Union of Concerned Scientists

POLICY MEMO

Building Equitable, Clean, and Climate-Safe Infrastructure

As a nation, we have long failed to invest adequately in our infrastructure. According to the American Society of Civil Engineers, failing to upgrade deteriorating infrastructure could cost the nation an estimated $3.9 trillion between now and 2025 (ASCE 2016). Meanwhile, many communities—particularly underserved and marginalized communities—face growing challenges from impacts of climate change for which they are largely unprepared (Maxwell et al. 2018).

To help avoid potentially disastrous impacts, the United States must make rapid, deep cuts in its heat-trapping emissions, but we must also ensure our infrastructure is prepared to withstand those impacts that are already unavoidable (NAS 2019). The investments needed to ensure we have the proper infrastructure in place could also help create more prosperous, equitable communities that are not only resilient to our changing climate but also benefit from our transition to a modern clean-energy economy.

Core Principles for Federal Infrastructure Policy

Policymakers must ensure that federal infrastructure investments strengthen the nation's climate resilience, accelerate its transition to a low- or zero-carbon economy, and address the inequities that have left many communities disproportionately exposed to climate risks. To accomplish this, policies must:

- be informed by the best available science;
- prioritize equitable outcomes by targeting investments and opportunities in historically underserved and marginalized communities;
- uphold bedrock environmental and public health protections; and
- ensure direct federal investments are commensurate with the magnitude of the challenge.

Dennis Schroeder/NREL

Federal infrastructure policy should prioritize modernizing the transmission system and enabling technologies such as offshore wind and battery storage, which will unleash vast amounts of renewable energy while driving economic development and creating high-quality jobs.

Accelerating the Transition to a Clean, Resilient Electricity Sector

The United States urgently needs to decarbonize its electricity sector to address climate change and build a modern, clean, and resilient electric grid. To accelerate this transition while cost-effectively improving reliability and resilience, federal infrastructure policy should:

UPDATE AND EXPAND AMERICA'S HIGH-VOLTAGE TRANSMISSION SYSTEM

High-voltage transmission lines are critical to delivering electricity where it's needed, but the US transmission system is aging, fails to adequately connect the flow of electricity across regions, and is not able to take full advantage of vast clean energy resources. This means a dirtier, less reliable, and less resilient electricity supply. An investment strategy designed to improve reliability, build resilience, and integrate much higher levels of renewable energy would provide benefits that far exceed the costs (Bloom 2018). Federal policy should also facilitate robust interregional transmission through comprehensive transmission planning, support to state and regional entities, appropriate use of federal authority, and incentives for smart investments.

ACCELERATE OFFSHORE WIND DEVELOPMENT

The Department of Energy estimates that developing just 4 percent of the nation's offshore wind resources would satisfy 7 percent of US electricity consumption, support 160,000 jobs, and reduce US global warming emissions (DOE 2015). With only one operational offshore wind project today, the United States is significantly behind the rest of the world in taking advantage of this resource. The offshore wind industry is poised for rapid growth and would benefit from federal support in the form of tax incentives, coordinated siting and leasing of top-tier offshore wind sites, and a comprehensive plan for transmission to carry offshore wind energy onto the electric grid.

ACCELERATE BATTERY STORAGE DEPLOYMENT

Battery storage can make the electricity system more reliable, affordable, secure, and resilient to extreme events, while accommodating high levels of renewable energy (DOE 2018). A strong

federal program that funds tax incentives for battery storage investments, grant programs for deployment in underserved communities, and a diverse body of research on the next generation of storage technologies would put the United States back in a global leadership position, attract private investments, create jobs, and provide significant value to the electricity sector.

INVEST IN WORKFORCE TRAINING PROGRAMS

A commitment to high-quality job creation in clean energy can help address both the consistent gap in employment rates and earnings between whites and people of color in the US labor force in general (BLS 2019) and the specific lack of diversity in the energy sector (DOE 2017). We also need to invest in new economic opportunities for coal miners and other workers currently employed in the fossil fuel industry. As a start, federal infrastructure policy should include workforce training funds targeted to displaced workers, people of color, and low-income communities so that all can benefit from the transition to clean energy.

Building a More Climate-Resilient Nation[1]

The costs of extreme weather and climate-related disasters are climbing: eight of the last 10 years featured the most natural disasters with damages of a billion dollars or more (NCEI 2019). Studies show that every dollar spent ahead of time on measures to reduce risk can save six dollars in future disaster costs (NIBS 2018). With that in mind, federal infrastructure policy should:

REQUIRE FEDERALLY FUNDED INFRASTRUCTURE TO BE "CLIMATE- READY"

To ensure taxpayer dollars are used responsibly, the construction or rehabilitation of federally funded buildings, facilities, and infrastructure must be designed to withstand the future impacts of climate change (GAO 2019). For example, to account for rising sea levels and intensifying rainstorms, infrastructure should be built at least two feet above the 100-year flood level (three feet for critical infrastructure)—a design standard that would have a high return on investment[2] and would serve as a benchmark for other public and private investments. Similar protective standards should be implemented nationwide to safeguard federally funded infrastructure from other climate impacts such as wildfires and extreme heat.

> ***We must ensure that US infrastructure is prepared to withstand climate impacts that are already unavoidable.***

Louisiana National Guard

Federal policies and investments to secure the nation's infrastructure against climate change impacts are critical to keeping communities safe and saving taxpayer dollars. Without risk reduction measures in place, we'll continue to see infrastructure failures similar to Highway 61 in Louisiana, which flooded after a storm dumped more than 20 inches of rain on south Louisiana in 2016.

CREATE AN EXPERT BODY TO INFORM CLIMATE-RESILIENT INFRASTRUCTURE INVESTMENTS

Congress should set up a diverse and inclusive expert advisory body to provide guidance on infrastructure that not only accounts for climate change but historic injustices as well, by targeting investments in underserved and marginalized communities (Rogers Gibson 2017).

PROVIDE ROBUST RESOURCES TO HELP COMMUNITIES PREPARE FOR THE FUTURE

Congress needs to invest in data and tools that can help address climate risks to infrastructure, including the Federal Emergency Management Agency (FEMA) flood risk mapping program, and the Department of Housing and Urban Development (HUD) HOME Program and Community Development Block Grant Program, which help provide affordable housing and are critical for low- and moderate-income communities to prepare for, recover from, and build resilience to extreme weather and other climate-related disasters. Congress should also ramp up funding for existing programs and establish bold new mechanisms for funding climate-safe infrastructure, such as state revolving funds or a national infrastructure bank.[3]

Sam Gomberg *is a senior analyst in the UCS Climate and Energy Program.* ***Shana Udvardy*** *is the climate resilience analyst in the program.*

ENDNOTES

1 *For more recommendations, see Spanger-Siegfried et al. 2016.*

2 *See NIBS 2018. The return on investment is as much as 11:1 for roads and railroads, 31:1 for water and wastewater facilities, and 9:1 for electric and telecommunications.*

3 *See the Digital Coast Act of 2017 (S.110) to help communities with tools, training, and best practices for coastal management* (www.congress.gov/bill/115th-congress/senate-bill/110). *Also see the State Flood Mitigation Revolving Fund Act of 2018 (H.R.7037) to provide states with funding assistance for reducing flood risks* (www.congress.gov/bill/115th-congress/house-bill/7037/text).

REFERENCES

American Society of Civil Engineers (ASCE). 2016. *Failure to act: Closing the infrastructure investment gap for America's economic future*. Online at *www.infrastructurereportcard.org/the-impact/failure-to-act-report*, accessed March 1, 2019.

Bloom, A. 2018. *Interconnections seam study*. Golden, CO: National Renewable Energy Laboratory. Online at *https://cleanenergygrid.org/wp-content/uploads/2018/08/NREL-seams-transgridx-2018.pdf*, accessed March 1, 2019.

Bureau of Labor Statistics (BLS). 2019. 2019 employment situation summary. Online at *www.bls.gov/news.release/empsit.nr0.htm*, accessed March 4, 2019.

Department of Energy (DOE). 2018. *Solving challenges in energy storage*. Washington, DC: Office of Technology Transitions. Online at *www.energy.gov/sites/prod/files/2018/09/f55/2018-08-23_Spotlight%20on%20Energy%20Storage%20-%20Brochure%20and%20Success%20Stories_0.pdf,* accessed March 4, 2019.

Department of Energy (DOE). 2017. *2017 US energy and employment report*. Online at *www.energy.gov/downloads/2017-us-energy-and-employment-report*, accessed March 4, 2019.

Department of Energy (DOE). 2015. *Wind vision: A new era for wind power in the United States*. Online at *www.energy.gov/sites/prod/files/WindVision_Report_final.pdf*, accessed March 1, 2019.

Government Accountability Office (GAO). 2019. *High-risk series: Substantial efforts needed to achieve greater progress on high-risk areas*. Online at *www.gao.gov/assets/700/697245.pdf*, accessed March 7, 2019.

Maxwell, K., S. Julius, A. Grambsch, A. Kosmal, L. Larson, and N. Sonti. 2018. Built environment, urban systems, and cities. In *Impacts, risks, and adaptation in the United States: Fourth National Climate Assessment,* volume II, edited by D.R. Reidmiller, C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart. Washington, DC: US Global Change Research Program. doi: 10.7930/NCA4.2018. Online at *https://nca2018.globalchange.gov/chapter/11*, accessed March 1, 2019.

National Academies of Sciences, Engineering, and Medicine (NAS). 2019. *Environmental engineering for the 21st century: Addressing grand challenges*. Washington, DC: The National Academies Press. Online at *www.nap.edu/read/25121/chapter/1*, accessed March 8, 2019.

National Institute of Building Sciences (NIBS). 2018. *Natural hazard mitigation saves: 2018 interim report*. Online at *www.nibs.org/page/mitigationsaves*, accessed March 1, 2019.

NOAA National Centers for Environmental Information (NCEI). 2019. U.S. billion-dollar weather and climate disasters (2019). Online at *www.ncdc.noaa.gov/billions/events/US/1980-2018*, accessed March 4, 2019.

Rogers Gibson, J. 2017. *Built to last: Challenges and opportunities for climate-smart infrastructure in California*. Cambridge, MA: Union of Concerned Scientists. Online at *www.ucsusa.org/global-warming/regional-information/california-and-western-states/climate-smart-infrastructure*, accessed March 7, 2019.

Spanger-Siegfried, E., J. Funk, R. Cleetus, M. Deas, and J. Christian-Smith. 2016. *Toward climate resilience: A framework and principles for science-based adaptation*. Cambridge, MA: Union of Concerned Scientists. Online at *www.ucsusa.org/global-warming/science-and-impacts/impacts/climate-resilience-framework-and-principles*, accessed March 4, 2019.

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NATIONAL HEADQUARTERS
Two Brattle Square
Cambridge, MA 02138-3780
Phone: (617) 547-5552
Fax: (617) 864-9405

WASHINGTON, DC, OFFICE
1825 K St. NW, Suite 800
Washington, DC 20006-1232
Phone: (202) 223-6133
Fax: (202) 223-6162

WEST COAST OFFICE
500 12th St., Suite 340
Oakland, CA 94607-4087
Phone: (510) 843-1872
Fax: (510) 451-3785

MIDWEST OFFICE
One N. LaSalle St., Suite 1904
Chicago, IL 60602-4064
Phone: (312) 578-1750
Fax: (312) 578-1751

WEB: www.ucsusa.org