Principles and Actions for More Effective Transportation Policy

How Reforms Will Benefit Families, Strengthen Supply Chains, and Improve the Environment

by Nick Loris

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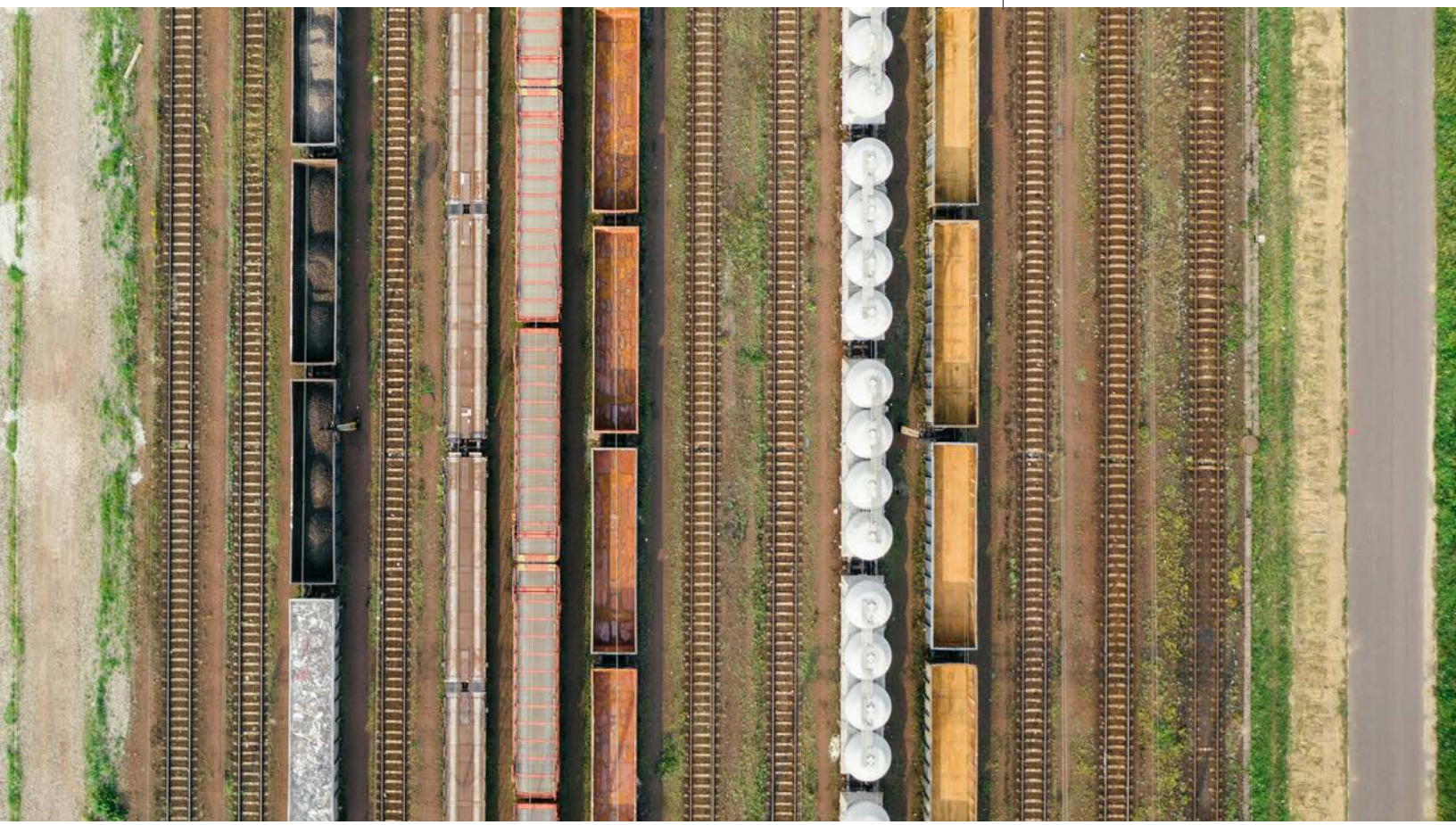


Affordable, reliable transportation is essential for everyday life, and sound transportation policy can have profound positive effects on the economy, the environment, and the lives of all Americans. The transportation sector affects personal comfort, the cost of goods and services for families, and the communities where people choose to reside. Cars and trucks provide the means to get to work, take kids to soccer practice, and go on road trips with friends. Freight rail and long-haul trucks connect farmers in the Midwest with grocers in the Southeast. Ships and planes connect American companies with global customers and empower travelers to see parts of the world with ease and comfort our ancestors could not even dream of.

Innovation across industries will continue to make transportation more affordable, efficient, safer, and cleaner. However, policies and regulations often obstruct and delay innovation, favor a politically preferred set of solutions, and create unintended economic and environmental consequences. Instead, public policy should empower more private sector-led investment in new technologies, implement reasonable standards to protect public health and safety, and improve opportunities for competition and disruption in the transportation sector. Opening opportunities and removing barriers to investment will benefit American families and businesses through more choices, competitive prices, and a safer and cleaner transportation ecosystem.

AMERICA'S TRANSPORTATION SECTOR BY THE NUMBERS: AN ECONOMIC AND ENVIRONMENTAL SNAPSHOT

The transportation sector is integral to the American economy, whether for personal use, public services, or moving products. Often taken for granted, the importance of efficient goods movement became especially evident when the COVID-19 pandemic disrupted supply chains in the U.S. for years. A complex and resilient network of highways, railroads, waterways, ports, and airports helps keep grocery stores stocked with food, hospitals supplied with medicine, homes provided with reliable energy, and materials available for construction and manufacturing. According to the U.S. Department of Transportation, "the U.S. transportation system moved a daily average of about 55.5 million tons of freight valued at more than $51.2 billion. This is equivalent to approximately 20.2 billion tons or $18.7 trillion of freight moved annually."

In addition to meeting families' daily needs and ensuring that Amazon packages arrive on doorsteps promptly, the transportation sector is a significant part of the U.S. economy. Supporting around 16 million jobs[1] in direct and related industries (more than 10 percent of the country's workforce), the transportation sector contributed $1.8 trillion to gross domestic product (GDP), 6.5 percent of the total U.S. GDP.[2]

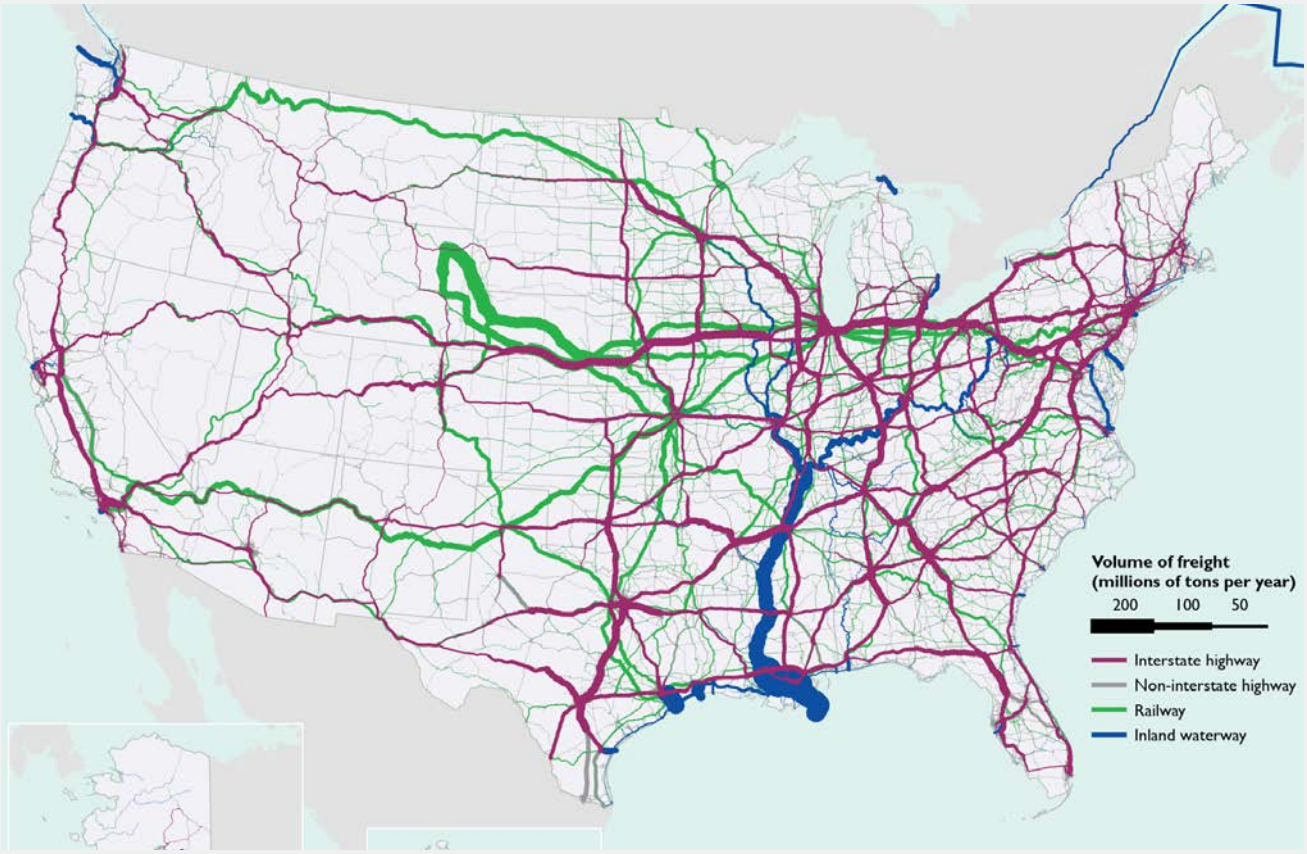
The transportation sector is also critical to meeting America's and the world's environmental ambitions. Concerning smog and air quality, the transportation sector accounts for 45 percent of the total emissions inventory for nitrous oxides (NOx) and less than 10 percent of domestic emissions for volatile organic compounds and particulate matter (PM10 and PM2.5).[3] In 2022, transportation accounted for 29 percent of total greenhouse gas emissions.[4] Across industries, opportunities exist to reduce the sector's environmental footprint while improving the reliable shipment of goods across the country. Nevertheless, it is vital to underscore America's environmental progress as policymakers address existing and future concerns.

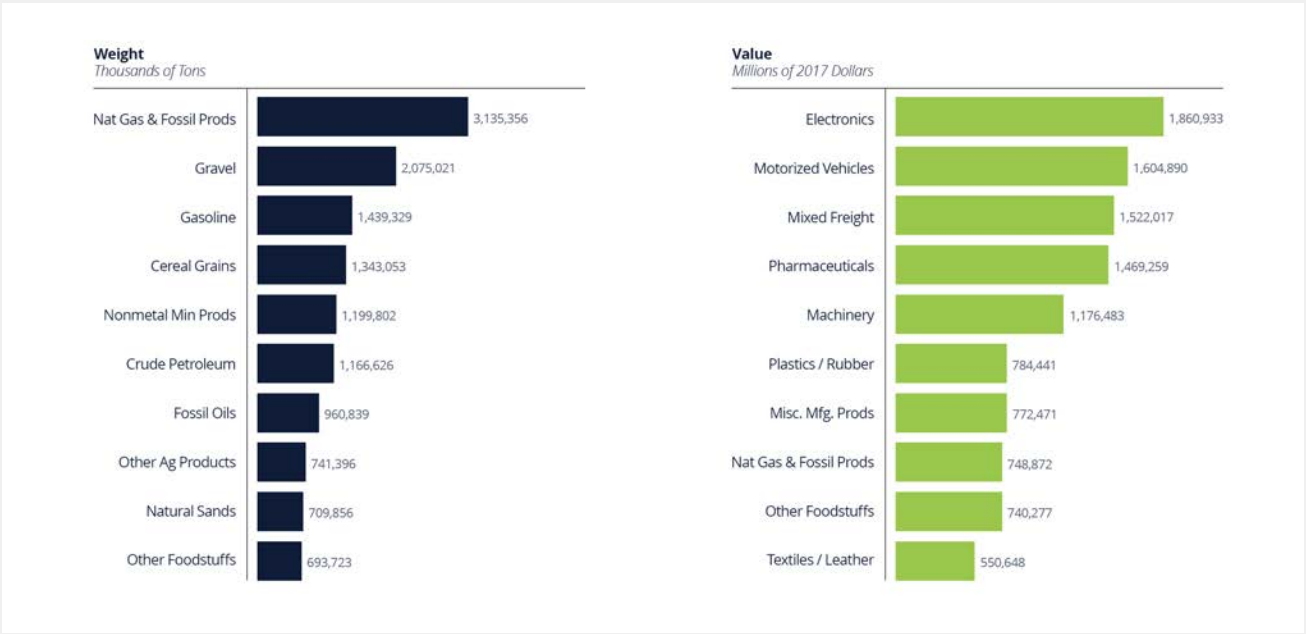
Public policy should empower more private sector–led investment in new technologies... and improve opportunities for competition and disruption in the transportation sector.

Figure 1.

America's Vast Network of Transportation Infrastructure is Critical for the Economy

A complex and resilient network of highways, railroads, waterways, ports, and airports helps keep grocery stores stocked with food, hospitals supplied with medicine, homes provided with reliable energy, and materials available for construction and manufacturing.





SOURCE: U.S. Department of Transportation: Bureau of Transportation Statistics

Nationwide, trends for criterion pollutants and greenhouse gas emissions in the U.S. have been encouraging. Through innovation, investment in more efficient technologies, and legislation, air quality has improved significantly in the U.S. Global, national, regional, and local environmental challenges remain, including many transportation sector-specific challenges.

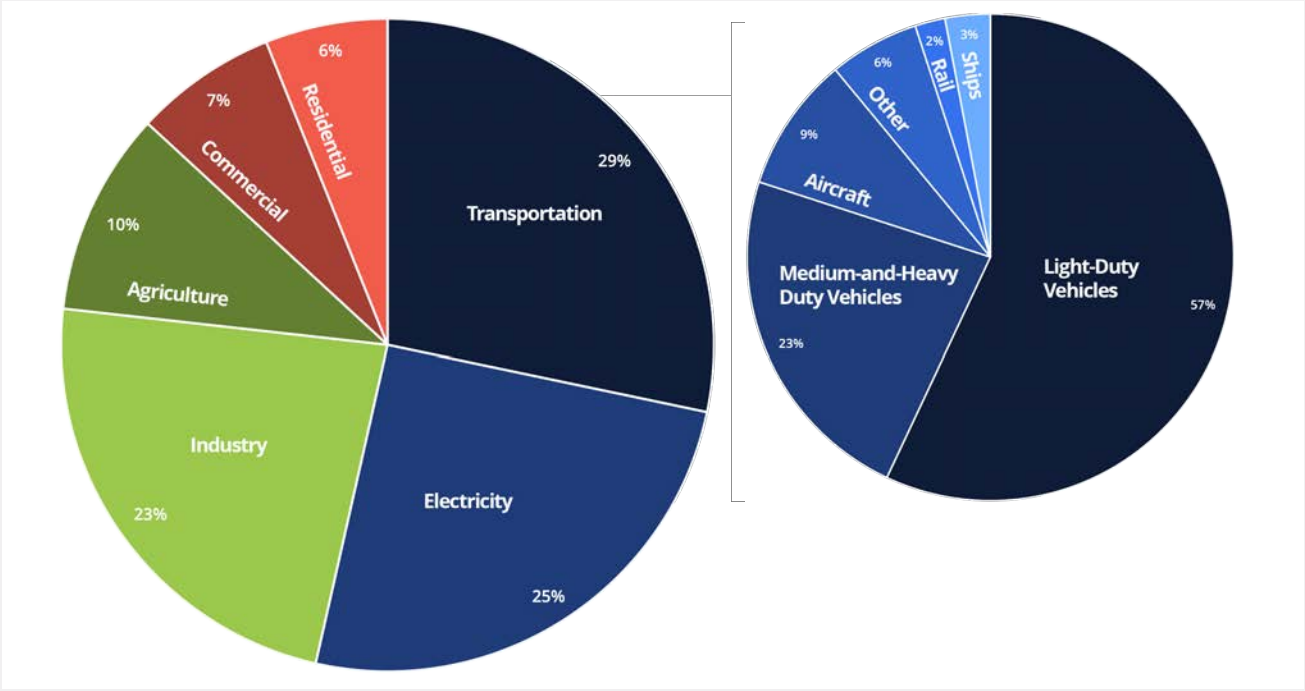
The U.S. Environmental Protection Agency (EPA) reports that in 2023, annual sulfur dioxide (SO2) emissions have declined 96 percent, annual nitrous oxide (NOx) emissions have declined 90 percent, and carbon dioxide (CO2) emissions have declined 28 percent compared to 1995 levels.[5] Furthermore, ozone season NOx emissions are 89 percent below 1997 levels, and the national trend for particulate matter (PM 2.5) has dropped 37 percent in the last 23 years.[6] Comparatively, America's air quality is among the best in the world and is on par or better than most European countries.[7]

The transportation sector has made similarly impressive gains in reducing pollution. Engines in all forms of transportation are dramatically cleaner and more efficient today. Although you might see some, gone are the days when most cars and trucks had black smoke billowing out of exhaust pipes. Compared to 1970 models, cars, trucks, buses, and heavy-duty trucks are 99 percent cleaner (for carbon monoxide, nitrogen oxides, particulate matter, and hydrocarbons).[8] Newer and re-manufactured freight trains (Tier4) lower particulate matter and nitrous oxide emissions by as much as 90 and 80 percent, respectively.[9] Modern airplanes are far more fuel-efficient. Fuel block intensity, which measures the amount of fuel consumed per unit of distance traveled, has decreased 43 percent from 1970 to 2024.[10]

Figure 2.

U.S. Greenhouse Gas Emissions by Source (2022)

Transportation accounted for 29% of total U.S. greenhouse gas emissions in 2022. The largest sources are light-duty trucks (include sport utility vehicles, pickups, and minivans), medium- and heavy-duty trucks (23%), and passenger cars (20%). Commercial aircraft (7%), pipelines (4%), ships (3%) and rail (2%) represent much smaller percentages.



SOURCE: U.S. Environmental Protection Agency

Figure 3.

Improvements in American Air Quality

Through innovation, investment in more efficient technologies, and legislation, air quality has improved significantly in the U.S.

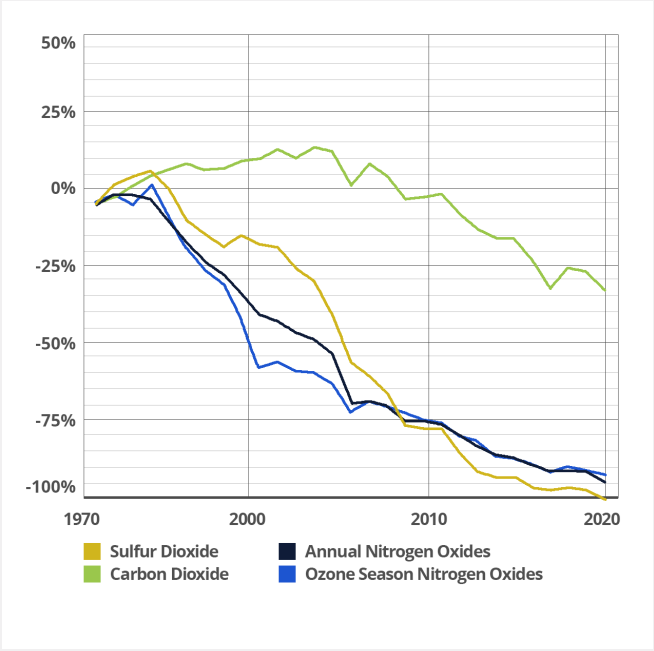
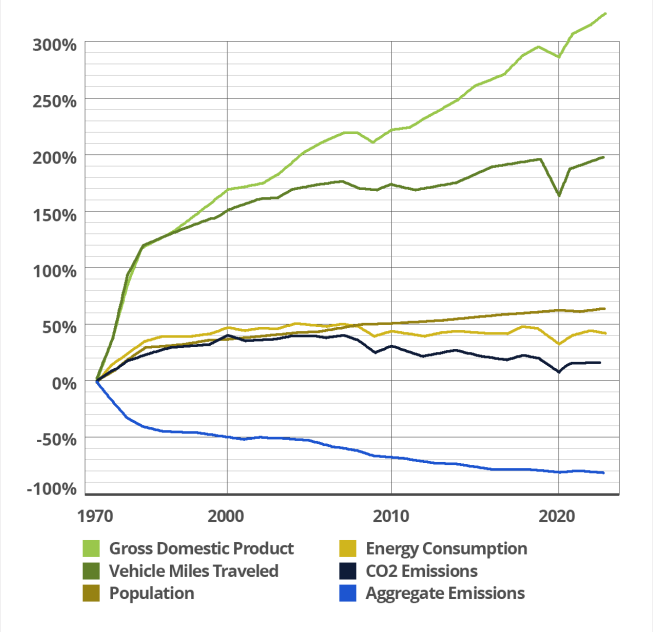


Figure 4.

Economy and Consumer Welfare Improve as Emissions Decline

Decoupling emissions from economic growth is paramount to environmental advancements that ensure resilient supply chains, support American businesses, and improve consumer welfare.



SOURCE: U.S. Environmental Protection Agency

As policymakers seek to shrink the transportation sector's environmental footprint, decoupling emissions from economic growth is paramount to environmental advancements that ensure resilient supply chains, support American businesses, and improve consumer welfare. Private sector-led innovation and investments in efficiency and new technologies drive simultaneous economic and environmental progress.

INNOVATION DRIVING ECONOMIC AND ENVIRONMENTAL PROGRESS

In open and competitive markets, companies respond to price signals and continually explore how to gain competitive advantages, reduce costs, and attract consumers. Market pressures incentivize opportunities to improve operational efficiency and minimize input costs. Within the transportation sector, companies are innovating, investing, and experimenting with new technologies to improve operations, gain a competitive advantage, and reduce their respective environmental footprint.

Investment priorities and risks vary by industry and can lead to significant cost savings, increased efficiency, and environmental gains. For instance, trains can carry one ton of goods nearly 500 miles on a single gallon of diesel fuel, but that does not suggest the rail companies care little about fuel efficiency.[11] Given the immense weight (3,000 tons) of the entire freight, a 500-mile trip consumes roughly 3,000 gallons of diesel.[12] Improving freight ton efficiency for container ships, airlines, freight rail, and long-haul trucking[13] is an economic driver that saves money and reduces emissions – even when factoring in the rebound effect where greater fuel efficiency encourages more driving.[14] Removing barriers

to efficiency investments in a technology neutral way can boost productivity while reducing emissions.

American-led innovation is not just important to reduce emissions in the U.S. but to pioneer cost-competitive technologies around the world. The private sector is substantially investing in innovative technologies across transportation industries. Some investments will succeed, while others will fail. Some investments may improve operations on the margin, while others could be transformational. While regulation and public policy (i.e. chasing tax credits) may be the motivation behind some investments, compelling areas of transportation innovation include:

Fuel, cargo, and infrastructure efficiency. Transport companies are constantly finding ways to improve efficiency and travel further at a lower cost. Even seemingly small investments to reduce weight can add up to significant savings. In 2017, United Airlines made a new inflight service guide that was 10 percent lighter than the previous one. That investment saves 220,000 gallons of fuel and avoids 2,100 metric tons of CO2 equivalent annually.[15] Airlines save money on fuel and reduce emissions by using lighter dishware, carrying less ice, getting rid of inflight magazines, and even slicing limes into more pieces, which saves Delta half a million dollars per year.[16] Companies like Peloton Technology work on platooning, where trucks travel in close formation to reduce drag and fuel use.[17] Freight railroads are investing in automated train dispatching and fuel management systems that improve efficiency by as much as 14 percent. Even the deployment of start-stop technology has drastically reduced idling and cut fuel waste by 50 percent.[18] Trucks, railcars, planes, and container ships have all deployed more aerodynamic technologies, which reduce drag and increase energy efficiency.[19] Autonomous semi-trucks have improved fuel efficiency by 11 percent, with improvements up to 27 percent in some cases, and reduced emissions primarily due to an unmanned truck's slow, smoother driving. If autonomous long-haul vehicles comprised 20 percent of the fleet, it could save an estimated 279 million gallons of diesel and avoid 3.2 million tons of CO2 emissions annually.[20]

Logistics optimization and deployment of AI. Even before the invention of Global Positioning Systems (GPS) and the rapid acceleration of AI, transport companies prioritized route optimization to save time and money. Better technology and data have transformed the ability to optimize routes and avoid congestion, delivering products to consumers faster. Rather than relying solely on real-time GPS, predictive route modeling can forecast problems such as congestion, road closures, and weather events. Companies like UPS and FedEx use AI and advanced routing to optimize fuel efficiency and delivery.[21] In partnership with Google and Breakthrough Energy, American Airlines is testing whether pilots can avoid creating contrails for minimal cost using satellite imagery, weather forecasting models, and flight path data.[22] Two-thirds of aviation's warming impact comes from non-CO2 impacts (primarily contrails and soot). Several studies,[23] including the most recent Intergovernmental Panel on Climate Change report, have found that the contrails represent 35 percent of the industry's climate impact.[24] Combining these technologies and algorithms could have substantial environmental benefits for relatively low costs.

Alternative fuels and electrification (including supply chains). With fuel being a significant cost, every transport sector invests in alternative fuels and battery-powered vehicles. Transport companies have made notable headway on alternative fuels, from research and development and testing first-of-a-kind technologies to deploying commercial fleets. Some technologies and fuels may never be commercially viable while others could diversify the fuel market. That is why is it essential for the private sector, with support in basic R&D from the government, to take risks and reap the rewards without extensive taxpayer support. With companies like Wabtec and Progress Rail leading the way as suppliers, freight rail companies are testing battery-electric,

hydrogen-powered, hybrids, and biofuel blends (including hydrotreated vegetable oil for locomotives).[25] BNSF and Union Pacific have piloted battery-electric locomotives and are investing in prototypes that run on diesel and batteries like the hybrid cars on the road today.[26] BNSF and Norfolk Southern are deploying battery and hybrid crane operators to reduce yard emissions.[27] Further, companies like Tesla, Daimler, and Volvo are investing in electric and hydrogen-based fuel cell trucks to reduce reliance on diesel.[28] Another promising development is cleaner burning "drop-in" fuels that require little or no modifications to existing engines. Biofuel blends used in jet engines can reduce particulate matter, soot, and GHGs.[29] Also called sustainable aviation fuels (SAF), airlines like United Airlines and Delta are investing in SAF production and adoption, where airlines can blend up to 50 percent of SAF with conventional fuel. While price will be the determining factor, Boeing has committed to ensuring all its planes can fly on 100 percent SAF by 2030.[30] On the fuel supply side, UK-based FireFly has developed a technology to turn sewage into SAF.[31] Furthermore, large shipping companies are experimenting with ammonia-based fuels, and Maersk has launched methanol-powered ships.[32] While many of these technologies are in pilot or early commercial deployment, private sector investment will be critical to drive cost reductions and encourage widescale deployment of these fuels and technologies.

Investment in basic and applied research and development (R&D). The technical innovations listed above are extremely promising but only represent the proverbial tip of the iceberg of what innovation can achieve. Robust private and public investment in research, particularly in basic and applied scientific research, will help launch a new set of private-sector solutions that improve transportation logistics while reducing pollution. Like the startling recent advances in AI that relied on decades of basic research in computer science and mathematics, the next transformative innovation in transportation could directly result from a highly creative, high-risk scheme being generated in a lab today. Adequate support of that ecosystem will be essential to long-term progress in making the transportation sector cleaner, safer, and cheaper.

Emissions transparency, reporting, and voluntary carbon markets. Economic motivations incentivize companies to reduce fuel, maintenance, labor, equipment, and insurance costs for the transport industry. Other incentives and motivations incentivize businesses to invest in greener solutions. Companies may want to improve their public image or respond to consumer or shareholder pressure. For example, big shippers like Amazon and Walmart are greening their fleets, not only with alternative fuels but also technologies like battery-powered refrigerated trailers.[33] Moreover, these companies also require suppliers to disclose and reduce transportation emissions, making it easier for suppliers to do so[34]without a mandate in place.[35] It is essential to differentiate between voluntary corporate initiatives in environmental stewardship and the lobbying for regulations and subsidies to disadvantage competitors strategically. While businesses may choose to invest in environmental priorities, pursuing regulations and subsidies that disproportionately affect rival enterprises is a distinct and separate action. Regardless of public policy, many businesses have set internal environmental and safety objectives and have committed to reducing greenhouse gas emissions, which could make them a more attractive place to work.[36] Voluntary carbon markets (VCMs) are another area where major transport companies have invested to reduce emissions. VCMs can be cost-effective for companies and their consumers in reducing their climate footprint. In a carbon offset market, an individual or business will purchase a carbon credit to compensate for their emissions by investing in a practice or activity that reduces emissions elsewhere. Air travelers could offset their emissions by paying someone to plant trees, or a manufacturer could invest in renewable or nuclear energy generation to offset emissions at its plant. For companies that have set their net-zero targets, especially in hard-to-decarbonize sectors, offsets provide a market-based mechanism to reduce emissions at lower costs. However, carbon offsets and using credits have valid criticisms, most notably accuracy in monitoring, verifying, and reporting for emissions avoidance and reduction. Consequently, fraudulent, cheap credits flood the market.[37] Companies want to

invest in legitimate carbon offset projects[38], and better transparency, accounting, and verification will help ensure that voluntary markets are a valid option for reducing emissions.

TRANSPORTATION POLICY PRINCIPLES

Concerning transportation and environmental policy, two seemingly contradictory concepts are valid. The first is American Enterprise Institute senior fellow Roger Pielke Jr.'s iron law of climate policy: When policies focused on economic growth confront policies focused on emissions reductions, economic growth will win out every time.[39] Pielke Jr. wrote that law for his book in 2010, which still holds today. Whether in the U.S. or Europe, polls have shown that families are unwilling to pay or make drastic lifestyle changes to help the environment. The most recent University of Chicago poll (with The Associated Press–NORC Center for Public Affairs Research) found that only 45 percent of people are willing to pay one dollar monthly to combat climate change.[40] Similarly, the same poll found that the primary reason Americans would be willing to buy an EV is to save money on gas, while the most significant barrier is the high upfront cost.[41] Policies that empower the private sector and save Americans money while delivering environmental co-benefits will have the most staying power.

The second concept is that consumers and businesses are, in fact, willing to pay a green premium. In the same University of Chicago poll, 25 percent of respondents said that they would be willing to pay $100 per month to combat climate change.[42] The poll describes this group as a "consistent minority" (despite 55 percent being unwilling to pay more than a dollar per month, the average is $35 per month, indicating a long tail of willingness to pay a high cost per month to combat climate change).[43] Moreover, a Boston Consulting Group survey found that 82 percent of shipping customers would be willing to pay a premium for zero-emissions shipping.[44] Notably, when given a range of how much of a premium they would be willing to pay, 40 percent said between .1 percent and 2 percent, and 30 percent said between 2.1 percent and 5 percent.[45] Only two percent of shipping customers said they would pay a premium of 10.1 to 20 percent, and one percent of respondents said they would pay a premium greater than 20 percent.[46] Businesses and consumers can be early adopters of innovative technologies, helping to drive down green premiums. These technologies will have the biggest economic and environmental impact when economically viable for all businesses and consumers. To that end, policymakers should keep the following principles in mind:

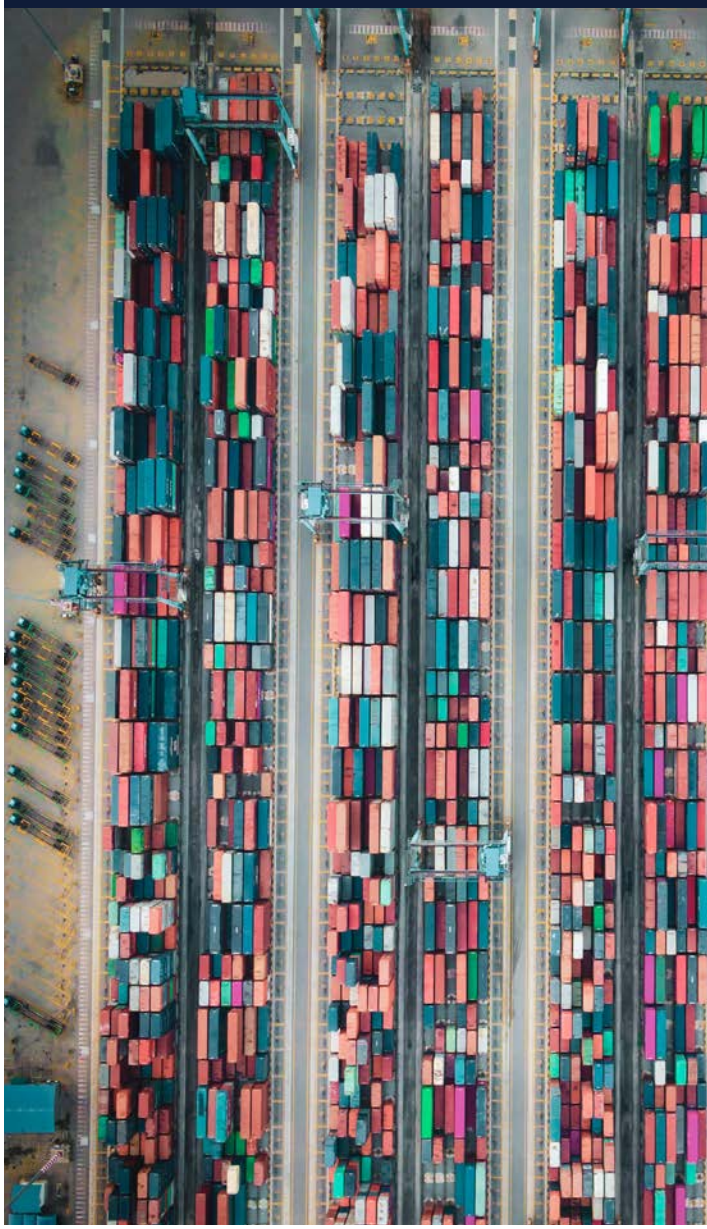
Protect taxpayers and consumers. Policymakers should reject and eliminate transportation policies that impose high costs on taxpayers and consumers, especially if they provide marginal, if any, environmental benefits. For example, EV tax credits have high taxpayer costs per dollar of CO2 reduced and primarily accrue to households buying an EV without the credit.[47] Furthermore, policymakers should unwind regulations that override the preferences of businesses and consumers, like fuel economy mandates or tailpipe emissions standards that require auto manufacturers to make a certain percentage of their fleet electric[48]. As mentioned above, fuel economy is an essential decision for transport businesses and drivers, but it is one of many factors influencing an investment decision or buying a car. Public policy should not nudge businesses and consumers in politically preferred directions. Consumers and companies should be free to choose the vehicle they want or transportation supplies that make the most sense for them, rather than having the government steer those decisions in a particular direction.

Let markets and price signals work. Prices, profits, and losses communicate valuable information to buyers and sellers. They tell businesses when to speed up, slow down, innovate, and invest. Open, competitive markets incentivize suppliers to deliver the best value for consumers. Government intervention through technology-specific tax credits and mandates distorts those decisions and can result in businesses chasing subsidies rather than focusing on customer needs and preferences. Subsidies that favor one technology over another take capital away from potentially promising technologies. As a result, public and private resources are stuck in unproductive places, stifling competition and innovation.

Be mindful of unintended consequences. Government intervention often results in unintended economic and environmental consequences. This includes many policies not directly associated with energy or environmental policy. For instance, anti-automation rail policy risks raising costs and shifting freight to highways, including long-haul trucking, which would likely cause an increase in emissions. Antiquated laws like the Foreign Dredge Act and the Jones Act have caused inefficiencies at America's ports and shipping, resulting in light loading and pushing more transportation to trucking.[49] Whether legislation or regulation, policymakers should be fully aware of unintended economic and environmental consequences, including offshoring production to less environmentally responsible countries.

Provide consistency and transparency to ensure the benefits of regulations outweigh the costs and consider tradeoffs. Federal and state governments play essential roles in protecting air and water quality and ensuring that polluters are liable for any economic and environmental damages they cause. However, efforts to mitigate and remediate pollution should achieve real environmental benefits. Using sound, objective science as a guiding policy, policymakers should consider the tradeoffs of regulations and adequately assess the risk of potential environmental harm. Furthermore, agencies should not overly depend on co-benefits to justify new rules.[50]

Open, competitive markets incentivize suppliers to deliver the best value for consumers.



ACTIONS FOR POLICYMAKERS

Transportation and infrastructure policy must remain a priority if the U.S. wants to lower prices for families, expand opportunities for American businesses, improve supply chains, and meet environmental targets. Policy reforms should center around modernizing antiquated and bureaucratic regulations, empowering the private sector, and creating more opportunities for innovative technologies to flourish. Some policies apply broadly across transportation sectors, while others are more industry-specific. To that end, Congress and the administration should:

Amend the National Environmental Policy Act (NEPA) to expedite timelines, increase accountability, improve efficiency, and curb excessive litigation.

Potential reforms include expanding the use of categorical exclusion, narrowing the projects requiring a more comprehensive Environmental Impact Statement, narrowing agency considerations for reasonably foreseeable alternatives, shortening the statute of limitation for NEPA-related claims, and letting state environmental reviews satisfy NEPA requirements.[51] The Federal Highway Administration, Federal Transit Administration, and Federal Railroad Administration's recent guidance for Section 139 also provides a more streamlined implementation of the supplemental requirements for NEPA to improve permits for transportation infrastructure.[52]

Amend the Clean Water Act to provide certainty, clarity, and flexibility to make infrastructure investments.

Policymakers should modernize the Clean Water Act (CWA) to protect America's waterways while reducing costly and unnecessary permitting delays. Narrowing the scope of CWA, providing states with more flexibility, reigning in judicial review, and ensuring that permitting decisions are determinative would provide businesses with much more clarity than the status quo. To that end, Congres should clearly define "navigable water," prohibit pre-emptive and retroactive vetoes under Section 404, improve citizen suit provisions, set timelines for final actions on water quality certification requests, extend and improve nationwide permits, and clarify state 401 certification authority limits.[53]

Improve Endangered Species Act permitting and compliance by clarifying regulatory definitions and simplifying the permitting process under the ESA.

The ESA Amendments Act of 2025 provides several of these fixes, giving businesses more certainty and incentivizing better species protection and recovery.[54]

Repeal the Foreign Dredge Act and the Jones Act.

More than a century old, the Foreign Dredge Act prohibits any foreign-built or chartered ships 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. Deeper and wider port channels would also improve transportation efficiency, reducing emissions from unwanted congestion and light loading. Similarly, the Jones Act mandates that goods shipped between two ports in the U.S. must be transported on a U.S.-built, U.S.-flagged vessel with a crew of at least 75 percent American. Even removing the foreign build requirement would improve opportunities to move cargo by water, thereby relieving traffic congestion on the roads.

Permanently restore immediate expensing and eliminate subsidies for mature technologies.

Immediate expensing, also known as full expensing and bonus depreciation, allows businesses to deduct the full cost of qualifying capital expenditures from their taxable income when the expenses occur. Immediate expensing is beneficial for American competitiveness, innovation, and economic opportunity. Expensing is also good for the environment because it spurs investment in more energy-efficient equipment and clean energy technologies.[55] Phasing out subsidies for all mature energy sources and technologies while instilling pro-growth tax reform would enable the most promising and economically viable energy sectors to thrive.

Support and improve innovation pathways at America's national laboratories.

The private sector is the primary leader and investor in research and development, and Congress should not allocate taxpayer funds toward research the private sector should undertake. However, public expenditures in research, development, and demonstration can advance critical technological breakthroughs.[56] Research at national laboratories for basic and materials sciences can spur scientific discoveries and result in new commercial applications. Applied programs at the Department of Energy's Vehicles Technologies Office[57] and the Advanced Research Projects Agency-Energy can spawn transformative innovations and establish productive public-private partnerships. Congress and agencies should streamline, reform, and standardize the processes and improve the coordination and efficacy of DOE's basic and applied programs.

Require congressional approval for major environmental regulations and codify stricter standards on environmental benefits.

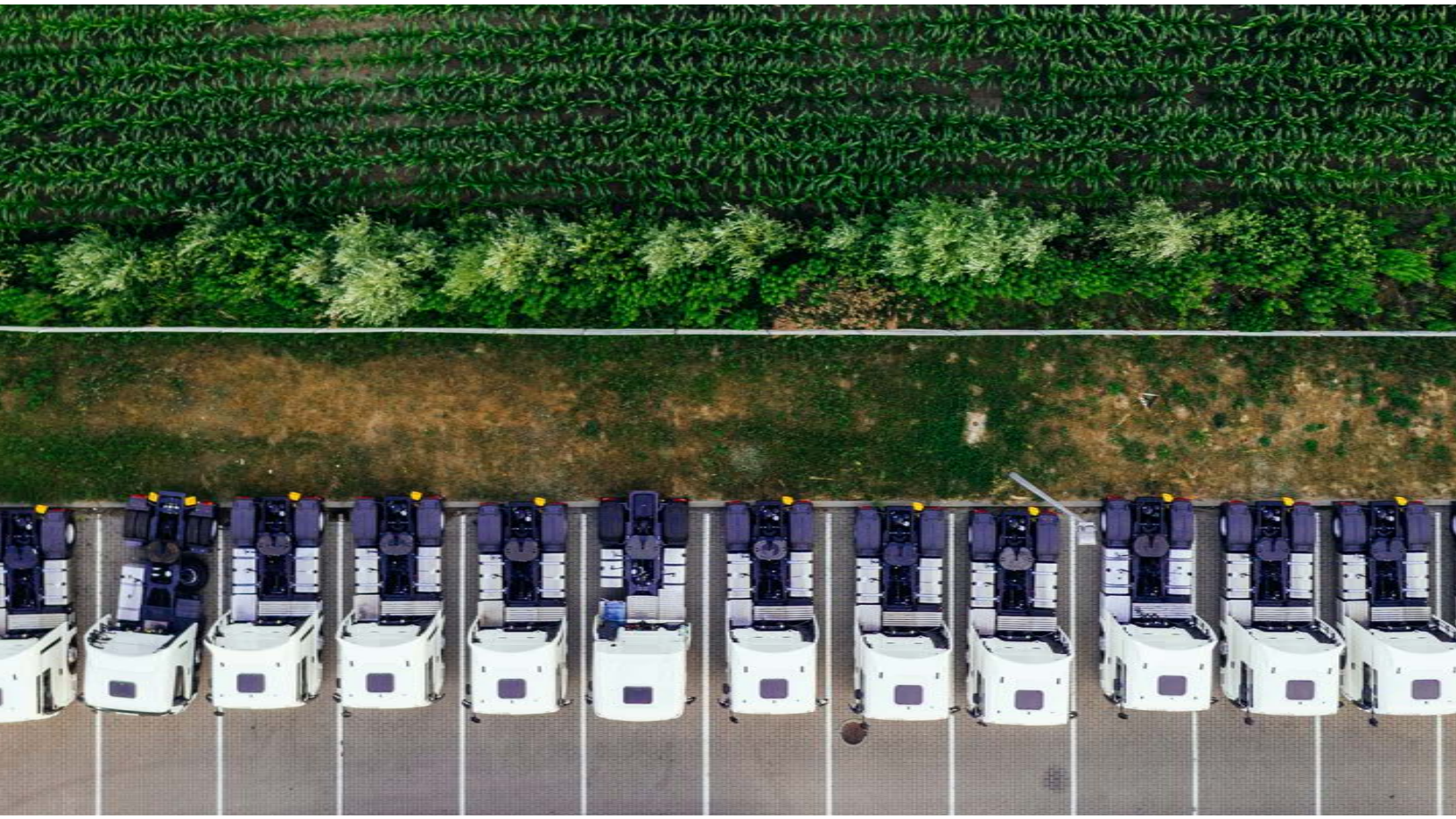
Many recent environmental regulations have had increasingly high compliance costs, have been de facto pushes for a specific technology, and have had diminishing environmental returns. For instance, critics called the Biden administration's tailpipe emissions standards a de facto ban on internal combustion engines, and the PM2.5 National Ambient Air Quality Standards regulations could have cost the U.S. economy $200 billion while approaching natural background levels.[58] Furthermore, agencies should not overly depend on co-benefits to justify new regulations.[59] While co-benefits are important in cost-benefit analysis, agencies should adequately consider the pollutants the proposed rulemaking targets. Fully shifting to permit-by-rule and performance-based regulations rather than relying on procedural laws and more subjective guidance documents that become de facto regulations would provide more clarity and certainty.[60] Congress could change how often agencies must review emissions standards and require congressional approval of major environmental regulations. Doing so would result in a welcome check on unilateral policymaking by agencies and provide more certainty than having changes in regulation every four or eight years.

Improve voluntary carbon markets and emissions accounting.

Companies and individuals have demonstrated a willingness to pay for environmentally friendly products and shipping services. Having robust monitoring, reporting, and verification (MRV) carbon offset projects verified by a certified third party and accurate and auditable emissions accounting[61] would provide customers the credible information they need to make those choices. Shipping customers could pursue greener options while shippers would be incentivized to reduce the emissions of their respective supply chains if the private sector has strong preference for greener options. Notably, reliable MRV and emissions accounting could be deployed without the need of taxes, regulations, tariffs or border adjustments.

CONCLUSION

The importance of a well-functioning transportation sector for Americans' mobility and efficient domestic and international supply chains cannot be overstated. An exceptional safety and environmental profile is critical to a robust transportation economy, whether cars, trains, ships, or planes. Public policy must keep up with the private sector to fully capitalize on the innovations and investments across the industry. Congress and the administration need to modernize outdated laws and regulations to comport with a 21st Century transportation system and be proactive instead of reactive. The United States is already a global leader in transportation. Implementing the necessary policy reforms will ensure that the industry meets our transportation needs, delivers products on time, and drives environmental progress forward.



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