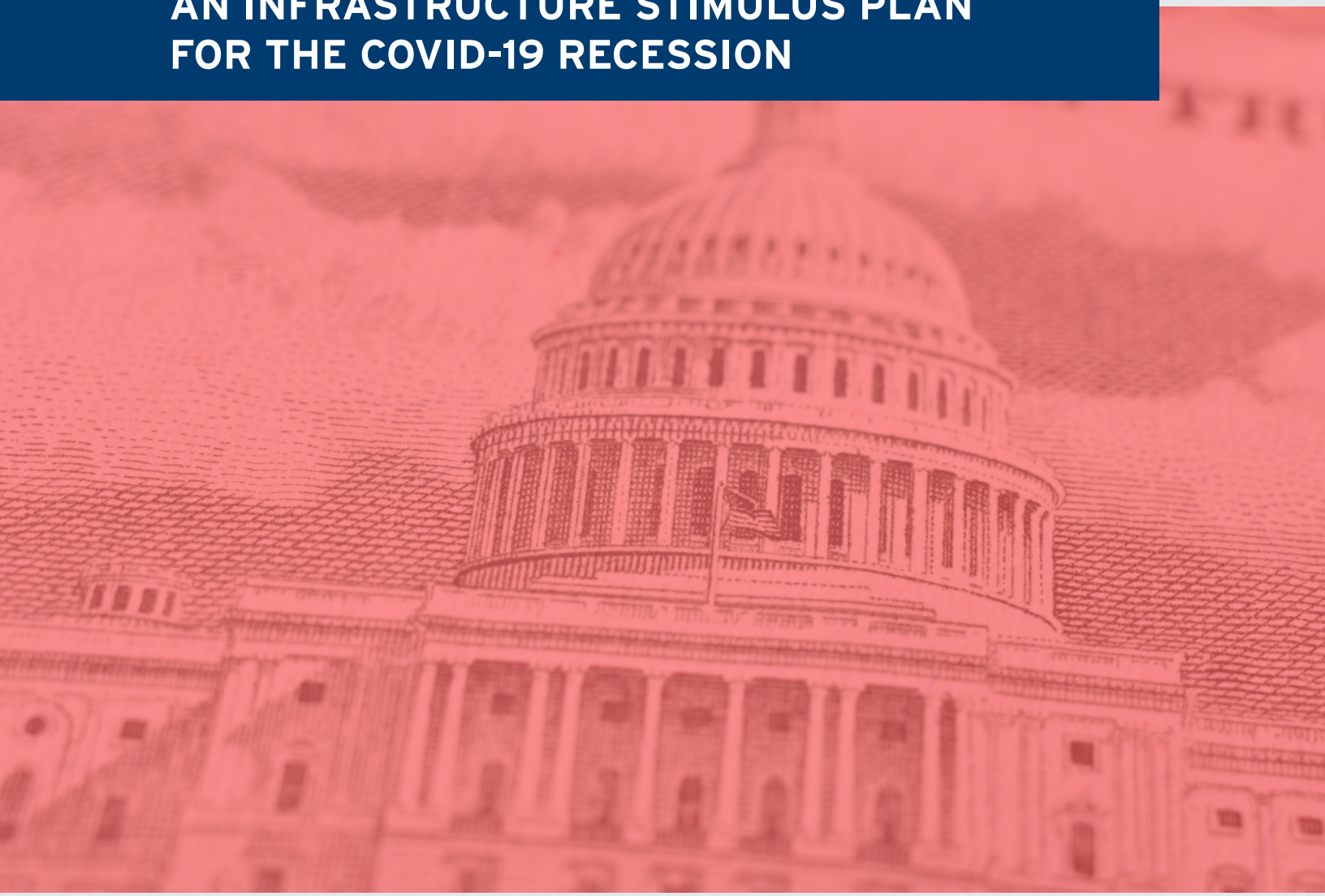
AN INFRASTRUCTURE STIMULUS PLAN FOR THE COVID-19 RECESSION



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Overview

Like most corners of American society, the COVID-19 pandemic has rattled the nation's infrastructure. National driving levels dropped over 40% in April—the largest decline since World War II—while public transit continues to run with few passengers. Internet data use is surging as meetings, shopping, and social gatherings moved online. Safe water is an urgent concern and electricity demand has been swinging wildly.

But even if these behavior changes subside, there is already a more sustained threat to U.S. infrastructure: a large-scale recession. The labor market is completely upended, with over 45 million workers making first-time unemployment claims between mid-March and mid-June. Household spending still hasn't recovered, and Black- and Latino- or Hispanic-owned small businesses have been hit especially hard. With initial metropolitan data confirming a widespread downturn, there is now little expectation for a quick, V-shaped recovery, despite some positive job reports.

Such a swift economic contraction will be overwhelming for governments and people. State and local governments have already cut infrastructure projects and related labor hours due to reduced sales and income tax revenue. These budgetary impacts will only grow if gas tax revenues stay below their targets, if transit systems and airports remain half empty or worse, and if unemployed workers stop paying their utility bills. For individuals, lost income starts a vicious cycle where some can no longer afford essential infrastructure services—whether it's filling their car with gas or paying for in-home broadband—which only makes finding a new job or getting to a grocery store that much harder.

Amid these ominous trends, though, recessions can also offer valuable opportunities to improve infrastructure and expand economic opportunity. Lower interest rates make borrowing cheaper compared to recent years, reducing the upfront costs of generational projects. Infrastructure spending can also create immediate professional opportunities across a mix of design, construction, and operational jobs. The mix of short-term employment and long-term investment makes infrastructure an attractive area for federal stimulus.

Which leaves a core question for federal policymakers: How can Congress design an infrastructure stimulus that responds to today's recession while still making forward-looking investments?

At their core, the pandemic and its associated recession are stories of human suffering. This means that any infrastructure stimulus program must put people at the center. Congress should fund policies that make essential services more affordable, promote workforce development opportunities, and build projects with a more resilient, equitable future in mind. The benefit of a people-first strategy is it can stimulate greater economic activity immediately while ensuring benefits flow directly to households and communities most in need.

The country also should not simply replay the 2009 stimulus. While the term "shovel-ready projects" still tends to lead conversations about stimulus packages, few capital projects can move quickly enough to create substantial jobs or upgrade systems' quality during a recession. Nor can the country afford to overlook environmental injustices that disproportionally impact our most vulnerable communities. Instead, federal lawmakers should adopt policies that can immediately benefit disadvantaged households and create training programs that lead to durable career opportunities.

This brief uses historical data and the earliest indicators from the COVID-19 downturn to make the case for a people-first approach to federal infrastructure stimulus. We specifically recommend that Congress:

- Launch a ***Boost Program*** (and associated *Boost Card*) to help cover the cost of essential transportation, water, energy, and broadband services for over 50 million households

- Pass a ***Keep America Moving*** grant program to protect state-of-good-repair initiatives and labor markets by expanding direct grants to state and local governments with requirements to spend on short-term maintenance projects

- Launch an ***InfraCorps Program*** to create and strengthen infrastructure career pathways for underrepresented and disadvantaged groups by securing multiyear funding for workforce development in the skilled trades and, potentially, full-time wages for 3 million apprenticeships

- Launch an ***ASCEND Program*** to promote long-run economic competitiveness by launching four public competitions and four private research investment programs that modernize water infrastructure, accelerate clean energy adoption, expand broadband networks and skills development, and address transportation and land use environmental injustices.

The total cost of these programs would range from $167 billion to $327 billion.

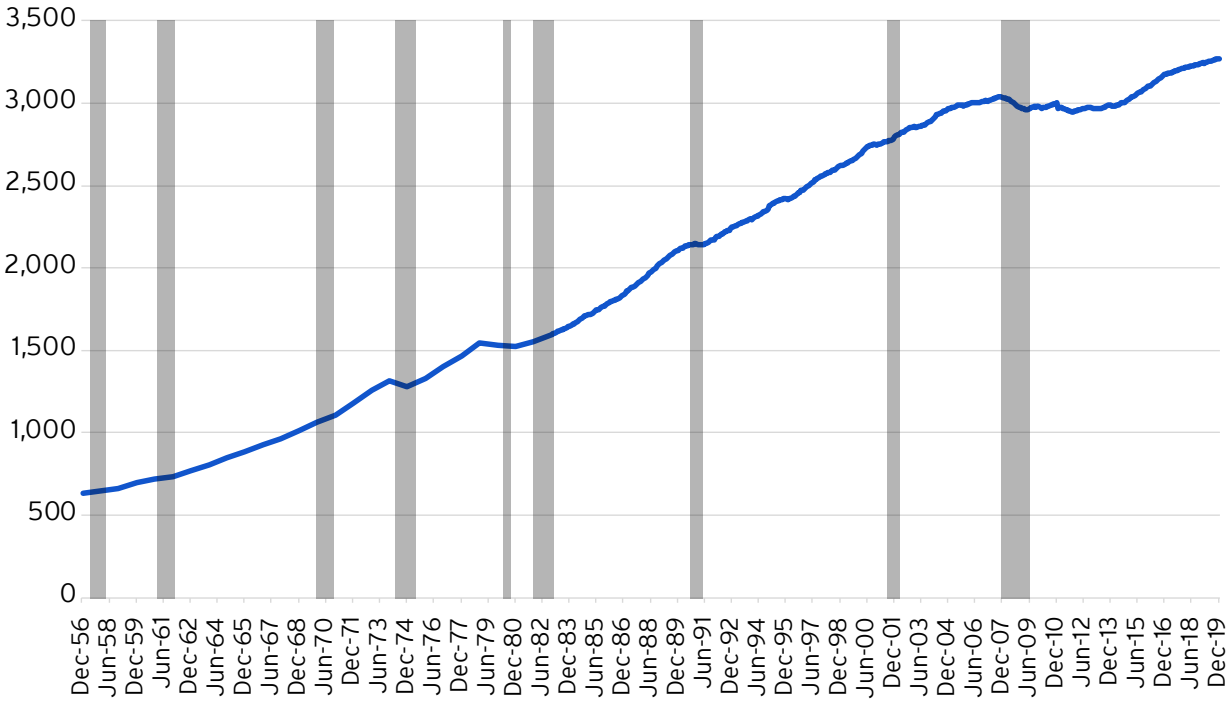
Recessions can shock infrastructure demand, but structural factors have a more enduring impact

The National Bureau of Economic Research (NBER) defines a recession as a "significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales." When looking at both historic recessions and the current recession, there is no question that reduced economic activity translates into less infrastructure use. Yet these impacts don't last as long as structural changes, such as continued suburbanization, the shift from manufacturing to service occupations, and development of energy-efficient equipment.

National driving habits exemplify this distinction. From 1956 to 2020—corresponding with the construction of the U.S. highway system—the only periods in which vehicle miles traveled (VMT) fell were during recessions (Figure 1). This was especially the case during the two energy crises of the 1970s and the Great Recession in 2007. Yet over six-plus decades, VMT kept rising due to structural patterns that overwhelmingly reinforced driving habits: longer supply chains demanding more freight activity, governments building more highways, and developers building more automobile-oriented communities.

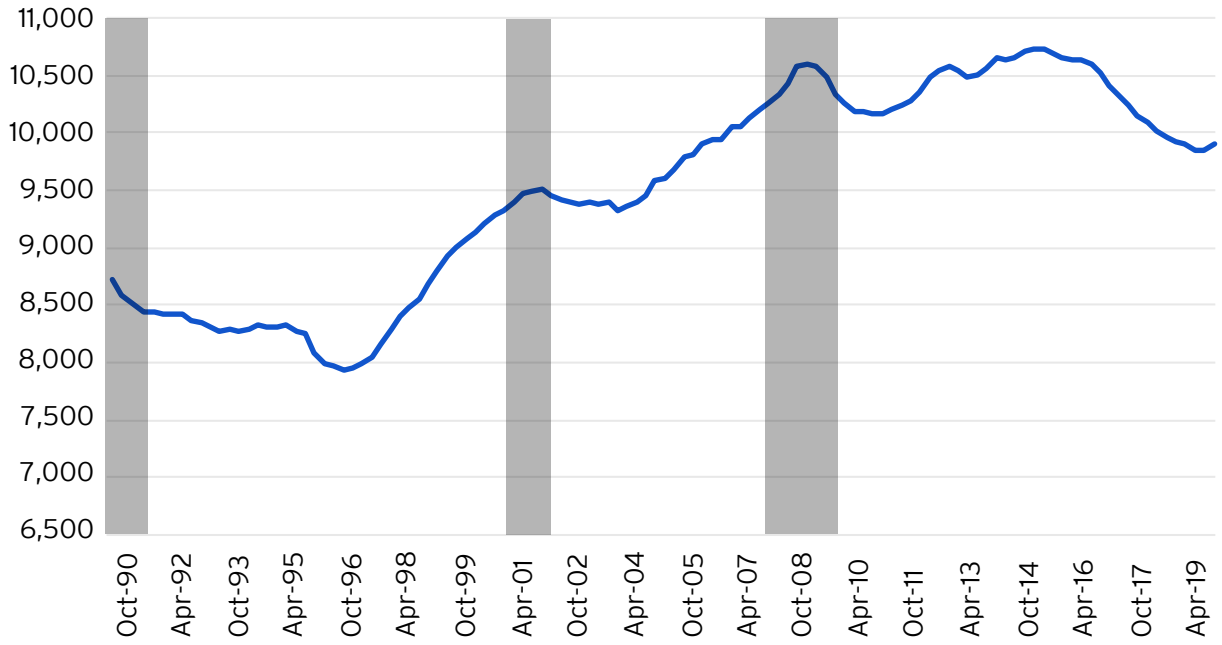
Transit ridership demonstrates a similar distinction. National ridership dropped during the 1990, 2001, and 2007 recessions (Figure 2). However, the largest sustained drop—which is still underway—started in 2014, during the longest economic expansionary period in U.S. history. Prior to COVID-19, the chief concern

Figure 1. Annualized vehicle miles traveled (in billions)
1956-2019



Source: 1956–1982: Highway Statistics, Table VM-201; 1983–September, 2019: Traffic Volume Trends

Figure 2. Annualized public transportation ridership (in thousands)
1990-2019



Source: Brookings analysis of 1-year American Community Survey data.

among transit professionals was investigating what structural issues caused this drop-off—not temporary impacts from past recessions.

The same core pattern appears within intercity transportation. Commercial air travel dips during recessions, but long-run passenger levels keep growing as inflation-adjusted ticket prices fall and the global economy continues to demand more face-to-face interactions. In fact, the longest period of sustained passenger drops after 9/11 had less to do with the 2001 recession than with security fears. Amtrak ridership—which began a steady period of growth around 2000—also changed less due to economic cycles and more because of improved performance, corridor investments, and changing consumer tastes.

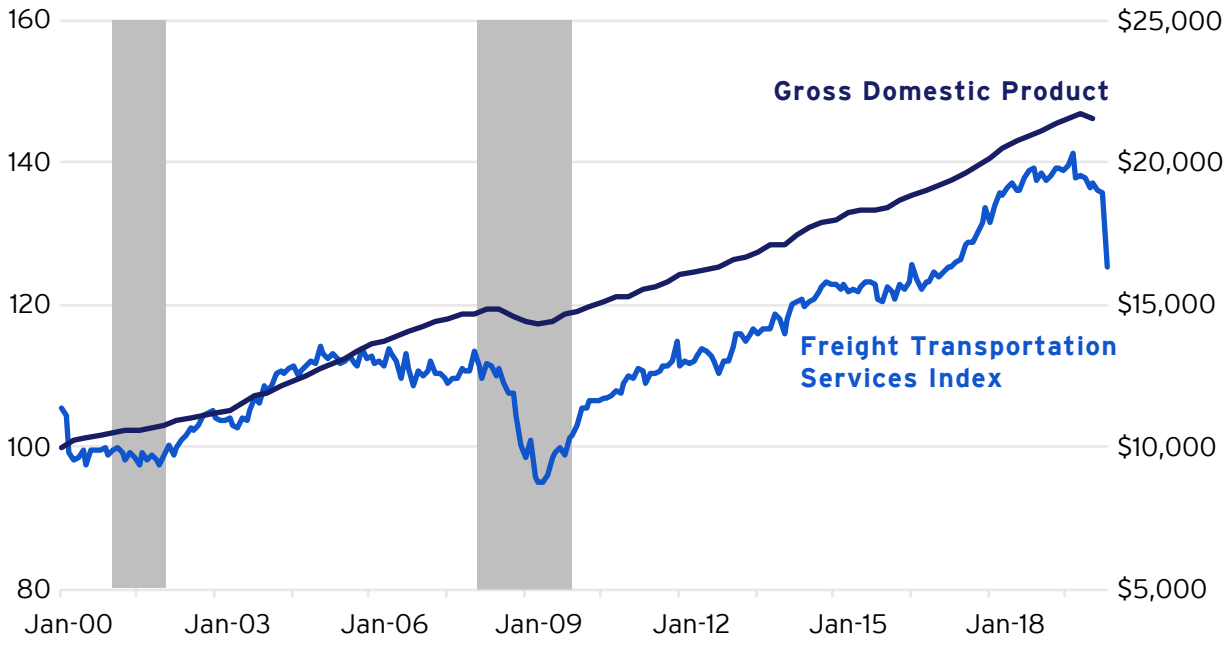
Freight activity has seen a similar trend (Figure 3). Though freight activity did fall during the past two recessions, there is a long-term upward trend over the past two decades.

While structural changes keep pushing up most transportation usage, the pattern works in reverse for the energy and water sectors. The threat of climate change, potential for technological innovation, and changing consumer tastes all push toward greater efficiency and sustainability across both sectors. This has resulted in 14% less electricity generation between 2001 and 2019, while total water use in 2015 was lower than 1970 levels. While recessions have the potential to temporarily decrease demand within these two sectors—through diminished industrial production and household consumption in certain cases—the impacts are still fleeting relative to long-run trends, given the essential nature of energy and water use for households and businesses.

So where does the 2020 recession fit within this historical context?

Unlike other recessions since the 1950s, COVID-19 shocked multiple infrastructure systems all at

Figure 3. Transportation Services Index, freight and Gross Domestic Product (in billions of dollars)
January 2000 - April 2020



Source: Brookings analysis of Bureau of Transportation Statistics and U.S. Bureau of Economic Analysis data.

once, and at an unusual scale. People stopped making local and long-distance trips at historic rates. Empty office buildings meant water utilities lost billions of dollars from anchor customers. Overall electricity demand is down and the daily load curve is fluctuating. Broadband demand surged as school, work, and socializing moved online.

Yet there is already evidence that these trends will reverse when the economy can open at scale. Local travel rose when some cities and states reopened. Broadband usage peaked in April and trended down through June, likely reflecting a mixed resumption of in-person activity and some level of "Zoom fatigue." Continued reopenings will allow water and electricity demand to tick up. After early fears, emerging data is showing that transit is less likely to heighten COVID-19 exposure than other travel modes, which should help transit agencies rebound even as they continue to address lingering apprehension around social distancing. With these factors in mind, *policymakers should design any infrastructure stimulus based on structural patterns, not temporary deviations*.

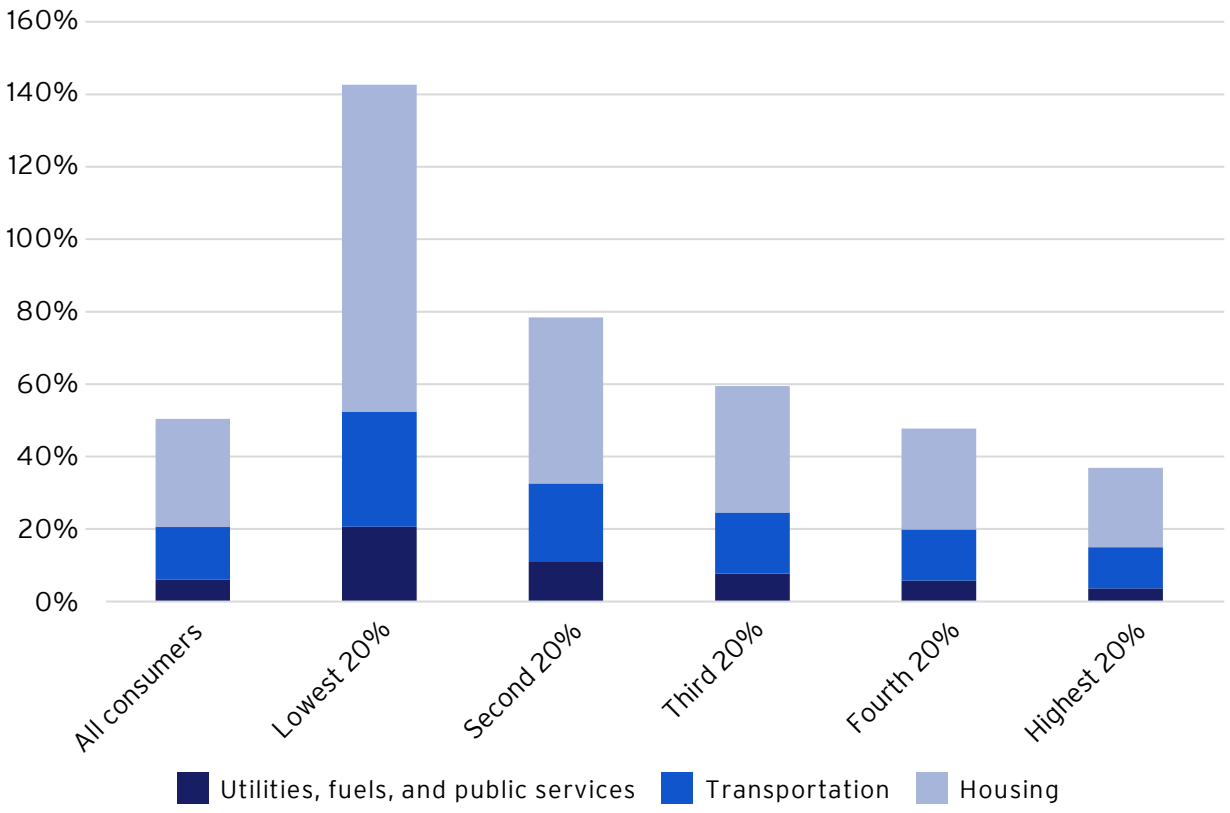
The exception is telework and the rapid rise in digital connectivity. With so many companies, nonprofits, and governments effectively forced to experiment with telework, early surveys confirm that workers and management like the new setup. A shift to more permanent telework policies could impact local demand for commercial and residential properties, launch new metropolitan competitions for industry and talent, and accelerate calls for universal broadband. Less demand for face-to-face meetings or conferences would hurt the aviation industry, while more workers staying at home could accelerate e-commerce's growing share of retail sales. It's vital that policymakers begin planning for scenarios in which significant chunks of the workforce stop commuting, while other trips—such as a doctor's appointment—similarly shift to remote alternatives.

Recessions amplify infrastructure's affordability issues

Infrastructure is essential to everyday life, but it's not always affordable to use. As economists point out, infrastructure services such as water and electricity are necessities, and demand is relatively inelastic, with consumers being less sensitive to changes in price. Infrastructure tends to be more expensive for lower-income households than higher-earning ones, with the lowest quintile of household earners spending over 50% of their post-tax income on transportation and other utilities (Figure 4). Housing costs push those 25 million households into the red each month. Research also regularly shows that the price of transportation and broadband are major barriers to use.

Recessions amplify the economic injustices built into current infrastructure pricing. Combined with an increasing number of furloughs and layoffs, infrastructure bills can hit many lower-income households harder during recessions. It's no wonder that electricity and water shutoffs spike during economic downturns, or that auto loan delinquencies rise. These struggles come even as the providers of these services—especially public infrastructure owners and operators such as transit agencies and water utilities—strive to better measure and address affordability concerns.

Figure 4. Household spending on infrastructure services
Grouped by household income quintile



Source: Brookings analysis of the Bureau of Labor Statistics' 2018 Consumer Expenditure Survey

The result can be a self-perpetuating cycle of economic disconnection. Workers who are laid off and then lose their vehicles may have no means to either interview for a job or report to the one they may get hired for. A family that loses water service may be forced to resort to pricier bottled water or face health concerns. A lost broadband connection can disengage students and job seekers. Infrastructure has always been essential, but cutoffs and service losses make it painfully obvious.

The scale of the infrastructure affordability issue could be especially overwhelming during the COVID-19 recession. The U.S. Census Bureau's Household Pulse Survey through July 14, 2020 found that 50% of respondents experienced income losses since March 13, 2020. The likelihood was even higher among those making less than $50,000 per year and with less than a bachelor's degree. To assist those in need, *policymakers should make affordability a chief structural concern*.

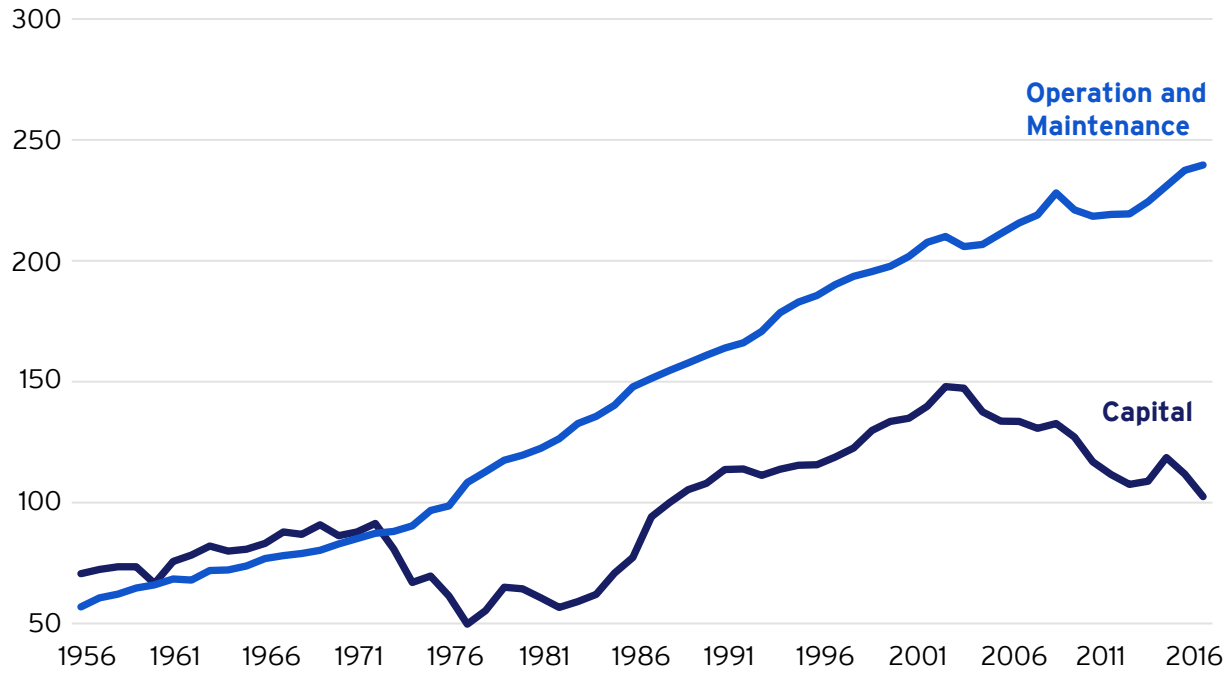
Recessions will lead to project delays and layoffs

While recessions may influence infrastructure usage only for a short period, loss of economic activity delivers a more sustained impact to project timelines and infrastructure employment. Recessions always create shortfalls in state and local governments' general tax revenues (including sales, income, or property taxes), which localities and states rely on to plan and fund their annual budgets. Since state and local governments cannot run deficits due to balanced budget requirements, revenue shortfalls will immediately impact their budgets, especially the local governments who are most reliant on income and sales taxes. The same overall trend applies to public authorities such as water utilities and airports, or private entities that own energy utilities and broadband networks. They each face shortfalls due to lost user fees.

Historically, financial markets alone cannot solve for revenue shortfalls. One lesson from the Great Recession was that new or refinanced debt can help localities, but not enough to fully compensate for tax revenue losses. In the worst scenarios, like the Great Depression, cities and states with the highest levels of existing debt relative to their economic output could actually default.

All types of infrastructure projects can be vulnerable during fiscal shortfalls. While state transportation agencies rely heavily on motor vehicle fuel taxes and other dedicated user fees, most local governments use the same general tax revenues to fund their transportation budgets as they do other critical services such as education, housing programs, and protective services. As a

Figure 5. State and local spending on transportation and water infrastructure, 1956-2017
In billions of 2017 dollars



Source: Congressional Budget Office, using data from the Office of Management and Budget, the Census Bureau, and the Bureau of Economic Analysis.

result, it's easy to delay transportation projects to reserve funding for other annual operations. Water utilities, airports, and other peers can make the same choice to delay long-run capital projects. Telecommunications and energy companies may prefer to keep cash on hand and delay projects the same way.

Once projects are delayed, it can lead to years of lower spending. State and local governments slowed spending on transportation and water capital projects for multiple years following the 1970s recessions and the Great Recession (Figure 5). Overall public construction spending within infrastructure sectors also fell for multiple years following the Great Recession. The Census Bureau found similar trends dating back to 1993 for private spending in the energy and communications sectors, although it's important to note those sectors also conduct investment cycles based on technological innovations such as new wireless standards.

Project delays don't happen in a vacuum. Less spending spills into the infrastructure labor market; as public infrastructure owners and operators struggle to plan and pay for projects, private contractors may not provide as many services, execute as much construction, or hire as many workers compared to typical schedules. Nor are these job losses confined to general construction jobs; millions of plumbers, electricians, engineers, and other skilled trades all work on infrastructure projects, including needed maintenance and repair. While governments may not formally delay projects until they pass a budget, once project delays begin, it's a certainty that workers will lose labor hours. Still, the transferable skillsets and experience these workers possess could readily translate into opportunities in a stimulus effort, and there remains an ongoing need to train new workers in the skilled trades.

Of course, the easiest way to keep projects going and provide greater certainty for all infrastructure owners is direct cash assistance or cheap loans. This was the case when the CARES Act provided airports, airlines, transit agencies, and state and local governments hundreds of billions of dollars in new direct funding. Flexible support also came from the Federal Reserve when it opened a new Municipal Liquidity Facility to purchase short-term securities from states, local governments of areas with populations over 250,000, and public authorities, in order to help cover revenue shortfalls (they've recently expanded this program to cover smaller localities, too). These efforts can boost funding and offer more flexible lending to cover immediate budgetary needs.

Still, industry representatives and outside experts continue to make the case for the federal government to invest even more money in order to avoid catastrophic service cuts. Timothy J. Bartik at the W. E. Upjohn Institute believes state and local government shortfalls could reach $899 billion, and Elizabeth McNichol and Michael Leachman at the Center on Budget and Policy Priorities estimate a $555 billion shortfall—both far more than the $150 billion provided through the CARES Act and in line with the budgetary and employment concerns raised by local government associations. State transportation and national transit associations also continue to ask for more direct assistance to defray project and service cuts. These demands are early confirmations of the impact that federal stimulus can have. *Policymakers should feel confident that targeted stimulus can accelerate projects and create workforce opportunities in the process.*

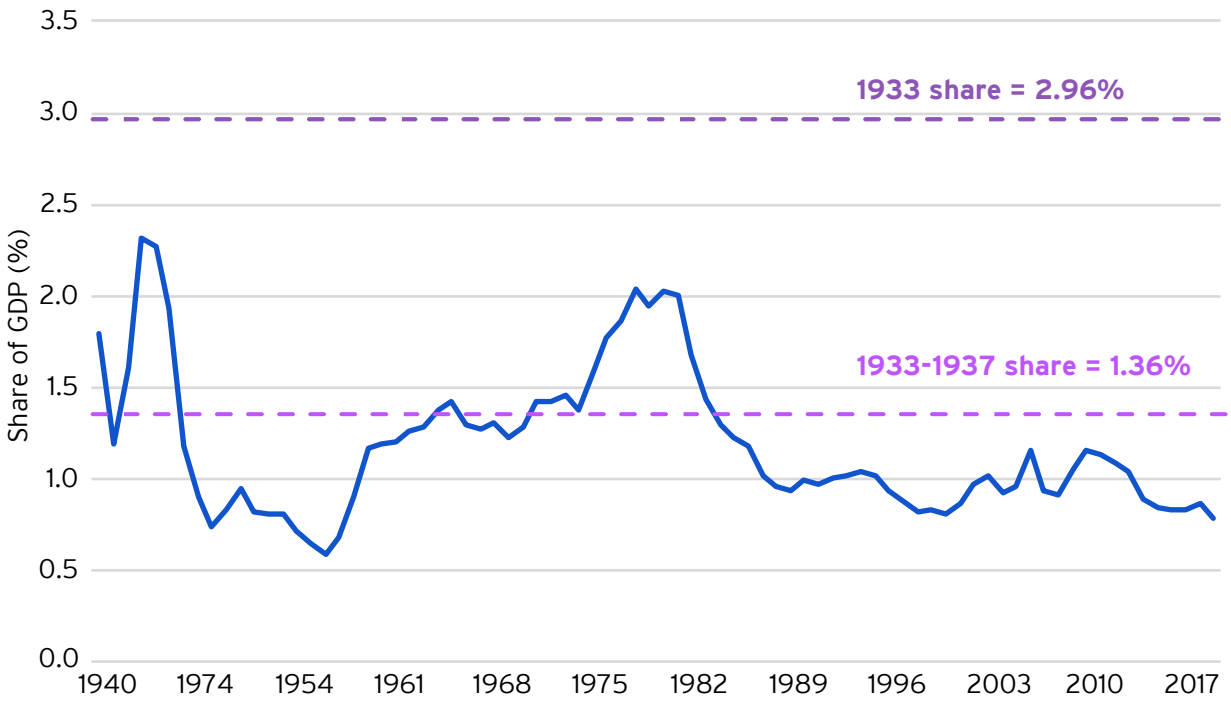
Federal infrastructure stimulus does not need to rely on traditional programming

For nearly 100 years, Congress has seen infrastructure spending as a way to stimulate economic growth during downturns. The New Deal was the first major example, which included an array of capital projects, from the massive Hoover Dam to scattered rural electrification efforts. The New Deal still represents the largest annual infrastructure spending in the country's history, measured by spending as a share of GDP. Those programs employed 8.5 million workers in the Works Progress Administration and an additional 3 million younger workers in the Civilian Conservation Corps, while fostering the development of new skills and launching good-paying careers across the country.

The Ronald Reagan and George H.W. Bush administrations both positioned transportation bills as important job programs. The 1982 transportation bill even included a five-cent hike in the gas tax—equal to a 120% increase—which Congress and President Reagan justified as a long-term investment that would create immediate job opportunities. President George H.W. Bush was even more animated; he famously declared the 1991 transportation bill was about "jobs, jobs, jobs" during the ceremonial signing.

But comparing the New Deal to the 1982 and 1991 transportation bills demonstrates two competing approaches to spending. The New Deal used massive spending to fund entirely new categories of forward-looking projects: delivering clean water, electricity, and telephone service to people for the first time; demonstrating mega-project capabilities such as New York City's Lincoln Tunnel; and reinvigorating the civic commons through projects such as San Antonio's

Figure 6. Federal infrastructure spending, as a share of GDP
1940-2019



Source: Brookings analysis of Office of Management and Budget data.

River Walk and Charleston, S.C.'s Dock Street Theatre. By contrast, the transportation bills mostly focused on building highways and transit lines via traditional programming (although the 1991 bill did empower metropolitan and local governments to make more project decisions). Just as importantly, workforce development programming was central to the New Deal, while the transportation bills take as a given that more spending creates more employment opportunities.

The 2009 stimulus—the American Recovery and Reinvestment Act (ARRA)—used a hybrid approach. Some infrastructure funding went right into current transportation formula programs, water-related revolving loan funds, airport grants, and other preexisting programs. Funding those established programs actually accelerated spending, which Shoshana Lew and John D. Porcari documented. But ARRA also launched the National Broadband Plan and the innovative Broadband Technology Opportunities Program, both of which inspired new approaches to bridging the digital divide and delivering true high-speed internet service. Funding toward clean energy programs used renewable generation, weatherization, and even new financing models to invest in long-term sustainability.

The COVID-19 recession presents a chance to learn from these past stimulus programs. So far, service workers—including many women—have borne the brunt of 2020's initial job losses, which is a major contrast from the Great Recession's male-dominated layoffs in construction-related occupations. The shift to telework and distance learning only raises the urgency to prepare all people for a digital future. Climate insecurity has grown since 2009, and lessons from fiscally challenged Flint, Mich. and flood-ravaged Houston are still fresh. Advances in mobility technologies and electric vehicles promise new approaches to transportation. *Policymakers should recognize stimulus funds are a distinct opportunity to launch workforce development programs and innovative capital programs.*

A COVID-19 stimulus package

Macroeconomic indicators—from aggregate consumer spending to durable goods orders to permanent job losses—all point toward a deep, sustained COVID-19-fueled recession. As the economic impacts worsen, federal leaders are searching for ways to stimulate an enduring economic recovery. Yet with so many obvious economic challenges—from supporting the unemployed to protecting essential workers—infrastructure supporters must make a compelling case.

Passing an infrastructure stimulus will require more than traditional calls for increased spending or legislation designed for a different economic moment. Federal leaders will need to promote infrastructure policies that directly respond to today's damaged economy and recognize where the country must go once the worst is behind us.

There are two immediate concerns. One is to support households who either experienced income loss or entered the recession already facing economic disadvantage. The other is to protect current infrastructure workers whose jobs may be under threat from state and local budget cuts.

A stimulus can also address the country's long-run needs, charting a new path for infrastructure policy for decades to come. A lack of interest and diversity in the skilled trades, outdated water and energy systems, persistent digital divides, and inequitable land use all limit national competitiveness.

We recommend Congress build a stimulus that will deliver immediate and long-lasting benefits, using the clear lessons from past programs. The stimulus should include four core programs:

Boost Program: *Deliver direct household aid to help people pay for essential transportation, water, energy, and broadband services.* Federal, state, and local policies inconsistently measure and address infrastructure affordability, both by infrastructure sector and geography. Congress can launch a coordinated program to address this barrier to opportunity, which will treat infrastructure as a basic human right. The program should support a basket of goods that reflects modern needs. We recommend:

- Households receive a fluid, monthly budget to cover transportation, broadband, and basic utilities as the recipient sees fit. Eligible travel expenses would include either transit passes or ride-share trips, with an exception for gasoline and automobile insurance in neighborhoods without alternatives. Eligible utility expenses would include water, in-home energy, telephone, and wireline and wireless broadband service. All benefits would scale based on household size, employment status, and regional cost-of-living adjustments. An independent commission of experts would annually review benefit levels and be subject to congressional oversight.

- All benefits would be tied to household tax information and delivered via the same Electronic Benefits Transfer card—and operational system—used for the Supplemental Nutrition Assistance Program (SNAP). The new single card could be named a *Boost Card*. By pairing infrastructure assistance with existing programs, the administrative costs would be lower, and eligible households would have fewer channels to navigate. Benefits would phase out based on household income, which would also be reviewed by the above commission.

- States would administer the program, and federal policy would permit states and localities to supplement national standards. For example, King County, Wash. could use its ORCA LIFT reduced fare program to further supplement local transit benefits. Similarly, states should also be permitted to negotiate with private companies who may be willing to offer discounted transportation, broadband, or energy services.

- To promote administrative efficiency, a central administrative unit should look to integrate new transportation and water assistance alongside existing parallel efforts, such as the Low Income Home Energy Assistance Program (LIHEAP) and the Lifeline program. The initial program launch should focus on the lowest-income households and those experiencing recent income losses, using initial reporting data to inform a more durable, long-term program.

- **Cost estimate:** Using the Consumer Expenditure Survey, we can see average spending by household income quintile for all utilities, telecommunications, gasoline, and transit expenses. It would cost the federal government between $80 billion and $90 billion per year to create a $160 monthly budget for the lowest-earning quintile (equal to over 50% of all expenses) and a $100 monthly budget for the second-lowest quintile (equal to under 25% of all expenses). Those benefits would reach a total of 53 million households, ensuring scaled benefits would reach households with the lowest incomes before the recession and those experiencing relative income losses since March.

Keep America Moving Program: *Provide direct grants to protect infrastructure state-of-good-repair and the current infrastructure workforce.* As Congress considers more direct support to state and local governments (including independent authorities), a portion of that funding should be dedicated to infrastructure maintenance projects. Prioritizing maintenance will ensure infrastructure quality does not degrade, which only leads to higher long-term costs. Increased funding will also eliminate many budget cuts, which will keep infrastructure workers employed. We recommend:

- Eligible expenses include any maintenance projects that improve a publicly owned fixed asset, including transportation, water, energy, and broadband infrastructure. Maintenance would focus on repairing existing capital assets—not on large expansions or replacement projects. Grants could also cover the current operational workforce if individuals were employed as of March 1, 2020. The program should not include other public capital stock such as schools and administrative buildings.

- Congress should develop a formula to scale grants based on state and local fiscal need, which must be more formally defined and measured. The federal program should not penalize places for having greater income security (such as larger "rainy day" funds), but Congress should provide extra benefits to places with greater economic disadvantage heading into recession, including conditions such as lower household income and less resilient revenue sources.

- The Treasury Department would deliver funding directly to state and local governments' general funds—not through current federal infrastructure programs or to specific agency accounts at the state and local level. However, states and localities must continue their ongoing maintenance projects and not simply substitute federal funding for these efforts.

- Treasury would be responsible for spending enforcement, working with federal bureaucratic colleagues where appropriate and reporting results to Congress. These results would be available online and transparent to the public.

- **Cost estimate:** State and local governments spent $342 billion on all transportation and water infrastructure in 2017, which includes all capital, operation, and maintenance expenses. The CARES Act already supplemented some of the emerging funding gap, including the $150 billion relief fund for state and local governments (which can apply to various expenses) and $35 billion directly to transit agencies and airport owners. Awarding an additional $50 billion to $100 billion for one year to state and local infrastructure agencies would provide a significant cushion against

continued revenue losses. An additional infusion could take place if the recession persisted and revenues still did not reach expected targets.

InfraCorps Program: *Launch a multiyear program to develop a diverse workforce in the skilled trades.* The ultimate depths of the COVID-19 recession are still unknown, but the labor market impacts are already serious and demand action. As Congress looks to support small businesses and other affected industries, there is an opportunity to hire, train, and retain talent in the skilled trades. Working in collaboration with the Department of Labor, federal policymakers should establish a new, 21st century infrastructure workforce program aimed at providing flexible learning and career opportunities in the skilled trades, especially for underrepresented, disadvantaged, and disconnected workers.

- Programming would focus on specific work-based learning opportunities—including apprenticeships and pre-apprenticeships—that would help build the skills and competencies for a new generation of skilled trades workers. The new federal program would expand beyond existing efforts such as AmeriCorps and the Corps Network to capture a broader range of underrepresented, disadvantaged, and disconnected workers, including the out-of-work.

- Congress would fund a new program within the Department of Labor focused on future-looking skilled trade careers. This program would receive additional guidance and technical support from other experts and federal agencies, including (but not exclusive to) the Department of Education, the Department of Transportation, the Environmental Protection Agency, and the Department of Energy.

- The program would make grants to and coordinate with state and local workforce development entities, including workforce agencies, workforce development boards, educational institutions, and infrastructure employers. These state and local bodies would help identify potential applicants and participating employers, design targeted

curricula and training, and administer and monitor program development.

- The program would aim to prioritize training opportunities in positions with high growth potential and/or replacement needs, including those in the clean energy economy. This could include new jobs and apprenticeships, but also additional support for existing jobs that may not currently receive as much funding or those that have a limited talent pipeline relative to expected retirements. For example, the program would look at existing project hiring channels—among local and state agencies, construction contractors, and other actors—to direct more funding toward hiring for projects that utilize cleaner technologies and more environmentally resilient designs.

- **Cost estimate:** Through the annual budget, Congress currently spends about $3.5 billion on a range of employment and training activities within the Department of Labor, including YouthBuild, apprenticeships, and Workforce Innovation and Opportunity Act (WIOA) programs focused on adults, youth, and dislocated workers. An additional $1.7 billion is spent on Job Corps, which includes vocational training for younger workers.

  - Spending an additional $5 billion per year to support infrastructure career pathways could effectively double current federal funding in related workforce development programs, with the potential to build capacity for new efforts with other agencies.

  - An infusion of $100 billion per year would rival inflation-adjusted spending for New Deal-era workforce development programs. This total would provide full-time wages (at $15 per hour) for 3 million workers—the projected number of infrastructure workers who will retire or need to be replaced over the next decade.

ASCEND (Affordable, Sustainable, Career-Engaged, Dynamic) Program: *Launch four complementary capital spending programs to modernize water infrastructure, accelerate clean energy adoption, expand broadband networks and digital skills development, and eliminate environmental injustices in transportation and land use.* Investment in the future is a constant process. The country's legacy frameworks responded to the challenges of a given time—issues such as connecting cities across state lines, delivering telephone and cable service, and stopping sewage dumping. Today's challenges reflect a different world, one where climate insecurity is a rising threat, digital connectivity is far from ubiquitous, and income inequality fractures along racial and other demographic lines.

To simultaneously address these three long-run threats to U.S. competitiveness, we recommend Congress pass a new ASCEND Program, which stands for Affordable, Sustainable, Career-Engaged, Dynamic. The program would orient around four core infrastructure goals:

- Modernize water infrastructure: For decades, drinking water, wastewater, and stormwater systems have aged and struggled to provide safe, clean, and reliable service. Congress can reverse these trends and provide greater certainty for utilities balancing a variety of investment, affordability, and management concerns. Offering greater funding flexibility and support for new technologies and green infrastructure designs would help, as would establishing new funding and financing platforms to boost resilient infrastructure investment. Critical to these efforts, too, is the Environmental Protection Agency's need to redefine and measure water affordability.

- Accelerate clean energy adoption: Climate insecurity is already damaging the U.S. economy, from more frequent natural disasters to property losses along coastal shorelines to higher asthma rates near major transportation facilities. Transitioning to cleaner energy sources and lowering overall energy consumption can reduce financial costs, support healthier communities, and

create new business opportunities in the process. Building weatherization, electric vehicle infrastructure, and a modernized energy grid—all part of the unpassed Moving Forward Act—are the kind of programs Congress should consider.

- Expand broadband networks and digital skills development: While the digital divide has been evident for decades, the COVID-19 pandemic makes it impossible to ignore. The government must address the broadband marketplace's core failures: It has been unable to bring networks to neighborhoods without service, make service and devices affordable for all, or provide skills training for those in need. Congress can choose from the range of ideas championed by House Democrats, former FCC Chairman Tom Wheeler, and others.

- Eliminate environmental injustices in transportation and land use: Continued low-density development along metropolitan fringes exacerbates spatial mismatch, demands more infrastructure per capita, and is a platform for income and racial segregation. Future federal land use policies should make better use of neighborhoods already built, especially those designed for proximity. That means experimenting with land value taxes, multimodal road designs, and impact fees. There is a grand opportunity to experiment with policies that manage externalities at the metropolitan scale while still being driven by genuine community input.

These efforts will take a generation or more to accomplish. Stimulus programs cannot reach those goals on their own, but they can offer an invaluable opportunity to experiment across the country and inform longer-term policies. Within each of the four output categories above, we recommend Congress launch two program types:

- Challenge grants: Learning from the Smart City Challenge and Race to the Top programs, challenge grants use a proverbial carrot to inspire major planning efforts at the state and local level. By dedicating a large enough pool of funding and ensuring multiple applicants can win grants, Congress can inspire a wealth of new ideas. Even if they fail to win the grants, many governments may execute their plans anyway. Consolidating all applicant materials also gives the federal government a database of future policy ideas (not dissimilar from Amazon's HQ2 effort). Each competition and funding pool would be administered by a relevant federal agency (e.g., EPA, DOE, Commerce, or DOT).

  - **Cost estimate:** Congress could designate $5 billion challenge grants in each of the four categories, for a $20 billion total budget. Each challenge grant would slightly exceed Race to the Top's nominal funding.

- Research and development investments: The U.S. economy must innovate to solve these generational challenges, which inherently requires risk-taking and frequent failures. To promote a culture of experimentation, Congress should create a funding pool available to private sector firms. Winning firms would receive an infusion of federal funding in exchange for stock that the federal government would own. This program will accelerate risk-taking and ensure the public sector can benefit from profitable inventions. The Treasury Department should work in consultation with agencies' technical experts to administer each program. Congress should work with Treasury to design transparent, upfront terms related to how long the federal government should hold stock and conditions around any stock sales or firm bankruptcy.

  - **Cost estimate:** Congress could designate $3 billion for investment in each of the four categories, for a $12 billion total budget.

The total cost of these programs would range from $167 billion to $327 billion. Congress could dedicate funding through tax increases, but that could dull the stimulus. Instead, we recommend the federal government borrow or consider other revenue sources to cover program costs.

Conclusion

The COVID-19 pandemic has shaken the nation to its core, and the ensuing economic contraction shows no signs of letting up. As in past recessions, infrastructure is not insulated from these effects—household affordability concerns are rising, strained state and local budgets are delaying projects, and workforce impacts in construction and other industries are just beginning to take shape.

Still, it is the underlying structural factors—how we design our communities, the technologies we deploy, and the projects we fund—that continue to shape our long-term economic trajectory. Infrastructure can act as an economic barrier to many people and places, but it can also function as an economic foundation. An infrastructure stimulus offers real potential, but to maximize that potential, it must build greater economic opportunity for more people and places. This brief has outlined several pathways for consideration—it is time for action.

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