

A PROPOSAL TO ESTABLISH A NATIONAL HIGH-SPEED RAIL NETWORK IN THE
UNITED STATES

by
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ABSTRACT

High-speed rail is well positioned to offer a solution to shrinking transportation capacity and growing environmental threats in the United States. While many competing nations have taken steps to build their own robust high-speed rail networks over the past several decades, the United States has fallen behind and lacks any proven examples of true high-speed rail. Recent federal infrastructure investments, including those in the Infrastructure Investment and Jobs Act (IIJA), have largely neglected high-speed rail, providing an opportunity for Congress and the Administration to back more targeted legislation to help incentivize investments in high-speed rail. This memorandum proposes that the U.S. Department of Transportation work with the White House and Congress to prioritize the passage of existing legislation, H.R.1845, which would provide \$205 billion over five years to incentivize investments in high-speed rail corridors across the United States.

Capstone Advisor: Paul Weinstein

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MEMORANDUM

To: Secretary Pete Buttigieg

From: John Hebert

Date: May 9, 2022

RE: A Proposal to Establish a National High-Speed Rail Network in the United States

I. Action Forcing Event:

The House-passed Build Back Better Act includes \$10 billion in new spending to support high-speed rail planning and development as a means of addressing the climate crisis in the United States.¹ Despite Congress's failure to advance that package, President Joe Biden has publicly committed to supporting high-speed rail projects in the United States.

II. Statement of the Problem:

The United States' overreliance on aviation and highway travel creates both environmental and logistical problems that will be difficult for the country to sustain in the long-term. Though the United States boasts the world's largest rail network, the country's intercity passenger rail system lags far behind that of its peers. Amtrak, the nation's primary provider of intercity passenger rail service, provides less than 1 percent of the total U.S. intercity passenger miles traveled by common carriers and owns just 625 miles of dedicated passenger rail track out of more than 140,000 miles of rail track in the United States.² By contrast, passenger rail accounts for more than 7 percent of all inland

¹ H.R.5376 - Build Back Better Act. 110009.

² Bureau of Transportation Statistics. "U.S. Passenger-Miles." National Transportation Statistics Table 1-40. Last modified 2021. <https://www.bts.gov/content/us-passenger-miles>.

passenger transport in the European Union, with some individual member states seeing a modal share as high as 17 percent.³ In east Asia, the modal share of intercity passenger rail transport is even higher. The modal share for intercity passenger rail in China exceeds 10 percent, with high-speed rail being the preferred mode of transportation for many medium and long-haul routes.⁴ In Japan and South Korea, rail's modal share ranges from 30 to 70 percent on short and medium haul routes.⁵

The United States' historical reliance on automobiles for short and medium haul travel is one of the leading contributors to the country's greenhouse gas (GHG) emissions. Transportation is the leading source of U.S. carbon dioxide (CO₂) emissions, accounting for 35 percent of all CO₂ emissions and 28 percent of all GHG emissions.⁶ Emissions within the transportation sector are overwhelmingly driven by light duty passenger vehicles, which account for 58 percent of these emissions.⁷ By contrast, passenger and freight rail collectively account for just 2 percent of emissions in this sector.⁸

Over the next century, global temperatures are projected to rise by between 2- and 9.7-degrees Fahrenheit due to gradually increasing GHG emissions stemming from

³ European Statistical Office. "Passenger Transport Statistics - Statistics Explained." Eurostat, Statistics Explained. Last modified 2016. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Passenger_transport_statistics&oldid=274593#Rail_passengers.

⁴ Zhu, Zhenran, Anming Zhang, and Yahua Zhang. "Connectivity of Intercity Passenger Transportation in China: A Multi-Modal and Network Approach." SSRN Electronic Journal, 2017. doi:10.2139/ssrn.2897428.

⁵ Matsumoto, Michiko, Shigeru Morichi, and Surya Raj Acharya. International Comparison on Modal Share of Intercity Passenger Trips in Asian Countries. Japan Society of Civil Engineers, 2012. https://library.jsce.or.jp/jsce/open/00039/201206_no45/pdf/346.pdf.

⁶ U.S. Environmental Protection Agency. "Overview of Greenhouse Gases." Last modified April 20, 2021. <https://www.epa.gov/ghgemissions/overview-greenhouse-gases>.

⁷ United States Environmental Protection Agency. "Fast Facts on Transportation Greenhouse Gas Emissions." Last modified June 8, 2021. <https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions>.

⁸ Ibid.

human activity, with transportation being a key contributor.⁹ There is widespread agreement that climate change will have a negative impact on U.S. economic growth and national security if current trends continue. The Fourth National Climate Assessment by the U.S. Global Change Research Program—made up of the administrative leads of thirteen federal agencies—found that “global greenhouse gas emissions [are] expected to cause substantial net damage to the U.S. economy throughout this century, especially in the absence of increased adaption efforts.”¹⁰ If emissions continue at current rates, the report estimates that annual losses will reach the hundreds of billions in certain economic sectors, exceeding the current gross domestic product of many U.S. states. This would be due to the potential impacts of factors such as increased road damage, coastal infrastructure damage, increased wildfires, decreased agricultural yields, and increased energy consumption.¹¹ Collectively, these effects are projected to reduce the growth rate of real GDP by an average of .03 percentage points per year over the next 30 years, accumulating to a 1.0 reduction in real GDP by 2050.¹²

Many of these effects are already costing the U.S. economy billions. A recent report from Morgan Stanley estimates that climate-related disasters have already cost

⁹ Herring, David. “Climate Change: Global Temperature Projections.” Climate Change: Global Temperature Projections | NOAA Climate.gov. National Oceanic and Atmospheric Administration, October 26, 2021. <https://www.climate.gov/news-features/understanding-climate/climate-change-global-temperature-projections#:~:text=Results%20from%20a%20wide%20orange,gases%20that%20human%20activities%20produce>.

¹⁰ U.S. Global Change Research Program. Fourth National Climate Assessment. Volume II. 2018. https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf.

¹¹ U.S. Government Accountability Office. Climate Change: Potential Economic Costs and Opportunities to Reduce Federal Fiscal Exposure. 2019. <https://www.gao.gov/products/gao-20-338t>.

¹² Herrnstadt, Evan. “CBO’s Projection of the Effect of Climate Change on U.S. Economic Output.” Congressional Budget Office. September 2020. <https://www.cbo.gov/system/files/2020-09/56505-Climate-Change.pdf>.

the global economy \$650 billion between 2016-2019, with North America absorbing approximately two-thirds of that amount, which is equivalent to .66 of North American GDP.¹³ The transportation sector is particularly vulnerable to even minor climate hazards. In the aviation sector, extreme heat has already resulted in costly global air travel disruptions, and studies have suggested that up to 185,000 airline passengers per year may be grounded by extreme heat by 2050, about 23 times higher than today.¹⁴ Higher temperatures and other extreme weather events are also causing increased damage to highways, particularly in high traffic areas, which is reducing the lifespan of many U.S. roads.¹⁵ At the same time, President Biden has committed to putting the United States on a path to achieving net-zero GHG emissions by 2050.¹⁶

The U.S. is now projected to grow by 60 million people by 2050,¹⁷ which will put a significant strain on highway and aviation systems and potentially lead to significantly higher rates of GHG emissions from this sector. Clogged freeways and airport congestion poses a potentially even bigger problem. Airports and highways, particularly around major cities, have finite space and limited capacities for expansion. Increasing gridlock at

¹³ Dichristopher, Tom. "Climate Disasters Cost the World \$650 Billion over 3 Years - Americans Are Bearing the Brunt: Morgan Stanley." CNBC, February 14, 2019. <https://www.cnbc.com/2019/02/14/climate-disasters-cost-650-billion-over-3-years-morgan-stanley.html>.

¹⁴ McKinsey Global Institute. "Will Infrastructure Bend or Break Under Climate Stress?" McKinsey & Company. August 19, 2020. <https://www.mckinsey.com/business-functions/sustainability/our-insights/will-infrastructure-bend-or-break-under-climate-stress>.

¹⁵ Ibid.

¹⁶ The White House. Long-Term Strategy of the United States, Pathways to Net-Zero. 2010. <https://www.whitehouse.gov/wp-content/uploads/2021/10/US-Long-Term-Strategy.pdf>.

¹⁷ Vespa, Jonathan, Lauren Medina, and David M. Armstrong. Demographic Turning Points for the United States: Population Projections for 2020 to 2060. U.S. Department of Commerce, U.S. Census Bureau, 2018. <https://www.census.gov/content/dam/Census/library/publications/2020/demo/p25-1144.pdf>.

airports also makes flights more difficult to schedule, and the cancellation or delay of single flights can have compounding effects on airport systems.

III. History/Background:

The obstacles to high-speed rail development in the United States are closely linked to broader challenges that have inhibited the subsistence and growth of intercity passenger rail service. Though the United States at one point boasted a large and robust passenger rail network, demand for intercity passenger rail travel started to decline by the early 20th century as competition from automobiles began to encroach on its modal share.¹⁸ As noted in Figure 1, this downward trend accelerated after a brief bump during the second world war, with annual intercity passenger rail traffic decreasing from a wartime peak of 691 miles-traveled per capita in 1945 to less than 200 by 1961.¹⁹

¹⁸ Davis, Jeff. "Amtrak at 50: The Rail Passenger Service Act of 1970." Eno Transportation. Last modified October 30, 2020. <https://www.enotrans.org/article/amtrak-at-50-the-rail-passenger-service-act-of-1970/>.

¹⁹ Ibid.

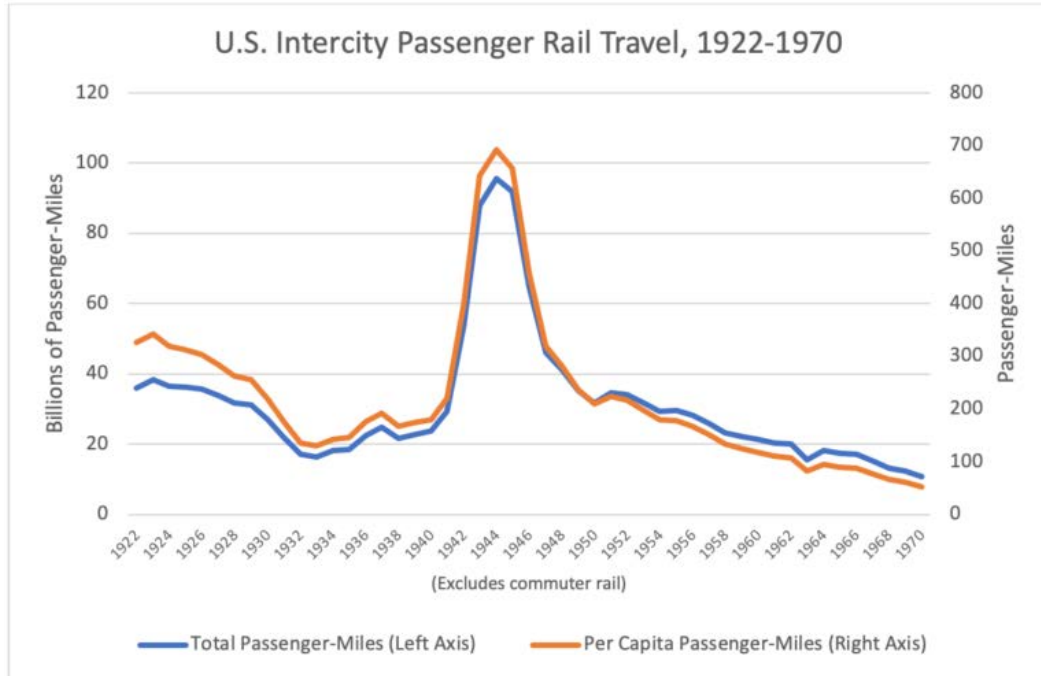


Figure 1: U.S. Intercity Passenger Rail Travel, 1922-1970

This trend was prompted by several factors. The aviation industry boomed during this period as new technology enabled the size and weight of commercial aircraft to more than double.²⁰ The American automotive industry also flourished, making intercity transportation easier and more accessible than ever. The passage of the Federal Aid Highway Act in 1956 would further amplify this trend with the creation of the Interstate Highway System, though construction would take years to fully complete. By contrast, railroad transportation was facing competitive disadvantages including an inflexibility in origins and destinations, a tendency toward high incidence of damage, and the relative low speed of movement.²¹ As a consequence of increased competition and declining

²⁰ BRIGHT, CHARLES D. "THE AEROSPACE INDUSTRY SINCE WORLD WAR II: A BRIEF HISTORY." In *The Jet Makers: The Aerospace Industry from 1945 to 1972*, 11–24. University Press of Kansas, 2020. <https://doi.org/10.2307/j.ctv1p2gmk7>.

²¹ Weston, J. Fred. "The Industrial Economics Background of the Penn Central Bankruptcy." *The Journal of Finance* 26, no. 2 (1971): 311–26. <https://doi.org/10.2307/2326047>.

traffic, passenger rail became even more costly to operate.²² In 1947, a fatal train disaster in Naperville, Illinois also led Congress to impose a 79-mph speed limit on passenger trains, which was about 60 mph below the speeds they were capable of operating at the time.²³ This speed limit remains in force on most lines today in the U.S.

Despite the rising operating costs prompted by this modal shift, the Interstate Commerce Commission (ICC) made it extremely difficult for private railroads to halt unprofitable passenger rail service.²⁴ During the postwar decade between 1947 and 1957, the largest railroads ran an inflation-adjusted deficit on their collective passenger rail operations of between \$5.37 billion and \$9.12 billion in 2022 dollars, respectively.²⁵ These financial challenges meant that railroads were in no position to experiment on any scale with new kinds of passenger motive power or equipment.²⁶ This effectively halted the incentive for any private investments in higher speed rail. Though Congress passed legislation in the late 1950s intended to make it easier for railroads to abandon unprofitable lines, it did little to lessen the financial struggles that plagued the industry.²⁷ By 1965, railroads' modal share by revenue had dropped to 36 percent, down from 72 percent in 1940.²⁸ These struggles culminated in a ring of major corporate

²² Weston, J. Fred. "The Industrial Economics Background of the Penn Central Bankruptcy." *The Journal of Finance* 26, no. 2 (1971): 311–26. <https://doi.org/10.2307/2326047>.

²³ Middleton, William D., and Andrew Dow. "REACHING 200: High-Speed Trains at 200 Km/h and 200 Mph." *Railroad History*, no. 200 (2009): 36–47. <http://www.jstor.org/stable/43504591>.

²⁴ Davis, Jeff. "Amtrak at 50: The Rail Passenger Service Act of 1970." *Eno Transportation*. Last modified October 30, 2020. <https://www.enotrans.org/article/amtrak-at-50-the-rail-passenger-service-act-of-1970/>.

²⁵ United States. Interstate Commerce Commission. "Railroad Passenger Train Deficit" (Proceeding No. 31954), 1958, at p. 72. <https://hdl.handle.net/2027/mdp.39015018275076>

²⁶ *Ibid.* At pg. 72.

²⁷ The Transportation Act of 1958. Pub.L. 85-625.

²⁸ Weston, J. Fred. "The Industrial Economics Background of the Penn Central Bankruptcy." *The Journal of Finance* 26, no. 2 (1971): 311–26. <https://doi.org/10.2307/2326047>.

railroad bankruptcies in the late 1960s and early 1970s, most famously with Penn Central Railroad, which was one of the largest bankruptcies in American history.

Penn Central cited passenger rail service losses as the primary cause of the bankruptcy, prompting Congress to examine long-term solutions to preserving the passenger rail network in the United States. This led to the Passenger Service Act of 1970, which created the National Railroad Passenger Corporation in 1971, known commercially as Amtrak. At the time of its creation, Amtrak owned no infrastructure of its own and the company's trains were operated entirely by private railroads on their railroad tracks, nearly all of which were shared with freight rail trains. Part of Penn Central's trackage along the 450-mile corridor between Washington, D.C. and Boston was given to Amtrak following the company's bankruptcy. This line is now known as the Northeast Corridor (NEC), which is Amtrak's only long-distance dedicated passenger rail line.

Meanwhile, as the privately funded American railroad systems struggled to survive, other nations were investing billions to create a publicly funded network of high-speed rail lines utilizing new high-speed rail technology. This began with the Tokaido Shinkansen project in 1959, which when completed just 5 years later could travel at more than twice the allowable speed of American passenger trains.²⁹ Speeds have since climbed to regularly reach 200 mph and higher. Other nations were slower to adapt, but

²⁹ Premack, Rachel, and Mary Meisenzahl. "Japan's Bullet Train Has a New Model That Can Run Even During an Earthquake. Here's the History of the Country's Iconic High-speed Railway." Business Insider. Last modified July 6, 2020. <https://www.businessinsider.com/shinkansen-bullet-train-now-50-years-old-2014-10>.

by the mid-1970s, many European countries were rolling out their own high-speed rail projects, with France, Italy, Spain, and Germany being the most notable examples.³⁰

As the United States was struggling to find solutions to adapt its privately funded passenger rail network to the transportation realities of the mid-20th century, public investments in this sector were met with early success, and attempts to replicate the HSR successes in Japan were met with broad bipartisan support. Shortly after Japan introduced the Shinkansen bullet train, President Lyndon B. Johnson signed into law the High-Speed Ground Transportation Act of 1965 as part of his Great Society infrastructure programs. Initially authorized at \$90 million, this legislation marked the beginning of a federal effort to develop and implement high-speed rail technologies in the United States.³¹ In 1969, the newly created Federal Railroad Administration deployed these technologies along the Northeast Corridor, marking the United States' first efforts to establish HSR.

The Department of Transportation worked with Penn Central Railroad, and later Amtrak, to develop the Metroliner series trains, which were capable of operating in regular service between 110 and 150 mph.³² This was later replaced by the Acela train,

³⁰ Shilton, David (August 1982). "Modelling the Demand for High Speed Train Services". *The Journal of the Operational Research Society*. Operational Research Society. 33 (8): 713–722. doi:10.1057/jors.1982.160. JSTOR 2634319. S2CID 56810453.

³¹ "High-Speed Rail Timeline | FRA." Federal Railroad Administration. Last modified December 5, 2019. <https://railroads.dot.gov/passenger-rail/high-speed-rail/high-speed-rail-timeline>.

³² Baer, Christopher T. (April 2015). "A GENERAL CHRONOLOGY OF THE PENNSYLVANIA RAILROAD COMPANY ITS PREDECESSORS AND SUCCESSORS AND ITS HISTORICAL CONTEXT:_1967" (PDF). Pennsylvania Railroad Technical & Historical Society.

which still runs today. However, while Acela trains today are capable of reaching speeds up to 150 mph, their average speed along the NEC is just 84 mph.³³

High-speed rail slowly gained renewed interest during the 1990s due to the support of proponents such as California Governor Jerry Brown, who shepherded legislation in 1996 to establish the California High Speed Rail Authority, which was established to help plan for a ballot measure on developing a high-speed rail network in California.³⁴ After years of delays, In 2008, California voters approved Proposition 1A, a ballot proposal to establish a high-speed rail line between San Francisco and Los Angeles.³⁵ This law initially allocated \$9 billion for the California High Speed Rail Initiative, but costs have since compounded amid project delays. While other states have considered developing other high speed rail corridors, California High Speed Rail is the only major rail project to have gathered steam in the United States as of this writing.

IV. Policy Proposal

The Biden Administration should prioritize legislation that would help jumpstart high-speed rail corridor development across the United States. The goal of this proposal would be to provide federal funding incentives to states, localities, and private sector

³³ Freed, Benjamin, and Elaina Plott. "Why Is The Acela So Slow?" Washingtonian. Last modified May 9, 2018. <https://www.washingtonian.com/2018/05/09/acela-really-high-speed-train/>.

³⁴ SB 1420 Senate Bill - CHAPTERED. An act to add Division 19.5 (commencing with Section 185000) to the Public Utilities Code, relating to transportation. 1996. https://www.leginfo.ca.gov/pub/95-96/bill/sen/sb_1401-1450/sb_1420_bill_960924_chaptered.html.

³⁵ Proposition 1A." California Transportation Commission | CTC. Accessed February 12, 2022. <https://catc.ca.gov/programs/proposition-1a-high-speed-passenger-train-bond-program#:~:text=The%20Safe%2C%20Reliable%20High%2DSpeed,to%20intercity%20rail%20lines%2C%20commuter.>

entities to make their own investments in high-speed rail development, which should encourage these entities to make long-term commitments to seeing those projects through to completion.

Without federal investment to encourage private and state and local investment, high-speed rail will continue to be out of America's reach. This proposal would provide federal funding necessary to encourage public and private investments in high-speed rail corridors across the United States. These investments would be used to support new or existing high-speed rail corridor development or expansion, high-speed rail planning, and research and development (R&D) activities that improve the adaption and integration of high-speed rail technologies through cost sharing arrangements with private or public entities. While most eligible projects receiving funding could take years or decades to be completed after funding is awarded, this proposal would provide the necessary funding to incentivize states or private sector entities to begin development on new corridor projects or secure the funding needed to help complete existing projects.

Authorization Tool

The Biden administration should prioritize existing legislation titled H.R.1845, the American High-Speed Rail Act, and cultivate support in Congress to pass the bill. H.R.1845 is a bill introduced in the U.S. House of Representatives by Representative Seth Moulton (D-MA-6) that would provide \$205 billion over five years for high-speed rail corridor development and creates incentives for public and private matching.³⁶ Funding would be

³⁶ "Text - H.R.1845 - 117th Congress (2021-2022): American High-Speed Rail Act." Congress.gov | Library of Congress. Last modified March 12, 2021. <https://www.congress.gov/bill/117th-congress/house-bill/1845/text?r=33&s=1>.

prioritized to 11 federally recognized high-speed rail corridors with additional funding available for early stage planning on potential new corridors. This legislation would need to be passed by both chambers of Congress and signed into law by the President to take effect.

Implementation Tool

H.R.1845 reauthorizes existing competitive grant programs administered by the U.S. Department of Transportation to fund high-speed rail corridor development, while also streamlining certain programs, updating definitions, and creating incentives for privately funded or state and local investments in high-speed rail corridors.

Funding:

The \$205 billion authorized by the legislation would be allocated as follows:

Program	Description	Total Five-Year Authorizations
High-Speed Rail Corridor Planning	Funds would be used to for competitive grants to provide financial assistance for early-stage corridor development planning at up to 50 percent of the publicly financed costs associated with eligible activities.	\$15 Billion
High-Speed Rail Technology Improvements	Funds would be used for competitive grants to provide financial assistance to public or private entities for the improvement, adaptation, and integration of proven technologies for commercial application in high-speed rail service.	\$15 Billion
High-Speed Rail Corridor Development	This program reauthorizes a competitive grant program by the FRA for select high speed rail projects that meet certain criteria at up to 80 percent of the total cost.	\$175 Billion

Figure 2: H.R.1845 Authorizations of Appropriations³⁷

³⁷ Programs reauthorized under Section 26104 of title 49, United States Code

The legislation also allows states to utilize Railroad Rehabilitation & Improvement Financing (RRIF) loans and Transportation Infrastructure Finance and Innovation Act (TIFIA) financing to cover non-federal sources for a project.

While funding would be awarded on a competitive basis, Figure 3 provides a list of federally designated corridors that would be eligible for the vast majority of grant funding.

Project	Year Designated	Description
Chicago Hub Network	1992	Up to 5 high-speed rail lines that would emanate from Chicago into large cities in neighboring states.
Florida Corridor	1992	Runs from Miami to Orlando and Tampa
California Corridor	1992	Connects metropolitan areas of San Diego, Los Angeles, San Francisco, and Sacramento. In 2012, this was extended to also encompass Las Vegas.
Southeast Corridor	2000	Links Florida, Georgia, South Carolina, North Carolina, Virginia, and Washington, D.C.
Pacific Northwest Corridor	1992	Links Eugene, OR to Vancouver, BC by passing through Portland, OR and Seattle, WA.
Gulf Coast Corridor	1998	Links Texas, Louisiana, Mississippi, Alabama, Georgia, and New Orleans
Keystone Corridor	1998	East/West link runs through Pittsburgh, Harrisburg, and Philadelphia. A north/south link would run from Washington, D.C. to New York City.
Empire State Corridor	1998	Runs from west to east across New York State
Northern New England Corridor	1998	Multiple short-distance lines stemming from Boston to neighboring cities
South Central Corridor	2000	Links San Antonio, TX to Dallas-Fort Worth, Tulsa, OK, and Little Rock, AR.
North-East Corridor	2012	Runs from Washington, D.C. to Boston, MA.

Figure 3: List of Federally Designated High-Speed Rail Corridors³⁸

³⁸ Mineta Transportation Institute. Advancing High-Speed Rail Policy in the United States. San Jose State University, Prepared for the U.S. Department of Transportation, 2012. <https://transweb.sjsu.edu/sites/default/files/2905-US-hsr-high-speed-rail-policy.pdf>.

Incentives:

To help encourage states and localities to pursue high-speed rail projects, the legislation would amend the Federal Transit Administration's (FTA) pilot program for Transit Oriented Development (TOD) grants to give high-speed rail development greater consideration. These grants are used to assist with transportation planning to improve economic development and ridership, foster multimodal connectivity and accessibility, improve transit access for pedestrian and bicycle traffic, engage the private sector, identify infrastructure needs, and enable mixed-use development near transit stations.³⁹ In addition, the legislation would create tax incentives to encourage private freight rail carriers to sell, grant an easement, or lease property for the purposes of developing high-speed rail corridors. These incentives include exclusion of any taxable gains from the sale of property utilized for HSR, exclusions of any grant amounts provided to rail carriers from their gross income, and exclusions of certain capital improvements made on property utilized for a HSR project.

Technical Amendments:

In addition, H.R.1845 would also standardize the definition of "high-speed rail" to mean speeds of 186 mph or higher, putting the U.S. in line with the definitions provided for other major high-speed rail networks and allowing true high speed rail projects to be prioritized. Currently, the U.S. has conflicting definitions of high-speed rail in the Code that define high-speed rail as speeds exceeding 125 mph and 110 mph.⁴⁰

³⁹ "Pilot Program for Transit-Oriented Development Planning – Section 20005(b) | FTA." Federal Transit Administration. Accessed March 12, 2022. <https://www.transit.dot.gov/TODPilot>.

⁴⁰ Sections 26105 and 26106 of title 49, United States Code

V. Policy Analysis

This analysis will review the impact of this legislation through the lens of several key metrics: economic, environmental, and social impacts. While the exact projects affected by this legislation cannot be predetermined since funding is awarded on a competitive basis, ample data supplied by many existing HSR plans and other research provides clear insight into the potential costs and benefits of such investments. This section will focus on the broad benefits identified by these analyses and then examine some of the challenges with these assessments.

Economic Impact:

High-speed rail investments have substantial direct and indirect impacts on national, regional, and local economies. At the most basic level, high-speed rail generates travel time savings for users and improvements to congestion on other modes. A reduction in travel time thus translates into more time available for work, leisure, or other activities, which can be used to improve economic productivity.⁴¹ Travel time savings are generated by increased train speed and potentially greater service frequency, while congestion improvements are made when users are attracted from competing modes of transportation, such as highways and airports. Congestion on U.S. roads are estimated to cost \$140 billion per year in lost time and productivity.⁴² High-speed rail also helps solve

⁴¹ California High-Speed Rail Authority. 2014 California High-Speed Rail Benefit-Cost Analysis. Parsons Brinckerhoff, 2014. https://www.hsr.ca.gov/wp-content/uploads/docs/about/business_plans/BPlan_2014_Sec_7_CaHSR_Benefit_Cost_Analysis.pdf.

⁴² American Public Transportation Association. Benefits of High-Speed Rail for the United States. March 17, 2021. <https://www.apta.com/research-technical-resources/high-speed-passenger-rail/benefits-of-high-speed-rail-for-the-united-states/>.

severe capacity problems that contribute to congestion. Both highways and airports are also subject to finite capacity improvements, and thus may struggle to keep up with the demand of a growing population in the coming decades without these investments. There are also substantial safety benefits to high-speed rail. By reducing the number of vehicle miles traveled (VMT), we can project a decrease in car accidents, though this metric may vary greatly depending on the project.⁴³

These savings can all be quantified into direct monetary savings by agency benefit-cost analyses (BCA), which examine factors such as these and dozens more to determine the net present value of any given project.⁴⁴ Competitive high-speed rail corridor development and planning grants require agencies to conduct a BCA under strict guidelines issued by the Federal Railroad Administration (FRA) as a prerequisite to receiving federal funding, allowing FRA to examine these benefits at a project level basis to ensure that the highest value projects are receiving federal funds.

While some of these savings can take decades to be fully realized due to the long-time horizon for project completion, federal high-speed rail investment also promotes more immediate job growth across numerous industries such as manufacturing, engineering, and construction. According to the American Public Transportation Association (APTA), every \$1 billion in investment creates 24,000 jobs.⁴⁵ Using APTA's calculations and more conservative metrics developed by the Mineto Transportation

⁴³ "Benefit-Cost Analysis Guidance for Discretionary Grant Programs | US Department of Transportation." Department of Transportation. Last modified March 18, 2022. <https://www.transportation.gov/office-policy/transportation-policy/benefit-cost-analysis-guidance-discretionary-grant-programs-0>.

⁴⁴ "Benefit-Cost Analysis Guidance | FRA." Federal Railroad Administration. Last modified November 14, 2019. <https://railroads.dot.gov/rail-network-development/planning/benefit-cost-analysis-guidance>.

⁴⁵ Ibid.

Institute, this proposal is estimated to generate between 725,000 and 1.1 million jobs per year over the five-year life of the bill.^{46,47}

Environmental Impact:

High-speed rail trains generate far fewer emissions than other modes of transportation. The U.S. Department of Transportation (USDOT) estimates that the carbon footprint of high-speed rail including operation, track construction, and rolling stock manufacturing and assembly is between 14 and 16 times lower than that of private vehicles or airplanes.⁴⁸ Figure 4 illustrates this difference using a case study prepared by USDOT as part of a study on the environmental impacts of high-speed rail.

⁴⁶ Pogodzinski, J. M. Measuring the Economic Impact of High Speed Rail Construction for California and the Central Valley Region. MINETA TRANSPORTATION INSTITUTE, 2018. https://scholarworks.sjsu.edu/mti_publications/246/.

⁴⁷ American Public Transportation Association. Benefits of High-Speed Rail for the United States. March 17, 2021. <https://www.apta.com/research-technical-resources/high-speed-passenger-rail/benefits-of-high-speed-rail-for-the-united-states/>.

⁴⁸ International Union of Railways. Carbon Footprint of High-Speed Rail. Paris,, 2011. https://railroads.dot.gov/sites/fra.dot.gov/files/fra_net/15009/Carbon%20Footprint%20of%20High-Speed%20Rail%20UIC%202011.pdf.

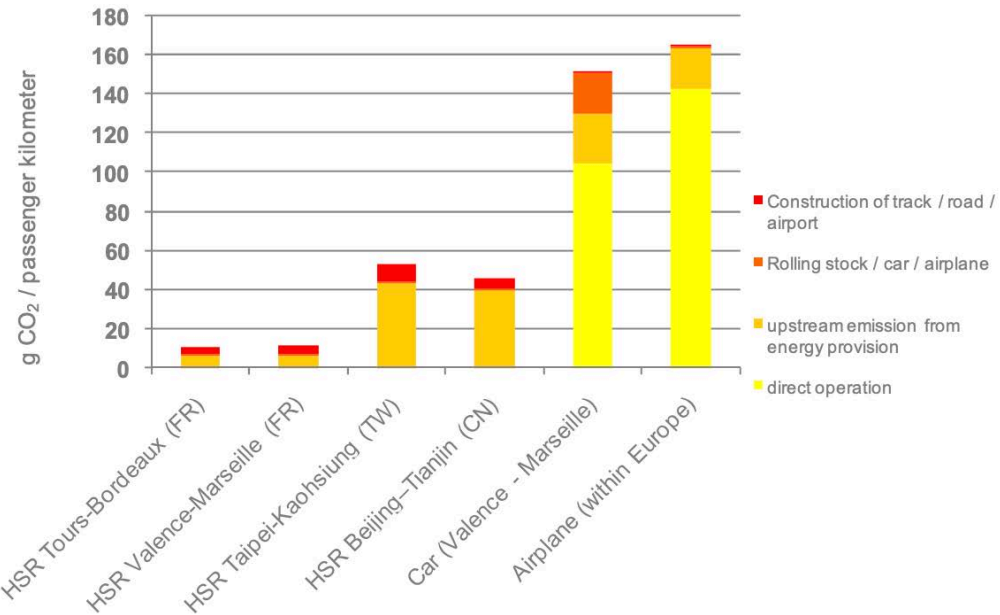


Figure 4: European Case Study: Carbon Footprint of Traffic Modes on Route Valence – Marseille in France⁴⁹

In addition to being more efficient than air and road travel, high-speed rail trains also have the potential to reduce emissions by shifting some travel away from cars and light-duty trucks, which combined account for the vast majority of the transportation sector’s emissions⁵⁰, due to HSR’s competitive advantage regarding a user’s travel time savings.

Social Impact:

The social impacts of high-speed rail are more difficult to estimate than economic and environmental impacts. Some of the social impact analyses (SIA) performed by state high-speed rail planning documents have cited personal mobility, improved

⁴⁹ Ibid.

⁵⁰ United States Environmental Protection Agency. "Fast Facts on Transportation Greenhouse Gas Emissions." Last modified June 8, 2021. <https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions>.

environmental quality, improved accessibility of jobs, property value change, and the new development of urban communities as various social factors for consideration.⁵¹

However, it is important to note that the impacts of high-speed rail development will affect various populations differently, making these impacts difficult to quantify in a way that considers their equitable distribution across the population. When conducting benefit-cost analysis, analysts typically assess these factors as positive values because the societal net benefit is positive, but there can be both winners and losers in high-speed rail development. For instance, property value increases are typically calculated as a net benefit, but these increases can have potentially disruptive impacts to communities that remain unaccounted for. Broader economic impact analyses (EIAs) also often take a strictly positive view and do not examine how the resources used for a project might have been put to alternate uses to benefit society.⁵² Though President Biden has issued an executive order directing the administration to develop methodology to consider distributional impacts in regulatory cost-benefit analysis, the current data on these impacts is scarce because grantees are not required to disclose data on societal benefits beyond what is required in EIAs and BCAs.⁵³ Additional factors identified by the President for consideration include the promotion of social welfare, racial justice, environmental stewardship, human dignity, equity, and the interests of future generations.

⁵¹ Urban Transportation Center, and University of Illinois at Chicago. Framework for Assessing the ROI for High-Speed and Intercity Rail Projects. Prepared for the American Public Transportation Association, 2017. <https://uofi.app.box.com/s/ejec8vra49k8dzyoytm25wcmtzyc5x9f>.

⁵² Ibid.

⁵³ The White House. "Executive Order on Modernizing Regulatory Review." The White House. Last modified January 21, 2021. <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/modernizing-regulatory-review/>.

Challenges with HSR Benefit Analyses:

All of the factors discussed above are reviewed by USDOT in a variety of formats when considering competitive grant awards, which can be used to directly assess the micro and macro-level impacts of this legislation. However, the ultimate benefits of federal investment in high-speed rail depend greatly on the accuracy of forecasts and cost-benefit analyses completed at the project level. Unlike other modes, the benefits of investment in high-speed rail can be difficult to measure because the technology has yet to be successfully implemented in the United States. While speed and convenience of HSR are unquestionably a dramatic improvement over existing intercity rail, the United States cannot rely on the experiences of dated successes in Europe or Japan, for example, for forecasting. Intercity rail travel has been on the decline for decades and many Americans have adapted to a preference for road and air travel. High-speed rail forecasting and cost-benefit analysis requires broad assumptions about the willingness of Americans to embrace that modal shift. By contrast, the experiences of countries like Europe and Japan are fundamentally different because ridership demand was far easier to predict. Intercity rail travel enjoyed widespread popularity, so high-speed rail simply solidified those existing preferences. In the U.S., policymakers must carefully consider the fact that HSR relies on public transportation succeeding against habitual preferences for air and car travel, and that customers may not behave as perfectly rational actors in economic modeling.

Challenges with Accurate HSR Analyses: A Case Study of Urban Mass Transit

The historical experiences of several American cities introducing urban mass transit systems provides a parallel case study. Cities such as San Francisco and Washington, D.C. had dismantled any remnants of an aging urban rail transit systems in the 1950s, so when proposals were offered in the late 1960s and 1970s to establish the San Francisco Bay Area Rapid Transit (BART) in San Francisco and Metro in Washington, the public had lost the memory and habit of traveling by rail. As a result, actual ridership once these systems had been built was between 28 and 85 percent lower than forecasts made prior to the decision to build.⁵⁴ Of nine projects reviewed by USDOT, the Washington Metro was the closest system to approach its forecast at the time of the study, which was still 28% below the original forecast.

Moreover, in these cases the capital cost forecasts were also poor. In 9 of 10 urban rail transit cases reviewed by the USDOT, the capital costs to construct rail facilities and purchase vehicles dramatically exceeded their original forecasts.⁵⁵ The reasons for these large cost overruns have also been difficult to pinpoint, with only 29% attributable to uncontrollable factors such as unanticipated inflation, start date delays, and construction schedule changes.⁵⁶

⁵⁴ Vaca, Erin. "Intercity Rail Ridership Forecasting and the Implementation of High-Speed Rail in California." Institute of Urban and Regional Development, University of California at Berkeley, no. 182 (May 1993).
https://escholarship.org/content/qt134464xn/qt134464xn_noSplash_dd3fc693d755d2e312a8e90438b8d7a0.pdf?t=mc2sdw.

⁵⁵ Pickrell, Don, Urban Mass Transportation Administration, and National Transportation Systems Center. "Urban rail transit projects: forecast versus actual ridership and costs. final report." *Urban Mass Transportation Administration*, 1989.

⁵⁶ *Ibid.*

	Weekday Rail Boardings	Weekday Total Transit Trips	Total Capital Outlays (Nominal)	Annual Rail Operating Expenses
No. of Projects Included in Sample	9	7	9	8
Lowest Error in Sample	-28%	+8%	+17%	+10%
Highest Error in Sample	-85%	-74%	+156%	+205%
Average Error	-65%	-44%	+77%	+81%
Standard Deviation	17%	25%	48%	79%

Figure 5: Case Study: Summary of Percentage Forecasting Errors for Select Rail Transit Projects Actual vs. Forecast (1970-1989)⁵⁷

VI. Political Analysis

President Joe Biden has publicly said that he strongly supports high-speed rail and vowed to ensure that the United States has “the cleanest, safest, and fastest rail system in the world.”⁵⁸ The President has also cited high-speed rail’s potential to “take literally millions of automobiles off the road—saving tens of millions of barrels of oil...” and proclaimed high-speed rail investment as a means of strengthening American competitiveness against countries like China.⁵⁹ However, the Biden administration has done little thus far to move these visions closer to reality.

⁵⁷ Ibid.

⁵⁸ "Biden Restores \$929 Mln for California High-speed Rail Withheld by Trump." Reuters. Last modified June 11, 2021. <https://www.reuters.com/world/us/biden-administration-restores-929-mln-california-high-speed-rail-2021-06-11/>.

⁵⁹ "Remarks by President Biden on the Bipartisan Infrastructure Bill and Build Back Better Agenda." The White House. Last modified October 21, 2021. <https://www.whitehouse.gov/briefing-room/speeches-remarks/2021/10/20/remarks-by-president-biden-on-the-bipartisan-infrastructure-bill-and-build-back-better-agenda-2/>.

Political Landscape

In 2021, the President signed the bipartisan Infrastructure Investment and Jobs Act (IIJA) into law, which was hailed to be a once-in-a-generation investment in our nation's infrastructure and competitiveness.⁶⁰ The bill provided more than \$66 billion for passenger and freight rail, approximately \$41 billion of which will go to Amtrak, with \$12.6 billion allocated for the Northeast Corridor and \$28.6 billion allocated for the national network.⁶¹ But despite this record level of funding, very little of it is eligible to be used to support high-speed rail. Certain high-speed rail projects in late-stage development or construction such as California High-Speed Rail would be eligible to apply for competitive grants through programs such as the Federal-State Partnership for Intercity Passenger Rail grant program, but the number of high-speed rail projects that would be eligible to apply for this funding is low.⁶²

The Build Back Better (BBB) reconciliation package offered more direct support for high-speed rail by including \$10 billion for competitive grants for high-speed rail planning.⁶³ This would have provided an incentive for many states and state agencies to start developing or advance early-stage high-speed rail projects. While messaging around the funding was convoluted by questions of "double dipping" with other transportation

⁶⁰ "Fact Sheet: The Bipartisan Infrastructure Deal." The White House. Last modified November 6, 2021. <https://www.whitehouse.gov/briefing-room/statements-releases/2021/11/06/fact-sheet-the-bipartisan-infrastructure-deal/>.

⁶¹ "Passenger Rail Funding in the Infrastructure Bill: Building a National Network." Transportation For America. Last modified March 1, 2022. <https://t4america.org/2022/02/08/passenger-rail-funding-infrastructure-bill/>.

⁶² Goldman, Ben. Passenger Rail Expansion in the Infrastructure Investment and Jobs Act (IIJA). Congressional Research Service, 2022. <https://crsreports.congress.gov/product/pdf/IF/IF11920>.

⁶³ American Public Transportation Association. "APTA Build Back Better Talking Points." American Public Transportation Association. Last modified October 15, 2021. <https://www.apta.com/wp-content/uploads/APTA-Build-Back-Better-Act-Talking-Points-Public-Transportation-10.15.2021.pdf>.

funding provided by the IJA, the experience of the BBB demonstrates that there is existing support within the White House and Congress to frame high-speed rail investments as a climate solution that is distinct from the IJA's broader infrastructure investments. This package has thus far failed to advance due to opposition from moderate Democratic Senators Joe Manchin (D-WV) and Krysten Sinema (D-AZ), whose support would be essential to passing H.R. 1845 in the Senate.⁶⁴

Prospect for Advancing H.R. 1845

Democrats currently maintain a narrow four seat majority in the House and an even narrower majority in the Senate. For this legislation to advance through regular order, it would need the support of all Democrats in both chambers, plus 10 Republicans in the Senate, which is an unlikely prospect given that Congressional Republicans have been fairly unified in their opposition to high-speed rail. As of this writing this legislation has also only garnered 10 cosponsors in the House and lacks a Senate companion.⁶⁵ However, a path exists for advancing this legislation using the budget reconciliation process because this legislation utilizes existing USDOT grant programs. This would allow the bill to be passed in the Senate without being filibustered. This would still require the support of moderates including Sens. Manchin and Sinema, who have thus far been the primary hurdles to passing the BBB. Their opposition has largely been attributed to the

⁶⁴ h Manchin Statement On Build Back Better Act." U.S. Senator Joe Manchin of West Virginia. Last modified December 19, 2021. <https://www.manchin.senate.gov/newsroom/press-releases/manchin-statement-on-build-back-better-act>.

⁶⁵ Text - H.R.1845 - 117th Congress (2021-2022): American High-Speed Rail Act." Congress.gov | Library of Congress. Last modified March 12, 2021. <https://www.congress.gov/bill/117th-congress/house-bill/1845/text?r=33&s=1>.

high costs of the \$2 trillion package.⁶⁶ By comparison, this more targeted package may be more appealing given its \$205 billion price tag.

Another hurdle to garnering Congressional support from moderates and progressives alike will be countering accusations of revisiting infrastructure after having just passed the IJA. However, it should be noted that the IJA enjoyed strong public support, with surveys showing that nearly two-thirds of voters supported it, including 88 percent of Democratic voters and 60 percent of independents.⁶⁷ This suggests that a secondary push on a more targeted infrastructure proposal focused on high-speed rail may be feasible.

Public Support for High-Speed Rail

Public support for high-speed rail is high among Democratic voters. While a national poll has not been conducted in recent years, a comprehensive national survey in 2015 by the American Public Transportation Association (APTA) showed that if high-speed rail were available today, 63 percent of Americans would be likely to use it.⁶⁸ Support was highest among millennials, with 71 percent supporting the use of high-speed rail, a figure that jumped to 76 percent when respondents were told of the expected costs and time

⁶⁶ "Manchin Statement On Build Back Better Act." U.S. Senator Joe Manchin of West Virginia. Last modified December 19, 2021. <https://www.manchin.senate.gov/newsroom/press-releases/manchin-statement-on-build-back-better-act>.

⁶⁷ Global Strategy Group. "Infrastructure Legislation: A Guide for Advocates." Navigator Polling. Accessed April 16, 2022. <https://navigatorresearch.org/wp-content/uploads/2021/11/Navigator-Update-11.30.2021.pdf?emci=fe11ef9d-5951-ec11-9820-a085fc31ac93&emdi=cebe729d-ca51-ec11-9820-a085fc31ac93&ceid=1397946>.

⁶⁸ American Public Transportation Association. "Two-Thirds of Americans Are Likely to Use High-Speed Rail in America if Available, According to Survey." PR Newswire: Press Release Distribution, Targeting, Monitoring and Marketing. Last modified September 24, 2015. <https://www.prnewswire.com/news-releases/two-thirds-of-americans-are-likely-to-use-high-speed-rail-in-america-if-available-according-to-survey-300148591.html>.

savings benefits. Democrats were also far more likely to support high-speed rail than Republicans, with 73 percent of Democrats supporting it versus 58 percent of Republicans.

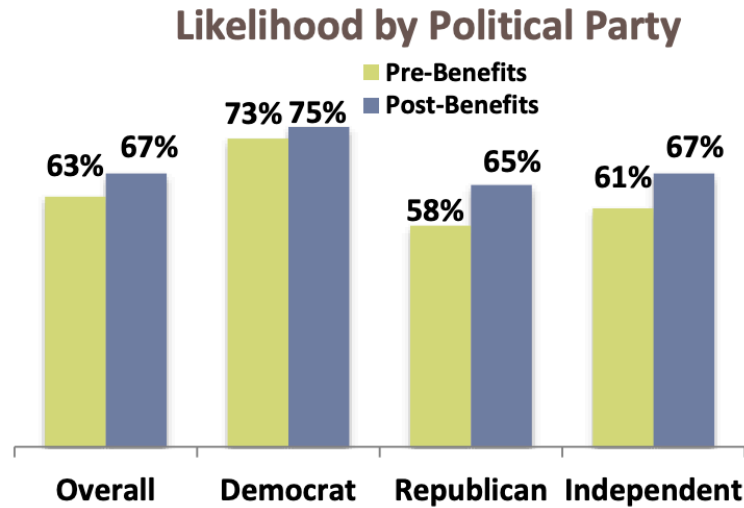


Figure 6: APTA 2015 Survey: Consumer Likelihood of Using High-Speed Rail Service⁶⁹

More recent surveys at the state and regional levels show that voters strongly support developing or continuing to develop high-speed rail corridors, though polling has skewed heavily partisan toward Democrats. While support for funding California high-speed rail has begun to waiver in recent years, recent polling showed that 71 percent of Democrats supported continuing to fund the project.⁷⁰ A more recent April 14 poll found that views about continuing to build the state's high-speed rail system remained highly partisan, but enjoy strong support from Democrats. 73 percent of Democrats back the

⁶⁹ TechnoMetrica Market Intelligence. "Survey: High-Speed Rail in America 2015." American Public Transportation Association. Accessed April 13, 2022. <https://www.apta.com/wp-content/uploads/Resources/resources/reportsandpublications/Documents/APTA-2015-High-Speed-Train-Survey.pdf>.

⁷⁰ Gardiner, Dustin. "High-speed Rail Opponents Seize on Poll Showing Waning Public Support." San Francisco Chronicle. Last modified June 29, 2021. <https://www.sfchronicle.com/politics/article/High-speed-rail-opponents-seize-on-poll-showing-16280351.php>.

project compared to just 25 percent of Republicans. In total, 56 percent of registered voters surveyed supported continuing the project.⁷¹ A 2021 poll commissioned by the Seattle Metropolitan Chamber of Commerce also found that 67 percent of Washingtonians and 60 percent of Oregonians supported connecting the major cities of the Cascadia region with high-speed rail.⁷²

VII. Recommendation

This memorandum recommends that the U.S. Department of Transportation work with the White House and Congress to prioritize the passage of H.R. 1845 before the end of 2022. This legislation would jumpstart key high-speed rail projects around the country and provide financial assistance that states can utilize for early and late-stage projects. It would also provide a strong incentive for public and private entities to begin making investments in high-speed rail corridor development that would extend beyond the five-year life of this legislation.

As the United States continues to face shrinking transportation capacity and growing environmental threats, the Biden Administration should prioritize the development of a national high-speed rail network to help remedy these challenges. By the end of the century, the effects are climate change are forecasted to cost the U.S.

⁷¹ DiCamillo, M. "IGS Poll: Voters offer a wide range of issues they'd like the state to address." UC Berkeley, no. 2022-08 (April 2022). <https://escholarship.org/uc/item/7sn293xs#author>.

⁷² Trumm, Doug. "Strong Public Support for Cascadia High-Speed Rail, Poll Finds." The Urbanist. Last modified August 21, 2021. <https://www.theurbanist.org/2021/08/19/strong-public-support-for-cascadia-high-speed-rail-poll-finds/>.

economy hundreds of billions of dollars annually.⁷³ These effects are also poised to threaten U.S. infrastructure, posing a potential national security threat as well.⁷⁴ Meanwhile, population is expected to grow by up to 60 million people in just the next three decades alone, which will put a significant strain on current transportation capacities, particularly in the highway and aviation sectors.⁷⁵ Federal investments in high-speed rail can help address both threats.

Recent polling suggest that Democrats are likely to lose control of the House and Senate during the November midterms.⁷⁶ This proposal could provide an opportunity to unify the party and voters around a comprehensive, landmark piece of legislation. While this gives the administration a narrow political window to announce its support for the legislation and shepherd it through Congress, the present failure of the Build Back Better package may provide a strong incentive for Democratic members to support this bill to secure a legislative victory before the midterm elections.

⁷³ U.S. Global Change Research Program. Fourth National Climate Assessment. Volume II. 2018. https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf.

⁷⁴ U.S. Department of Defense. Department of Defense Climate Risk Analysis. 2021. <https://media.defense.gov/2021/Oct/21/2002877353/-1/-1/0/DOD-CLIMATE-RISK-ANALYSIS-FINAL.PDF>.

⁷⁵ Vespa, Jonathan, Lauren Medina, and David M. Armstrong. Demographic Turning Points for the United States: Population Projections for 2020 to 2060. U.S. Department of Commerce, U.S. Census Bureau, 2018. <https://www.census.gov/content/dam/Census/library/publications/2020/demo/p25-1144.pdf>.

⁷⁶ Agiesta, Jennifer, and Ariel Edwards-Levy. "CNN Poll: The Supreme Court's Draft Opinion on Roe V. Wade Hasn't Shaken the Midterm Landscape." CNN. Last modified May 6, 2022. <https://www.cnn.com/2022/05/06/politics/cnn-poll-abortion-midterms-roe-v-wade/index.html>.

Curriculum Vitae

John Hebert is a government affairs and communications consultant for several non-profits in the railroad, manufacturing, and housing sectors. Prior to his current role, Hebert worked as an infrastructure and trade policy lobbyist for a bipartisan firm in Washington, D.C. He began his career as an intern for his hometown representative on Capitol Hill, Congressman Don Beyer (D-VA-08,) and later spent time in the office of Congresswoman Cheri Bustos (D-IL-17).

Hebert was born on June 13, 1994, in Washington, D.C. He graduated *cum laude* from the University of Georgia's School of Public and International Affairs in 2016 with a B.A. in Political Science and is currently pursuing an M.A. in Public Management from Johns Hopkins University.