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"America's Infrastructure: Today's Gaps, Tomorrow's Opportunities, and the Need for Federal Investment"

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Good morning Chairman Yarmuth, Ranking Member Womack, and Members of the Committee. I appreciate the invitation to appear before you today. I also want to thank you for tackling this essential topic: the future of American infrastructure and the federal policy frameworks that manage and invest in those networks.

The past few years have been a dynamic time for the topic of infrastructure reform. Seemingly all at once, there is a growing consensus around the need to support infrastructure modernization through Congressional action. This is an important development. Infrastructure is an essential enabler of economic growth, whether serving as a platform for industrial innovation, fostering social opportunity and connectivity, or protecting the natural environment. Simply put, effective infrastructure policies drive national success.

Amid these calls for infrastructure reform, Congress faces a once-in-a-generation opportunity to physically shape the future of the country. To do so, you all must ask yourselves: what does genuine reform look like? What outcomes should it hope to achieve?

I respectfully submit that the primary answer cannot not be "spend more." It's true that some of our infrastructure systems require capacity expansions and significant upgrades, but the amount we spend on infrastructure should not be the primary reason to motivate reform. Nor is the amount of federal infrastructure spending a direct corollary to economic, social, or environmental success. Spending is not an outcome.

To enact genuine reform, we must be willing to revisit the fundamental goals we hope to achieve. We also must execute an honest assessment of whether our current policy frameworks share those objectives.

I respectfully submit they do not. The authors of our legacy frameworks responded to challenges of their time—issues like connecting cities across state lines, delivering telephone and cable service, and stopping sewage dumping. Those frameworks were never designed to address today's challenges: the most extreme income and wealth inequality since the Gilded Age, broadband as an economy-wide platform, or the existential pressures of climate change.

The country needs federal infrastructure reform because it is time to develop and enact new frameworks that respond to today's challenges. If we want to maximize value from the infrastructure networks we've already built and strategically prioritize the networks we will build in the future, we need to escape the path dependencies we've built for ourselves and adopt a new set of economic, social, and environmental goals. We must be willing to question the short- and long-term viability of our existing frameworks—and be willing to start from scratch where it's necessary.

Outmoded and Outdated Frameworks

Across the country, we can see evidence of a new, digitalized industrial era. Businesses are rapidly turning to new machinery and computing equipment, including new forms of artificial intelligence to inform their business practices. The American workforce is digitalizing just as quickly, acquiring a new set of skills to fill an increasingly complex range of occupations. Our daily lives now run on digital platforms, from communication, to shopping, to entertainment.

Evan as this digital transformation accelerates, today's federal infrastructure frameworks are still designed to respond to challenges of an analog industrial age.

Our transportation frameworks are legacies of an era focused on ***building intercity connectivity*** using the newest technologies of the twentieth century. Congress spent nearly two decades designing a framework that would bring limited-access highways to every corner of the country. Over six decades since the landmark 1956 Federal Aid Highway Act, the National Highway System now carries 55% of all vehicle miles traveled on just 9% of all national lane miles.[1] Rapid innovation in the aviation sector led to design of the national air traffic control system, which promoted safe and frequent travel between our locally-owned airports. As a result, the U.S. aviation industry boomed: from 1975 to 2017 alone, commercial aviation passengers grew at a rate 6 times faster than population growth.[2]

As America rapidly suburbanized—and it became clear just how many households would own vehicles—those same federal surface transportation dollars flowed to ***connections within cities*** and their metropolitan areas. Highway dollars helped develop land on the urban fringe, unlocking demand for single-family housing and promising short drives back to old city centers. The federal government began supporting large-scale transit investments—starting with Atlanta, San Francisco, and Washington, DC—focused primarily on connecting suburbs to cities.

[1] Source: 2017 Highway Statistics, Federal Highway Administration.
[2] Source: 2018 National Transportation Statistics, Bureau of Transportation Statistics.

The twentieth century also brought a new kind of climate insecurity: the overwhelming ***pollution of our water resources***. In response, Congress passed the Clean Water and Safe Drinking Water Acts to protect and improve the environmental quality of our water systems and drive investment in state and local water infrastructure. By 1976, annual grant program appropriations exceeded $30 billion in inflation-adjusted terms.[3] However, construction grant programs for clean water were phased out in the 1980s—replaced by revolving loan funds—and it wasn't until the 1990s that we even had sizable federal support for drinking water. Investment needs, in turn, have increasingly fallen to states and localities.

But it's also important to consider what infrastructure opportunities our twentieth century policies did not address to the full extent possible.

First, ***digitalization*** was still a techno-futurist fantasy in the twentieth century. It would have been difficult for mid-century policymakers to predict the sheer scale of digital data in today's world—and its logarithmic rise in terms of creation and distribution.[4] Still, telecommunications policy architecture primarily focuses on delivering phone and television service to households and businesses. As a result, we have a patchwork approach to broadband policy without a clear imperative on the federal government's role to prepare workers for a digital future or how to ensure every household can afford and use a personal broadband connection.

Second, current federal policies do not consistently or proactively expand the full range of opportunities the ***infrastructure workforce*** can provide. For generations, politicians used construction jobs as a lever to attract support for infrastructure bills, including President George H.W. Bush's support for the 1991 Intermodal Surface Transportation Efficiency Act and President Barack Obama's support for the 2009 American Recovery and Reinvestment Act. However, 77% of infrastructure workers are employed in long-term positions related to operation, management, and governance. There is still an opportunity to recruit, train, and retain millions of workers as part of a sector-wide strategy, aimed at supporting infrastructure career pathways that offer competitive pay and portable skills.

Finally, today's infrastructure policies do not reflect the scale of the ***climate imperative***. While annual news makes clear just how disruptive and destructive climate change will be for essentially every community across the country, our current policy frameworks either take an antiquated approach or are simply absent. For example, the Congestion Mitigation and Air Quality program, one of the largest surface transportation programs, continues to fund highway expansions. Likewise, there is still far too little guidance to local governments that may want to finance more resilient infrastructure to better manage flooding and other stormwater concerns. And these are just two brief examples.

The foundations of the policy frameworks we have today, designed decades ago, are outdated. And because their foundations were meant to pursue a different set of objectives, the foundations also are outmoded.

[3] Congressional Research Service, "Funding for EPA Water Infrastructure: A Fact Sheet", 2019.
[4] McKinsey Global Institute, "The Age of Analytics: Competing in a Data-Driven World", 2016.

To set the country on a path towards industrial competitiveness, equitable opportunity, and climate security, the country needs a revised set of infrastructure policy frameworks, ones that act directly in support of 21st century national goals. Fortunately, that is the exact opportunity facing this Committee and your colleagues across both Congressional Chambers.

Connecting National Outcomes to Infrastructure Needs

Too often, infrastructure debates narrowly focus on the limitations of specific infrastructure systems: congested highways, water main breaks, slow broadband speeds. While these challenges are real and deserve attention, addressing them does not necessarily reflect the goals of infrastructure networks. Infrastructure is not an end in itself—infrastructure should serve a broader set of shared outcomes.

As the country considers a new approach to infrastructure policy, the federal government should start by clearly defining the economic, social, and environmental outcomes it wants those frameworks to address.

Existentially, there is no more pressing need than ***addressing climate insecurity***. The Department of Defense designates climate change as a significant security threat facing the country, and Department leadership continues to make this declaration during a period of global political instability.[5] It's not hard to understand why. We're already witnessing more frequent flooding in coastal and inland markets, more extreme storms and droughts, more warming just about everywhere—and these are just the leading indicators of our climate instability. Much of this can be connected to our transportation system, where pollution levels are still rising and now represent 29% of national greenhouse gas emissions.[6]

Climate insecurity has quickly become the ultimate tragedy of the commons, where seemingly benign individual actions add up to heightened risk factors for us all. The federal government is uniquely positioned to internalize all these costs and redirect behavior in climate-sensitive ways. This certainly includes the aggressive pursuit of cleaner energy generation and cleaner fuel consumption, areas where conversation efforts are already ongoing. We must also add land use to that list, since one locality's interest in developing open space can negatively impact a far larger geographic space. National data bears this out, with the average metropolitan neighborhood's population density actually dropping at a time of overall population growth.[7] Managing how much natural land we convert to a built environment—and the density of that built land—is essential to manage our climate impacts.

Income and wealth inequality represent another significant threat to American opportunity, and a topic this Committee discussed in detail just last week. While many of our older generations remember the shared economic gains of the post-War era, median household incomes only

[5] For one instance, see: United States Department of Defense, "Report on Effects of a Changing Climate to the Department of Defense", January 2019.
[6] Source: Energy Information Administration. Available online at https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions [accessed September 2019].
[7] Paul Krugman, "Density", *New York Times*, April 16, 2013.

exceeded 1999 levels in 2016, based on inflation-adjusted data.[8] Interrelated, wealth-building increasingly concentrates among a select group. For example, the top 1% of households owned 29%—or over $25 trillion—of household wealth in 2016, while the middle class owned just $18 trillion.[9] Consumer spending, labor market outcomes, and savings rates are just a slice of the impacts such inequality introduces.

Stalled real wage growth and a lack of a financial safety net means many of our households face an inequitable infrastructure reality. Housing affordability is a challenge in metropolitan areas of all kinds, not just a select group of large coastal markets, and especially pronounced in central cities.[10] Transportation is the number two household expense after shelter, primarily driven by vehicle costs.[11] Water and broadband prices are frequently found to be a barrier to adopting these essential services. To put these challenges in perspective, the combined cost of housing, transportation, and other infrastructure services often exceeds the total after-tax income of the bottom 20% of households by income.[12] Our built environment is deepening our inequality.

Industrial competitiveness is always a national concern, and one where infrastructure can either unlock or restrict business growth. As it stands, our transportation frameworks are well-attuned to this need, with formula highway funding bringing high-speed roadway access to most places. But where our current frameworks fall short is around digitalization and workforce access. To remain competitive in the digital age, American industries need access to a highly-skilled workforce, genuine digital security, and fast and reliable telecommunications networks—all areas where the federal government directly supports business.

National infrastructure reform should address these competitiveness drivers head-on. There are still millions of Americans who both do not have basic digital skills, do not have direct access to computing equipment, and do not have private access to a broadband connection.[13] From rural communities to central city neighborhoods, many people still do not have access to wired broadband at the speeds modern business requires, putting every business at a disadvantage in these areas.[14] Lengthy commutes—combined with the affordability issues raised above—often

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[8] Source: U.S. Census Bureau

[9] Isabel V. Sawhill and Christopher Pulliam, "Six facts about wealth in the United States" (Washington, DC: Brookings Institution, 2019). Available online at https://www.brookings.edu/blog/up-front/2019/06/25/six-facts-about-wealth-in-the-united-states/ [accessed September 2019].

[10] Cecile Murray and Jenny Schuetz, "Housing in the US is too expensive, too cheap, and just right. It depends on where you live" (Washington, DC: Brookings Institution, 2018). Available online at https://www.brookings.edu/research/housing-in-the-u-s-is-too-expensive-too-cheap-and-just-right-it-depends-on-where-you-live/ [accessed September 2019].

[11] Source: Bureau of Labor Statistics, Consumer Expenditure Surveys, 2019.

[12] Adie Tomer, "Can people afford American infrastructure?" (Washington, DC: Brookings Institution, 2018). Available online at https://www.brookings.edu/blog/the-avenue/2018/05/09/can-people-afford-american-infrastructure/ [accessed September 2019].

[13] For a primer on digital inclusion and 2018 statistics, see: Doug Kinkoph, "Five Digital Inclusion Trends in the United States", National Telecommunications Information Administration. Available online at https://www.ntia.doc.gov/blog/2018/five-digital-inclusion-trends-united-states [accessed September 2019].

[14] Adie Tomer, Elizabeth Kneebone, and Ranjitha Shivaram, "Signs of digital distress: Mapping broadband availability and subscription in American neighborhoods" (Washington, DC: Brookings Institution, 2017). Available online at https://www.brookings.edu/research/signs-of-digital-distress-mapping-broadband-availability/ [accessed September 2019].

mean employers struggle to retain workers who either live far away from the job site or cannot access a private vehicle.[15]

Finally, ***regional economic divergence and fiscal health*** are emerging challenges across the country. Much like household inequality, the past decade has seen metropolitan areas with more than one million residents account for 72% of national employment growth, indicating the heightened economic momentum in a relatively small set of places.[16] A similar phenomenon exists within communities as well. Even in more prosperous metropolitan areas, certain independent cities and older suburbs have seen their populations and industrial levels fall, displaced by growth in other places within their metropolitan area. Meanwhile, across the country, municipalities' general fund spending is rising faster than revenue growth, a risk-filled pattern.[17]

Whether at the metropolitan or municipal level, slow-growth and shrinking communities can lead to a vicious cycle when it comes to maintaining essential infrastructure. Without a stable revenue base, local leaders often must make difficult decisions, including delayed maintenance or more drastic service changes. Flint's recent water experience is a perfect example of this phenomenon, where a long-run fiscal shortfall contributed to a public water failure. Fiscal shortfalls in one jurisdiction can also impact entire metropolitan areas, like the example of pothole-stricken roads inflicting vehicle damage on all who use the roads. As the major owners of public infrastructure—including most roads, water authorities, airports, and seaports—it's in the country's best interest to help local governments maintain essential physical services.

In summary, these national outcomes are no different from what this Committee may raise as motivating factors around other policy debates. Due to the sheer visual quality of infrastructure—to sit in traffic, to watch a water main break—it can be easy to focus strictly on the physical assets themselves. We must look beyond than those visual cues.

Adopting New Federal Infrastructure Objectives

As this Committee and your colleagues debate the future of federal infrastructure policy, I urge you to think creatively. Congress should be willing to start from scratch—at least in terms of legislative design—and only keep current policies that directly respond to a new set of modernized objectives.

While it's beyond the scope of this hearing to outline every component of a comprehensive infrastructure reform package, I respectfully submit a range of evolutionary ideas, bucketed around broader national goals the federal government should pursue. The ideas are new, but the

[15] For one example, see: Laura Ducceschi and Erin Mierzwa, "The Role of Transportation in Fostering Economic Mobility in Northeastern Pennsylvania" (Federal Reserve Bank of Philadelphia, 2017).
[16] Clara Hendrickson, Mark Muro, and William A. Galston, "Countering the geography of discontent: Strategies for left-behind places" (Washington, DC: Brookings Institution, 2018). Available online at https://www.brookings.edu/research/countering-the-geography-of-discontent-strategies-for-left-behind-places/ [accessed September 2019].
[17] Christiana McFarland and Michael A. Pagano, "City Fiscal Conditions – 2018" (Washington, DC: National League of Cities, 2018). Available online at https://www.nlc.org/sites/default/files/2018-09/City%20Fiscal%20Conditions%202018_WEB.pdf [accessed September 2019].

concept is direct: organizing our policy frameworks around shared concepts can inspire entirely new approaches to infrastructure policy.

Environmental Resiliency

- **National Land Value Tax and Impact Fee:** Traditionally, local governments manage land use and the federal government primarily stays out of the way. However, in an era of climate insecurity, income inequality, and local fiscal diversion, the federal government has a strong case to take a more active approach to land use in metropolitan areas. A federal land value tax and impact fee could serve as twin policies to directly steer land uses towards more resilient ends, with the added benefit of promoting more affordable housing and greater transportation choice. A national impact fee would dissuade development in greenfields and other low-density locations, steering development towards places where infrastructure already exists, effectively promoting physical proximity. Meanwhile, a land value tax would incentivize more development in places with flourishing economies, effectively giving rise to more housing and commercial density in the places that need it. While the taxes would steer development, the revenues they raise could be reinvested in infrastructure to promote a state-of-good repair and targeted expansions.

- **Resilience Marketplace:** Recent climate impacts have laid bare the extreme financial costs for communities without adequate defenses against unpredictable weather. To promote more resilient investment, the federal government could establish a new institutional framework that can drive alternative project delivery and financing while increasing overall investment in more resilient infrastructure.[18] Starting with stormwater infrastructure, various federal agencies should collaborate with the private sector—including financiers and ratings agencies—to better define the environmental and economic benefits of resilient infrastructure, develop technical understanding and capacity around new financing tools, and identify the appropriate governing bodies to promote scale.

- **Comprehensive Electric Vehicle Framework:** Considering transportation's role in rising greenhouse gas emissions, there is a growing consensus among the general public and automakers that vehicle electrification is essential to mitigate climate change's worst impacts. And with the average trip distance exceeding 10 miles, many households will feel stuck in their cars.[19] While automakers are already charting a course of action, the federal government can adopt a comprehensive framework to further accelerate the transition. This should include: sizable investment in battery- and materials-related research and development (including a high risk tolerance); cash incentives for electric vehicle purchases and older vehicle trade-in's, both among households and businesses

[18] For more information, see: Joseph Kane and Adie Tomer, "Creating a new marketplace for resilient infrastructure investment" (Washington, DC: Brookings Institution, 2019). Available online at https://www.brookings.edu/research/creating-a-new-marketplace-for-resilient-infrastructure-investment/ [accessed September 2019].

[19] Source: 2017 National Household Travel Survey, U.S. Department of Transportation.

like port operators; expansive public charging infrastructure; and workforce programming around digital transportation.

Affordability

- **National Infrastructure Identification Card:** Federal programs like the Supplemental Nutrition Assistance Program already prove the value of using a centralized system to deploy benefits to those most in need. Likewise, transportation, broadband, and traditional utilities already have experience using common identification systems—ranging from public transportation cards to credit identification—to serve their customers. A national infrastructure identification program would be a method to unite all infrastructure services under one common payment system, a development underway in a wide range of countries.[20] The new system could help distribute means-tested benefits, allowing progressive pricing and a data trail to adjust federal support to local infrastructure providers. It also could use anonymized and encrypted design, promoting trust among all residents in an era of heightened political and data security concerns. This system could also connect to other services, from libraries to publicly-supported housing.

- **Customer Assistance Programs:** No one should lose their job or fail to provide for their children because they can't afford essential infrastructure services. Using lessons from the water sector and its customer assistance programming, the federal government can better quantify and define what affordable infrastructure rates even mean at a regional level. This could lead to more customized assistance strategies, including affordability testing across transportation, water, electricity, and broadband services. An expert commission, appointed by Congress and/or the President, should regularly update these assistance rates to promote affordability, provider solvency, and a broad pursuit of national economic opportunity.

- **Transportation Pricing:** As it stands, transportation offers unclear price signals to consumers and uses disconnected revenue streams to cover public expenses. This is especially true of driving, where there is no way to connect price signals to aggregate demand for the roadways at any given time. The digital age, especially GPS technology and mobile computing, make it possible to install national transportation pricing, starting with a specific set of pilots. Combined with prior bullets in this section, the ability to offer means-tested pricing and using the revenues to reinvest in shared alternatives can reduce the transportation cost burden for our most disadvantaged households while promoting free-flowing traffic on our highest-demand roadways.

Economic Competitiveness

- **Infrastructure Sector Partnership:** Preparing workers for long-term infrastructure career pathways demands additional federal funding, flexibility, and support for work-based learning opportunities that cut across multiple infrastructure sectors. In addition to

[20] For more information, see: USAID, "Identity in a Digital Age: Infrastructure for Inclusive Development", 2017. Available online at https://www.usaid.gov/digital-development/digital-id/report [accessed September 2019].

apprenticeships and the creation of more portable, stackable credentials, there should be a new national strategy and network around infrastructure sector partnerships. Forging stronger employer, educational, community, and labor connections around the entire infrastructure sector could boost programmatic coordination and more comprehensive skills mapping. Similar efforts in the past, including the National Network for the Transportation Workforce by the U.S. Department of Transportation, have provided some guidance in this way. However, multiple agencies, from EPA to USDA to DOE, should come together to share expertise and lead around these issues.

- **Digital Literacy and Skills Program:** In the digital age, the digital skills shared across all households will always serve as a ceiling on the country's economic potential. To help address the continued gap in even basic digital literacy, the federal government should adopt a program suite to reach our most digitally-disconnected neighborhoods. This would include sustained funding for trusted local nonprofits to host training classes, financial support for computing equipment, and active development with peers in the Departments of Education and Labor to develop lifetime learning curricula.

- **Economic Level-Setting:** Public agencies related to the built environment, from transportation to land use to housing, tend to measure performance strictly through the lens of their established expertise. However, to bring a greater degree of economic acumen to those agencies, they require new kinds of frameworks to translate national and regional economic goals into the geographies where they already measure built environment performance. Based on a recent collaborative Brookings pilot in the Portland–Vancouver–Hillsboro, OR-WA metropolitan area, there is an opportunity to build a scalable approach to mapping local economic and built environment data.[21] This approach could eventually inform Comprehensive Economic Development Strategies, long-range planning, and other areas from housing to local financing incentives.

Agency Redesign

- **Department of the Built Environment:** Any largescale infrastructure reform should not treat agency design as static, either. Current agency and department designations reflect a kind of physicality, whether it be different transportation modes or even housing versus transportation. However, there is a United States and global model around multiagency consolidation. A new "Department of the Built Environment" could bundle USDOT, HUD, and parts of EPA and Commerce to organize federal executive branch activities around common outcomes. This setup could maintain specific technical expertise around current staffing structures, but use a more integrated management level to promote shared values and goals.

These concepts represent a part of a comprehensive infrastructure reform effort. I did not list other ideas like Complete Streets, Dig Once, more direct federal support for resilient water

[21] For more information, see: Adie Tomer, Ranjitha Shivaram, and Annibel Rice, "Announcing the Economic Value Atlas: A new approach to regional transportation and land use planning" (Washington, DC: Brookings Institution, 2019). Available online at https://www.brookings.edu/research/announcing-the-economic-value-atlas-a-new-approach-to-regional-transportation-and-land-use-planning/ [accessed September 2019].

improvements, high speed rail investments, or a whole range of concepts that I personally support and could fit directly under these banners. An outcomes-driven framework provides a flexible platform to include a whole range of new and old ideas—and it ensures those policy concepts work towards a common set of goals.

Conclusion

Over the next few years, infrastructure reform represents a profound opportunity to shape America's physical landscape for multiple generations. But I want to repeat a point I made at the onset: simply spending more money without reconsidering what outcomes we want to achieve would be a missed opportunity.

Congress should see setting national, shared outcomes both as a pathway to address our infrastructure needs and as a much-needed chance to reset how we approach infrastructure in the first place. Our economic, social, and environmental challenges are immense, but our country has the resources to meet them. With sustained commitment to a reform effort and an open-minded, outcome-driven approach, I'm confident Congress can deliver infrastructure reform that will support a more inclusive, competitive, and resilient country in the decades to come.

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