

An aerial photograph of a deep canyon. A river flows through the center, flanked by a multi-lane highway on the right and a railway track on the left. The canyon walls are steep and covered in dense green forest. The scene is captured from a high angle, looking down into the valley.

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*Transportation  
& Infrastructure*



## MEETING AMERICA'S INFRASTRUCTURE NEEDS

### Key Takeaways:

- Affordable, dependable transportation options are critical for Americans' way of life. By sector, transportation is also the largest source of greenhouse gas emissions in the United States.
- Reforming government-imposed barriers for infrastructure projects will stretch taxpayer dollars further, inject more private capital into projects, and deliver cleaner, more resilient infrastructure.
- Reducing congestion provides many economic and environmental benefits including savings on fuel, reduced pollution, fewer greenhouse gas emissions, and less traffic noise.
- Congress and the administration should eliminate energy subsidies, including preferential treatment for fossil fuels. A next-best strategy should be to make existing subsidies more economically and environmentally efficient while not adding more to the federal debt.

Affordable, dependable transportation options are critical for Americans' daily needs. Whether it is driving to work, busing to school, flying to a favorite vacation spot, or transporting goods on a barge, transportation makes our lives easier, safer, and more efficient. By sector, transportation is also the largest source of greenhouse gas emissions in the United States, accounting for 29 percent of domestic emissions.<sup>1</sup> The largest sources of transportation emissions are light-duty vehicles (58%), medium-and heavy-duty trucks (24%), and aircraft (10%).<sup>2</sup> 90 percent of America's transportation needs are met through petroleum (gasoline, diesel, and jet fuel).<sup>3</sup>

Globally, transportation accounts for about 20 percent of total carbon dioxide emissions.<sup>4</sup> Passenger road vehicles comprise 45.1% with road freight (29.4%), aviation (11.6%), and shipping (10.6%) making up the rest.<sup>5</sup>

The widespread use of oil as a transportation fuel is not because the industry has a monopoly or manipulates the market but because it is affordable and reliable. The market is changing, however, and innovation and competition is diversifying the transportation sector, providing consumers more choices. As a multi-trillion-dollar market, the transportation sector is ripe for competition and disruption, where economic alternatives to oil-based fuels will benefit tremendously from the profit opportunity that is available. Those alternatives could be batteries, biofuels, natural gas, propane, hydrogen, drop-in fuels, or a fuel that may not even exist yet. For instance, December 2021 marked the first time that electric vehicle sales in Europe outpaced diesel.<sup>6</sup> Still, most vehicles rely on the internal combustion engine.<sup>7</sup>

For their part, U.S. policymakers have not wanted to follow the European model where petroleum prices have been consistently high, mostly because of high taxes. Based on price elasticities of demand, higher taxes may not meaningfully reduce consumption or drive a switch to alternative fuels. A July 2019 paper in the National Bureau of Economic Research estimates a global carbon tax of \$200 per ton would only eliminate four percent of oil production and could impose high costs for relatively low cumulative emissions avoided.<sup>8</sup> However, a paper in the American Economic Journal, using Sweden as a case study, found that using price elasticity simulations may in fact underestimate the emissions reductions impact of a carbon tax.<sup>9</sup>

Regardless of efficacy, political realities cannot be discounted. When prices are high and the economy is slumping, people

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tend to worry less about the environment and climate change.<sup>10</sup> In the spring of 2022, as American prices at the pump soared above \$4 per gallon, the priority for most families was determining ways to get to work and take their kids to baseball practice without busting their budget. The stark reality is that even when the economy is strong and energy prices are more affordable, Americans' willingness to pay to reduce emissions is still quite low.<sup>11</sup> Consequently, **the role for public policy-makers should be to open market opportunities and remove barriers for the development of lower-cost alternatives rather than raise prices on households and businesses. Taxes, regulations, and subsidies will change behavior at some level, but a policy that works best for consumers will be one that unleashes innovation and competition and empowers the market to reduce any green premiums that exist.**



Furthermore, as in every sector, transportation climate policy requires pragmatism and careful consideration of costs and benefits. Oil use has an environmental cost, as does mining for batteries, charging an electric vehicle powered by coal, or converting land for biofuel use. Effective climate policy must take into consideration lifecycle emissions, potential unintended environmental consequences, and abatement costs per dollar spent. Energy pragmatism should also recognize that oil is very likely going to be a transportation fuel source well into the future and policies that restrict development in the United States could outsource production to dirtier authoritarian regimes (For further discussion, see energy security chapter).

## POLICY RECOMMENDATIONS TO REMOVE BARRIERS TO INFRASTRUCTURE

In November 2021, President Joe Biden signed the \$1.2 trillion Infrastructure Investment and Jobs Act into law. The legislation included money for roads, bridges, ports, airports, transit, rail, electric buses, electric ferries, and electric vehicle charging infrastructure (among many other programs).<sup>12</sup> Regrettably, the law also entrenches regulations and failed to implement policy fixes that would allow these infrastructure investments to occur more resourcefully. Real dollar, per mile construction costs have tripled from the 1960s to the 1990s.<sup>13</sup> Reforming government-imposed barriers to infrastructure projects would stretch taxpayer dollars, inject more private capital into projects, and deliver cleaner and more resilient infrastructure in a timelier manner. A May 2017 Heritage Foundation report outlined many potential reforms to make infrastructure spending more efficient.<sup>14</sup> These recommendations, which are still relevant today, include:

- **Modernizing the National Environmental Policy Act.** At nearly every level of government, delays can obstruct the development of more environmentally friendly infrastructure. Excessive litigation has blocked bike paths and outdated zoning laws have stifled renewable energy projects and transmission lines.<sup>15</sup> The primary tool to block projects at the federal level is the National Environmental Policy Act (NEPA). President Nixon signed NEPA into law more than 50 years ago. Since then, many federal, state, and local environmental laws have been enacted, creating a confusing web of unclear, overlapping, and complex requirements. NEPA reform is not about removing environmental safeguards but improving efficiency. Both the Undoing NEPA's Substantial Harm by Advancing Concepts that Kickstart the Liberation of the Economy Act (UNSHACKLE Act) and the Building United States Infrastructure through Limited Delays and Efficient Reviews Act of 2021 (BUILDER Act) are legislative fixes that would expedite permitting timelines, increase accountability, and curb excessive litigation.<sup>16</sup> (For more information, see permitting chapter).
- **Repealing Davis-Bacon Act (DBA) requirements.** From Heritage: "The Davis-Bacon Act, enacted in 1931, effectively requires construction contractors on federal projects to use union wage and benefit scales and follow union work rules. These rules inflate the cost of federal construction by nearly 10 percent on average. Eliminating the DBA has current support in Congress and would stretch each federal construction dollar further, delivering more infrastructure without the need to increase spending levels. Barring complete elimination, the Labor Department should shift to using more accurate Bureau of Labor Statistics data to estimate DBA 'prevailing wages' so they more closely reflect market pay."<sup>17</sup>



- **Ending Buy-America Restrictions.** Also from Heritage: “Like with the [Davis-Bacon Act] most federally funded infrastructure projects must comply with ‘Buy America’ mandates, which require that certain input components must be manufactured in the United States. This protectionist mandate limits selection and price competition among input manufacturers, which often leads to higher costs for projects.”<sup>18</sup>
- **Improving Opportunities for Public Private Partnerships.** Recommendations to increase the private sector’s role in major infrastructure projects, as recommended by the Heritage report, include:
  - “Ensure adequate access to Private Activity Bonds (PABs)—which puts the financing cost of privately financed infrastructure on a nearly equal level with projects financed by tax-exempt municipal bonds—by expanding the federal cap on PABs to meet demand. [In a positive reform, the Infrastructure Investment and Jobs Act increased available PAB authority from \$15 billion to \$30 billion].<sup>19</sup>
  - Remove the grant repayment requirements mandated by Executive Order 12803 (issued in 1992), which requires the repayment of federal grants in order to lease or sell certain infrastructure assets intent on entering into a P3. This payment amounts to a tax on P3s.
  - Lift the ban on tolling existing federal interstate highways.
  - Comprehensively audit and amend other regulatory impediments to private infrastructure investment.”<sup>20</sup>

## POLICY RECOMMENDATIONS TO REDUCE CONGESTION

Another priority for federal, state, and local policymakers should be to reduce congestion. Reducing congestion provides many economic and environmental benefits including savings on fuel, reduced pollution, fewer greenhouse gas emissions, and less traffic noise.<sup>21</sup> Evidence of congestion pricing implemented in several cities worldwide has documented the benefits.<sup>22</sup> Congestion pricing that would reduce emissions also falls victim to bureaucratic obstacles. Infrastructure expert DJ Gribbin, founder of Madrus and former Nonresident Senior Fellow at the Brookings Institute, documented this frustration in testimony, writing:

*A prime example of how the dysfunctional process harms environmental goals involves New York City’s plan to implement congestion pricing. Congestion pricing is a market mechanism with the potential to drastically lower emissions simply by charging drivers market-clearing prices to enter congested areas. Implementing such a pricing plan requires a negligible footprint; the only new infrastructure needed is the erection of tolling “mast arms” on existing structures in Manhattan. Yet the current NEPA process may force the project to undergo the same level of analysis (an Environmental Impact Statement) as required for the construction of the new Tappan Zee Bridge, a 3.1-mile span crossing one of the East Coast’s most important estuaries. Delaying a beneficial project for months to study how hanging tolling arms on Manhattan street lights affects parklands and recreational resources; topography, geology, and soils; water resources; and ecology (including that of endangered species and bald eagles) hardly makes sense from an economic or an environmental standpoint.<sup>23</sup>*

**States and cities should expand congestion pricing where they can. At the federal level, Congress and the administration should fix antiquated laws and regulations that increase congestion. Approving oil and gas pipelines, including Keystone XL, would reduce the need for resources to be transported by rail or tanker truck.**

Several other policy reforms would improve America’s transportation and infrastructure needs. They include.

- **Repealing the Foreign Dredge Act.** More than a century old, the Act prohibits any foreign-built or chartered ships

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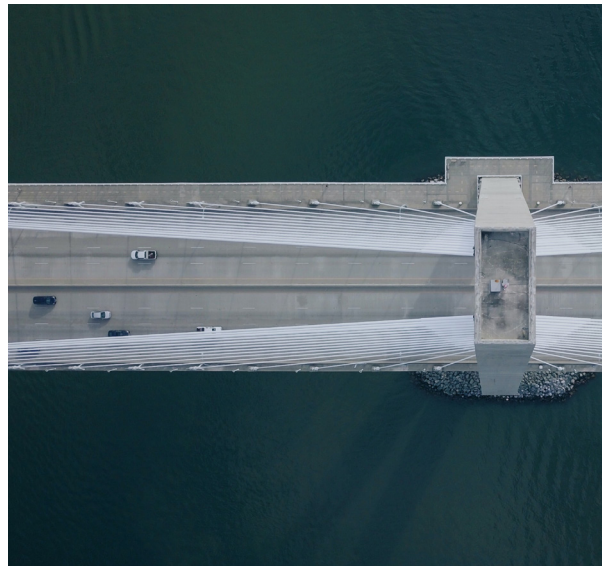


from dredging in the U.S. Consequently, some of the world's best dredgers, ships that could deepen and widen America's ports at a fraction of the cost and time, cannot bid on contracts. The Dutch and Belgians own these dredgers, not countries that are hostile to the U.S.

More competitive dredging bids would be beneficial to taxpayers, American consumers and companies, and the environment. Taxpayers would save money because the Army Corps of Engineers and state and local governments are the customers for dredging projects. Families and businesses would be better off because ports would be greater hubs for economic activity. With just an inch of additional depth, a cargo ship could transport millions of dollars in more products per trip. The National Oceanic and Atmospheric Administration equates that additional inch of depth to "50 more tractors, 5,000 televisions, 30,000 laptops, or 770,000 bushels of wheat."<sup>24</sup> Increasing activity at U.S. ports would provide more opportunities for American farmers, manufacturers, and businesses to export their products.<sup>25</sup>

**Deeper, wider port channels would also improve transportation efficiency, reducing emissions from unwanted congestion and light-loading.** Unable to accommodate two-way traffic or larger cargo ships, port channels across the U.S. have become congested. As a result, companies move more goods via truck or rail, increasing congestion and wear-and-tear on America's highways. Light-loading occurs when ships cannot carry a full cargo load through a channel because the channel cannot accommodate the depth; therefore, ships offload some of their cargo at a different port before making their way to a destination. Both congestion and light-loading waste time and money and generate more emissions than otherwise would occur.<sup>26</sup> Senator Mike Lee (R-UT) introduced four bills, any or all of which would be a marked improvement from the current law that harms taxpayers, the economy, and the environment. The bills are:

- The Dredging to Ensure the Empowerment of Ports (DEEP) Act would repeal the Foreign Dredge Act of 1906 and streamline key impediments in the Clean Water Act as well as the Army Corps' process for considering dredge projects at our ports.
- The Allied Partnership and Port Modernization Act would support more economic opportunities at our ports. It would amend the Foreign Dredge Act of 1906 to allow NATO affiliated dredging vessels to operate in the United States.
- The Port Modernization and Supply Chain Protection Act repeals the Foreign Dredge Act of 1906's cabotage requirements and allows all dredge vessels that qualify under the laws of the United States to operate in the United States.
- The Incentivizing the Expansion of U.S. Ports Act would amend the Foreign Dredge Act of 1906 to allow Americans to purchase foreign-built dredge vessels for operation in the United States so long as they are crewed by Americans and flagged under U.S. law.<sup>27</sup>



- **Repealing the Jones Act**, which mandates that oil (and other goods) shipped between two ports in the U.S. must be transported on a U.S.-built, U.S.-flagged vessel with a crew that is at least 75% American. Colin Grabow of the Cato Institute writes, "By disincentivizing the use of water transport—by far, the most carbon-friendly means of transporting goods—the Jones Act serves to drive up the emission of greenhouse gases. Rather than transporting cargo by water, a portion is instead diverted to more carbon-intensive modes, such as trucking and rail."<sup>28</sup> The Open America's Waters Act would repeal the Jones Act.<sup>29</sup>
- **Deploying smart technologies.** One should not overlook the use of technology to improve efficiency, reduce congestion, and lower emissions. The installation of an Intelligent Transportation System, which is a "network of technology





embedded in transport infrastructure and vehicles to improve safety and mobility,”<sup>30</sup> has helped cities significantly reduce congestion and emissions. This includes cameras, sensors, and technologies that help communicate real-time information to commuters and local governments. A study examined the implementation of these technologies from 1994-2014 in 99 urban areas in the United States and found they saved “over \$4.7 billion dollars and 175 million hours of travel time annually in US cities. It also reduced fossil fuel consumption by about 53 million gallons and saved over 10 billion pounds of CO2 emissions.”<sup>31</sup> Technological innovation is also making bus service more efficient by transitioning to an on-demand service rather than stopping at each bus stop.<sup>32</sup> With funding available, states, cities, and localities should expand the use of cutting-edge technologies to help drivers and commuters and reduce emissions.

## POLICY RECOMMENDATIONS TO PHASE OUT OR IMPROVE EFFICIENCY OF SUBSIDIES

Over the last several decades, Democrats and Republicans have supported preferential treatment for various alternative fuels. To reduce dependence on foreign oil and address environmental concerns, federal and state legislators have enacted targeted tax credits for alternative fuels, electric vehicles, grant programs, fuel tax exemptions, and more.<sup>33</sup> Another policy, the Renewable Fuel Standard, mandates that fuel supplies mix ethanol into gasoline at blending stations. The law requires the blending of 36 billion gallons of ethanol in 2022. In 2023, the Environmental Protection Agency will set new renewable volume obligations.<sup>34</sup>

The concern with the subsidization of alternative fuels is not a criticism of the specific fuel or technology, but the economic and environmental inefficiencies they cause. The fundamental concern for policymakers should be the lack of environmental benefit or emissions abatement cost per dollar of taxpayer money spent. For example, a 2019 Government Accountability Office (GAO) study found the Renewable Fuel Standard was “associated with modest gas price increases in areas outside the Midwest” while providing “limited effect, if any, on greenhouse gas emissions.”<sup>35</sup> Further, subsidies for electric vehicles and the “cash for clunkers” program to encourage the retirement of old vehicles have some of the highest abatement costs per dollar spent compared to other federal and state policies.<sup>36</sup> Philip Rossetti, senior fellow at the R Street Institute, estimates that the electric vehicle subsidies proposed in the Build Back Better agenda would have minimal impact on vehicle sales because the subsidies would accrue to households that are already likely to purchase an EV.<sup>37</sup>

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Policymakers should also voice concern over the market-distorting effects of subsidies. In addition to the direct cost to taxpayers,<sup>38</sup> **subsidies tip the scale toward one energy source or technology over another, taking capital away from potentially promising technologies. As a result, public and private resources are stuck in unproductive places, stifling competition and innovation.** Or, if the technology is successful, public dollars merely displace private dollars that would have been invested. Ideally, Congress and the administration would eliminate energy subsidies, including fossil fuel subsidies. A next-best strategy should be to make existing policies more economically and environmentally efficient while not adding more to the federal debt. While maintaining revenue neutrality, improvements could:

- **Replace targeted transportation fuel and EV tax credits in favor of a technology neutral one.** Swapping the convoluted mix of credits for an emissions-based, technology neutral one would bring more efficiency and reward performance over political preference. Neutrality should also harmonize tax credits available for alternative fuels and alternative technologies (ie, biofuels<sup>39</sup> and EVs). A reverse auction that awards the lowest-priced bidder could improve the efficiencies of production tax credits. Similar to the Energy Sector Innovation Credit, credits should expire once a defined market penetration has been met to support nascent transportation fuels.
- **Explore ways to incorporate ridesharing.** Recent research has demonstrated that one of the quickest and most effective ways to reduce emissions is through pooled rides, or ridesharing.<sup>40</sup>



- **Consider shifting the EV tax credit to hybrid-electric vehicles and secondary markets.** A common complaint about EV tax credits is that they accrue to the wealthiest Americans who would have bought an EV without the credit. Repurposing existing credits to apply to hybrids and secondary markets could be a more effective and equitable use of the funds and could go much further in reducing emissions.<sup>41</sup>
- **Consider replacing the Renewable Fuel Standard and Corporate Average Fuel Economy Standards (CAFE) with higher octane standards.** Rather than prolong policies that pick winners and losers and have mandates with complex formulas based on antiquated notions of energy scarcity such as CAFE, Congress should charge agencies to simply address the source of emissions. A higher octane standard would likely still benefit corn ethanol, as it is an effective oxygenate for fuel, and could lower emissions significantly.<sup>42</sup>
- **Continue research and development into breakthrough alternative fuels.** Drop-in hydrocarbon biofuels and hydrogen transportation could be economic and climate gamechangers for the transportation sector.<sup>43</sup> Congress should continue to support basic research, development, and demonstration for alternative fuels and maximize public expenditures allocated in the bipartisan Infrastructure Investment and Jobs Act.

## TACKLE INTERNATIONAL AIR POLLUTION

Reducing air pollution from the transportation sector will have significant public health and climate benefits. Preventing and removing black carbon, for instance, would dramatically improve air quality but also remove a short-lived climate forcer.<sup>44</sup> Addressing international black carbon in developing countries would reduce premature mortalities and mitigate warming.<sup>45</sup> The exact amount of climate mitigation derived from reducing black carbon is unknown and may be weaker than expected.<sup>46</sup> Nevertheless, reducing harmful pollutants presents an environmental and climate win-win. China has been the largest emitter of black carbon, though much of the pollution is not from the transportation sector but from burning coal without the appropriate pollution controls.<sup>47</sup>

Much of the focus for international climate policy has centered on the Paris Agreement and to a lesser extent, the Kigali Amendment to the Montreal Protocol. However, international treaties such as the Convention on Long-Range Transboundary Air-Pollution and the Gothenburg Protocol should be instrumental in cleaning up the planet and helping to abate warming. Working with international allies, the United States should pursue aggressive efforts to bring the major polluters into these conventions and ramp up the urgency to reduce air pollution.



## TRANSPORTATION & INFRASTRUCTURE WORKS CITED

<sup>1</sup> U.S. Environmental Protection Agency, “Fast Facts on Transportation Greenhouse Gas Emissions,” February 11, 2022, <https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions>

<sup>2</sup> Ibid.

<sup>3</sup> U.S. Energy Information Administration, “Use of energy explained: Energy use for transportation,” May, 17, 2021, <https://www.eia.gov/energyexplained/use-of-energy/transportation.php#:~:text=Energy%20sources%20are%20used%20in,and%20some%20types%20of%20helicopters.>

<sup>4</sup> Hannah Ritchie and Max Roser, “Transport,” Our World in Data, September 2021, <https://ourworldindata.org/transport#-co2-emissions-by-mode-of-transport>

<sup>5</sup> Ibid.

<sup>6</sup> Jack Ewing, “Sales of Electric Vehicles Surpass Diesel in Europe, a First,” New York Times, January 1, 2022, <https://www.nytimes.com/2022/01/17/business/electric-vehicles-europe.html>

<sup>7</sup> CNN, “Gas prices around the world,” March 2005, [https://money.cnn.com/pf/features/lists/global\\_gasprices/](https://money.cnn.com/pf/features/lists/global_gasprices/)

<sup>8</sup> Geoffrey Heal and Wolfram Schenker, “Coase, Hotelling and Pigou: The Incidence of a Carbon Tax and CO2 Emissions,” National Bureau of Economic Research Working Paper 26086, July 2019, [https://www.nber.org/system/files/working\\_papers/w26086/w26086.pdf](https://www.nber.org/system/files/working_papers/w26086/w26086.pdf)

<sup>9</sup> Julius J. Andersson, “Carbon Taxes and CO2 Emissions: Sweden as a Case Study,” American Economic Journal: Economic Policy, Vol. 11 No. 4, 2019, <https://pubs.aeaweb.org/doi/pdfplus/10.1257/pol.20170144>

<sup>10</sup> Matthew E. Kahn and Matthew J. Kotch, “Environmental Concern and the Business Cycle: The Chilling Effect of Recession,” The National Bureau of Economic Research, Working Paper 16241, July 2010, <https://www.nber.org/papers/w16241>

<sup>11</sup> James Rainey, “More Americans believe in global warming — but they won’t pay much to fix it,” NBC News, January 24, 2019, <https://www.nbcnews.com/news/us-news/more-americans-believe-global-warming-they-won-t-pay-much-n962001>

<sup>12</sup> Senator Maria Cantwell, “Bipartisan Infrastructure Investment and Jobs Act Summary A Road to Stronger Economic Growth,” Section-by-Section, <https://www.cantwell.senate.gov/download/iija-section-by-section>

<sup>13</sup> DJ Gribbin, “On Paving the Way for Funding and Financing Infrastructure Investments,” Testimony before the Committee on Ways and Means U.S. House of Representative, Madrus LLC, January 29, 2020, [https://gop-waysandmeans.house.gov/wp-content/uploads/2020/01/Gribbin\\_Ways-and-Means-Testimony\\_Final.pdf](https://gop-waysandmeans.house.gov/wp-content/uploads/2020/01/Gribbin_Ways-and-Means-Testimony_Final.pdf)

<sup>14</sup> Michael Sargent and Nicolas Loris, “Driving Investment, Fueling Growth: How Strategic Reforms Can Generate \$1.1 Trillion in Infrastructure Investment,” The Heritage Foundation, May 3, 2017, <https://www.heritage.org/transportation/report/driving-investment-fueling-growth-how-strategic-reforms-can-generate-11>

<sup>15</sup> Sara Bronin, “Zoning Rules Stifle Urban Clean Energy. Can The Rules Be Rewritten?” Kleinman Center for Energy Policy, September 29, 2020, <https://kleinmanenergy.upenn.edu/podcast/zoning-rules-stifle-urban-clean-energy-can-the-rules-be-rewritten/>

<sup>16</sup> U.S. Senator Mike Lee, March 11, 2021, <https://www.lee.senate.gov/2021/3/sen-lee-reintroduces-unshackle-act>. Full text of the legislation available at: S.717 USHACKLE Act, 117<sup>th</sup> Congress (2021-2022), <https://www.congress.gov/bill/117th-congress/senate-bill/717> U.S. House Committee on Natural Resources and U.S. Committee on Transportation and Infrastructure, “The BUILDER Act Building U.S. Infrastructure through Limited Delays and Efficient Reviews,” <https://republicans-naturalresources>.





## TRANSPORTATION & INFRASTRUCTURE WORKS CITED

[house.gov/uploadedfiles/builder\\_2021\\_1-pager.pdf](https://www.congress.gov/bills/117/congress/house/bills/2515?r=9). Full legislative text available at: H.R.2515 - Building United States Infrastructure through Limited Delays and Efficient Reviews Act of 2021, 117th Congress (2021-2022), [https://www.congress.gov/bill/117th-congress/house-bill/2515?s=1&r=9](https://www.congress.gov/bills/117th-congress/house-bill/2515?s=1&r=9)

<sup>17</sup> Michael Sargent and Nicolas Loris, "Driving Investment, Fueling Growth: How Strategic Reforms Can Generate \$1.1 Trillion in Infrastructure Investment," The Heritage Foundation, May 3, 2017, <https://www.heritage.org/transportation/report/driving-investment-fueling-growth-how-strategic-reforms-can-generate-11>

<sup>18</sup> Ibid

<sup>19</sup> U.S. Department of Transportation, "Private Activity Bonds," Section 11143 of Title XI of SAFETEA-LU amended Section 142 of the Internal Revenue Code, April 19, 2022, <https://www.transportation.gov/buildamerica/financing/private-activity-bonds#:~:text=The%20Infrastructure%20Investment%20and%20Jobs,investment%20in%20U.S.%20transportation%20infrastructure.>

<sup>20</sup> Michael Sargent and Nicolas Loris, "Driving Investment, Fueling Growth: How Strategic Reforms Can Generate \$1.1 Trillion in Infrastructure Investment," The Heritage Foundation, May 3, 2017, <https://www.heritage.org/transportation/report/driving-investment-fueling-growth-how-strategic-reforms-can-generate-11>

<sup>21</sup> U.S. Department of Transportation Federal Highway Administration, "Congestion Pricing: Environmental Benefits," February 11, 2022, [https://ops.fhwa.dot.gov/congestionpricing/resources/enviro\\_benefits.htm#:~:text=Congestion%20pricing%20can%20improve%20the,generated%20by%20accelerations%20and%20decelerations.](https://ops.fhwa.dot.gov/congestionpricing/resources/enviro_benefits.htm#:~:text=Congestion%20pricing%20can%20improve%20the,generated%20by%20accelerations%20and%20decelerations.)

<sup>22</sup> Hannah Parks, "Investigating the Impact of Congestion Pricing Around the World," Climate Xchange, May 29, 2019, <https://climate-xchange.org/2019/05/29/investigating-the-impact-of-congestion-pricing-around-the-world/#:~:text=-Congestion%20Pricing%20and%20Carbon%20Emissions&text=First%2C%20it%20decreases%20the%20total,%20and%20go%20traffic%20decreases.>

<sup>23</sup> DJ Gribbin, "On Paving the Way for Funding and Financing Infrastructure Investments," Testimony before the Committee on Ways and Means U.S. House of Representative, Madrus LLC, January 29, 2020, [https://gop-waysandmeans.house.gov/wp-content/uploads/2020/01/Gribbin\\_Ways-and-Means-Testimony\\_Final.pdf](https://gop-waysandmeans.house.gov/wp-content/uploads/2020/01/Gribbin_Ways-and-Means-Testimony_Final.pdf)

<sup>24</sup> National Oceanic and Atmospheric Administration, "An Inch of Water. What's It Worth?" U.S. Department of Commerce, <https://oceanservice.noaa.gov/economy/inch-water/#transcript>

<sup>25</sup> U.S. Army Corps of Engineers, Hopper Dredge Recapitalization Analysis: Examination of the Corps and Industry Hopper Dredge Capacity; The Need, Composition, Location, and Recapitalization of the Corps Hopper Dredge Fleet, June 20, 2017, <https://bayplanningcoalition.org/wp-content/uploads/2018/07/HDRRecapFinal.pdf>

<sup>26</sup> Nicolas Loris, "How to Improve America's Ports," The Heritage Foundation, June 24, 2020, <https://www.heritage.org/transportation/report/how-improve-americas-ports#:~:text=families%20and%20businesses.-,The%20Foreign%20Dredge%20Act%20of%201906%20prohibits%20any%20foreign%20built,better%20services%20for%20lower%20cost.>

<sup>27</sup> Press release, "Sen. Lee Introduces Four Dredging Bills," U.S. Senator Mike Lee, December 13, 2021, <https://www.lee.senate.gov/2021/12/sen-lee-introduces-four-dredging-bills#:~:text=The%20Port%20Modernization%20and%20Supply,operate%20in%20the%20United%20States.>

<sup>28</sup> Colin Grabow, "The Progressive Case for Jones Act Reform," Cato Institute, September 7, 2021, <https://www.cato.org/study/progressive-case-jones-act-reform#disproportionate-impact>



## TRANSPORTATION & INFRASTRUCTURE WORKS CITED

<sup>29</sup> Press release, “Lee, McClintock Introduce Bill to Repeal Jones Act,” U.S. Senator Mike Lee, May 14, 2021, <https://www.lee.senate.gov/2021/5/lee-mcclintock-introduce-bill-to-repeal-jones-act>

<sup>30</sup> Zhi (Aaron) Cheng, Min-Seok Pang and Paul A. Pavlou, “Mitigating Traffic Congestion: The Role of Intelligent Transportation Systems,” *Information Systems Research*, Vol. 31, Issue 3, September 2020, <https://pubsonline.informs.org/doi/10.1287/isre.2019.0894>

<sup>31</sup> Ibid.

<sup>32</sup> Mariya Frost and Todd Myers, “How technology can make public transit more efficient,” Washington Policy Center, October 8, 2020, <https://www.washingtonpolicy.org/publications/detail/how-technology-can-make-public-transit-more-efficient>

<sup>33</sup> Alternative Fuels Data Center, “Federal Laws and Incentives,” U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, <https://afdc.energy.gov/laws/all?state=US#Incentives>

<sup>34</sup> Erin Voegele, “OMB reveals expected timeline for post-2022 RFS rule, other rules,” *Biomass Magazine*, December 13, 2021, <http://biomassmagazine.com/articles/18555/omb-reveals-expected-timeline-for-post-2022-rfs-rule-other-rules>

<sup>35</sup> U.S. Government Accountability Office, “Renewable Fuel Standard: Information on Likely Program Effects on Gasoline Prices and Greenhouse Gas Emissions,” Report to the Chairman, Subcommittee on Regulatory Affairs and Federal Management, Committee on Homeland Security and Governmental Affairs, U.S. Senate, May 2019, <https://www.gao.gov/products/gao-19-47>

<sup>36</sup> Erica Schlaikjer, “Cash for Clunkers: ‘Environmental Effects Will Be Negligible,’” *The City Fix*, August 10, 2009, <https://thecityfix.com/blog/cash-for-clunkers-environmental-effects-will-be-negligible/#:~:text=The%20Cash%20for%20Clunkers%20program%2C%20which%20gives%20consumers%20up%20to,and%20longtime%20contributor%20for%20TheCityFix> and Kenneth Gillingham and James H. Stock, “The Cost of Reducing Greenhouse Gas Emissions,” *Journal of Economic Perspectives*, Vol. 32, No. 4, Fall 2018, [https://scholar.harvard.edu/files/stock/files/gillingham\\_stock\\_cost\\_080218\\_posted.pdf](https://scholar.harvard.edu/files/stock/files/gillingham_stock_cost_080218_posted.pdf)

<sup>37</sup> Philip Rossetti, “EV Subsidies Likely to Have Minimal Impact,” R Street Institute, February 24, 2022, <https://www.rstreet.org/2022/02/24/ev-subsidies-likely-to-have-minimal-impact/>

<sup>38</sup> Alex Brill, “Broad, Efficient, and Technology Neutral Tax Policy for Clean Energy,” American Enterprise Institute, Statement before the Senate Committee on Finance Hearing: Climate Challenges: The Tax Code’s Role in Creating American Jobs, Achieving Energy Independence, and Providing Consumers with Affordable, Clean Energy, April 27, 2021, <https://www.finance.senate.gov/imo/media/doc/Testimony%20-%20Alex%20Brill1.pdf>

<sup>39</sup> Philip Rossetti, “Alternative fuels subsidies are small in size but with interesting potential,” R Street Institute, March 22, 2022, <https://www.rstreet.org/2022/03/22/alternative-fuels-subsidies-are-small-in-size-but-with-interesting-potential/>

<sup>40</sup> Ashley Nunes, Laurena Huh, Nicole Kagan, and Richard B Freeman, “Estimating the energy impact of electric, autonomous taxis: evidence from a select market,” *Environmental Research Letters*, No. 16 094036, September 2, 2021, <https://iopscience.iop.org/article/10.1088/1748-9326/ac1bd9>

<sup>41</sup> Ashley Nunes, Lucas Woodley, and Philip Rossetti, “Re-thinking procurement incentives for electric vehicles to achieve net-zero emissions,” *Nature Sustainability*, April 4, 2022, <https://www.rstreet.org/wp-content/uploads/2022/04/s41893-022-00862-3.pdf> and Ashley Nunes, Laurena Huh, Nicole Kagan, and Richard B Freeman, “Estimating the energy impact of electric, autonomous taxis: evidence from a select market,” *Environmental Research Letters*, No. 16 094036, September 2, 2021, <https://iopscience.iop.org/article/10.1088/1748-9326/ac1bd9>

<sup>42</sup> Jennifer Chu, “Shifting up to higher octane,” *MIT News*, October 28, 2014, <https://news.mit.edu/2014/premium-gas-could-save-fuel-money-1028#:~:text=When%20assessing%20the%20emissions%20produced,stem%20mostly%20from%20more%20efficient>



## TRANSPORTATION & INFRASTRUCTURE WORKS CITED

<sup>43</sup> Alternative Fuels Data Center, “Renewable Hydrocarbon Biofuels,” U.S. Department of Energy office of Energy Efficiency and Renewable Energy, [https://afdc.energy.gov/fuels/emerging\\_hydrocarbon.html](https://afdc.energy.gov/fuels/emerging_hydrocarbon.html)

<sup>44</sup> Venkatesh Rao and Joseph H. Somers, “Black Carbon as a Short-Lived Climate Forcer: A Profile of Emission Sources and Co-Emitted Pollutants,” U.S. Environmental Protection Agency, <https://www3.epa.gov/ttnchie1/conference/ei19/session5/rao.pdf>

<sup>45</sup> Sabrina Shankman, “The Most Important Climate Treaty You’ve Never Heard Of,” Inside Climate News, April 11, 2018, <https://insideclimatenews.org/news/11042018/climate-treaty-gothenburg-protocol-air-pollution-regulations-global-warming-science-black-carbon-lrtap/>

<sup>46</sup> Toshihiko Takemura and Kentaroh Suzuki, “Weak global warming mitigation by reducing black carbon emissions,” Vol. 9 No. 4419, March 14, 2019, [https://www.nature.com/articles/s41598-019-41181-6#:~:text=Reducing%20black%20carbon%20\(BC\)%2C,absorbs%20solar%20and%20infrared%20radiation.](https://www.nature.com/articles/s41598-019-41181-6#:~:text=Reducing%20black%20carbon%20(BC)%2C,absorbs%20solar%20and%20infrared%20radiation.)

<sup>47</sup> David G. Streets et al., “Black carbon emissions in China,” Atmospheric Environment, Vol. 35 Issue 25, September 2001, <https://www.sciencedirect.com/science/article/abs/pii/S1352231001001790> and Shaojun Zhang, “Mitigation potential of black carbon emissions from on-road vehicles in China,” Environmental Pollution, Vol. 278 No 116746, June 1, 2021, <https://www.sciencedirect.com/science/article/abs/pii/S0269749121003262>

