Center for American Progress

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State Future Funds

Jumpstarting Investments in Low-Carbon and Resilient Energy and Transportation Infrastructure

By Cathleen Kelly June 2015

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Introduction and summary

Ask 50 governors or 100 mayors or 1,000 city council members to name their biggest challenges in serving their constituents and it's a safe bet that a lack of money will top the list. Across the country, state and local leaders face budget shortfalls that, in some cases, are preventing them from accomplishing even the most basic tasks, from repairing roads, to training first responders, adequately maintaining schools, and providing critical social services.

The need to upgrade the nation's infrastructure looms large. In 2013, the American Society of Civil Engineers gave America's aging energy and public transit infrastructure grades of D+ and D, respectively.[1] In the nation's first-ever Quadrennial Energy Review, or QER, released in April 2015, federal energy experts highlight the growing vulnerability of the nation's electrical grid to extreme weather and terrorist threats and the need for public and private investment to modernize the country's energy infrastructure.[2] The QER authors assert that upgrading the U.S. electrical grid—including grid storage, transmission, and power system operations—would allow for better integration of renewable energy into the national energy mix, reduce carbon pollution, help curb climate change, improve air quality and public health, and increase the reliability of electricity delivery in the face of more extreme weather. In addition, increasing the use of microgrids, or localized grids—which can be disconnected from the traditional grid to operate autonomously—and the use of distributed generation—or power generated at the point of use—can help communities keep the lights on when the larger system goes down in a storm or is otherwise disrupted.[3] Microgrids and distributed generation that use renewable energy, such as wind and solar, can help to improve energy system reliability while also reducing carbon pollution and improving air quality.[4]

Similarly, expanding public transit services—including metros and subways, buses, passenger trains, trams, and other light rail—would help to provide public transportation options to the roughly 45 percent of American households that lack access to public transit and the millions more who are making do with inadequate transit services.[5] Public transit systems and bike and walking paths improve mobility,

which in turn expands access to jobs. It also increases transportation options that are important not only for everyday needs such as traveling to and from work or school, but are also critical in times of emergency, particularly in terms of getting people to safety before extreme weather hits. Moreover, by taking cars off the road and reducing traffic congestion, public transit and bike and pedestrian paths improve air quality and public health.

For all of the above reasons, state and local leaders have asked the federal government for a financial and technical boost to build low-carbon and resilient energy and public transportation infrastructure.[6] President Barack Obama made a positive step in that direction in November 2013 when he established the State, Local and Tribal Leaders Task Force on Climate Preparedness and Resilience to advise the federal government on how to strengthen community resilience to extreme weather and climate change.[7] In response to its charge, the task force has recommended federal support for planning and investments in climate resilient, efficient, and low-carbon transportation and energy systems.[8] Congress could answer the call to support state and community-based preparedness and climate change mitigation efforts by replicating existing state loan programs that have successfully helped states preserve the nation's waters for recreational use and, since the mid 1990s, deliver safe drinking water for 95 percent of Americans. Those loan programs—specifically, the Clean Water State Revolving Fund and the Drinking Water State Revolving Fund—were created and capitalized by Congress.[9]

Today, federal lawmakers can similarly partner with states and localities to address pressing energy and transportation infrastructure needs by establishing what CAP calls State Future Funds—proposed new revolving loan funds designed to supplement state and local government resources.[10] State Future Funds would help states and localities cut carbon pollution and improve community resilience to extreme weather events, which are increasing in number and severity, along with other associated shocks.

As envisioned, State Future Funds would combine federal resources with state, local, and private sector dollars to expand investments in low-carbon and resilient energy and transportation infrastructure, including in low-income and tribal communities. State Future Funds would offer a host of benefits, including improving public health and air quality, reducing traffic congestion and climate change risks, and increasing community access to good jobs, schools, and other valuable outcomes. In addition, State Future Funds would help states comply with the U.S. Environmental Protection Agency's, or EPA's, proposed Clean Power Plan, which calls on states to reduce reliance on fossil fuels and increase their use of clean energy.

Ideally, State Future Funds would have the following design features:

- **Deploying funds:** State Future Funds would give states new resources to offer low-interest or interest-free loans and to provide loan guarantees in order to support low-carbon and resilient energy and transportation infrastructure projects and planning.[11]

- **Developing investment plans designed with meaningful stakeholder engagement:** States would prepare annual investment plans based on meaningful engagement with local leaders, the public, and stakeholders, including low-income communities and tribes.

- **Assisting low-income communities and American Indian tribes:** Similar to the Safe Drinking Water Act, each state would be required to invest 30 percent of its annual State Future Fund capitalization grant in low-income areas. In addition, each state would be required to invest 2 percent of its annual State Future Fund capitalization grant in American Indian and Alaska Native villages that have not otherwise received State Future Fund grants.[12] If needed, states could offer low-income communities longer loan payback periods. States could also provide technical and financial assistance to build needed capacity to support low-carbon and resilient transportation and energy infrastructure in low-income areas, including energy efficiency improvements.[13]

- **Sharing the cost:** Each state would be required to contribute to its State Future Fund at least 20 percent of the total capitalization grant made to the state.[14]

States could use State Future Funds to support a wide range of low-carbon and resilient energy and transportation projects. For example, states could provide low-interest loans for smart grids, distributed renewable energy, microgrids, large-scale renewable energy generation facilities, and residential and commercial energy efficiency programs, including in low-income areas. To provide more sustainable and resilient transportation options, State Future Funds could provide loans for bus acquisition to help expand bus service, reduce flood and other extreme weather risks to existing public transit systems, and expand bike and pedestrian paths. States could also use State Future Fund resources to support long-term planning for low-carbon and resilient transportation and energy infrastructure and for job training. States could also support challenge grants or prizes to spark innovative infrastructure designs. Additional State Future Fund design features are offered in the report.

The reality is that state and local governments—and communities—are on the front lines when it comes to coping with crumbling and outdated infrastructure, traffic congestion, air pollution, more extreme weather driven by climate change, and growing inequities. Congress has the power to provide state and local officials with a remedy to the pressing on-the-ground challenges they confront daily. Specifically, by creating State Future Funds, Congress can support state and local efforts to build low-carbon and resilient infrastructure, strengthen communities and grow opportunities for all to prosper.

Poor air quality and climate change put Americans' health at risk

A recent discussion between President Barack Obama and some of the nation's top health care professionals highlighted[15] what experts have long forewarned:[16] Climate change can lead to more smog, longer allergy seasons, and higher rates of extreme weather-related injuries and illnesses, including heat stroke and insect-borne diseases. A recent American Thoracic Society survey revealed that 7 out of 10 doctors believe that increased air pollution due to climate change is worsening the severity of illnesses in their patients. Moreover, those same doctors expect that health risks related to air pollution—and by extension, climate change—will increase in the future.[17]

Low-income individuals and people of color are particularly vulnerable to climate-related health hazards. According to an analysis by the National Association for the Advancement of Colored People, or NAACP, "heat-related deaths among African Americans occur at a 150 to 200 percent greater rate than for non-Hispanic whites. Asthma, which is exacerbated by pollutants, affects African Americans at a 36 percent higher rate of incidence than whites."[18]

In the United States, the electricity and transportation sectors, respectively, are the two largest sources of carbon pollution—the primary driver of global climate change—and other greenhouse gas emissions.[19] These sectors together were responsible for 58 percent of total U.S. greenhouse gas emissions in 2013 and are major sources of sulfur dioxide and nitrogen oxide emissions, which are harmful to public health and the environment.[20] The transportation sector also emits fine particulate matter, or PM, along with volatile organic compounds, or VOCs, which also have adverse health effects.[21] Energy- and transportation- sector emissions are discussed in more detail below.

Disaster risks and costs are skyrocketing

According to the National Climate Assessment, or NCA, climate change is increasing the rate and intensity of extreme weather events, including hurricanes, heavy downpours, drought, and extreme heat.[22] The NCA also concludes that climate change effects—such as sea level rise, more intense storm surge, and heavier rain storms—are overwhelming existing and outdated flood protections and putting communities, businesses, and infrastructure at risk.[23] Similarly, risk management experts and insurance industry leaders have determined that the number, strength, and cost of extreme weather events has increased and are likely to continue to do so in the future.[24] For example, an analysis by the insurer Swiss Re indicates that a storm today causing $19 billion of physical damage and economic loss is considered a once-in-70-years occurrence.[25] But with climate change taken into account, models suggest that by the 2050s, the probability of a $19 billion event will grow to once in every 50 years.[26] Swiss Re estimates that such storms will cause a whopping $90 billion of damage in current dollars by the 2050s.[27] For this reason, the Government Accountability Office, or GAO, listed extreme weather at the top of its 2015 High Risk List for federally funded infrastructure, affordable housing, and other assets.[28]

A recent CAP analysis found that over the past four years—from 2011 to 2014—there were 42 extreme weather events that each caused at least $1 billion in damage.[29] Together, these disasters killed 1,286 people and triggered $227 billion in economic losses across 44 states.[30]

As experienced during Superstorm Sandy in 2012, more intense storms can devastate communities by damaging homes, businesses, public transportation, power plants, and other critical infrastructure. The National Oceanic and Atmospheric Administration, or NOAA, estimated that the total property, infrastructure, and economic activity losses caused by Superstorm Sandy were $65 billion.[31] Furthermore, Superstorm Sandy rebuilding and recovery efforts cost the federal government—and by extension taxpayers—$50 billion.[32]

Climate change risks are not equally shared

While all communities are affected by extreme weather events, in a world of growing inequities, extreme weather risks are not equally shared.[33] Recent extreme weather events such as Hurricane Katrina and Superstorm Sandy reveal that low-income communities bear the brunt of these natural disasters.[34] Storms easily damage poorly constructed housing and crumbling infrastructure, which are common

in low-income communities.[35] Environmental hazards from power plants, toxic-waste sites, and landfills, often built along-side low-income neighborhoods, create added risks for these communities during and after extreme storms.[36] Financial insecurity that can come in the form of lost wages and other financial hardships in the wake of an extreme weather can push already struggling families into poverty.[37]

With extreme weather events on the rise, low-income families are at a greater risk than ever before. According to a 2012 CAP analysis, on average, the counties harmed by many of the most expensive extreme weather events in 2011 and 2012 had a majority concentration of middle-and low-income households.[38] The typical household in counties hit by floods causing more than $1 billion in damage during the 2011–2012 timeframe earned a median income of $44,547 per year—a staggering 13 percent below the U.S. median income of $51,371 in 2012.[39]

Low-income communities are particularly vulnerable to flooding because they are often located in low-lying areas and lack the resources to respond to and recover from disasters. For instance, nearly 30 percent of low-income neighborhoods in New Orleans experienced moderate to heavy damage during Hurricane Katrina.[40] In addition, only one in five households in New Orleans owned a vehicle to help them evacuate, which compounded the vulnerability of people in low-income communities to Katrina's flood waters.[41]

Similarly, more than one-third of the people living in the path of Superstorm Sandy resided in government-assisted housing.[42] Reports estimated that roughly half of New York City's public housing residents—some 40,000 people—were displaced from their homes, either temporarily or permanently, by Superstorm Sandy.[43] In the immediate wake of Superstorm Sandy, many other public housing residents found themselves stranded in their dark and cold apartments, having to get by without heat, backup generators, emergency boilers, or working elevators.[44] Many were forced to endure these conditions because they had no other affordable place to stay or lacked a reasonable means of leaving their neighborhoods due to the shut-down subway system and because they did not have access to other public transit or transportation options, among other reasons.[45]

Extreme weather effects

Extreme weather makes it harder to keep the lights on

According to the Quadrennial Energy Review, extreme weather and climate change "is a leading environmental risk" to electricity transmission, storage, and distribution systems.[46] In 2012, Superstorm Sandy, for example, caused massive power outages across New York and New Jersey, leaving more than 8.5 million customers without power.[47] The QER authors found that historically, the leading causes of grid outages in the United States have been weather related.[48]

The effects of global climate change are well documented and immediate. Heat waves increase customer demand for air conditioning, which strains the grid and reduces the efficiency of electricity transmission and distribution.[49] Droughts constrain water supplies needed for hydropower and other types of power generation and for natural gas production.[50] Low water levels can cut off water-based transport routes for energy products.

Rising sea levels, more extreme storms, and more intense storm surges put at risk the roughly 100 power plants, substation, and other electric facilities in the contiguous United States that are located within 4 feet of local high tide.[51] The average global sea level has already increased 8 inches since 1880.[52] Experts expect seas to rise as much as an additional 6 feet by 2100, further increasing coastal flood risks.[53]

Wildfires can damage transmission and distribution infrastructure and cause power outages.[54] In addition, smoke and fine particulate matter from fires can cause transmission lines to shut down "by ionizing the air and creating an electrical path away from transmission lines," according to experts.[55] Not surprisingly, climate change is increasing wildfire risk factors by jacking up temperatures and lowering the level and occurrence of rain and snowfall and other forms of precipitation.[56] The average number of large wildfires in the western United States rose from 140 fires in the 1980s to 250 wildfires between 2000 and 2012.[57]

Lastly, warmer air temperatures heat up water in rivers and reservoirs that are needed by power plants for cooling.[58] When incoming or outflowing water gets too hot, power plants must reduce production or shut down temporarily to avoid unsafe conditions at the plant or violation of federal and state temperature regulations to protect local ecosystems.[59]

In addition to being vulnerable to the effects of climate change, the electricity sector is the largest sources of carbon pollution in the United States. In 2013, the electricity sector contributed 31 percent of total U.S. greenhouse gas emissions—the six gases that contribute to global climate change, including carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorinated chemicals, and sulfur hexafluoride.[60] The majority of U.S. electricity sector emissions come from the burning of fossil fuels such as coal, oil, and natural gas, used to produce electricity.[61] Fossil fuel-fired power plants are also responsible for 70 percent of the nation's sulfur dioxide emissions and 13 percent of nitrogen oxide emissions.[62] These emissions cause smog, acid rain, and visibility-reducing haze and are harmful to public health, ecosystems, and wildlife.[63]

Extreme weather is a risk to the transportation sector

Extreme weather events, storm surge, and sea level rise threaten the reliability and capacity of U.S. transportation systems, particularly in coastal areas. In addition, extreme weather events can disrupt the transportation networks that people depend on daily to get to work and school and that businesses rely on to deliver goods and services.[64] These disruptions can cause both large economic and personal losses.[65]

According to the NCA, the nation's roads, bridges, railways, ports, airports, light rail, subways, and other transportation systems are increasingly vulnerable to the impacts of climate change.[66] In 2011, the heavy rains and flood waters of Hurricane Irene damaged more than 2,000 roads, 1,000 culverts, 200 bridges, and more than 200 miles of railroad in Vermont alone.[67] Irene closed airports from Philadelphia to New York with an estimated 11,800 flights canceled.[68] In preparation for Irene, New York City shut down its subway system, the first time in the city's history that a weather event closed the subway.[69]

A year later, in October 2012, Superstorm Sandy hit the northeastern region of the United States. Called the "worst disaster for public transit systems" in the nation's history by the Hurricane Sandy Rebuilding Task Force, Sandy caused a transportation nightmare for more than half of America's public transit commuters as

subways, commuter rail, and buses ground to a halt.[70] Furthermore, major damage to transportation infrastructure created storm recovery delays, including seawater seepage at New York City's Brooklyn-Battery tunnel and flooding that closed eight New York City subway tunnels.[71] As metropolitan New Yorkers sought alternative means of commuting, roads were overwhelmed with personal vehicles that created hours of traffic gridlock.[72]

America's transportation sector, in addition to being highly exposed to climate change risks, is a second leading source of U.S. carbon pollution. In 2013, 27 percent of total U.S. greenhouse gas emissions came from the transportation sector, the majority of which is carbon pollution from burning gas and oil in cars.[73] The transportation sector is also responsible for 13 percent of the nation's primary fine particulate matter, or PM, emissions, 59 percent of nitrous oxide emissions, and 46 percent of volatile organic compound, or VOC, emissions.[74]

Community resilience to climate change and other shocks

As the public health, safety, and economic risks of climate change accelerate, communities are increasingly recognizing the need to strengthen their resilience to extreme weather events and other shocks such as economic recession. But what does community resilience actually mean? According to the NCA, a resilient community has "the capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment."[75]

For simplicity's sake, some describe resilience as the ability to bounce back from shocks. But, there is a growing movement that defines resilience as more transformational than simply bouncing back or returning to the status quo. There is an increasing amount of literature and analysis that characterizes resilience as an opportunity for communities to "bounce forward"—that is to say, become more sustainable and prepared to meet the challenges and risks of extreme weather and economic opportunities of the 21st century.[76] For example, in a 2015 report entitled "Bounce Forward: Urban Resilience in the Era of Climate Change," the Kresge Foundation and Island Press modernize the definition of urban resilience based on an extensive literature review and interviews with experts. The report defines resilience as, "the capacity of a community to anticipate, plan for, and mitigate the dangers—and seize the opportunities—associated with environmental and social change."[77] In other words, resilience is more than just withstanding stresses; it also includes the capacity to thrive under new circumstances as global temperatures rise.

In reality, resilience is possible over the long term only if society reduces greenhouse gas emissions and avoids the worst impacts of climate change.[78] In addition, there is rising recognition that, in a world of growing inequality and disproportionately high climate change risks in low-income areas, equity is crucial to building resilient communities.[79] Island Press and the Kresge Foundation assert:

In an increasingly unequal world, the affluent are well-positioned to seize the opportunities that come with change and shield themselves from harm, while the disadvantaged and marginalized face disproportionate risks. These dynamics are self-perpetuating: the affluent consolidate their gains while the poor fall farther behind. Equity, then is central to resilience.[80]

For these reasons, there is a growing number of cities, community advocates, and experts who see resilient communities as those that not only plan for changes that are already under way or anticipated, but also reduce carbon pollution as a way to curb anticipated climate change risks. At the same time communities work to reduce emissions, they can simultaneously fostering greater social cohesion, equity, and inclusion.[81]

Take the example of New York City. Recognizing that resilience, equity, curbing climate change, and sustainable development are the building blocks of a livable city, Mayor Bill de Blasio recently renamed and updated the city's sustainability and resilience plan. Now called OneNYC—previously named PlaNYC—the plan includes the goal to lift 800,000 New Yorkers out of poverty by 2050 and reduce premature mortality rates by 25 percent, alongside the city's greenhouse gas reduction and sustainability targets.[82] OneNYC aims to make New York City more equitable, resilient, and sustainable for all city residents.

Across the country, similarly forward-thinking local governments are working to reduce extreme weather risks in low-income communities while increasing living standards in those communities. Washington, D.C., and Portland, Oregon, have made equity core principles in their climate preparedness plans.[83] By building relationships with community-based organizations, officials in both cities are engaging residents in the planning process. Similar efforts are underway in Seattle, San Francisco, and Oakland, California.[84] By meaningfully engaging community advocates, residents, and others stakeholders in the planning process, city leaders can build trust and ensure that their resilience plans adequately address the real risks and challenges facing communities.

Building reliable electricity and transit systems

Low-carbon energy system resilience

Given that the electricity sector is highly vulnerable to extreme weather events and is the leading sources of carbon pollution in the United States, state and local leaders have identified a host of strategies to strengthen energy system resilience, including developing cleanly sourced, distributed microgrids.[85] Similarly, the QER recommends that governments and the private sector invest in improving the reliability of the nation's energy infrastructure. For example, the QER authors suggest more support for efficient energy use, rapid adoption of renewable energy, clean energy storage, distributed generation, and smart grid and long-distance electricity transmission technologies that would make electricity delivery more reliable and cut carbon pollution.

Superstorm Sandy revealed several powerful lessons for increasing electricity sector resilience. The Co-op City housing complex in the Bronx neighborhood of New York City, for example, maintained power during Superstorm Sandy because it is equipped with a microgrid that disconnected temporarily from the centralized power system.[86] Likewise, the majority of New York University's buildings at its downtown Manhattan campus kept power during the storm due to reliance on a combined heat and power system, which allowed the campus to disconnect from the grid and produce its own electricity. Because it maintained power, the NYU campus served as an emergency command post for New York City officials and an emergency service center for local residents in the wake of the storm.[87]

The need to improve the reliability of the country's energy infrastructure was further highlighted in a 2014 analysis from the Union of Concerned Scientists, which noted:

> *Renewable technologies like wind turbines and rooftop solar panels are small, distributed, and often weather storms and heat waves better than conventional power plants. If individual turbines or solar panels are damaged, the impact on the grid is far less than if a large coal or nuclear plant goes off-line … Unlike convention power plants, wind turbines and solar panels do not require water to produce electricity.*[88]

Moreover, improving the energy efficiency of buildings and homes can make them more habitable during power outages, allowing residents to shelter in place during extreme weather events.[89] By reducing electricity demand from homes and businesses, energy efficiency improvements can reduce energy demand and the need to build out capacity, in addition to the added benefit of diminishing carbon pollution and other harmful emissions.[90]

In the aftermath of Superstorm Sandy, New York City is increasing the resilience of its power sector by expanding distributed generation, microgrids, and building efficiency.[91] City officials are also working with utilities and regulators to implement smart-grid technologies to enable real-time assessments of system outages that consumers and utilities can use to reduce peak and total demand.[92]

Washington, D.C.'s, sustainability and resilience plan aims to improve the reliability of the city's electricity system and cut carbon pollution by building 1,000 additional residential and commercial renewable energy projects by 2032.[93] The city is also developing a plan for a rollout of smart meters and smart-grid technologies that would allow consumers and utilities to better understand and manage energy use and reduce power outage duration and cost.[94]

By helping protect against power outages, microgrids can improve the reliability of other systems that need energy to function. For example, NJ Transit, New Jersey's public transportation system, was awarded $1.3 billion in 2014 from the Federal Transit Administration to prepare infrastructure for more extreme weather events.[95] The money will be used for five projects, including NJ TRANSITGRID, a microgrid that will generate and supply power to key state transit corridors in case the traditional grid fails.[96] Power for the microgrid will be supplied by a variety of technologies, including renewable energy and distributed generation.[97]

Expanding the use of renewable energy, energy efficiency, smart-grid technologies, and energy storage systems—in addition to strengthening the resilience of the nation's electricity sector—also helps cut carbon pollution by reducing reliance on fossil fuels. In 2012, energy-related carbon emissions dropped to an 18-year low in the United States.[98] Studies indicated that wind and solar energy were responsible for 31 percent of these reductions.[99]

Fortunately, the cost of low-carbon energy, such as solar and wind power, is plummeting. For example, in 42 of the nation's 50 biggest cities, rooftop solar photovoltaic energy systems are cheaper than power from local utilities.[100] The wind energy sector is also experiencing a period of declining costs and increasing deployment.[101]

These dramatic price drops for solar and wind energy create opportunities for households and communities to produce their own energy while reducing carbon pollution in the process. While beneficial for all, the opportunity to install solar panels and take advantage of their lower energy costs may be particularly attractive to low-income families—who spend up to 30 percent of their annual monthly income on energy bills.[102]

By upgrading the power grid, the federal and local governments and the private sector can increase flexibility to better integrate renewable energy sources, expand transmission capacity and energy storage, and increase the reliability of the electricity system. Similarly, investments in smart meters and demand-response programs, microgrids, and energy efficiency upgrades can improve energy system resilience. All of these strategies offer the added benefits of helping to lower energy expenses for consumers, improve air quality, curb climate change, and drive down health care costs over the long term.[103]

A low-carbon resilience strategy for public transit

State and local leaders are increasingly recognizing that expanding public transportation, such as buses, subways, and light rail, is an important strategy to provide communities crucial access to safety before extreme weather strikes, while also increasing daily mobility, curbing climate change and traffic congestion, and improving air quality. In the wake of Superstorm Sandy, for example, the NYS 2100 Commission—established by Gov. Andrew Cuomo (D) to identify infrastructure resilience strategies—recommended strengthening and expanding existing public transit systems and building a bus rapid transit network to give people safe and affordable options before extreme weather events.[104] Similarly, former New York City Mayor Michael Bloomberg's city resilience plan called for the expansion of bus service and bike and pedestrian paths to increase connectivity between transportation hubs and to give commuters more options during subway outages. [105] In 2008, New York City began installing elevated sidewalk grates along Hillside Avenue in Queens, a high flood risk area, to prevent silt and water from washing across sidewalks during floods and flowing into the subway system.[106]

The building of new biking and walking paths are also part of Washington's sustainability plan. The plan calls for the expansion of the Capital Bikeshare program—a bike sharing service that is owned by the local government and operated by a public-private partnership—in order to give commuters more transportation options, including when parts of the transit system are closed due to extreme

weather. Washington's sustainability plan also aims to reduce flood and other risks to the existing transit system.[107] Meanwhile, Atlantic City, New Jersey, converted its 190-vehicle fleet of buses to run on compressed natural gas, or CNG, and built a public CNG fueling station. During Superstorm Sandy, the fueling station remained open, and the city's buses were used to evacuate elderly and disabled residents, transport patients to medical services, and gather emergency goods.[108]

In addition to extreme weather risks, many communities are challenged by the fact that much of the nation's affordable housing is not linked to the transportation options that families need to access good jobs, schools, fresh food, and other amenities.[109] Increasing federal resources for public transit investments would empower local leaders to build a 21st century transportation system that provides all residents with high-quality and affordable mobility options, while reducing traffic congestion, improving air quality, and curbing climate change.

Even with substantial gaps in the nation's public transportation services, existing public transit offers millions of low-income residents' access to jobs, education, and health care, among other services.[110] A 2007 national survey by the American Public Transportation Association revealed that 35 percent of all transit riders had household incomes in 2004 that were roughly half the national median household income of $44,389 or less, in 2004 dollars.[111] In addition, the survey found that 65 percent of all transit riders have incomes of less than $49,999, or slightly higher than the median income.[112]

In New Orleans, city officials plan to add six biodiesel buses to the existing bus system and increase streetcar routes.[113] The aim is to expand access to goods and services for residents, as well as provide cheaper and more efficient transit options.

In addition to increasing mobility, public transit reduces the number of cars on the road, improves air quality, and helps to lower rates of asthma, lung disease, lung cancer, and mortality associated with tailpipe pollution.[114] According to the American Public Transportation Association, in 2014, public transportation reduced carbon dioxide emissions by 37 million metric tons and saved an estimated 4.2 billion gallons of gasoline.[115] Moreover, high-density residential and commercial development around transit service lowers the number of daily vehicle trips anywhere from 20 percent to 40 percent relative to the U.S. average.[116] Cutting down on congestion, public transit eases burdens on drivers and communities.[117] A Texas A&M University analysis estimates that removing transit service in the top 10 metro regions alone would add 677 million hours of additional traffic delay each year.[118]

Recommendations: A strategy to support a low-carbon and prosperous future for all

Despite progress developing strategies to strengthen infrastructure and community resilience in cities and states, few resilience plans have actually been implemented to date because of budget limitations, policy and legal barriers, and the challenge of predicting climate change effects at the local level.[119]

By establishing State Future Funds, Congress can empower state and local leaders to build low-carbon and resilient infrastructure and communities. State Future Funds would help state and local governments overcome funding and technical obstacles by, for example, providing loans and loan guarantees for low-carbon and resilient energy and transportation infrastructure projects and planning. For these reasons, State Future Funds would give state and local leaders a powerful tool to address urgent challenges, including rising extreme weather risks, traffic congestion, carbon and other air pollution, and growing economic inequities.

Here's how State Future Funds would work: Congress would create new revolving loan funds to supplement state and local government resources to build low-carbon and resilient transportation and energy infrastructure. Through a cost sharing approach, State Future Funds would combine federal resources with state dollars to leverage local and private sector investments to meet state and local energy and transportation infrastructure priorities. States would use State Future Funds to offer loans at competitive or below-market rates for a variety of projects—increasing residential and business access to renewable energy, improving building efficiency, making electricity grids smarter and more reliable and expanding and hardening public transit systems. As discussed above, these projects would improve the reliability of energy and transportation services while also reducing carbon pollution and consumer energy costs and improving public health.

State Future Funds would also help states meet or exceed their pollution reduction targets under the EPA's proposed Clean Power Plan, which calls on states to decrease carbon emissions from the energy sector, in part by reducing reliance on fossil fuels and increasing the use of clean energy. Many state leaders strongly support the Clean Power Plan's flexibility and its benefits, including cleaner air and lower health care and disaster recovery costs.[120]

EPA's Clean Power Plan

On June 2, 2014, the EPA proposed its Clean Power Plan, or CPP, a strategy to cut carbon pollution from the nation's existing fossil fuel-fired power plants.[121] The EPA plans to finalize the CPP by the end of summer 2015.

The CPP outlines the best system of emissions reduction, or BSER, for carbon pollution from existing power plants based on four key "building blocks." Building block 1 focuses on making existing coal-fired power plants run more efficiently, while building blocks 2 and 3 strive to replace higher-carbon electricity generation with lower- or zero-carbon generation. Building block 4 seeks to reduce overall electricity demand.

The CPP also includes states-specific carbon-pollution reduction targets based on each state's electricity generation mix and other factors. The EPA proposal outlines an interim carbon-pollution reduction goal for each state, calculated as an average over the 10-year period from 2020 to 2029, and a final goal in 2030. Altogether, the plan would reduce nationwide carbon emissions by 30 percent of 2005 levels by 2030.[122]

The CPP does not prescribe which policies states must use to achieve their pollution reduction goals. Instead, states have the flexibility to implement all, some, or none of the building blocks or to apply alternative measures that reduce power plant emissions.

This flexibility will ensure states can meet their pollution reduction goals without compromising the reliability of the electricity grid. In February 2015, the Analysis Group released a report concluding that the EPA rule "provides states and power plant owners a wide range of compliance options and operational discretion … that can prevent reliability issues while also reducing carbon pollution and cost."[123] Similarly, the Brattle Group analyzed grid reliability concerns in a report prepared for the Advanced Energy Economy Institute. Brattle concluded that the "ongoing transformation of the power sector, the steps already taken by system operators, the large and expanding set of technological and operational tools available and the flexibility under the CPP are likely sufficient to ensure that compliance will not come at the cost of reliability."[124]

States will be able to comply with the Clean Power Plan without the State Future Funds envisioned by this report. But this funding mechanism certainly would help states meet their pollution reduction targets or, perhaps, exceed those targets by investing more aggressively in renewable energy and energy efficiency technologies.

Federal support to bolster state compliance with environmental regulations is nothing new. In 1987, for example, Congress created the Clean Water State Revolving Fund to provide low-cost clean water financing and to support state efforts to comply with the Clean Water Act. A similar fund, the Drinking Water State Revolving Fund, was created in 1996 to provide financing for water infrastructure improvements and help states comply with the Safe Drinking Water Act. These funds pair federal funds with state and private sector resources to upgrade the nation's water infrastructure, to ensure that American's have access to safe drinking water, and to protect our nation's water resources.

A blueprint for the design of State Future Funds, which is detailed below, draws on Congress' design for the Drinking Water State Revolving Loan Fund and the associated funds established by states in the Safe Drinking Water Act.[125] A list of eligible projects types that State Future Funds could support is also listed below.

Blueprint for the creation and implementation of State Future Funds

State and local governments and communities are confronted with multiple pressing challenges, including crumbling and outdated infrastructure, traffic congestion, air pollution, more extreme weather driven by climate change, and growing inequities. Congress could empower state and local governments to address these challenges by providing grants to states to capitalize State Future Funds. States could then use their State Future Funds to provide low-interest loans and loan guarantees for low-carbon and resilient infrastructure projects and planning. The how to steps to establish State Future Funds—from deciding how much funding each state fund would receive to cost-sharing and assisting low-income communities—are described below.

- **Establishing State Future Funds:** The U.S. Treasury secretary would offer to enter into agreements with states to make annual capitalization grants—seed money—to support low-carbon and resilient energy and transportation infrastructure.[126] To be eligible to receive a capitalization grant, a state would establish a State Future Fund, or state revolving loan fund.[127]

- **Capitalizing State Future Funds:** Congress could use income from reforms to the federal tax code depreciation rules or from other one-time sources of tax-reform revenue to provide the initial capitalization grants for State Future Funds. A recent CAP analysis concluded that some common-sense tax reforms could generate more than $200 billion over 10 years for the federal government.[128] The federal government would ideally make an initial contribution of at least $500 million to each State Future Fund to kick start investments in clean energy and other low-carbon and resilient infrastructure. Capitalization grants for future years could be supported by revenue from additional tax reforms, or a carbon tax if enacted down the road. In addition, as money is paid back into the revolving loan funds, states can use those funds to make new loans.

- **Developing an allotment formula:** For the first three years of the program, funds would be allotted to states based on a formula similar to that used by Department of Energy, or DOE, to allocate State Energy Program funds. The 2009 American Recovery and Reinvestment Act requires DOE State Energy Program funds to be allotted to states based on a grant formula that takes into account population and energy consumption in each state. State Future Funds could be allocated based on a grant formula that considers the population, energy consumption, and public transit use in each state.[129] The minimum proportionate share allotted to states would be 1 percent of available funds. If needed, the minimum proportionate share could be adjusted for Wyoming with its low population numbers and for the District of Columbia because of its small size.[130] After the first three years of the program, State Future Funds resources would be allocated to each state based the proportional share of the state needs, identified through an energy and transportation infrastructure improvement needs survey conducted by DOE and the Department of Transportation, or DOT, with input from EPA and the Department of Housing and Urban Development, or HUD.[131]

- **Deploying funds:** States could use State Future Fund resources to make loans with interest rates that are less than or equal to the market interest rate, including interest-free loans. States could also use State Future Fund resources to provide loan guarantees, as a source of reserve and security for leveraged loans, or provide other authorized financial assistance to support low-carbon and resilient energy and transportation infrastructure projects and planning.[132]

- **Developing investment plans informed by meaningful stakeholder engagement:** States would prepare an annual investment plan to identify how they will use State Future Fund resources. Investment plans would be developed based on meaningful engagement with local leaders, the public, and stakeholders, including low-income communities and tribes. Each state investment plan would include a list of projects they intend to support with the State Future Fund, as well as project selection criteria and methods. States would be required to prioritize investments in energy and transportation systems and projects that address the most pressing public health risks and improve equity, such as projects that would increase low-income and tribal community access to clean and affordable energy and transportation options.

- **Assisting low-income communities and American Indian tribes:** Similar to what Congress authorized in the Safe Drinking Water Act, each state would be required to invest 30 percent of its annual State Future Fund capitalization grant in low-income areas. In addition, each state would be required to invest 2 percent of its annual State Future Fund capitalization grant in American Indian and Alaska Native villages that have not otherwise received State Future Fund grants.[133]

- **Sharing the cost:** Consistent with congressional authorization in the Safe Drinking Water Act, each state would be required to contribute to its State Future Fund at least 20 percent of the total capitalization grant made to the state.[134]

- **Offering special assistance:** As Congress authorized under the Safe Drinking Water Act, low-income communities could be offered longer loan payback periods.[135] States could also provide technical and financial assistance to build needed capacity to support low-carbon and resilient transportation and energy infrastructure, including energy efficiency improvements, particularly in low-income areas.

- **Ensuring oversight:** The U.S. Treasury Department would manage oversight of State Future Funds, with technical input from the DOE, DOT, EPA, and the HUD.

- **Holding states accountable for program success:** Congress could ensure state accountability for use of State Future Fund resources by designing economic, social, and environmental performance metrics against which all grant recipients will be measured.[136]

Energy and transportation projects for the 21st century

States would use State Future Fund resources to support the following types of low-carbon and resilient energy and transportation projects:

Low-carbon and reliable energy

- Smart grids and incentives for smart meters to improve the reliability and efficiency of the electrical system and to lower energy cost.
- Distributed renewable energy, such as solar and wind, to improve access to low-carbon and reliable power and to lower energy costs.
- Microgrids to supply reliable power to communities, businesses, and public transit and rail lines that provide access to jobs every day and help people get to safety before extreme weather hits.
- Large-scale renewable energy generation facilities to lower carbon pollution and improve air quality.
- Residential and commercial energy efficiency and weatherization programs to lower energy costs.
- Energy efficiency and resilience improvements for public housing to lower energy costs and ensure access to power in the wake of severe storms, including the installation of back-up generators.
- Other low-carbon and resilient energy projects.

Sustainable and resilient transportation

- Help expand bus, rail, and other rapid transit services, through projects such as bus acquisition, including in underserved areas.
- Strengthen the resilience of existing public transit as a way to reduce risks of flood and other extreme weather events, where appropriate.
- Expand or build bike and walking paths to improve air quality and reduce street and highway congestion.
- Develop other low-carbon and resilient transportation infrastructure projects, where appropriate.

Planning and technical support, job training, and innovation incentives

- Long-term, low-carbon, and resilient energy and transportation infrastructure planning, including technical assistance to identify communities and infrastructure that are highly exposed to extreme weather risks.
- Challenge grants and prizes to support innovative design ideas for resilient and low-carbon energy and transportation infrastructure.
- Job training programs for energy efficiency, renewable energy distributed generation, and other low-carbon and resilient transportation and energy strategies.

Conclusion

States, cities, and communities face a host of challenges from aging infrastructure, to traffic congestion, air pollution, mounting health care costs, growing inequities, and rising risks from extreme weather driven by climate change. These are problems that people across the country, particularly state and local leaders, grapple with daily. Congress has an opportunity to support state and local solutions to these pressing challenges by creating State Future Funds that can bolster state and local efforts to build low-carbon and resilient energy and transportation infrastructure and communities and thereby expand opportunities for all to prosper.

By establishing State Future Funds, Congress can combine federal funds with state dollars to leverage local and private sector resources to significantly increase investments in low-carbon and resilient transportation and energy infrastructure. These much needed investments would help strengthen community resilience, improve air quality, increase access to good schools and jobs, and reduce energy and health care costs. State Future Funds would also help states meet or exceed their emission reduction targets under the EPA's proposed Clean Power Plan.

By establishing State Future Funds, Congress would go a long way toward providing all people access to low-carbon and affordable energy and transportation services, which are key to creating resilient communities where all people can adapt and thrive.

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