

Rebuild with Purpose—Recommendation summary

April 2021

Federal leaders need to build a 21st century infrastructure vision. That means adopting an American infrastructure policy that can respond to emerging challenges around climate resilience, digitalization, workforce development, and fiscal health in ways that improve the quality of life for all people, reinforce our global economic standing, and protect our planet. We recommend the federal government anchor a new infrastructure vision around three interdependent strategies:

- First, the federal government should update how agencies **measure** infrastructure need and connect that information to shared goals.
- Second, the federal government should use these improved measurement systems to **modernize** physical assets and better serve user needs.
- Third, the federal government should commit more resources to **experiment** with physical technologies, fiscal practices, training systems, and applied management practices.

The following three tables summarize these long-term, conceptual strategies and outline several actions that the federal government should take to bring a new infrastructure vision into practice. Examples of the types of federal agencies involved in discussing, designing, and implementing these strategies are listed as well. While some of these strategies are already in motion, we do not explicitly tie them to specific legislative cycles, nor are they an exhaustive list of every step legislators or bureaucrats will need to take—or all the various impacts to state, local, and private infrastructure owners and operators. We also do not characterize the political circumstances surrounding the recommendations, many of which—such as environmental permitting or data privacy standards—will cause significant fights among opposing parties. Instead, these recommendations are meant to strategically shift how policymakers and their colleagues approach policy reform.

MEASURE

| Category | Recommendation | Actions and example agencies |
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| Asset inventories | Accurately record the location and quality of physical assets | • Conduct a national audit of where public and private infrastructure are |
| | | • Dedicate funding to maintain inventories over time |
| | Complement geographic audits with infrastructure spending and underlying fiscal indicator data | • Create an interagency database to help federal policymakers and practitioners understand exactly where federal dollars flow and the quality of the asset built |
| | | • Store operational and performance data in asset inventories |
| Environmental impact analysis | Upgrade and integrate existing environmental data resources across agency, regulatory, and sectoral silos | • Use a database to track lifecycle costs and inform long-term fiscal decisions |
| | | • Conduct place-based emissions inventories to track air and water pollution from transportation, land use practices (including building activity), and agricultural practices |
| | | • Frequently update watersheds, including wetlands, groundwater resources, and other sensitive land features, whether in rural or urban environments |
| | Execute environmental justice audits at a greater geographic scale | • Integrate regulations to upgrade environmental data with asset modernization efforts, specifically to require sensor deployments |
| | | • Measure the environmental justice impacts of current infrastructure networks |
| | Leverage improved environmental data to develop scenarios of environmental risk in all states and communities | • Prioritize investments and operational reforms that address environmental injustice |
| Benchmarking workforce, | | • Integrate environmental scenario planning into federal infrastructure planning efforts |
| | | • Identify mission-critical occupations in a collaboration between DOL and other agencies, including DOT, EPA, and DOE |

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| household, and small business prosperity | Benchmark hiring, training, and retention needs facing current employers | • Measure demographic characteristics (including retirement concerns) |
| | | • Track changing skill considerations, especially in light of new technologies |
| | | • Develop additional technical training resources for infrastructure employers and other workforce leaders |
| | Benchmark impacts of infrastructure service pricing and service availability for U.S. households | • The White House Domestic Policy Council can convene relevant infrastructure agencies and other central offices, notably the Council of Economic Advisers , to design affordability targets for households based on need |
| | | • Use standards to inform the operations of current affordability programs such as the Low Income Home Energy Assistance Program (LIHEAP) or help launch new ones |
| | Monitor and benchmark infrastructure needs among small business communities | • The Department of Commerce and the Federal Reserve banks and branches should collaborate on this effort with local lending institutions and other economic development agencies |
| Federal Data Reserve | Establish data privacy and cybersecurity standards for all federal agencies | • Hire expert staff and rely on outside counsel to stay at the forefront of privacy practices and cybersecurity techniques |
| | | • Collaborate with federal agencies and state and local partners to adopt common standards |
| | Establish interagency and external data sharing standards | • Adopt data formatting standards across the federal government |
| | | • Adopt a safe sharing standard like the Health Insurance Portability and Accountability Act (HIPAA) does for health care |
| | | • Wherever possible, use established open-source data standards |
| | Serve as a central repository for sensitive public or procured data | • Convene leaders of federal agencies who collect and host sensitive information—such as the Internal Revenue Service —to develop a safe, interconnected data storage system |
| | • Lead federal regulations and procurement for acquiring emerging private data sources such as geospatial movement patterns | |

MODERNIZE

| Category | Recommendation | Actions and example agencies |
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| Physical standards | Accelerate sensor deployment across the country | • Develop clear, flexible standards—based on prevailing and evolving needs measured at a state and local level—around integrating digital sensors into infrastructure assets |
| | | • Reform existing grant and loan programs, beginning with DOT , to require installation where sensible |
| | | • Help cover the relatively small costs of state and local governments to procure and maintain sensors as the federal government grows its monitoring mandates |
| | Upgrade design manuals and funding programs to incentivize more resilient infrastructure construction and maintenance | • Set green infrastructure designs and other distributed infrastructure upgrades—including rain gardens and pervious pavers that reduce stormwater runoff—as a standard within transportation, water, and related programs |
| | | • Promote the burying of essential energy and telecommunications in areas with minimal underground risk exposures, to protect against major and chronic climate impacts |
| | Use definitional standards and benchmarks to incentivize innovation | • Use federal emissions guidelines to incentivize automakers to manufacture vehicles with the most sustainable inputs, whether related to battery components, fuel efficiency, or fuel sources |
| • The FCC and Department of Commerce should regularly update broadband definitions based on the economy’s growing intensity of data use and to compel faster and ubiquitous broadband coverage | | |
| • Incentivize utilities and product manufacturers to shift to renewable electricity sources and more sustainable energy consumption practices | | |
| Physical network upgrades | Upgrade interstate and local energy delivery systems to reflect the shift to clean and renewable energy sources | • Coordinate with private owners of energy transmission and distribution as well as state-level regulators and commissions |
| | | • Determine if public funds should help cover private network operators' construction costs |

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| | Upgrade transportation networks, which face many assets nearing the end of their useful life and a range of new user behaviors taking shape | • Transition to satellite-based aviation navigation |
| | | • Modernize locks and other navigation activities within the inland waterway system |
| | | • DOT should support construction techniques that reflect updated physical standards for the resiliency and durability of roadways, railways, and bridges |
| | | • Address poor road quality on local streets |
| | | • Ensure public right of way has the sensors to facilitate adoption of autonomous vehicles and more flexible user charge schemes, including for local deliveries |
| | | • Improve freight rail access to ports, industry facilities, and intermodal terminals |
| | | • Facilitate inter-metropolitan travel through the modernization of passenger rail infrastructure |
| | Upgrade water systems to ensure safety and efficiency | • Replace outdated distribution infrastructure, including lead pipes |
| | | • Use direct federal spending in coordination with new asset inventories to accelerate the process of ensuring all U.S. water systems are built to safe standards |
| | | • Repair wastewater pipes and conveyance systems and upgrade outdated combined sewer systems that are susceptible to overflows |
| | | • Implement reuse technologies and other innovations that promote energy, water, and resource efficiency |
| | | • Upgrade aging dams and levees |
| | Ensure every household and business address can access fiber wireline, high-speed wireless (including 5G), or both | • Prioritize neighborhoods underserved by current wireline and wireless networks |
| Equitable access | Ensure equitable access and affordability of essential | • Expand support for water utilities' customer assistance programs |
| | | • Expand existing federal programs such as LIHEAP and the FCC's Lifeline program |

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| | infrastructure services for households | <ul style="list-style-type: none"> • Launch affordability programs in the transportation space, including zero fare transit programs and targeted rideshare subsidies for low-income households |
| | | <ul style="list-style-type: none"> • Adopt permanent "shutoff moratorium" regulations during economic, environmental, and public health crises |
| | Ensure equitable access and affordability of essential infrastructure services for small businesses and startups | <ul style="list-style-type: none"> • The Department of Commerce should partner with financial institutions to design a new enterprise program focused on small businesses' and startups' infrastructure needs, from telecommunications discounts to water and energy utility forgiveness |
| | | <ul style="list-style-type: none"> • Test green construction techniques or accelerate roll out of emerging technologies through distribution of tax credits or direct subsidies to targeted businesses |
| Fiscal capacity-building | Reform federal procurement | <ul style="list-style-type: none"> • Use federal procurements to incentivize growth of the electric vehicle industry, including within the U.S. Postal Service |
| | | <ul style="list-style-type: none"> • Explore ways to help localities reform their procurement process for green technologies |
| | Use equity- and environmental-focused accounting methods to ensure federal grants and loans improve fiscal health | <ul style="list-style-type: none"> • Support community discernment of which assets can be maintained and where downsizing infrastructure obligations should be considered |
| | | <ul style="list-style-type: none"> • Offer technical assistance to communities to better understand their budgetary scenarios |
| | | <ul style="list-style-type: none"> • Work actively with local civic networks, including adjacent neighborhood groups, to determine where which national highway systems (NHS) portions should be modernized and which should be decommissioned to make way for healthier neighborhood growth |

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| | <p>Interrogate the strains caused by fragmented governance at the metropolitan level, continued outward population growth, and mounting infrastructure costs required to service greater land areas</p> | <ul style="list-style-type: none"> • Use federal policy, especially grant funds, to incentivize regions to explore ways to regionalize infrastructure management, mitigate the climate-related impacts from excessive land consumption, and promote more equitable land use practices |
| | <p>Explore permitting reforms and predevelopment activities</p> | <ul style="list-style-type: none"> • Use demonstration projects to test how fast-tracked reviews can reduce long-run fiscal costs while still increasing environmental sustainability • Continue to explore how limited support for state and local predevelopment activities could lead to accelerated project delivery and improved project outcomes |

EXPERIMENT

| Category | Recommendation | Actions and Example Agencies |
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| Technology testing | Research and deploy cost-saving technologies whenever possible, including purposeful pilots with states and localities | • Test cost-efficient tunneling with local transit projects |
| | | • Test innovative gray and green infrastructure techniques |
| | Support experiments with advanced materials and ascendant technologies to address both fiscal and environmental challenges | • Create an interagency pilot program to consider building resilience into physical assets that serve multiple purposes |
| | | • Incentivize materials testing and other emerging technology pilots across all federal agencies overseeing capital grant programs |
| | Support energy generation and delivery pilots | • Continue supporting tax-related policies that incentivize development of renewable energy sources |
| | | • Increase financial resources for the Department of Energy's Loan Programs Office and its direct funding to state and local governments |
| | | • Support the development of new products through funding renewable-energy-related R&D |
| | | • Pursue energy infrastructure toward zero carbon generation and dependable interstate transmission and distribution |
| | Incentivize the transition toward an electrified transportation system | • Accelerate household and fleet EV adoption with programs to help cover the costs of public charging infrastructure, plus in-home and small business electrical upgrades |
| | | • Increase federal tax credits to reduce vehicle purchase costs |
| • Incentivize bidirectional vehicle-to-grid communication and related pricing policies that encourage off-peak charging and create grid resiliency | | |
| • Continue sponsoring transportation decarbonization research | | |
| | | • Consistently monitor the best ways to authorize safe in-vehicle and roadway sensor technology |

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| | Provide safety and regulatory leadership for emerging forms of transport | <ul style="list-style-type: none"> • Use applied research to test how AVs interact with pedestrians and other transportation modes • Develop a thoughtful regulatory approach for the emergence of drones associated with e-commerce and other freight deliveries • The FAA should regulate emerging urban passenger flight products for safety and airborne right-of-way considerations, and evaluate their potential impacts on competing travel modes |
| Data systems | Identify and implement philosophical AI priorities | <ul style="list-style-type: none"> • Convene AI ethical experts to identify priorities • Filter those priorities into operational programs |
| | Establish cybersecurity and privacy best practices | • Collaborate with partners at NIST , OSTP , and a newly established Federal Data Reserve to establish cybersecurity and privacy best practices, both for federal agencies and interested private sector partners |
| | Use emerging data practices to test new affordability programs | <ul style="list-style-type: none"> • Launch a consolidated affordability program (Boost Program) that delivers portable, flexible benefits for essential infrastructure services via an associated Boost Card • Standardize and encrypt identification cards to carry affordability benefits and other digitized records for airport screening, library services, and more |
| | Use clearer environmental accounting standards and interagency programming to reduce total spending and improve environmental outcomes | • Create a new Climate Planning Unit (CPU) within OMB to combine expert environmental and budgetary staff to identify resilience-focused, cost-saving opportunities within agency operations |
| | | • Use cost savings to fund the unit's operations and create opportunities to test larger, more expensive resilience projects |
| Future of work | Support the financial and technical capacity of regions through additional sector partnerships | • DOL should coordinate planning and provide additional technical and financial resources to support industry-wide collaborations among infrastructure employers, workforce development agencies, and other partners, especially at a regional level |
| | Continue to invest in work-based learning | • DOL , alongside other federal agencies such as DOT , EPA , and DOE , should expand apprenticeships, pre-apprenticeships, and other earn-and-learn opportunities across the infrastructure sector |

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| | Ensure a broader range of students and prospective workers can benefit from infrastructure careers | <ul style="list-style-type: none"> • Provide more flexible training pathways, supportive services, and opportunities for quick immersion |
| State and local fiscal laboratory | Leverage the federal government's role as the country's central financial regulator to streamline investing in green infrastructure | <ul style="list-style-type: none"> • Convene Treasury, Securities and Exchange Commission, EPA, and DOE experts with infrastructure owners and capital market experts to develop new resilience-focused rules • Use these new rules to inform current financial instruments such as green bonds |
| | Explore launching a federal green bank to scale up successful practices at the state and local level | <ul style="list-style-type: none"> • Support state and/or local projects that would improve local environmental performance but may not be viable without federally reduced borrowing rates |
| | | <ul style="list-style-type: none"> • Offer financial expertise and other technical assistance to communities |
| | Empower regional governments through federal infrastructure funding | <ul style="list-style-type: none"> • Design regional empowerment pilots that would use tax reforms and other fiscal programming to incentivize local governments to regionalize infrastructure services |
| | Explore new methods to automatically deploy emergency support during economic downturns | <ul style="list-style-type: none"> • Test “automatic spending triggers” that provide immediate aid when certain national economic conditions are met, such as loss of employment, output, or a similar measure |