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Statement for the Record of

The American Society of Civil Engineers

on

"Working Toward Climate Equity: The Case for a Federal Climate Service"

Subcommittee on Environment
Committee on House Science, Space, and Technology
U.S. House of Representatives

April 21, 2021

Introduction

The American Society of Civil Engineers (ASCE)[1] appreciates the opportunity to submit a statement to the House Science, Space, and Technology Committee's Subcommittee on Environment for the hearing on *Working Towards Climate Equity: The Case for Federal Climate Service.* **Increasing investments in climate risk research will be critical as we make data driven investments that can ensure our infrastructure is resilient to ever-changing climate patterns**.

Civil engineers are responsible for the planning, design, construction, operations, and maintenance of physical infrastructure, including communication facilities, energy generation and distribution facilities, industrial buildings, transportation networks, water supply and sanitation systems, and flood control structures. Most infrastructure is built to provide long service lives (50 to 100 years) and are expected to remain functional, durable, and safe. However, the increasing frequency and intensity of natural disasters, combined with increasing population densities, and system interdependencies have demonstrated vulnerabilities in the nation's infrastructure.

To ensure the nation's infrastructure systems continue to provide critical services and acceptably low risks of failures over time, engineers, designers, planners, and policymakers must incorporate system resilience into the decision-making process. Our nation's infrastructure system is only as strong as its weakest link — if our roadways become too rough or flooded to travel, if our bridges close to heavier traffic like ambulances, if a region's energy grid is devastated by high winds, or if our levees protect one community at the expense of the one next door, quality of life degrades for American communities and the economy grinds to a halt.

Therefore, the foundational step in building smarter and improving resilience is first assessing the nation's existing infrastructure needs and conditions through robust asset management strategies. In addition, a robust Federal investment in research and development (R&D), including both applied and basic research, is critical to understanding and mitigating the impact of climate change. The most cost-effective method for the nation's infrastructure to accommodate and adapt to a changing climate is by gaining knowledge of the impacts and developing new tools and strategies to mitigate those impacts.

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[1] ASCE was founded in 1852 and is the country's oldest national civil engineering organization. It represents more than 150,000 civil engineers individually in private practice, government, industry, and academia who are dedicated to the advancement of the science and profession of civil engineering. ASCE is a non-profit educational and professional society organized under Part 1.501(c) (3) of the Internal Revenue Code. www.asce.org,

A Snapshot of Infrastructure Conditions Today - ASCE's *2021 Report Card for America's Infrastructure*

Every four years, ASCE publishes the *Infrastructure Report Card*, which grades nation's major infrastructure categories using a simple A to F school report card format. The Report Card examines the current infrastructure needs and conditions by assigning grades and making recommendations to raise them. The 2021 *Report Card for America's Infrastructure*[1] was released on March 3rd and graded 17 categories with the cumulative grade of "C-." This grade represents the first time in 20 years that our infrastructure is out of the "D" range. The 2021 Report Card therefore demonstrates that we have made some incremental progress toward restoring our nation's infrastructure, however much work is left to be done.

Overall, the 2021 grades range from a "B" for rail to a "D-" for transit. Five category grades — aviation, drinking water, energy, inland waterways, and ports — went up, while just one category — bridges — went down. And stormwater infrastructure received its first grade: a disappointing D. Overall, eleven category grades were stuck in the D range, an indication that significant maintenance backlogs remain.

The Report Card also clearly illustrates that we are still just paying about half of our infrastructure bill, as the total investment gap has gone from $2.1 trillion over 10 years to nearly $2.59 trillion over 10 years. As ASCE discovered in its 2021 study, *Failure to Act: Economic Impacts of Status Quo Investment Across Infrastructure Systems*[2], failing to close this infrastructure investment gap brings serious economic consequences. Poor roads and airports mean travel times increase. An aging electric grid and inadequate water distribution make utilities unreliable. Problems like these translate into higher costs for businesses to manufacture and distribute goods and provide services. These higher costs, in turn, get passed along to workers and families. By 2039, America's overdue infrastructure bill will cost the average American household $3,300 a year, or $63 a week. When we fail to invest in our infrastructure, we pay the price.

Solutions to Raise the Grades: Focus on Resilience

ASCE's Report Card does not just define the challenges we face, but makes recommendations to address our infrastructure problems, improve our quality of life, and strengthen our international competitiveness. The solutions include bold **leadership and action**, sustained **investment**, and a **focus on resilience** to raise the national infrastructure grade over the next four years, so that every American family, community, and business can thrive.

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[1] https://infrastructurereportcard.org/

[2] https://infrastructurereportcard.org/resources/failure-to-act-economic-reports/

Strong leadership and decisive action require a clear understanding of what the United States needs to achieve an infrastructure system fit for the future. To close the nearly $2.59 trillion 10-year investment gap identified in the 2021 Report Card, meet future needs, and restore our global competitive advantage, we must increase investment from all levels of government and the private sector from 2.5% to 3.5% of U.S. Gross Domestic Product (GDP) by 2025.

As we consider these long-term investments, it must be through the lens of ensuring that our nation's infrastructure is resilient using new approaches, materials, and technologies to ensure infrastructure systems can withstand or quickly recover from natural or man-made hazards.

Advancements in resilience across all infrastructure sectors can be made by:

- Enabling communities to develop and institute their own resilience pathway for all their infrastructure portfolios by streamlining asset management, implementing **life cycle cost analysis** into routine planning processes, and **integrating climate change projections** into long-term goal-setting and capital improvement plans.
- Incentivizing and enforcing the use of **codes and standards**, which can mitigate risks of major climate or manmade events.
- Understanding that our **infrastructure is a system of systems** and encourage a dynamic, "big picture" perspective that weighs tradeoffs across infrastructure sectors while keeping resilience as the chief goal.
- Prioritizing projects that **improve the safety and security of systems** and communities, to ensure continued reliability and enhanced resilience.
- Improving **land use planning** across all levels of decision-making to strike a balance between the built and natural environments, while meeting community needs, now and into the future.
- Enhancing the resilience of various infrastructure sectors by including or enhancing natural or "green" infrastructure.

Adaptation to Climate Change

To address the challenges faced by climate change will take leadership and a commitment to act proactively instead of reactively. Specially, we must:

- Establish government policies that anticipate and prepare for the impacts of climate change on the built environment.
- Make necessary revisions to engineering design standards, codes, regulations, and associated laws that strengthen the sustainability and resiliency of infrastructure at high risk of being affected by climate change.
- Make a robust investment in research and development (R&D) to conduct the necessary research, development, and demonstration to advance recommended civil engineering practices and standards to effectively address climate change impacts.

- Encourage cooperative research among engineers and climate, weather, and life scientists to gain a better understanding of the magnitudes and consequences of future extremes.
- Raise awareness among practicing engineers, project stakeholders, policy makers, and decision makers about the uncertainty in predicting future climate and the reasons for the uncertainty.
- Identify critical infrastructure that is most threatened by changing climate and inform decision makers and the public.

The most reliable way to ensure our nation's infrastructure is resilient is the widespread adoption and enforcement of modern, up to date building codes. Having the federal government prioritize the development of climate risk data will help inform consensus-based standards that are critical for resilient infrastructure, including several that ASCE develops. For example, ASCE 7, *Minimum Design Loads and Associated Criteria for Buildings and Other Structures*, is integral to U.S. building codes and relies on up to hazard data for wind, seismic, flood, snow, ice, and tsunami risk. Meanwhile, ASCE 24, *Flood Resilient Design and Construction*, relies on flood hazard data, while ASCE Manual of Practice 140, *Climate-Resilient Infrastructure: Adaptive Design and Risk Management*, provides guidance for infrastructure analysis/design in a world where risk profiles are changing due to climate change and therefore requires up to date climate data.

A current example of how outdated data can threaten infrastructure planning and design is the use of precipitation data for dams and levee construction, which is why the PRECIP Act and the FLOODS Act are critical legislation.

The PRECIP Act and the FLOODS Act

Unfortunately, currently many floodplain managers, local governments, dam safety officials, and everyday citizens are using precipitation data that was last updated in the 1960s and 1970s to understand the risk of floods to life and property. It's the only data available, even as precipitation increases in frequency and severity due to climate change. Not only is precipitation data is used in immediate decisions like evacuation orders during hurricanes, but it is vital when making long-term decisions like planning zoning restrictions to minimize climate risks.

While the National Oceanic and Atmospheric Administration (NOAA) has the responsibility for updating precipitation frequency estimates and other precipitation data, due to underfunding it must instead rely on voluntary funding from state and local governments and other agencies to update critical precipitation studies. This has resulted in a piecemeal approach, which reflects state boundaries rather than watersheds. Additionally, it has allowed some studies, like vital probable maximum precipitation estimates, to remain unchanged for nearly 50 years due to a lack of funding. Even more concerning,

these studies do not incorporate future climate projections, meaning they are outdated immediately upon completion.

Therefore, ASCE urges Congress to continue its recent path to address the impacts of climate change and pass both the PRECIP Act (H.R. 1437) and the FLOODS Act (H.R. 1438). These bills aim to address the out of date, but critical data that engineers and other rely on when designing public safety structures.

By mandating that NOAA update Atlas 14, or precipitation frequency estimates, every 5 years and probably maximum precipitation estimates, or the greatest possible amount of precipitation in an area, every 10 years, the PRECIP Act will ensure that engineers have the data that they require when designing critical infrastructure systems. Furthermore, the legislation goes a step further to include future changes to precipitation due to climate change. Meanwhile, the FLOODS Act would improve NOAA's forecasting and communication of flood, tornado, and hurricane events and would create a National Integrated Flood Information System to guarantee that flood research is coordinated.

Engineers strongly rely on the sound science that would be developed by the PRECIP Act and the FLOODS Act. For this reason, ASCE strongly supports both of these critical research bills and urges Congress to pass them as part of any climate mitigation package.

Conclusion

ASCE once again thanks the Subcommittee on Environment for holding this hearing and highlighting the importance of the resilience of the nation's infrastructure.

Natural and man-made disasters have repeatedly demonstrated the vulnerability of the nation's infrastructure. Congress and the Administration, as well as state and local governments, need to make addressing infrastructure vulnerability a major component of infrastructure initiatives, research, and investments going forward. Such emphasis is critical to the nation's infrastructure and to the health and safety of American communities.

If you need more information or ASCE can be of further assistance, please do not hesitate to contact Caroline Sevier, ASCE's Director of Government Relations at csevier@asce.org or 202-789-7843.