THE HAMILTON PROJECT

Advancing Opportunity, Prosperity, and Growth

POLICY BRIEF 2017-01

Protecting Urban Places and Populations from Rising Climate Risk

MARCH 2017

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We believe that today's increasingly competitive global economy demands public policy ideas commensurate with the challenges of the 21st Century. The Project's economic strategy reflects a judgment that long-term prosperity is best achieved by fostering economic growth and broad participation in that growth, by enhancing individual economic security, and by embracing a role for effective government in making needed public investments.

Our strategy calls for combining public investment, a secure social safety net, and fiscal discipline. In that framework, the Project puts forward innovative proposals from leading economic thinkers — based on credible evidence and experience, not ideology or doctrine — to introduce new and effective policy options into the national debate.

The Project is named after Alexander Hamilton, the nation's first Treasury Secretary, who laid the foundation for the modern American economy. Hamilton stood for sound fiscal policy, believed that broad-based opportunity for advancement would drive American economic growth, and recognized that "prudent aids and encouragements on the part of government" are necessary to enhance and guide market forces. The guiding principles of the Project remain consistent with these views.

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Protecting Urban Places and Populations from Rising Climate Risk

As global carbon dioxide concentrations increase, the United States faces intensified risk from heat, drought, and other natural disasters. The risk will vary by region, state, and even neighborhood, with urban areas facing exceptional risks and challenges. Many residents of urban areas are low-income individuals who will likely struggle to adapt to the changing climate. Although some efforts are being made to lay the groundwork for climate change adaptation, much work remains to be done to ensure that urban areas will survive and thrive.

In a new Hamilton Project policy proposal, Matthew Kahn of the University of Southern California discusses the climate change challenges faced by urban areas and offers a three-pronged approach that federal, state, and local governments can take to help the people and infrastructure in these areas adapt and become more resilient. To facilitate urban adaptation, Kahn proposes strategies to invest in urban infrastructure resilience, protect the urban poor against climate shocks, and correct mispricing in flood insurance markets and commodities.

The Challenge

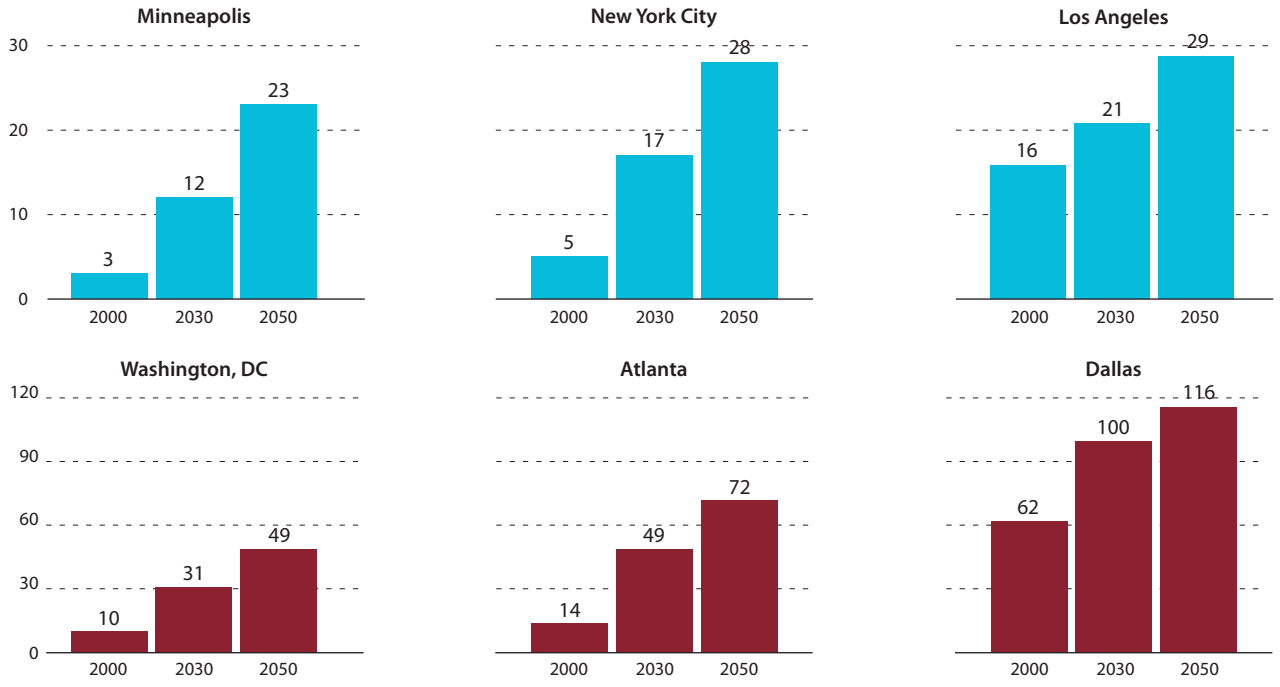
There is a broad consensus in the scientific community that temperatures will rise in the coming decades regardless of how aggressively world policy makers act to curb emissions. The risks likely associated with rising temperatures include a combination of excessive rainfall events, sea level rise, and extreme heat for long stretches of time. Over the next 34 years, every state is projected to experience increasing temperatures; even such cities such as Minneapolis and New York City are expected to suffer 23 or more days with a heat index above 104°F in 2050 (see figure 1). By the same year, between 4.2 million and 13.1 million Americans may have to migrate inland due to rising sea levels.

Among many other effects, climate change will put stress on existing infrastructure. Urban infrastructure is essential to providing electricity, clean water, and transportation; these basic necessities, among others, underlie continued economic growth and individual well-being. Many urbanites, however, take these infrastructure services for granted until and unless they stop functioning. In recent years, infrastructure maintenance has been neglected, and the necessary investments have not been made to ensure resilience to climate change. Figure 2 depicts investment deficits that have accumulated in different types of infrastructure. Looking to the future, investment in urban infrastructure will be critical to successful climate change adaptation.

According to the author, climate change creates special problems for low-income people, because they possess fewer options to respond to

FIGURE 1.

Projected Number of Days with Heat Index Above 104°F for U.S. Cities



Source: Climate Central, 2016, July, "U.S. Faces Dramatic Rise in Extreme Heat, Humidity," Climate Central, Princeton, NJ.

Note: Blue bars are on a y-axis with a maximum of 30 days. Red bars are on a y-axis with a maximum of 120 days. Days with a heat index above 104°F are referred to as "danger days" in the Climate Central report. Annual average danger day count based on current emissions trends. Projected temperature and humidity calculations come from Climate Central analysis of CMIP5 multi-model ensemble dataset.

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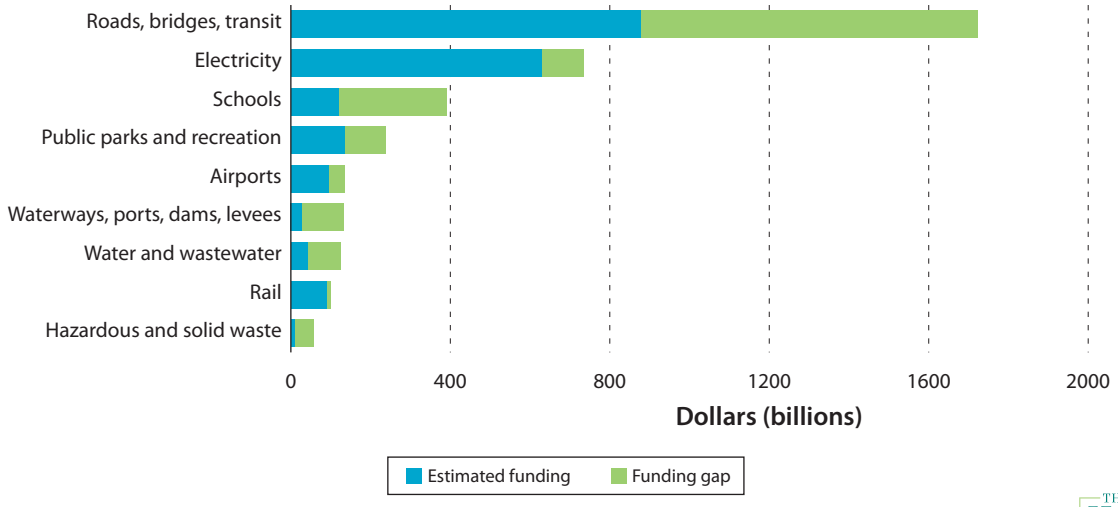
FIGURE 2.

Infrastructure Needs, Funded and Unfunded, 2013–20



Source: McNichol, Elizabeth C, 2016, February, "It's Time for States to Invest in Infrastructure," Center on Budget and Policy Priorities, Washington, DC.; American Society of Civil Engineers, 2013, March, "2013 Report Card for America's Infrastructure," American Society of Civil Engineers, Reston, VA.

Note: The funding gap does not take into account climate change needs.

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new climate threats. The urban poor tend to live in neighborhoods with limited resources and in older housing structures that cannot withstand extreme heat or flooding. Many with low incomes do not own a car and rely on public transportation, making it difficult to escape extreme temporary weather conditions.

For the entire U.S. population, adaptation to climate change is made difficult by a distinct set of problems that Kahn highlights. Market prices for insurance and scarce resources such as water and electricity often do not accurately reflect true costs – which include climate risks – and consequently do not lead individuals to respond effectively to climate change. Prices for water and electricity in particular are kept artificially low, encouraging overuse and discouraging conservation. Prices may also be inflexible, failing to rise when circumstances temporarily cause increased scarcity. Adaptation will require consumers to face accurate incentives, and will require the markets to reflect appropriate risk and scarcity. Because of these price distortions, markets as currently constructed are not efficiently enabling individuals to make sensible choices regarding conservation and residential location.

Mispricing is common in the flood insurance market, where prices do not accurately reflect actuarial risk of flooding today, let alone future risk from rising sea levels. Though coastal flood risk modeling is becoming more sophisticated, markets for flood insurance continue to suffer from three problems. First, when community residents have better information about flood risk than outside insurers, insurers may be reluctant to offer protection from flood risk. Second, and relatedly, uninformed outsiders may underestimate the likelihood of flood damage, especially if they over-rely on past experience and neglect to account for the growing impact of climate change. Third, if an expectation emerges that the government will recompense property owners for damages due to climate change–related events, individuals and businesses may ignore the possibility of these events and locate themselves in unsafe places. This impedes adaptation to climate change and results in greater climate risk exposure for the U.S. population.

A New Approach

Kahn proposes a three-pronged solution to improve resilience and facilitate adaptation to new climate risks. The first proposal entails investments that improve the resiliency of urban infrastructure, thereby minimizing disruptions caused by climate change. These investments have multiple dimensions, described next.

Invest in Urban Infrastructure Resilience

Many U.S. cities are now able to gather information on various measures including air quality, climate, and traffic, and to offer this information to citizens, the media, and researchers. The author suggests that the federal government subsidize municipal competitions for both the collection of urban risk information and for creative programs that disseminate this information and encourage urban leaders to act on it. This data collection and analysis has the potential for citizens to hold city, state, and federal officials accountable for preparing their jurisdictions to weather the negative impact of climate change.

In addition to making use of new data, the author recommends that cities be required to contract with third parties such as the U.S. Army Corps of Engineers or the American Civil Society of Engineers to evaluate key infrastructure. Disinterested experts would assess the quality and resilience of cities' infrastructure, producing annual status reports similar to the so-called stress tests that the Federal Reserve Board has conducted to assess banks' financial risks. These reports would evaluate which aspects of a city's infrastructure are at risk from extreme heat, flooding, natural disasters, and sea level rise, and would also evaluate the effectiveness of ongoing resiliency investments.

Financing Resilience Investment

Because many cities will struggle to pay for the necessary investments, the author considers alternative financing mechanisms. One is to simply raise local property taxes and apply the tax revenue

to infrastructure improvements, but this can be difficult for many local governments. The sale of bonds is a second way to finance such investments. Augmenting this approach, the author suggests that the federal government offer a subsidy for bond issues related to climate resilience.

Third, the author proposes that the federal government establish competitive grants for infrastructure projects and, to raise the likelihood that such projects would be actionable and meritorious, that cities pay for half of the projects. Finally, as a fourth possibility, the federal government could cosign loans, bearing the default risk while allowing cities to borrow at a lower interest rate.

To help focus cities' investments in resiliency, the author proposes that subsidies increase with the quality and quantity of investments. To measure improvement, the author proposes that the U.S. Army Corps of Engineers create a metric that would issue a resilience score, similar to the current approach taken by the Department of Energy's certification programs such as the ENERGY STAR program for Leadership in Energy and Environmental Design (LEED). The federal government would then tie its subsidy to the resilience score.

Evaluating the Effectiveness of New Infrastructure Investment

Kahn recommends that cities establish data collection networks and set annual benchmarks to measure the benefits of resilience investments. Measures of flooding and transportation disruption would be used to evaluate whether urban areas are successfully adapting to heat waves, heavy rainfall, and sea level rise. Fewer disaster-related deaths or hospitalizations, transit delays, and flood insurance claims would indicate increased urban resilience. The likelihood of cities receiving future federal resilience investments would be tied to such evaluations. This approach will help to create accountability and raise the likelihood that public funds will be used effectively.

Protect the Urban Poor Against Climate Shocks

The urban poor face a unique set of climate change challenges that can be addressed through short- and medium- term adaptation strategies.

Information Provision

Kahn proposes that local authorities send information alerts to inform residents of risks from storm flooding, heat waves, and air pollution. While it has been established that people respond to such information alerts, the poor are at a particular disadvantage in their response due to lack of resources. To address these challenges, the author proposes several cost-effective strategies to protect low-income individuals.

Short-run Protection

Extreme heat due to climate change presents a particular threat to the urban poor, who, unlike higher-income individuals, cannot easily escape the heat. Although subsidies are often available to low-income individuals for electric utilities, these lower rates may not be sufficient. The author therefore recommends that cities provide designated cooling centers where people could go to escape extreme heat, similar to those currently offered by Los Angeles and Houston. City officials would record demand for such services and researchers could survey those using the centers to better understand how they cope with extreme heat in the absence of cooling centers and how service delivery could be improved.

Roadmap

Information Provision

- Congress will encourage municipalities to collect, evaluate, and disseminate information on climate change risk through competitive grants.
- Congress will require municipalities to contract with outside experts (e.g., the U.S. Army Corps of Engineers) to conduct stress tests of key infrastructure.
- Municipalities will implement rapid alert systems to inform residents of risks from storm flooding, heat waves, and air pollution, and provide shelters and transportation to these shelters for low-income residents.
- Congress will fund utilities to test dynamic pricing models for water and electricity, so that consumers can be provided with more information about changing conditions of resource scarcity.

Financing Resilience

- Congress will provide subsidies of bond issues, cosign loans, and provide competitive grants for municipalities to invest in climate resilience. The size of the subsidies will be tied to the quantity and quality of municipal infrastructure investments, as measured by a resilience score developed by the U.S. Army Corps of Engineers.

Regulatory Reform

- Congress will require more homeowners to purchase flood insurance and real estate buyers to receive flood risk assessments.
- FEMA will evaluate ways to make the Community Rating System underpinning the National Flood Insurance Program more closely tied to objective risk reduction.
- Municipalities will change zoning codes in areas insulated from climate risk and test a climate risk-focused housing voucher program to encourage low-income residents to move from at-risk areas.

Transportation to these cooling centers presents another challenge for the urban poor, who often do not have cars and who rely on public transportation. The author proposes that cities contract with ride-sharing services on hot days. Drawing on ride-sharing data, cities could assess which neighborhoods are most at risk during extreme heat and further improve the targeting of government services.

Medium-term Adaptation

In addition to implementing services to protect the poor from climate change in the short term, the author proposes two medium-term adaptation strategies: migration incentives and land-use policy.

Migration Incentives

Neighborhoods with more amenities tend to be in higher demand and thus tend to have higher rents and home prices. Typically, the urban poor are unable to afford these higher prices, limiting

Learn More about This Proposal

This policy brief is based on the Hamilton Project policy paper, "Protecting Urban Places and Populations from Rising Climate Risk," which was authored by

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their ability to move to and benefit from the amenities in such neighborhoods.

The author proposes to test a program that would encourage low-income families to move from areas with increased flood risk and exposure to high temperatures to neighborhoods where these risks are lower. The Moving to Opportunity experiment, which encouraged low-income families to move to low-poverty neighborhoods, is one model for this proposal.

Land Use Policy

Urban land use regulations limit the ability of all people, but especially those with low incomes, to relocate to areas that are insulated from climate change risks. The author recommends that climate scientists identify urban neighborhoods that face relatively little climate risk. In these areas, zoning codes would be changed to allow for increased housing density. These changes in zoning restrictions would provide dual benefits of mitigating carbon emissions (through increased density and use of public transit) and increased climate change resilience.

Reduce the Cost of Climate Change Adaptation Through Better-Functioning Markets

The third proposal aims at accelerating adaptation through better-functioning markets, allowing prices of natural resources, energy, and flood insurance to reflect true conditions of scarcity and risk.

Risk Disclosure and Risk Updating

One straightforward way to improve the availability of information about flood risk would be for the federal government to pass laws requiring that real estate purchasers receive flood risk assessments. As part of this effort, companies that provide the Multiple Listing Service—a repository of real estate information commonly accessed by buyers and sellers—could be required to supply climate risk information as another attribute of a home. As awareness of risk increases and insurance rates are adjusted, residents would be guided to areas featuring lower climate change risk.

Evaluate the Effectiveness of the Current National Flood Insurance Program

The Federal Emergency Management Agency's (FEMA's) records reveal that communities participating in the Community Rating System (CRS) under FEMA's National Flood Insurance Program are—perhaps surprisingly—often not making investments that would substantially increase a city's resilience in the face of flooding. The average community is not attaining goals related to hazard disclosure, flood insurance provision, open space preservation, flood data maintenance, stormwater protection, flood protection, and levee and dam safety. The author suggests that the CRS point score be more closely tied to objective risk reduction than it is now.

To better focus the CRS program, Kahn proposes that FEMA carefully evaluate it. If the value of insurance claims in high-CRS-score areas are lower than in low-CRS-score areas, this would suggest that the program is effective. If CRS does not appear to be effective, reforms should be implemented that focus on incentivizing residents of flood-prone areas to make investments that shield them from new risks. The simplest way of doing this would be to increase residents' exposure to the costs of climate risks, for instance through increased flood insurance deductibles.

Finally, the National Flood Insurance Program should be reformed to ensure that more home owners are required to buy flood insurance. Currently, there are sharply delineated flood maps that determine whether a home owner is required to buy flood insurance in order to access federal benefits such as housing loan guarantees. These flood maps imply that homes just outside of the map face no flood risk, but this is not accurate. A more realistic approach would be to acknowledge that many homes face flood risk under climate change, but different areas face different risks, and these risk probabilities will evolve over time as climate change unfolds and our knowledge of climate change risks improves.

Water and Electricity Pricing

Water and electricity markets should be restructured to provide consumers with more information about changing conditions of resource scarcity. To improve our understanding of how consumers respond to more-flexible resource prices, the federal government should fund randomized field experiments by water and electric utilities that evaluate this dynamic pricing. Recent experiments in California on electricity price manipulation showed that consumers delayed consumption until prices were lowered, which improved the ability of electric utility companies to reduce the frequency of blackouts on extremely hot days.

Conclusion

The author notes that urban areas and their residents, especially the urban poor, will experience particular challenges in the face of climate change. These challenges include more-frequent flooding, extreme and prolonged heat waves, and rising sea levels.

Kahn proposes policies that reduce the risk that urban residents will face as climate change unfolds. These policies would diagnose infrastructure risks, finance infrastructure resilience, and evaluate the effectiveness of adaptive strategies to address climate change. In addition, they would address the unique challenges faced by low-income households, providing short- and medium-term adaptation strategies for this population. Finally, these policies make better use of markets by combining dynamic pricing for water and electricity with appropriately priced flood insurance.

Questions and Concerns

1. How can firms be encouraged to adapt to climate change?

Recognizing the new risks posed by climate change, the U.S. Securities and Exchange Commission (SEC) has issued guidance encouraging companies to disclose not only their carbon positions, but also their climate change exposure. These sunshine rules will have two effects:

1. ***Accountability:*** The SEC guidance is meant to alert investors and to reduce asymmetric information issues and thus to increase the accountability of management to its shareholders and bond holders.
2. ***Business resilience:*** The SEC guidance is meant to inform investors about the new risk that extreme heat waves, natural disasters, drought and heavy rains, and sea level rise will all cause for business. Those who lend to businesses at risk will lend at a higher interest rate if the loan becomes risky (as the lender fears default). If businesses can borrow at a lower interest rate when the geographic area where they operate is safer, then there will be a profit motive for companies to lobby local officials to invest in resilience.

2. Does strengthening urban infrastructure in at-risk places encourage more risk taking?

Investment in infrastructure resilience can encourage individuals and businesses to relocate in places that face significant climate risk, potentially raising the total risk exposure of the population. If people become convinced that a coastal area is less risky because of defensive infrastructure investments, those who enjoy coastal living will move to the area. This effect would be compounded even further if individuals and businesses assume that—now that more people live in the area—a federal bailout is likely in the event of a disaster. While this possibility must be taken seriously, this proposal has introduced several features ensuring that investors retain some risk exposure as well as increased access to information about the risks they face.

Highlights

Matthew Kahn of the University of Southern California proposes to implement a series of policies to improve urban climate change adaptation strategies, including investing in infrastructure, assisting those who are most vulnerable to climate risks, and allowing markets to accurately reflect potential climate threats.

The Proposals

Invest in urban infrastructure resilience. This proposal seeks to diagnose disruptive risks caused by extreme climate change events and to finance resilience investments. Kahn proposes that the effectiveness of these infrastructure investments should be tested through empirical evaluation.

Protect the urban poor against climate shocks. Kahn suggests that local authorities focus on disseminating information about short-run risks, providing services that some urban poor might not have access to, incentivizing migration to lower-risk areas, and relaxing zoning restrictions to allow more people to live in lower-risk areas.

Reduce the cost of climate change adaptation through better-functioning markets. This reduction can be achieved by allowing the prices of natural resources, energy, and flood insurance to reflect true risks and conditions.

Benefits

Implementation of Kahn's three proposals would benefit individuals who face significant risks related to climate change and would improve the nation's resilience in the face of serious threats from climate change. In particular, low-income urban residents who currently have minimal ability to adapt to these risks would be better protected.

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