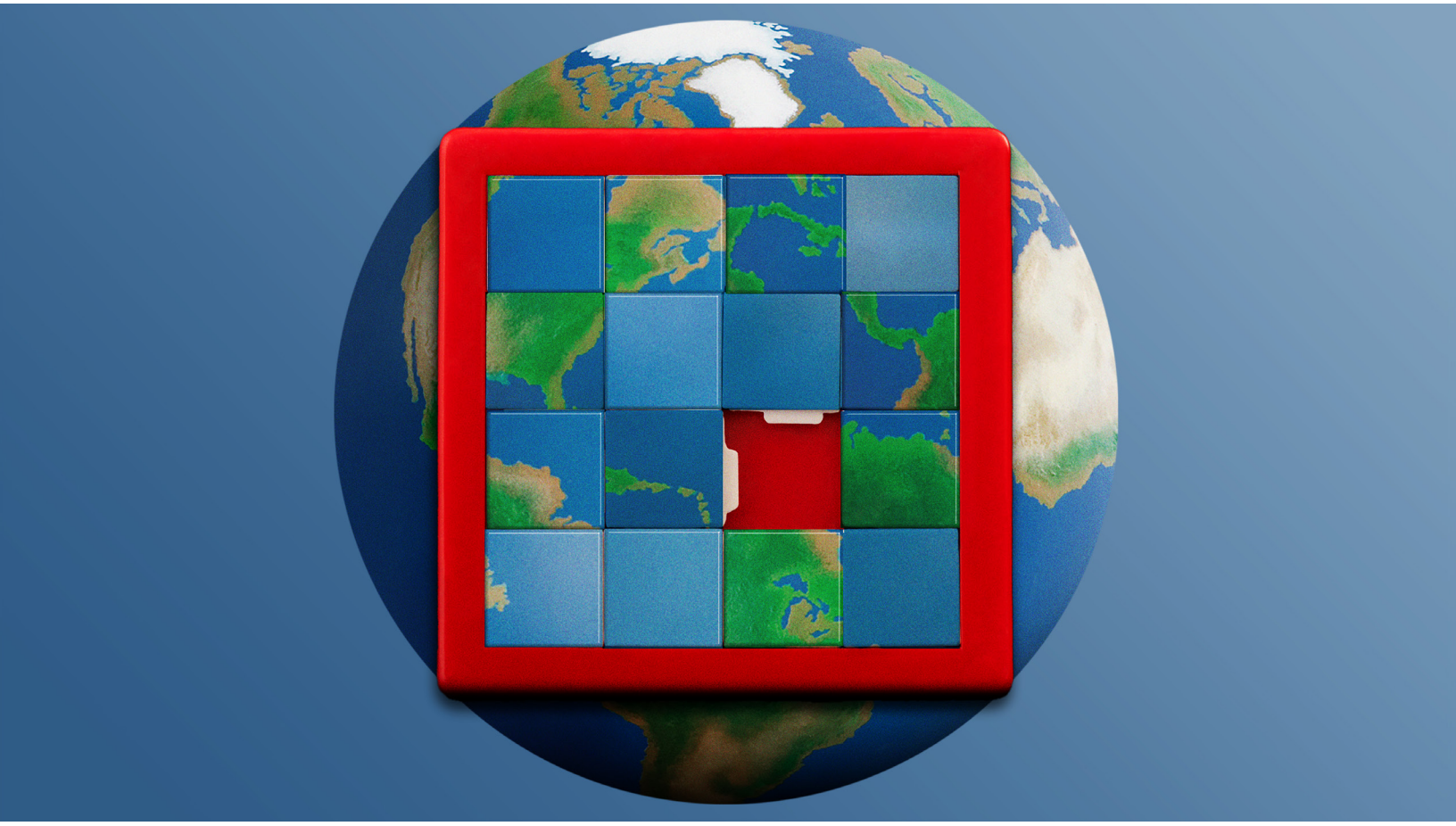


Image by Nicolas Ortega

December 2020

Amid the challenge of the COVID-19 pandemic this year, communities across the United States have also faced serious hazards from climate change. The Northern Hemisphere just emerged from its warmest summer on record, when 20,000 weather stations reported unprecedentedly high temperatures. The extreme heat contributed to wildfires that burned more than 10,000 square miles of the western United States, an area the size of Massachusetts, Delaware, and Rhode Island combined. In the Atlantic Basin, warming waters strengthened 30 named storms, including 13 hurricanes and six major hurricanes (Category 3 or greater), through the end of November 2020. According to the National Centers for Environmental Information, by early October, the United States had experienced 16 weather and climate disasters that caused $1 billion or more in damages each, tying the full-year record set in 2011 and 2017.[1]

Climate models indicate that further warming, which is bound to take place this decade, will make physical climate hazards even more frequent and intense.[2] Scientists also warn that global temperatures will increase and risks will intensify after 2030 unless dramatic emissions reductions take place this decade.[3] Recognizing these dangers, 23 states have set goals to reduce their greenhouse-gas emissions and 17 states have issued plans to adapt to climate change. Many cities, too, have established targets to decarbonize their economies and build climate resilience. These states and cities are not just setting goals; they are instituting standards, programs, and mandates to hasten climate action. State and local government leaders may soon see additional support from the Biden administration, which has named climate change as one of its four top priorities.

The task ahead for state and local leaders is to make the most of this new opportunity. By curbing emissions and investing in resilience, governments can help prevent countless deaths and billions of dollars in damage. Climate action could also help reinforce economies that the COVID-19 pandemic has weakened and create healthier, more equitable communities. In this article, we offer state- and local-government leaders a guide to the main elements that can help inform their decisions on climate action: the threat posed by climate change, the near-term benefits of climate action, and the steps they can consider in 2021 to help develop inclusive and effective climate plans.

Gauging the threat of climate change

Climate-related disasters and extreme weather already impose high costs on US communities. Over the past five years, direct damage from the most severe storm, drought, flood, and wildfire events has averaged $107 billion per year, according to the National Oceanic and Atmospheric Administration.[4] The secondary and tertiary impacts of climate damage can be significant as well. In Florida, residential properties exposed to flooding have lost approximately $5 billion of value—a figure comparable to the $2 billion in average annual damages that storm surges cause to residential real estate in Florida.[5]

Climate hazards like these will inevitably get worse through 2030, since humans have added enough greenhouse gases to the atmosphere to continue trapping heat. What happens beyond then will depend on how much the United States and other countries reduce their greenhouse-gas emissions. Supposing that emissions rise unchecked, in a

[1] "Billion-dollar weather and climate disasters: Overview," NOAA National Centers for Environmental Information (NCEI), 2020, ncdc.noaa.gov.
[2] For more, see Brodie Boland, Hauke Engel, Mekala Krishnan, Dickon Pinner, Carter Powis, Hamid Samandari, and Jonathan Woetzel, "Climate risk and response: Physical hazards and socioeconomic impacts," McKinsey Global Institute, January 2020, McKinsey.com.
[3] For more, see Kimberly Henderson, Dickon Pinner, Matt Rogers, Bram Smeets, and Christer Tryggestad, "Climate math: What a 1.5-degree pathway would take," *McKinsey Quarterly*, April 2020, McKinsey.com.
[4] "Billion-dollar weather and climate disasters: Overview," NOAA National Centers for Environmental Information (NCEI), 2020, ncdc.noaa.gov.
[5] Hauke Engel, Claudia Kampel, Mekala Krishnan, Dickon Pinner, Hamid Samandari, Marlies Vasmel, and Jonathan Woetzel, "Will mortgages and markets stay afloat in Florida?," April 2020, McKinsey.com.

scenario known as Representative Concentration Pathway 8.5 (RCP 8.5), climate models predict the following dire outcomes[6]:

— *Extreme heat.* According to projections by McKinsey and the Woodwell Climate Research Center, the number of lethally hot days would increase across the United States (Exhibit 1). Most Florida and Texas counties would see more than 30 such days per year by 2050, up from about nine per year now. Extreme heat is particularly harmful to people 60 years and older; studies show that they account for the vast majority of excess mortality during heat waves.

— *Hurricanes and coastal flooding.* McKinsey projections point to stronger, more destructive hurricanes. By 2050, the likelihood of a "one in 500 years" hurricane landing along the Gulf Coast would be more than double what that same likelihood was between 1981 and 2000 (Exhibit 2).

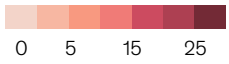
— *Drought.* California's 2011–17 drought caused widespread water shortages and a related pine-beetle infestation, killed more than 100 million trees, and increased the risk of wildfires. That could be a preview of a multi-*decade*-long drought that has an 80 percent likelihood of striking the Central Plains and Southwest in a high-emissions scenario (up from 12 percent between 1950 and 2000).[7]

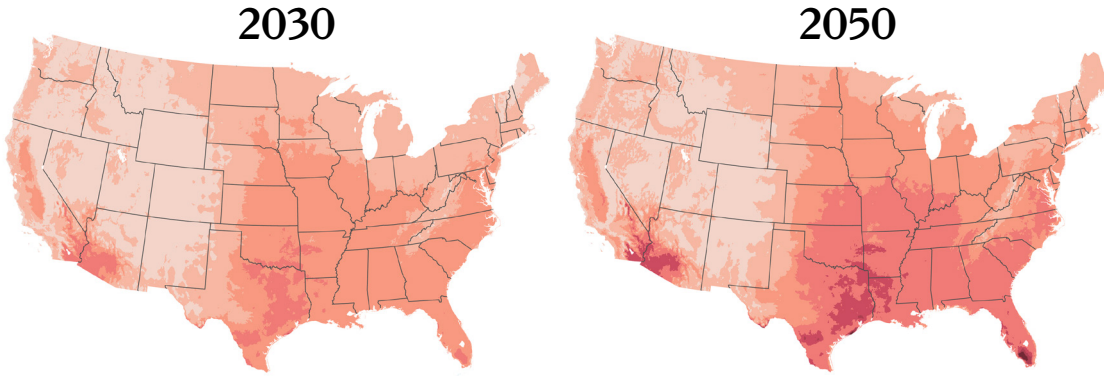
— *Extreme precipitation.* When precipitation does fall, it is expected to come in fewer, more extreme weather events. The Fourth National Climate Assessment says all regions will face a greater likelihood of heavy rainstorms, which can cause flooding and do less to irrigate crops and recharge aquifers than lighter storms. By 2050, the frequency of extreme precipitation events (those which historically occurred no more often than once every five years) is expected to increase by at least 50 percent in every region, while the frequency of moderate rain events will decline.[8]

Exhibit 1

Lethally hot days are likely to happen more often if carbon emissions increase over the next 30 years.

Projected increase in annual number of days above 34°C wet-bulb temperature, compared with 1986–2005



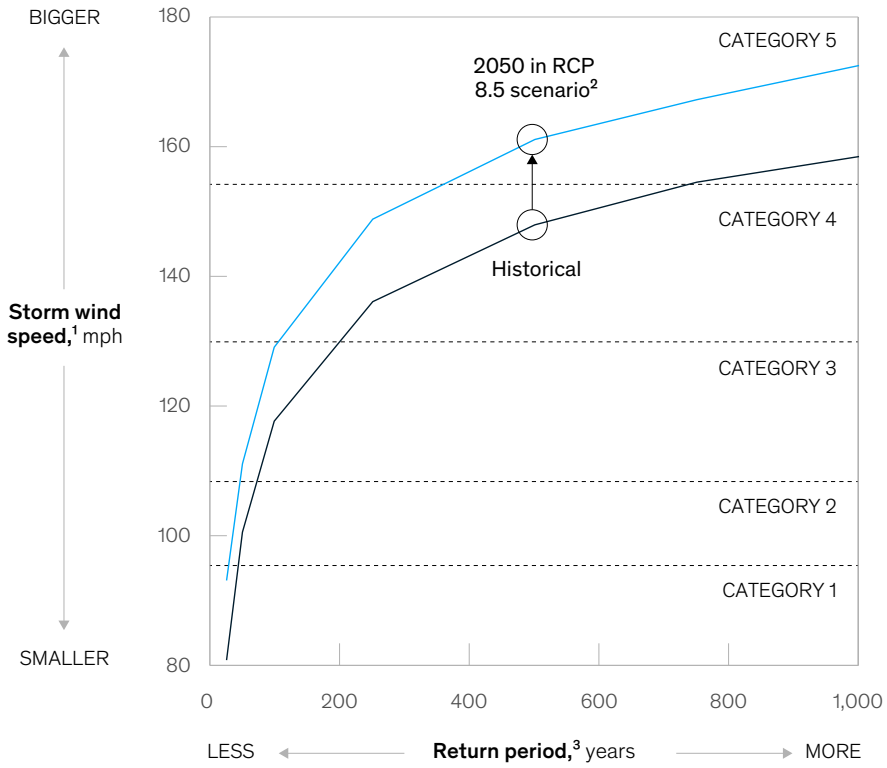


[6] We use the Representative Concentration Pathway 8.5 scenario for atmospheric CO_2 concentration to assess physical risk in the absence of further decarbonization.
[7] Toby R. Ault, Benjamin I. Cook, and Jason E. Smerdon, "Unprecedented 21st century drought risk in the American Southwest and Central Plains," *Science Advances*, February 2015, Volume 1, Number 1, advances.sciencemag.org.
[8] D. R. Easterling et al., "Precipitation change in the United States," in *Climate science special report: Fourth National Climate Assessment, volume I*, eds. D. J. Wuebbles et al., Washington, DC: US Global Change Research Program, 2017, pp. 207–30, globalchange.gov.

Exhibit 2

Rising carbon emissions would likely mean that Gulf of Mexico hurricanes become more intense.

Storm severity and storm regularity by 2050



A storm with similar frequency may become more intense

An event with a probability of occurring approximately once every 500 years could intensify from being a Category 4 storm today to being a Category 5 storm by 2050

[1]A measure of how severe the storm is. Based on data provided by WindRiskTech for maximum wind speeds of simulated future hurricane tracks crossing through offshore waters in the Gulf of Mexico.
[2]RCP 8.5 (Representative Concentration Pathway 8.5) is a high-emissions scenario used, for this analysis, to assess physical risk in the absence of further decarbonization.
[3]Estimated average time between events of a particular severity. The higher the return period, the less frequently a storm of that size will occur.
Source: WindRiskTech

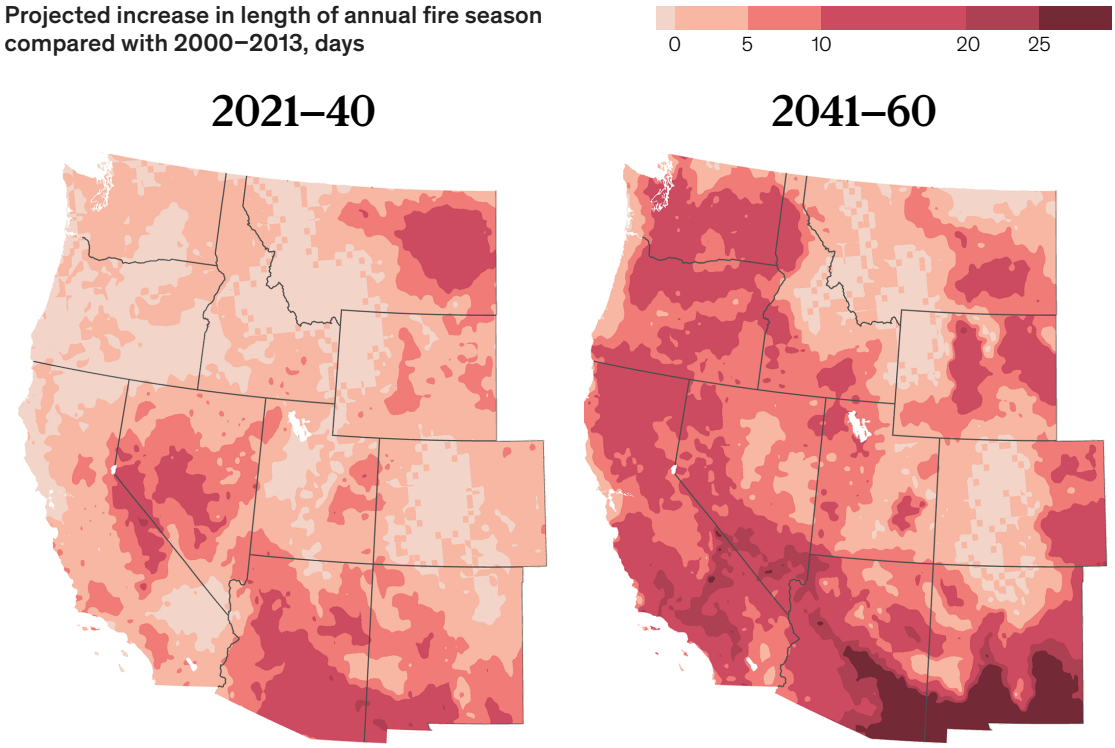
— ***Wildfire.*** Projections from the Woodwell Climate Research Center indicate that by 2050, heat and drought will add three to four weeks of severe wildfire risk in California, Oregon, and Washington (Exhibit 3). As it is, fire season stretches more than 100 days in most of the Northwest and more than 200 days in most of the Southwest.

Failing to mitigate emissions or adapt to hazards like those described above would expose the United States to substantial risk. Impact analysis prepared for the Fourth National Climate Assessment makes that clear. It estimates that by 2050, under a high-emissions scenario, extreme heat could wipe out $44 billion of labor productivity per year, and direct damages to coastal properties from storms and sea-level rise could reach $75 billion annually.[9] The second- and third-order effects of these hazards would add to those costs.

[9] *Multi-model framework for quantitative sectoral impacts analysis: A technical report for the Fourth National Climate Assessment*, US Environmental Protection Agency, May 2017, epa.gov.

Exhibit 3

In a high-emissions scenario, the wildfire season in the western United States would likely get considerably longer.



Source: Woodwell Climate Research Center

Still, for state and local government leaders it could be difficult to justify taking aggressive action to prevent the long-term effects of climate change—especially now, when many are focused on the COVID-19 pandemic and its socioeconomic impact. However, responding to climate change now not only helps lessen long-term risks but also can form a part of the solution to states' current challenges by delivering economic and health benefits in the near term.

The near-term benefits of climate action

Responding to climate change requires action on two fronts: adaptation, which consists of preparing communities for the physical climate risks that are (and will be) unavoidable because of historic emissions, and decarbonization, which means lowering greenhouse-gas emissions to prevent the further warming that increases physical risks.[10] Such efforts could both improve the well-being of future generations *and* generate sizable benefits in the near term. Indeed, the four near-term benefits outlined below may be compelling to communities across the United States.

Climate action can help stimulate the economy

Short-term public stimulus spending is a time-tested way of creating jobs and revitalizing local economies after a downturn such as that caused by the pandemic. Low-carbon investments appear to be particularly effective in that regard.[11] According to a recent survey of prominent economists, renewable-energy, energy-efficiency, and climate-resilience

[10] For more, see Kimberly Henderson, Dickon Pinner, Matt Rogers, Bram Smeets, and Christer Tryggestad, "Climate math: What a 1.5-degree pathway would take," *McKinsey Quarterly*, April 2020, McKinsey.com.

[11] Sophie Bertreau, Peter Cooper, Hauke Engel, David Fine, Alastair Hamilton, Solveigh Hieronimus, Sebastien Leger, Tomas Nauclér, Dickon Pinner, and Matt Rogers, "How a postpandemic stimulus can both create jobs and help the climate," May 2020, McKinsey.com.

projects tend to create more jobs than projects that are environmentally neutral or harmful.[12] Another study found that public-transportation works funded by the American Recovery and Reinvestment Act (ARRA) generated 70 percent more job-hours than highway projects.[13]

To illustrate the possible stimulus benefits of climate action for US communities, we examined the job-creation and economic-productivity impact of an illustrative set of climate-adaptation and decarbonization measures (Exhibit 4). On average, the measures we looked at create ten jobs per million dollars invested and have a 1.5-times multiplier effect on economic productivity. Natural-capital solutions, such as urban forestry and mangrove restoration, create more jobs per dollar invested than infrastructure investments that address the same climate hazards.

Adaptation protects against imminent threats

When Hurricane Michael hit Mexico Beach, Florida, in 2018, the Category 4 storm damaged more than three-quarters of the buildings along one mile of the beach. The only beachfront home left standing on one block had been elevated to avoid storm surges and built to withstand wind speeds of 250 miles per hour—a symbol of how unprepared the United States

Exhibit 4

Climate adaptation and decarbonization measures can produce sizable economic benefits in the near term.

Economic benefits of climate adaptation and decarbonization

Type	Measure	Jobs per $ million	Average salary, $	GVA[2] multiplier	Ease of implementation	Speed
Heat adaptation 	Urban forestry	16–23	40,000	1.80×	Medium	<6 months
	Subsidize AC for low-income seniors	5–6	40,000	1.27×	Easy	<3 months
Flood adaptation 	Sea walls	10–11	45,000	1.57×	Hard	>12 months
	Mangroves	16–20	40,000	1.35×	Medium	>12 months
Transport decarbonization 	Subsidize municipal transit operations	16–23	50,000	1.60×	Medium	<6 months
	Expand EV[1] charging networks	10–22	55,000	1.44×	Medium	<6 months
Electricity decarbonization 	Solar rooftops	9–13	55,000	1.50×	Medium	<6 months
	Home electrification[3]	13–14	60,000	1.57×	Medium	<6 months

[1]Electric vehicle.
[2]Gross value added.
[3]For example, electric heat pumps.

[12] Cameron Hepburn et al., "Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change?," *Oxford Review of Economic Policy*, Volume 36, Number 1, May 2020, pp. 359–81, academic.oup.com.
[13] Stephen Lee Davis, Beth Osborne, and Will Schroeer, *Learning from the 2009 Recovery Act: Lessons and recommendations for future infrastructure stimulus*, Smart Growth America, April 2020, smartgrowthamerica.org.

is to cope with physical climate risk.[14] While some communities have taken steps to reduce climate risk, the pace and scale of adaptation must increase in the next several years to protect lives and livelihoods against ever-more intense floods, wildfires, storms, and droughts. Fortunately, investments in adaptation have a track record of success.

A review of $590 million in projects to protect utilities and transport against flooding, wind, and other natural disasters estimated that the projects will save society $2.5 billion of costs and damages. Another review estimated that $27 billion of federal grants to protect against natural hazards, made since 1995, prevented $160 billion of costs and damages, more than 600 deaths, and more than 1 million injuries.[15] Many frontline communities have considered the cost–benefit calculus and chosen to pay for greater action themselves. In 2017, voters in Florida's Miami-Dade County passed a $400 million bond measure intended to provide nearly $200 million for citywide flood resilience. Three years later, the residents of Key Biscayne, Florida, passed a similar $100 million bond.

In an era of budget constraints, some state and local leaders have chosen to pursue adaptation through policies and regulations that require only modest public expenditures. Insurance requirements are one example of such policies. Although homes with federally backed mortgages in high-risk flood plains must have flood insurance, just 30 percent of homes in the highest-risk flood plains have this type of insurance.[16] State governments can expand flood-coverage requirements or provide incentives for homeowners to buy flood insurance. Many states also require insurers to discount premiums when owners take measures to mitigate hazards.[17]

Updates to building codes can also be considered. Analysis from the National Institute of Building Sciences has found that every private dollar invested in constructing or retrofitting buildings to meet or exceed official codes saved between $2 and $10 in avoided damages due to climate events.[18] Other possible interventions at the state and local level include requirements to disclose property risks from floods or wildfires and restrictions on property development in high-risk areas.

Decarbonization can support health and environmental justice

Fossil-fuel combustion not only contributes to climate change but also pollutes the air. In the United States, the problem is widespread: 45 percent of Americans live in counties with unhealthy levels of ozone or particle pollution,[19] and air pollution causes between 100,000 to 200,000 deaths per year.[20] As the 2015 federal Clean Power Plan acknowledged, exposure to fine particulates ($PM_{2.5}$) and ozone causes myriad additional impacts including worsening asthma, increased hospital admissions, and missed days of work. Climate change is expected to make matters worse because hotter temperatures tend to increase the number of high-ozone days and more frequent wildfires will generate more particulates.

Air pollution can have a disproportionate impact on minority communities. A 2018 study by researchers at the National Center for Environmental Assessment, a division of the Environmental Protection Agency, found that Black Americans are exposed to 50 percent more fine particulates from burning fossil fuels than the population at large.[21] In designing decarbonization pathways, cities and states have the opportunity to prioritize the closure of facilities that have the most significant health impacts.

[14] Patricia Mazzei, "Among the ruins of Mexico Beach stands one house built 'for the Big One,'" *New York Times*, October 14, 2018, nytimes.com.
[15] Multihazard Mitigation Council, *Natural hazard mitigation saves: 2019 report*, National Institute of Building Sciences, 2019, nibs.org.
[16] *2019 national preparedness report*, FEMA, 2019, fema.gov.
[17] Carolyn Kousky and Helen Wiley, *The role of insurance in coastal adaptation: Workshop findings*, Wharton Risk Management and Processes Decision Center, University of Pennsylvania, March 2020, riskcenter.wharton.upenn.edu.
[18] *Natural hazard mitigation saves*, 2019.
[19] "The state of the air 2020," American Lung Association, 2020, stateoftheair.org.
[20] Sumil K. Thakrar, "Reducing mortality from air pollution in the United States by targeting specific emission sources," *Environmental Science and Technology Letters*, September 2020, Volume 7, Number 9, pp. 639–45, pubs.acs.org.
[21] Ihab Mikati et al., "Disparities in distribution of particulate matter emission sources by race and poverty status," *American Journal of Public Health*, April 2018, Volume 108, Number 1, pp. 480–5, ajph.aphapublications.org.

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State leaders are already transitioning their economies from fossil fuel to clean energy. For example, California intends for all passenger-car sales to be electric by 2035, and New York has a statutory deadline to fully decarbonize power generation by 2040. These actions can have significant health benefits in the near term in addition to reducing long-term climate risks. Rapidly phasing out fossil-fuel power generation and internal combustion engines nationwide could save 1.4 million American lives over the next 20 years, lower healthcare expenses, and increase labor productivity. These societal benefits—potentially worth as much as $700 billion per year—could more than offset the costs associated with an early transition to a zero-carbon economy.[22] While the federal government is expected to implement policies that accelerate the energy transition, state support and collaboration will be critical to reaching a net-zero-emissions economy.

Planning can strengthen local economies as fossil-fuel demand wanes

With sound decarbonization plans, state and local officials could help avert costly disruptions and secure economic opportunities as US communities shift from hydrocarbon energy to renewable energy. Over 200 gas plants, totaling more than 70 gigawatts of new capacity, are planned or in development.[23] Depending on the speed with which the power sector decarbonizes, there is an increasing risk that added gas-power capacity would go unused or be underutilized, even as ratepayers still have to cover the capital costs. This risk is particularly acute given multiple studies that show building new wind and solar projects will provide cheaper power than operating existing gas plants within this decade.[24] States can help spare ratepayers those expenses by requiring that utility commissions account for the risk of "stranded assets" when considering rate cases. Authorities can also explore options such as securitization to reduce the burden that stranded assets place on utility balance sheets and on ratepayers.

Planning for structural economic changes in communities that rely on coal, oil, and gas is also a critical consideration in decarbonization planning. In North Dakota, for example, fossil-fuel businesses employ roughly 6 percent of the workforce. However, North Dakota also has abundant wind resources and the opportunity to create clean-energy jobs. McKinsey estimates that investments in wind-power generation, electric-power transmission, methane-leak detection and repair, and home retrofitting consistent with a pathway to zero emissions by 2050 could sustain approximately 13,500 jobs over the next decade. In the long term, there is potential for additional job opportunities from companies and workers using their natural-resources expertise to grow industries such as those that produce geothermal energy, use technologies for carbon capture and storage, and manufacture hydrogen from both natural gas and wind power.

[22] *Health and Economic Benefits of a 2°C Climate Change Policy: Hearings on the Devastating Health Impacts of Climate Change before the House Committee on Oversight and Reform*, 116th Congress, August 5, 2020, (statement of Drew Shindell, Nicholas Distinguished Professor of Earth Science, Duke University).
[23] Richard Martin and Stephanie Tsao, "Overpowered: Why a US gas-building spree continues despite electricity glut," S&P Global, December 2, 2019, spglobal.com.
[24] Ibid.

Best practices for an integrated climate and economic-recovery response

Detailed climate-response plans address a comprehensive set of economic, environmental, and social considerations. That can be most effectively done by developing climate-response plans and economic-development plans as part of a single integrated exercise, rather than carrying out these planning efforts separately and trying to reconcile them after the fact (Exhibit 5). Inevitably, creating these plans involves making tough choices. Experience suggests that leaders can balance competing interests more effectively by adhering to four practices: developing a thorough understanding of climate-risk exposure, including stakeholders from the public and private sectors; bringing equity to the forefront of risk analysis and response planning; and prioritizing response measures with quantifiable, objective criteria.

Developing a thorough, highly localized understanding of climate risks

To allocate resources effectively among climate-response efforts, officials can benefit from a thorough, location-specific understanding of physical risks and transition risks. Exposure levels range considerably because of differences among various factors, including current and projected climatic conditions, the composition of economies, the demographic profiles of populations, and fiscal situations. For example, damage from extreme-weather events amounts to more than 1.0 percent of GDP in seven states; in 21 states, it is less than 0.1 percent. Those differences determine what adaptation measures are necessary. States with emissions-intensive economies might need to prepare more for the low-carbon transition (Exhibit 6).

Exhibit 5

A structured approach can help policy makers incorporate climate response in states' long-term economic plans.

Approach structure for climate action

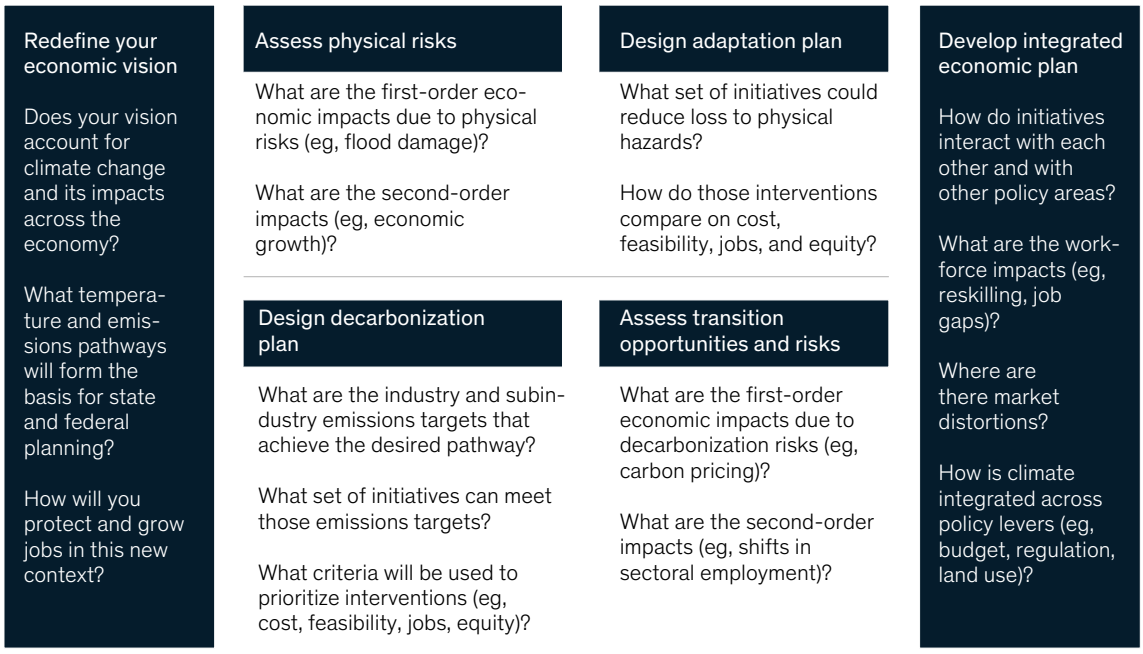
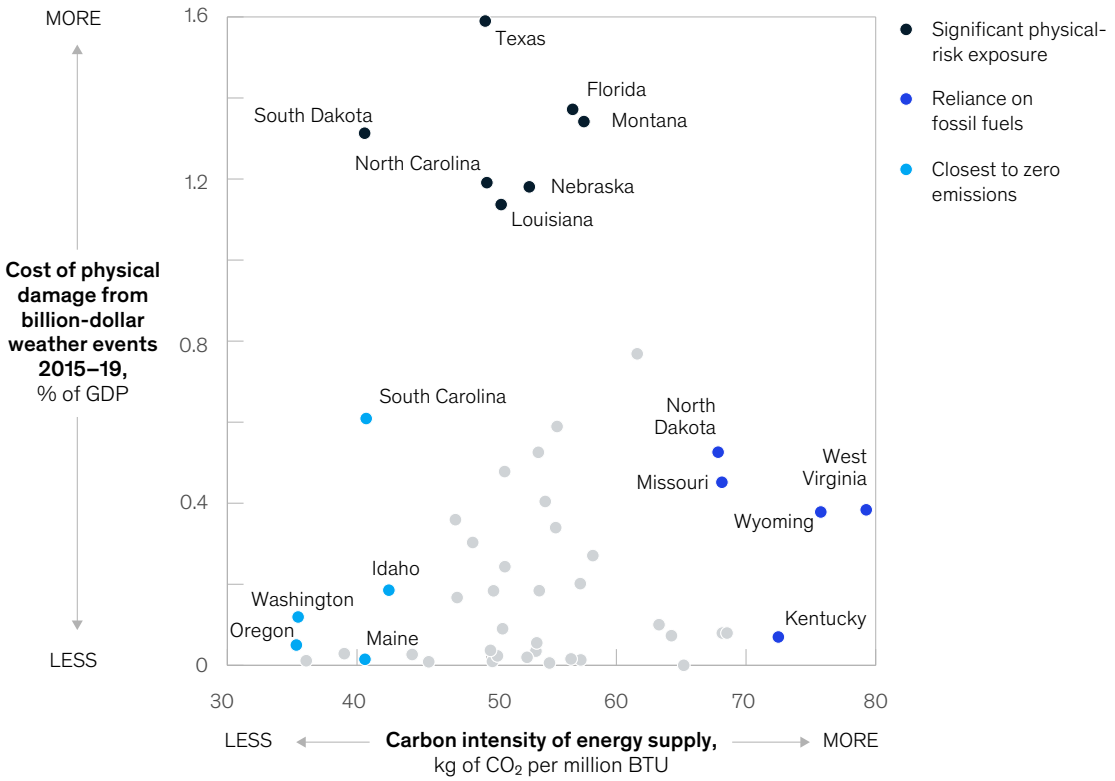


Exhibit 6

Physical climate risk and carbon intensity of energy supply vary considerably among states.

Physical climate risk and carbon intensity of energy supply, by state



Source: State Energy Data System, US Energy Administration, eia.gov; "Billion-dollar weather and climate disasters: Overview," NOAA National Centers for Environmental Information, 2020, ncdc.noaa.gov

New tools and techniques, such as geospatial climate analytics and economic models of decarbonization pathways, can help states assess physical risks and transition risks across multiple dimensions. One dimension is space: risks vary not only among states but also among regions within states. A detailed spatial understanding of risk can help state and local land-use planners avoid making decisions that increase exposure. Another dimension is extent. Risk assessments should take in both direct, or first-order, economic impacts as well as second- and higher-order impacts.

Time is also a crucial dimension of climate-risk analysis, given that climate hazards will worsen as warming continues. Many projections will show increases in damage that might be prevented through immediate action. For example, McKinsey analysis shows that the continued buildup of residential real estate in Florida could increase the potential damage from a 100-year storm surge by 50 percent. To anticipate risks like these, decision makers can shift from basing their assessments on historical records to basing them on projections from climate models. These tools can also help officials determine which risks will remain steady or decline, so they can avoid taking unnecessary protective measures. States can also identify climate risks that might affect their pension funds by calling on companies in their portfolios to disclose both physical and transition risks.

Including stakeholders from the public and private sectors

Although many components of climate risk can be quantified, weighting those aspects and determining what to do about them is a highly subjective exercise. Stakeholders will have different opinions about what assets—physical, financial, natural, cultural, and others—are worth and how important it is to protect them. In addition, climate-response plans require participation and action from many different stakeholders, not just those in the government. For these reasons, it's important for government leaders to take a highly inclusive approach to analyzing climate risk and to planning responses.

Two examples help to illustrate that approach. First, after two one-in-500-years hurricanes struck North Carolina in two years, the state's government launched a climate-risk assessment and resiliency effort. Representatives of every state agency, experts from state universities, and public participants formed an integrated perspective of physical climate risk and a corresponding plan to build resilience. Second, New York has begun planning to decarbonize the state's economy by 85 percent or more by 2050. A statewide steering committee of agency and local leaders, along with private stakeholders, is coordinating efforts to map how each sector of the economy will reduce emissions.

State governments are well positioned to convene relevant stakeholders, including regulators, agency officials, business leaders, heads of economic-development organizations, and community representatives. Government leaders can provide the framework for mapping the interests, concerns, and contributions of stakeholders and aligning them with the shared objective of lowering climate-risk exposure.

Bringing equity to the forefront of risk analysis and response planning

One issue in climate planning warrants special attention: the unequal, regressive nature of climate risk. We noted above that minorities in the United States are disproportionately exposed to pollution. Many other forms of injustice exist. Low-income and minority communities are expected to suffer most as climate hazards increase, because they are more vulnerable to acute climate events and chronic hazards and often less able to pay for protection or recovery. These communities are also less likely to benefit from government-funded adaptation and decarbonization measures.[25]

For example, FEMA has found that households with federally subsidized flood insurance in the highest-risk flood zones have a median annual household income that is $37,000 more than households without flood insurance. That finding indicates that many low-income households with similar flood risk are unable to access primary federal resilience programs. Equity in public expenditure is a particular concern in flood-resilience programs, where a primary consideration is often the avoided loss to property. However, an effort that prioritized neighborhoods for flood-protection investment purely by property value would mean that wealthier neighborhoods get more funding. The low-carbon transition will also have concentrated geographic impacts, particularly in rural communities where fossil-fuel extraction and power generation are mainstay industries.

Leaders could help address inequities by systematically identifying the disproportionate risks and impacts on local communities and targeting interventions to help them. Investments in zero-carbon infrastructure can be accelerated in locations where fossil-fuel jobs are projected to decline. State leaders can model and quantify the economic impact on low-income neighborhoods and use it as a factor when prioritizing climate actions.

As a simple but concrete example, cooling centers can effectively protect a city's most vulnerable people (for example, low-income seniors) against extreme heat, since visiting air-conditioned facilities can reduce the risk of mortality by up to two-thirds during heat waves.[26] Similarly, home-weatherization programs targeted toward low-income households could help them cope better with extreme heat and also lower their energy bills.

[25] *Greater impact: How disasters affect people of low socioeconomic status*, SAMHSA, July 2017, samhsa.gov.
[26] Stasia Widerynski et al., *The use of cooling centers to prevent heat-related illness: Summary of evidence and strategies for implementation*, Centers for Disease Control and Prevention, August 2017, cdc.gov.

Prioritizing response measures using quantifiable, objective criteria

To derive the most benefit from adaptation and decarbonization initiatives, state officials could evaluate them using a common framework that includes three considerations: societal costs and benefits, job growth, and feasibility.

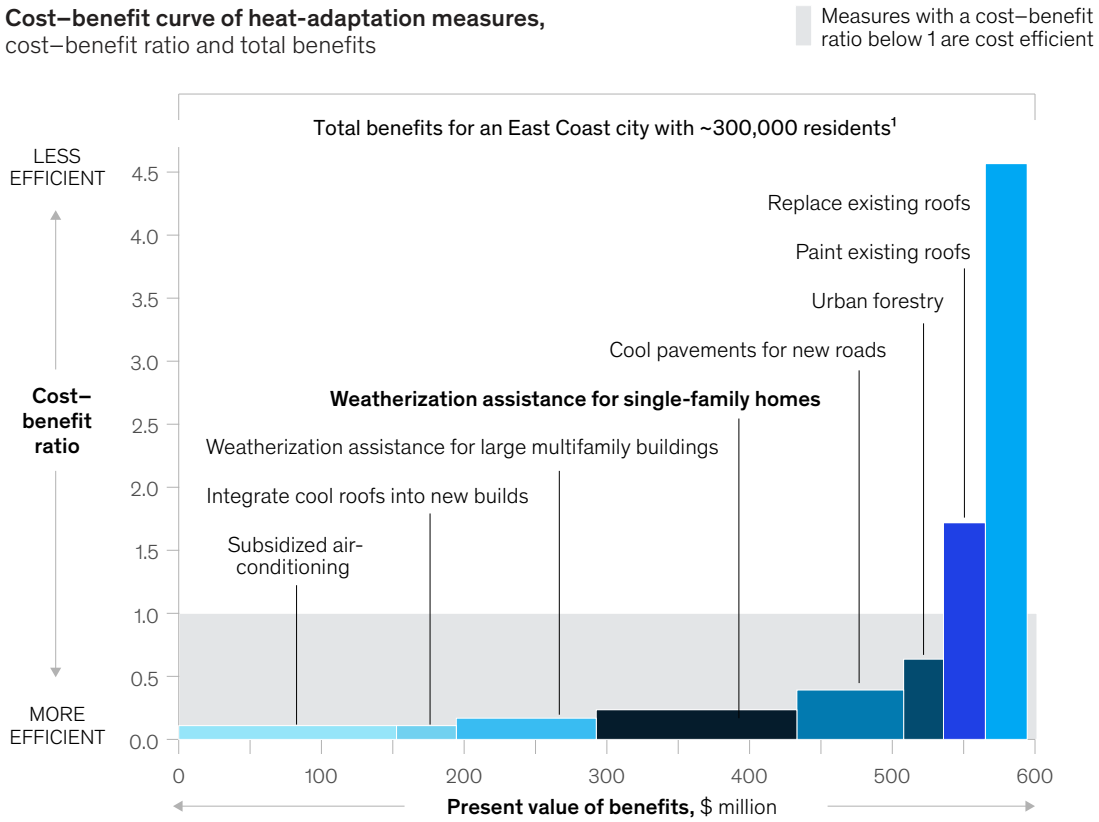
Analyzing costs and benefits can enable officials to compare large numbers of climate-response measures on a level playing field. This mode of analysis should account for a meaningful array of costs and benefits. For example, a cost–benefit analysis of measures for adapting to extreme heat that omits the benefit of reduced mortality would indicate that certain lifesaving initiatives have less value. According to our analysis of such measures for an East Coast city, weatherization assistance for single-family homes provides about $4 in benefits for each dollar of cost, with half the benefit coming from improved health outcomes (Exhibit 7). Consulting a diverse set of stakeholders, as discussed above, is one way for officials to make sure their cost–benefit analyses reflect constituents' priorities.

Another consideration for assessing climate-response measures, especially in times of economic difficulty, is job growth. Air-conditioning subsidies for low-income seniors are more cost-effective for mitigating climate risk than urban forestry, largely

Exhibit 7

Cost–benefit analyses can help officials compare climate solutions if they include a meaningful array of factors.

Cost–benefit curve of heat-adaptation measures, cost–benefit ratio and total benefits

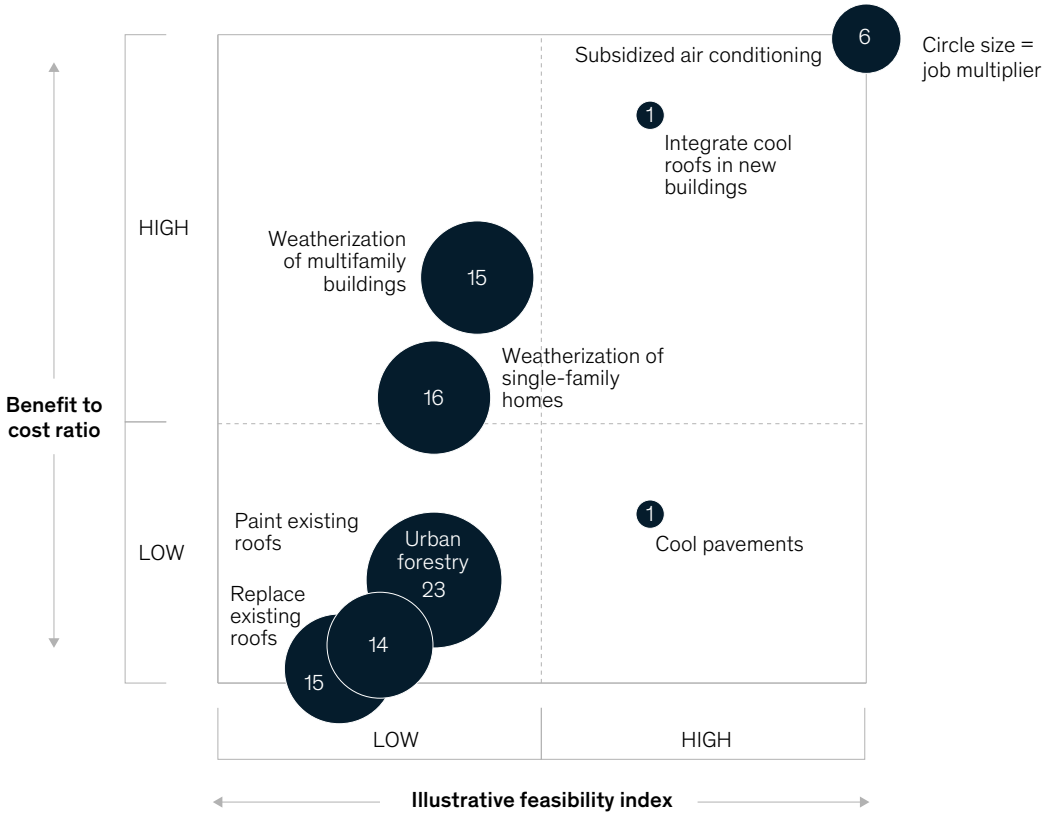


Breakdown of benefits from weatherization of single-family homes, $ million

[1]Excluding jobs and economic stimulus.

Exhibit 8

Looking at factors other than cost–benefit ratio can help policy makers select climate measures that meet other social objectives, such as job creation.



because they directly reduce heat-related mortality. But these subsidies produce little job growth, whereas urban forestry projects create 16 to 25 jobs per million dollars of spending.

Finally, officials may want to consider the feasibility of climate-response measures. For example, a requirement that new buildings use highly reflective roof surfaces, which reduce the urban-heat-island effect, offers a solid cost-to-benefit ratio, creates many jobs, and can be implemented with relative ease. A framework that brings together all three considerations can help state officials make better comparisons (Exhibit 8).

By getting in front of climate change today, US communities can position themselves to seize opportunities as the transition to a resilient zero-carbon economy plays out. With a strong case for action and a thorough, inclusive planning approach, state and local leaders can set and implement climate-response agendas that serve their communities well both in the near term and for years to come.

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