

The State of U.S. Infrastructure

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Abstract

The \$20 trillion U.S. economy relies on a vast network of infrastructure from roads and bridges to freight rail and ports to electrical grids and internet provision. But the systems currently in place were built decades ago, and economists say that delays and rising maintenance costs are holding economic performance back. Civil engineers raise safety concerns as well, warning that many bridges are structurally deficient and that antiquated drinking water and wastewater systems pose risks to public health. Meanwhile, Americans' international peers enjoy more efficient and reliable services, and the U.S. lags behind other developed countries in infrastructure spending. Skeptics of federal spending have pushed for new models of private sector involvement, which they say is more efficient and cost-effective. Others argue that increased public spending will be necessary to meet the country's growing needs. With the COVID-19 pandemic delivering a major economic shock, President Joe Biden has rolled out a sweeping plan to overhaul the nation's infrastructure.

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Background to the Study

How Important is Infrastructure to the U.S. Economy?

Economists argue that robust investment in infrastructure in the twentieth century set the foundation for the nation's strong growth in the aftermath of World War II. And as engineer and historian Henry Petroski explains in his book *The Road Taken: The History and Future of America's Infrastructure*, poor infrastructure can impose large costs on the U.S. economy. In addition to the threat to human safety of catastrophic failures such as bridge collapses or dam breaches, inadequately maintained roads, trains, and waterways cost billions of dollars in lost economic productivity. According to Petroski, the delays caused by traffic congestion alone cost the economy over \$120 billion per year. Airports are another choke point: air transportation services support 1.4 million U.S. jobs, and international tourism brings in hundreds of billions of dollars of tax revenue. But some studies have found that delays and avoided trips due to the poor state of the nation's airports cost the economy over \$35 billion per year. Many analysts say that investing in both new infrastructure and current maintenance would stimulate the economy. By increasing efficiency and reliability and lowering transportation costs, it would boost long-term U.S. competitiveness, insulate the economy from shocks, and create jobs. Economists generally see infrastructure spending as having a significant “multiplier effect,” meaning that the economic gains are greater than the amount spent. A 2014 University of Maryland study [PDF] found that infrastructure investments added as much as \$3 to gross domestic product (GDP) growth for every \$1 spent, with a bigger effect during a recession.

What is the Overall State of the Nation's Infrastructure?

The U.S. population has more than doubled since the 1960s, when most of the country's major infrastructure systems were designed. Many are reaching the end of their lifespan, and are dangerously overstretched, experts say. The American Society of Civil Engineers (ASCE) has compiled regular “report cards” on the state of U.S. infrastructure since the 1980s. In its 2021 report [PDF], the ASCE found that the nation's infrastructure averaged a “C-,” up from a “D+” in 2017 and the highest grade in twenty years. Still, the group estimated that there is an “infrastructure investment gap” of nearly \$2.6 trillion this decade that, if unaddressed, could cost the United States \$10 trillion in lost GDP by 2039. Other analysts agree that the shortfall is large. McKinsey researchers say that \$150 billion per year will be required between 2017 and 2030 to keep abreast of all the country's infrastructure needs. Transportation will require the largest chunk of funding needs. The U.S. Government Accountability Office finds that nearly one in four bridges are deficient, with 10 percent categorized as structurally deficient and 14 percent categorized as functionally obsolete. While America's airports carry the most passengers of any country in the world, its aviation infrastructure is also overburdened, with some 20 percent of all arrivals and departures delayed in 2019, according to the Department of Transportation's Bureau of Transportation Statistics.

The country's rail systems are a mixed bag. U.S. commercial rail, a large portion of which is owned by the private freight industry, is among the most developed in the world, moving nearly 40 percent of the nation's goods. At the same time, the focus on freight rail has relegated passenger rail to a lower priority. Amtrak, the United States' main provider of intercity

passenger rail, has more than \$30 billion in backlog [PDF] of infrastructure investments. The country's water and energy systems are under stress. The Environmental Protection Agency estimates that drinking water, wastewater, and irrigation systems will require \$632 billion in additional investment over the next decade. Ports and waterways, which handle over one-fourth of the country's freight transport, face mounting delays. The operators of the U.S. electrical grid are struggling to make the necessary investments, and increasing power outages are costing the economy billions of dollars. Meanwhile, experts warn of the “broadband gap,” in which rural and low-income communities suffer from a lack of infrastructure to deliver reliable, fast internet, referred to as broadband. A 2020 Federal Communications Commission report [PDF] finds that some 18 million Americans, the majority of whom live in rural areas, lack access to any broadband network. Other estimates suggest that more than twice as many people lack access. Governors from both major parties identify internet access as a priority in their state, and propose plans costing tens of millions of dollars.

How Does that Compare Internationally?

The United States generally lags behind its peers in the developed world. According to the World Economic Forum's Global Competitiveness Report, in 2019, the United States ranked thirteenth in the world [PDF] in a broad measure of infrastructure quality down from fifth place in 2002. That places it behind countries including France, Germany, Japan, Spain, the United Arab Emirates, and the United Kingdom. U.S. infrastructure performance suffers from its comparatively low quality, with consequences for businesses, workers, and travellers. U.S. passenger trains average just half the speed of Europe's high-speed rails. Aviation industry rankings cited by Business Roundtable put only four U.S. airports in the top fifty worldwide, with the top-ranked coming in at number thirty. When it comes to internet access, the World Economic Forum ranks the United States eighteenth worldwide in broadband coverage. At the same time, Americans pay more than their European peers, and receive slower internet speeds. Some analysts attribute this to the lack of competition in most U.S. markets, which are often served by only one internet provider. Others argue that the incoherence of federal internet regulations discourages telecommunication companies from investing in better infrastructure, especially in rural areas where running broadband lines across vast distances is more expensive.

Much of the discrepancy between the United States and its peers can be traced to different funding levels. According to the Organization for Economic Cooperation and Development (OECD), a group that mostly consists of developed countries, the United States invests less in transportation infrastructure as a percentage of GDP than many other wealthy countries, including France, Germany, Japan, and the United Kingdom. China, meanwhile, spends far more. Simultaneously, China's Belt and Road Initiative is slated to increase the country's economic influence across Asia. Australia, Canada, France, and the United Kingdom have also developed national infrastructure frameworks that allow the central government to direct and prioritize projects in a way that the United States' more decentralized system has struggled to do.

How is U.S. Infrastructure Funded and Financed?

The United States differs from most other industrialized countries in the extent to which it relies on local and state spending to meet its infrastructure needs. While most European countries fund the bulk of their infrastructure development at the national level, only 25 percent of U.S. public infrastructure funding comes from the federal government. That is down from a peak of 38 percent in 1977, leaving often cash-strapped local governments to bear more of the costs of investment and maintenance. Washington's primary mechanism for funding transportation infrastructure is through direct grants to states, paid out from the Highway Trust Fund (HTF), created in 1956 to fund the creation of the interstate highway system. The HTF raises money through the gas tax (which has not increased in over two decades) and other transportation-related taxes. It spends about 80 percent of that money on roads and highways and the remainder on mass transit projects.

The federal government supports infrastructure in some indirect ways, through financing mechanisms or tax incentives. These include the 1998 Transportation Infrastructure Finance and Innovation Act (TIFIA), which provides low-interest loans and other credit assistance that local governments can use to finance their infrastructure projects. The Congressional Research Service (CRS) calculates that TIFIA has provided nearly \$25 billion [PDF] in financing since its creation. The federal government also supports the municipal bond market, which is what local governments mostly rely on to finance infrastructure projects. States and other municipalities issue bonds to raise money from private investors, and Washington gives these bonds a number of tax incentives. Most significantly, the interest on municipal bonds is exempt from federal taxes. The CRS estimates this costs the federal government some \$37 billion a year.

Finally, a small but growing number of infrastructure projects are being organized as joint efforts between government and private developers, known as public-private partnerships, or P3s. Under this model, private firms win a concession from the state to build infrastructure, say a highway, as well as the right to charge tolls or user fees on it in exchange for the responsibility of operating and maintaining it. P3s are much more popular in European countries partially because, experts say, the low cost of private financing via municipal bonds in the United States is often an easier and cheaper route for local governments to secure financing.

What is the Debate around Infrastructure Investment?

Many experts argue that the United States will have to find ways to spend significantly more money to address its infrastructure deficit. Proposals to do so often break down along partisan lines, with Democrats backing more direct federal funding, whether financed by debt or higher taxes, and Republicans generally arguing that better results can be achieved at lower cost by encouraging more private sector development. Many economists support raising revenue by increasing user fees, such as tolls. They argue that requiring users to shoulder more of the cost of the nation's infrastructure both raises revenue and encourages more efficient use of resources. At the federal level, the most common proposal is increasing the gas tax. States could also increase the use of toll roads in order to raise revenue for road maintenance. Some

economists worry about expanding the federal role, given what they see as a history of politically driven and wasteful federal infrastructure spending. Some argue that a steady flow of federal money gives states an incentive to build things they don't need and that they struggle to maintain. Proponents of this view say the federal government should return public funding back to state and local governments, which are more equipped to manage local infrastructure needs, and cut red tape. Under this model, funding for local projects would be raised by hiking local taxes, issuing debt, or expanding P3s, rather than borrowing from the federal government during a time when most states are struggling to repay existing debt.

Other experts say that further localizing infrastructure management will widen the gap in quality that already exists across states, since differences in climate, weather patterns, and frequency of use as well as taxpayer wealth mean states' infrastructure needs and abilities vary. They also point out that the federal government is better equipped to spend on large-scale infrastructure projects; it can run a deficit, whereas nearly all state and local governments must balance their budgets. Some analysts say that the focus on using P3s and relying on private sector financing alone won't address major gaps in the system, such as in maintenance, since those projects are unlikely to be profitable enough to entice private investors. And, as CFR Adjunct Senior Fellow Heidi Crebo-Rediker argues, the United States lacks a culture of private ownership of major infrastructure, which could pose enduring political barriers to efforts to privatize swaths of the transportation system and public utilities. A proposal in Congress that has seen some support [PDF] is the establishment of a national infrastructure bank. Such a bank would be a government-owned corporation and, like the TIFIA program, would provide cheap, long-term financing for infrastructure projects. Supporters argue that this could overcome the fractured nature of local spending, help coordinate developments that cross state borders, and give Washington greater ability to prioritize important projects; they point to the European Union's version of such a bank, the European Investment Bank, as evidence of this. Skeptics point out that municipal bonds already offer very cheap financing, especially with interest rates near record lows.

Conclusion/Recommendation

President Donald Trump's administration put forward several ambitious infrastructure plans, including a proposed \$2 trillion to be included in the fourth COVID-19 recovery package. Little came of them, though he did take executive action to try and spur investment by shortening some regulatory reviews. President Biden campaigned on a pledge to “build back better,” and in March 2021, unveiled the specifics of a \$2 trillion infrastructure plan he has hailed as a “once-in-a-generation investment in America.” That November, Congress approved the largest federal investment in decades. The sweeping, \$1 trillion, bipartisan plan will invest hundreds of billions of dollars to upgrade physical infrastructure such as roads and bridges, railways, airports, and water systems. The plan also invests tens of billions of dollars to modernize the U.S. electrical grid, spur the adoption of electric vehicles, and expand broadband internet access. But the Biden administration is also looking to expand the traditional definition of infrastructure. The president is pushing a separate social spending bill that includes hundreds of billions of dollars for child- and elder-care programs, which he has argued is an investment in “human infrastructure.” To pay for this plan, Biden has proposed

raising taxes on corporations and wealthy Americans. The administration has also backed a new global minimum corporate tax and proposed other measures to crack down on companies moving overseas for tax purposes. However, the broader social spending plan has drawn opposition, mostly from Republican lawmakers, complicating Biden's efforts to win congressional approval.

Reference

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