

# The Revenue Failure of the Highway Trust Fund

*Why the Gas Tax is Obsolete*



February 2020

## Why the Gas Tax is Obsolete

### Introduction to the Highway Trust Fund

The federal fuel tax was originally introduced in the United States in 1932 to balance the federal budget, but was later repurposed to fund the building, maintenance, and repair of the Interstate Highway System. Once married to transportation infrastructure, the fuel tax—administered on a per-gallon basis—was envisioned as a user fee so that all drivers paid for their own wear and tear on the roads.

The Highway Trust Fund (the “Fund”) was later established in 1956 to collect this tax revenue and disburse it to state transportation departments as part of a collaboration to connect the nation’s roadways. The Fund was intended to be perpetual and independent, constantly taking in the revenue it needs from road use. This helped prevent political fights over General Fund appropriations for the critical need of transportation infrastructure.

It also had a narrow purpose: highways. The Fund has since been bifurcated into two purposes, the Highway Account and the Mass Transit Account. This means that part of the

fuel tax from drivers is immediately allocated to mass transit rather than road maintenance. This spending issue needs revisiting, but with looming insolvency, we direct our immediate attention to the revenue side.

The original excise tax was authorized by Congress and signed by President Hoover at just one cent per gallon.<sup>1</sup> The ensuing 88 years saw only 10 increases in the tax.<sup>2</sup> The Fund itself was established in conjunction with the Interstate Highway System project. The gas tax was raised and directed into the Fund to facilitate the building of the Interstate system rather than through bond financing or tolls. The funds are now used primarily for maintenance and repair rather than building. Today, the tax is 18.4 cents per gallon for gasoline and 24.4 cents per gallon for diesel.<sup>3</sup>

Despite significant economic and technological shifts, the fuel tax has not been adjusted since 1993. If indexed to inflation, these fuel taxes would be roughly 31 cents and 42 cents, respectively today.<sup>4</sup> That is no guarantee of solvency – particularly given spending practices, fleet-wide efficiency gains, and untaxed electric power— and would not bring a fuel tax into the 21st Century.

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<sup>1</sup> Adjusted for inflation, this would be 18 cents in 2020. “CPI Inflation Calculator.” U.S. Bureau of Labor Statistics. U.S. Bureau of Labor Statistics. Accessed February 14, 2020. <https://data.bls.gov/cgi-bin/cpicalc.pl?cost1=0.01&year1=193201&year2=202001>.

<sup>2</sup> Murse, Tom. “How Much Has the US Federal Gasoline Tax Increased Since 1933?” ThoughtCo. ThoughtCo, October 3, 2019. <https://www.thoughtco.com/history-of-the-us-federal-gas-tax-3321598>.

<sup>3</sup> “U.S. Energy Information Administration - EIA - Independent Statistics and Analysis.” How much tax do we pay on a gallon of gasoline and on a gallon of diesel fuel? - FAQ - U.S. Energy Information Administration (EIA). Accessed January 1, 2020. <https://www.eia.gov/tools/faqs/faq.php?id=10&t=10>.

<sup>4</sup> “What Is the Highway Trust Fund, and How Is It Financed?” Tax Policy Center. Accessed February 4, 2020. <https://www.taxpolicycenter.org/briefing-book/what-highway-trust-fund-and-how-it-financed>.

Together gasoline and diesel taxes comprise over 85 percent of the Fund, with the remaining percentage coming primarily from taxes on heavy trucks and trailers in the form of sales taxes, tire taxes, annual use taxes, and other commercial permits.<sup>5</sup>

As the leading revenue source for the Fund, the per-gallon fuel tax has long been viewed as a proxy for road use, and therefore directly related to wear and tear. Even if originally accurate, this is no longer the case, thanks in part to today's highly fuel-efficient vehicles, including hybrids and electric vehicles (EVs) temporarily innovating around the tax.

Due mainly to innovation, but also poor governance, roads and bridges are in unprecedented disrepair, and the Highway Trust Fund is ill-equipped to address it. In fact, it is slated to be entirely insolvent within two years.<sup>6</sup>

This would be an enormous and highly publicized crisis if the Fund had not already dried up multiple times. In 2008, the Fund required an infusion of \$8 billion in General Fund tax dollars. This was followed by another \$7 billion in 2009 and \$19 billion in 2010. Ultimately, over \$140 billion was transferred from the General Fund between 2008 and 2018.<sup>7</sup>

Much has been written on the bureaucratic aspect of this issue, which includes mismanagement and failure to balance spending and revenue, as well as the redirecting of Fund resources to other transportation projects.<sup>8</sup> These are critical areas for analysis and reform, but underlying the revenue crisis is innovation.

Mismanagement demands review, but it is a failure to understand or account for innovation that has exacerbated the revenue crisis. Using Fund money on everything from bike trails and beautification projects to sidewalks and mass transit has not aided solvency, but here, we analyze the revenue coming in and why fuel taxes—in theory or application—cannot sustain the Fund.

If policymakers desire to continue using the Highway Trust Fund as a general purpose transportation account, it is all the more critical to establish sound funding. Ultimately, even if Congress limits expenditures narrowly to road and bridge maintenance, revenue must be bolstered. This report explores the revenue side of the problem and why innovation renders the gas tax obsolete. Fuel taxes, therefore must be phased out and replaced for the sake of Fund solvency, taxpayer fairness, and road conditions.

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<sup>5</sup> “The Highway Trust Fund - Policy: Federal Highway Administration.” U.S. Department of Transportation/Federal Highway Administration. Accessed February 14, 2020. <https://www.fhwa.dot.gov/policy/olsp/fundingfederalaid/07.cfm>.

<sup>6</sup> “Status of the Highway Trust Fund,” Congressional Budget Office, (September 2016), <https://www.cbo.gov/publication/52307>.

<sup>7</sup> *Supra*, note 5.

<sup>8</sup> Davis, Jeff. “Ten Years of Highway Trust Fund Bankruptcy: Why Did It Happen, and What Have We Learned?” The Eno Center for Transportation, September 5, 2018. <https://www.enotrans.org/article/ten-years-of-highway-trust-fund-bankruptcy-why-did-it-happen-and-what-have-we-learned/>.

## No Longer A Proxy for Use

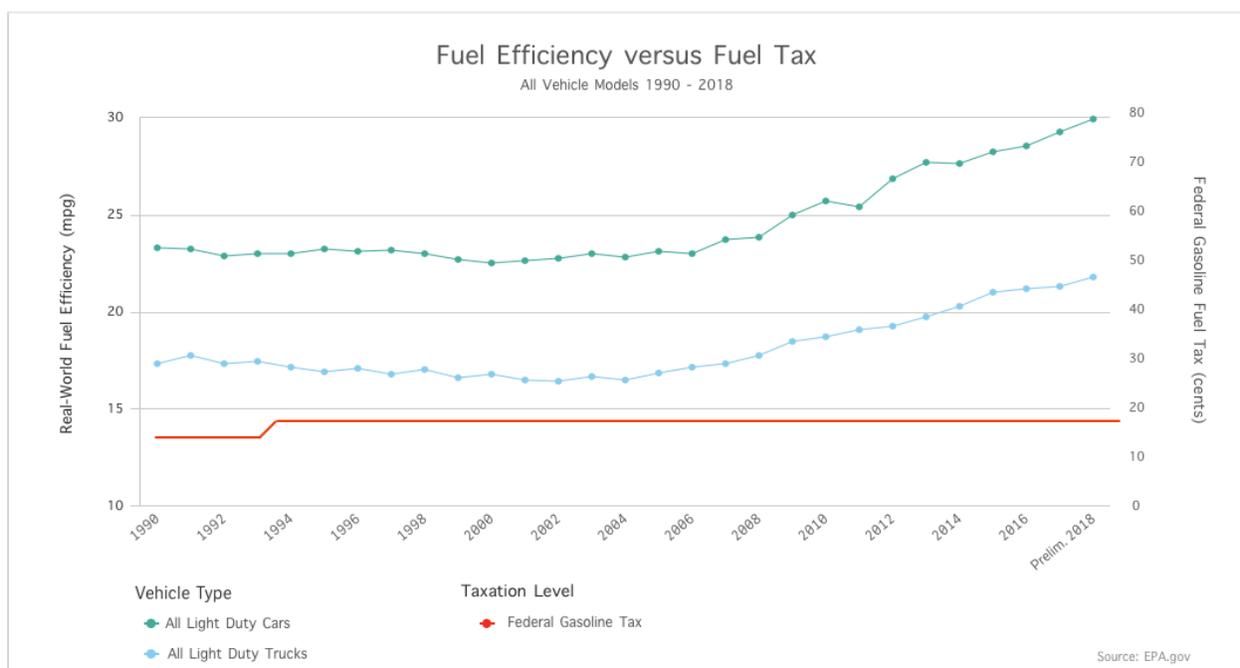
As conceived, the Fund was set to always have its outlays met or exceeded by revenue from the fuel tax and related fees, as actual driving directly correlated to the wear and tear impact. But as time goes on, the fuel used in vehicles is less aligned with the impact of driving. This would happen naturally as innovators improve vehicle performance and efficiency. But Congress actually intervened in a way that hamstrung the funding strategy.

Beginning in 1975, fuel efficiency standards known as Corporate Average Fuel Economy (CAFE) were implemented.<sup>9</sup> The policy required ever-higher fuel economy for new cars. The consequence was a significant increase in the average fuel efficiency of the automotive fleet.

In fact, CAFE and other standards represent a significantly shortsighted policy arrangement, where climate and environmental policy directly undermines infrastructure and transportation policy.

With one hand, the government is requiring vehicles to travel further on the same gallon of fuel, and with the other hand is attempting to finance increasingly deficient roads with per-gallon revenue.

When organic innovation and competition is combined with a federal mandate, the result is a dramatic shift toward vehicle efficiency. Without a new revenue policy, new efficiency necessarily destroys fuel being a viable proxy for road use, especially with a whole vehicle class now not using that fuel.



<sup>9</sup> “Corporate Average Fuel Economy.” NHTSA, September 19, 2019. <https://www.nhtsa.gov/laws-regulations/corporate-average-fuel-economy>.

Added to this revenue decline is another issue: the value of the revenue has slipped away due to inflation. Doubly concerning, this means maintenance costs are getting higher while both revenue and its purchasing power are declining.

Many desire to see the fuel tax indexed to inflation. This is an intuitive idea, that if all else were equal, would preserve revenue and protect purchasing power of the Fund. The problem is that innovation necessarily destroys such an all-else-equal assumption.

While indexing the tax to inflation would mean that the tax and revenue would increase on its own, it is no guarantee revenue would keep pace with maintenance needs and costs.

Innovation disrupts the funding scheme rendering an inflation index ineffectual. Particularly with hybrid technology, fuel efficiency simply increases more rapidly than the value of currency changes.

When the rate of change in fuel efficiency outpaces the rate of inflation, no per-gallon tax can exist as a viable proxy for road usage, even when indexed.

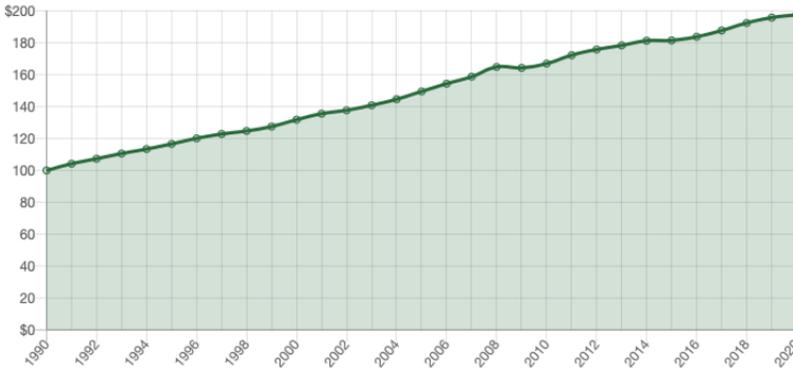
Not only has the entire fleet increased in fuel efficiency, but a growing segment of the industry uses no gasoline at all. Indexing or raising the tax would do nothing to capture revenue from drivers of electric vehicles.

The consequence of indexing or outright increasing fuel taxes would be a whole segment of lower-income and rural drivers paying the bill though gasoline taxes, as others transition to hybrids and EVs.

Without an alternative tax or revenue system, the fuel tax is no proxy at all, and an inflation index is similarly ineffectual, and inequitable. This failing status quo creates an unbalanced tax burden for drivers of traditional vehicles and allows electric vehicle drivers to avoid paying a fair share - indeed, any share at all for road use and maintenance.

All drivers have historically paid for road use, no matter what they drive. A gasoline tax simply offers an efficiency and electric loophole Congress never intended to make.

**\$100 in 1990, adjusted for inflation**



Source: OfficialData.org, BLS

**Buying power of \$100 over time, 1990-2020**



Source: OfficialData.org, BLS

## Innovation Requires Dynamic Policy

A static proxy like a per-gallon tax is not equipped for an innovative technological landscape. Not only does it fail as an actual user fee, but vehicles are changing all the time, such that setting policies that are not adaptable will make them moot and require constant policy adjustment.

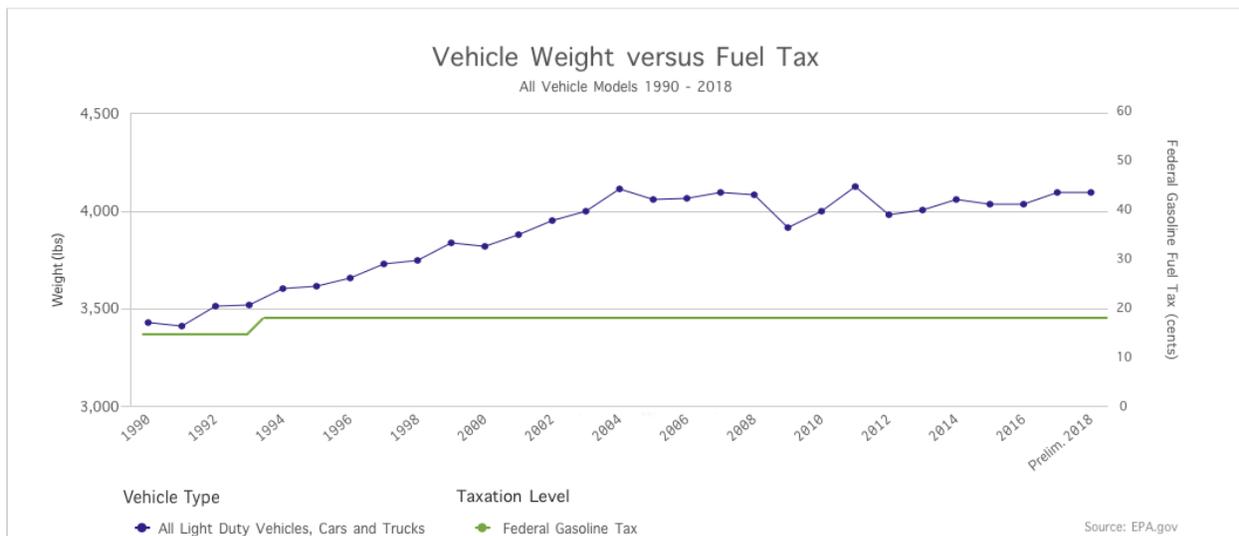
When it comes to fuel taxes, hybrids and EVs present more than one confounding issue. While using no gasoline obviously allows electric vehicles to skirt around a fuel tax, they actually exacerbate the issue on a second front. First by not paying into the Fund through the fuel tax, but secondly by weighing an average of 24 percent more<sup>10</sup> than traditional internal combustion

engine vehicles, and thereby creating more wear and tear than their counterparts.

This problem is actually a fleet-wide issue. Not only are EVs a current small-scale drain on the Fund due to their lack of input and greater impact, but all vehicles appear to be exerting ever more strain on the roadways.

The average weight of all cars has been on the rise, with some fluctuation.<sup>11</sup> This raises another critical weakness in the fuel tax. What good is a per-gallon fee when the same fuel consumption leads to different impacts?

If two vehicles have the same fuel efficiency, but one weighs more, those drivers are not paying proportionately for their road use and impact. This is a tax policy failure, not a problem with drivers or their vehicles.



<sup>10</sup> Timmers, Victor R.j.h., and Peter A.j. Achten. “Non-Exhaust PM Emissions from Electric Vehicles.” *Atmospheric Environment* 134 (2016): 10–17. <https://doi.org/10.1016/j.atmosenv.2016.03.017>.

<sup>11</sup> US Environmental Protection Agency. 2018 EPA Automotive Trends Report. Data available at [www.epa.gov/automotive-trends/explore-automotive-trends-data](http://www.epa.gov/automotive-trends/explore-automotive-trends-data). Accessed January 28, 2020.

Heavier vehicles, efficiency notwithstanding, would mean that it costs more to repair roads. Accounting for heavier vehicles also advancing in fuel efficiency, a fuel tax can actually cause revenue to *decline* as wear and tear *increases*.

### Why are Vehicles Packing on the Pounds

The added weight comes from different sources. The most straightforward reason is that electric vehicles host multiple heavy batteries and require stronger frames to support them.

Unless or until battery technology is improved and miniaturized, EVs will continue to be heavier than their combustion cousins.

Another source of weight, which spans all vehicles, is improved safety features. More integrated technologies like rearview and side angle cameras, display screens, as well as more airbags and stronger materials go a long way toward saving lives, but also come with some added poundage.

Public safety is no doubt improved by many of these features. In fact, drivers and

**While the fuel tax has been unchanged for nearly 30 years, innovation has led to heavier, more fuel-efficient vehicles**

passengers within larger or heavier vehicles are statistically more protected in collisions than those in smaller cars.<sup>12</sup> The other side of that issue is that heavier vehicles on the road may actually be more dangerous to pedestrians, other drivers, and infrastructure.

Of the greatest concern for infrastructure is that weight is undeniably linked to wear and tear.<sup>13 14</sup> This is one reason that commercial truckers and shippers pay such vastly greater sums to use the roadways, although more could be desired.

Through higher per-gallon taxes on diesel fuels to tire taxes and even license and permit requirements, commercial vehicle operators interact with the infrastructure funding arrangement much differently than the average American. And rightfully so. But changes are on the horizon there as well.<sup>15 16</sup>

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<sup>12</sup> Montoya, Ronald. “Are Small Cars Safe? Comparing Car Crash Safety Ratings: Big vs. Small and Old vs. New.” Edmunds, February 16, 2017. <https://www.edmunds.com/car-safety/are-smaller-cars-as-safe-as-large-cars.html>.

<sup>13</sup> Office, U.S. Government Accountability. “Excessive Truck Weight: An Expensive Burden We Can No Longer Support.” Excessive Truck Weight: An Expensive Burden We Can No Longer Support, July 16, 1979. <https://www.gao.gov/products/CED-79-94>.

<sup>14</sup> Lindeke, Bill. “Chart of the Day: Vehicle Weight vs Road Damage Levels.” streets.mn, July 11, 2016. <https://streets.mn/2016/07/07/chart-of-the-day-vehicle-weight-vs-road-damage-levels/>.

<sup>15</sup> Hirsch, Jerry. “Volvo Launches Electric Heavy-Duty Truck Program in California.” Trucks.com, February 12, 2020. <https://www.trucks.com/2020/02/11/volvo-launches-electric-heavy-duty-truck-program/>.

<sup>16</sup> Winston, Andrew. “Inside UPS's Electric Vehicle Strategy.” UPS, April 9, 2018. <https://www.ups.com/us/es/services/knowledge-center/article.page?kid=ac91f520>.

All of these factors must be taken into account when crafting a revenue system. While the fuel tax has been unchanged for nearly 30 years, innovation has led to heavier vehicles, more fuel-efficient vehicles, and now a fleet of vehicles entirely exempted from the fuel tax. All of this while inflation is left unaddressed.

If the system is pay-as-you-go, we have to actually pay as we go. Electric vehicles do not pay at all. Hybrids pay very little. And even traditional vehicles are paying less and less due to innovation. On top of this, the imprecise gas tax causes even those who do pay to pay disproportionately on the basis of their fuel consumption alone rather than accounting for weight or miles driven. These are fairness concerns as much as they are revenue concerns, and ultimately all display shortcomings of taxing fuel.

A new revenue policy should not penalize or single out EVs, hybrids, or traditional vehicles. Instead, it should seek to obtain fair and proportionate fees so that all drivers are contributing and revenue matches maintenance costs.

Innovation simply triggered a policy loophole by exempting some from road use fees. Reforming the system to include those drivers now is essential to fairness and improving roadway conditions.

## States and Other Revenue

To be sure, the federal government is not solely responsible for roads and bridges – even for the Interstate Highway System. All Interstate sections are owned and maintained by the respective states. The federal government pays roughly a quarter of all road maintenance costs in the country.<sup>17</sup> But the federal government has a 90 percent share of the cost for the Interstate, leaving states with a 10 percent share.

States also have their own state highways and local roads to address. To do this, all 50 states and the District of Columbia have their own fuel taxes, extracted alongside the federal 18.4 cents per gallon at the pump. Not all states use a fixed tax rate, however.

Some index the state fuel tax to inflation, the price of fuel, fuel economy, and more. Such dynamic taxing models seek to extract the lost potential from a fixed fuel tax.

The problems with a fuel tax, however, apply to the state level as well. Increased fuel efficiency, vehicle weight, and rise in electric vehicles underscore the reason mere inflation indexing or tax increases – at any level of government – are not viable paths forward.

Various pilot programs have explored alternative revenue sources.<sup>18</sup> Pilot programs and state experimentation are vital to finding workable solutions. It is not enough to simply point to the flaws and shortcomings of the fuel tax and Highway Trust Fund.

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<sup>17</sup> “Alternative Approaches to Funding Highways.” Congressional Budget Office, March 23, 2011. <https://www.cbo.gov/publication/22059>.

<sup>18</sup> “Road Use Charges (RUC).” National Conference of State Legislatures, April 24, 2018. <https://www.ncsl.org/research/transportation/road-use-charges.aspx>.

It is critical, however, to explain pitfalls of the current system so that policymakers can create solutions that are not susceptible to the same flaws. We must explore innovative solutions to this innovation-borne challenge.

## The Gas Tax Genius

Before replacing the gas tax and setting in place a new revenue source, we must pay attention to the success of the gas tax and the difficulty replacing it will encounter.

The gas tax is effectively a hidden tax. Many consumers have no idea the price of gas reflects multiple levels of taxation. They simply view it as the price per gallon. This essentially guarantees minimal grumbling and maximum compliance. One cannot buy gas at the station and avoid the tax. Any new scheme must have a plan for compliance and enforcement.

The universal and indiscriminate nature of the gas tax aids in its usefulness. There is no active role for the government, which merely sits back and sees fuel tax revenues flow into the Fund.

Low income drivers as well as wealthy drivers pay the tax as they drive. Switching away from this tax will likely cause low income *and* EV drivers to feel like they are being taxed disproportionately and subjected to new taxes. This would not be true, especially if the gas tax is repealed, but it is a political reality in need of confronting. Paying along the way is necessary for low income drivers who may not have the funds to pay a higher, one-time annual registration fee or tax, but can afford gas taxed per gallon.

If a new plan calls for self reporting in any way, many people will likely underreport or fail to report at all. It may be then, that a self-reporting plan must be paired with a supplemental one to account for some percentage of revenue not captured by tax avoidance or fraud.

The final strength of the gas tax is that it utilizes drivers' demand elasticity for gasoline to achieve other policy goals. By raising the price of fuel, Congress can discourage drivers from driving inefficient vehicles or from driving at all. This can reduce road wear, congestion, pollution, and more, all with a simple revenue scheme.

Although the primary purpose of the fuel tax has been to raise funds for road maintenance, if Congress wishes to retain this ability to influence behavior with its highway revenue tax, the new plan should feature equally dynamic incentive levers.

It is this same feature of the gas tax, however, that brought about one of the current problems. The gas tax incentivizes and rewards drivers for buying more fuel-efficient vehicles and switching to hybrid and EV technology. These drivers may view a new tax as punishment and argue against it. But it has never been the policy to allow some drivers to use the roads without paying, so applying a surcharge or miles-based tax on EVs is not a penalty, but a realignment of the user-pay model.

**A new revenue policy should not penalize or single out EVs, hybrids, or traditional vehicles**

## Alternatives and Solutions

The popular solutions vary greatly, not only in terms of efficacy and impact, but in terms of political palatability. Ultimately, the chief certainty is that America's roads and bridges greatly need maintenance *and* the money to pay for it. Equally certain is that the Highway Trust Fund is not adequately set up to bring those repairs about from a federal revenue standpoint.

There are two horizons to address: the immediate plan to address looming insolvency, and the longterm plan to achieve fairness, consistency, and Fund independence from General Funds and future insolvency.

### Short Term

One solution is to provide a short-term boost to the Fund to buy time to decide upon and implement a new surface transportation revenue policy.<sup>19</sup> While General Fund infusions have been used to do this, current proposals seek road-based revenue, not bail outs.

Whether this is inflation indexing or a simple fuel tax increase, it would generate more revenue at the outset. Of course, it would put a disproportionate burden in the short term on gasoline users and continue to benefit EV drivers. For drivers with relatively inelastic demand for gasoline, driving would remain consistent enough to generate more revenue until the new system is in place.

A common analysis of gas tax increases is that demand elasticity for gas could lead drivers to respond by driving less, thereby reducing the revenue going into the Fund. Because they are driving less, and fuel is supposedly a proxy for use, the resulting revenue decline is proportionate and not an issue.

This overlooks the compounded maintenance needs built up over time. Any revenue scheme must account for the backlog and cannot only realign the fee to future road use. This practically means that revenue must not only meet, but reasonably exceed costs.

While transitioning to a longer-term solution, flat fees are also being considered. Such a policy could have a low flat fee levied on EVs. This could be an annual registration fee or a gas tax approximation fee.

### Long Term

Longer-term solutions look beyond fuel taxes almost entirely because of the weakness inherent to per-gallon taxes. They seek to apply fees across the board to account for ever evolving innovation.

The Vehicle Miles Traveled (VMT) or Road Usage Charging (RUC) methods are gaining popularity, and are widely perceived as the way forward. These would replace a pay-per-gallon system with a pay-per-mile system; achieving the actual road use objectives to which the fuel tax only paid lip service. Such methods have a few possible executions.

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<sup>19</sup> "New Report Highlights Strategies to Shore Up Highway Trust Fund." Bipartisan Policy Center. Accessed February 14, 2020. <https://bipartisanpolicy.org/press-release/new-report-highlights-strategies-to-shore-up-highway-trust-fund/>.

Mileage fees could be implemented in low-tech fashion with drivers filing a paper or digital form not unlike income tax filings to report their odometer reading at the beginning and end of the month, quarter, or year. This would primarily be an effective federal revenue solution, as it would not account for which roads, or in which states, drivers added wear and tear.

The high-tech options include plug ins, GPS, and smart phone connectivity to identify actual locations and road use. Some privacy concerns exist, but would likely not be more invasive than current insurance tracking. Privacy concerns are further diminished by having different options for reporting.

The simplicity of paying per mile is a major advantage. It could also be implemented alongside regular federal taxes or through a smart phone app, with drivers filing a form indicating their vehicle make and model (to account for efficiency and weight) and odometer reading for actual use. This would allow the government to continue advancing environmental policy by encouraging more efficient models, but ultimately would realign actual use with wear and tear by accounting for the vehicle weight and actual miles driven - the two direct metrics of wear and tear.

A major drawback of mileage reporting is compliance. Many are likely to feel overtaxed, even though they are already taxed for gasoline. A mileage tax could be as low as a penny per mile at the federal level, and if the gas tax is truly repealed, drivers would have the funds to pay it. Compliance still needs a strong mechanism not solely reliant on self-reporting. This could be cross checked

or simply administered by annual vehicle inspections or at annual vehicle registration. In either case, a third party could inspect the odometer or collect the tax. This could be solely for the miles driven or an additional registration or road use fee for all vehicles going directly into the Fund.

Tolls are another way to achieve per-mile revenue, because they could track actual use more directly and account for traffic patterns and congestion where most wear takes place. The difficulty with tolls, beyond political backlash, is that it takes new technological deployment, which can be expensive. Driver would need to stop at toll booths or buy toll tags, and the government would need to install new toll technology at taxpayer expense in many areas.

Although innovation has made tolls incredibly efficient to collect through cameras, sensors, and more, these are still large scale projects with big price tags. This may be a state or local level option, especially as federal law currently prevents most non tolled sections of Interstate from being converted into tollways.

### **Supplemental Policies**

Another class of fee is the kind that bolsters revenue, rather than providing the lions share. In this class of supplemental policy, policymakers can address varied concerns from the environment to traffic, or simply bring in new revenue as a cushion.

Congestion taxes are another melding of environmental and transportation policy that can be added on top of the fuel tax, mileage tax, or other proposal.

This may be best left to state or local-level policy, as they are closer to the issue and congestion is more of an urban issue and not an Interstate one. Moreover, states can implement dynamic toll pricing for times of day, weather phenomena, and more, which the federal government could not apply across the whole nation.

Importantly, congestion pricing is a revenue supplement, which aims to raise revenue but also change behavior by incentivizing ride sharing, mass transit, biking, or walking. This can help reduce wear on heaviest trafficked roads, and bring in revenue, but is ultimately not a transportation revenue setup on par with a VMT or RUC capable of bringing in great revenue and applying to all drivers.

Other limited revenue options could take aim at universal vehicle features. For instance, while gasoline or diesel fuel were once a necessity for virtually all motor vehicles, and has since lost its usefulness as a proxy, other ubiquitous features still exist.

All road vehicles use tires, whether they are electric or gasoline powered, making a tire tax one avenue for revenue. Tire taxes could be implemented immediately in lieu of a gas tax increase, with lower potential for backlash as drivers only replace tires every few years.

A broader and more forceful form of this would be a value added tax (VAT) on automobiles, which tax parts at every stage like a cumulative sales tax, and means the final price is higher to the consumer.

This could be a way to raise revenue for the Fund by extracting money from all parts,

unlike fuel tax that sought to pinpoint one revenue source but has since lost effectiveness.

A VAT would broadly tax vehicle parts and could bolster revenues. The downside is that it would inflate vehicle costs, potentially disenfranchising lower income car buyers and disincentivize the purchase of newer more environmentally-friendly vehicles.

An unproductive proposal is to simply – or solely – raise trucking fees. Not only does this ignore the wear and tear by non commercial drivers and the rising electric fleet, but the higher costs for shippers would increase costs on the goods they ship, namely essentials like food, fuel, and clothing.

Importantly, shippers and commercial vehicles do account for the highest share of wear and tear, as they are heavier and use the roads most. Commercial drivers should be included in the switch to mileage-based taxes and fees, with a system able to account for vehicle weight, number of tires, and miles. If this results in shippers paying more, it should only be due to proportionate road use and impact from actual miles driven and weight.

As electric power for heavy duty vehicles becomes more prominent, this will be all the more important. There is no reason all drivers cannot be on the same or similar system, dynamic enough to account for everything from motorcycles to hybrids, and electric cars to tractor trailers. This would improve transparency and revenue across the board.

Any solution aimed at connecting use to revenue must encompass all drivers: gasoline,

users, diesel users, private and commercial drivers, and electric vehicle drivers. This is not only imperative from a fairness standpoint, but because maintaining a link between road use and payment requires it.

## Recommendations

First, Congress must recognize where its policies are counterproductive or in conflict. Presently, CAFE and other standards continue to push the automotive industry toward higher fuel efficiency. With this policy in place, it directly reduces revenue for the Highway Trust Fund. An efficiency-neutral funding policy would reconcile this.

Second, Congress must make an innovation-proof revenue policy so that the same crisis is not visited upon us in 20 years. We must think of ways innovation is likely to occur and do our best to establish fair, broadly applicable, and effective user fees. Innovation by its nature occurs in ways the conventional wisdom does not foresee, so we should look to things that will not change.

This means taxing the vehicle itself or the miles driven, rather than some minor factor going into either like fuel, which is proven to change.

If we want to fund our road maintenance and support the Highway Trust Fund with a pay-as-you-go system, we all have to actually pay as we go.

The fuel tax is not an effective pay-as-you-go system, because many are not paying at all, and those who are paying are disproportionately supporting the Fund but

still providing inadequate revenue. Innovation continues to undermine the fuel tax due to changes in efficiency, vehicle weight, and other features.

Congress should set a definitive deadline for the federal fuel tax to sunset, whether it is five, ten, or fifteen years. With the end point slated, some modest tax increase is needed.

Because the fuel tax does not capture many drivers, fuel-tax equivalent fees or road use surcharges should be levied on hybrid and electric vehicles. This can be done at point of sale, during regular annual registration, or as quarterly fees of some kind.

Ultimately, some form of a mileage tax should be implemented. Whatever form Congress decides must have an implementation date far enough in the future to be practical, and give notice to all drivers.

It should be able to address privacy and cyber concerns, especially if it utilizes GPS or any Internet-based integration. Multiple reporting formats should also be included for low-tech preferences.

The new revenue plan must account for actual miles driven, vehicle weight, and number of tires. This would allow the system to account for innovation in almost every way it is relevant to impact. Accounting for efficiency is not necessary, but may be desired.

It must also account for compliance and avoidance by self-reporting. And it must be fair to all drivers, not only in terms of the fee it levies on them, but allowing drivers at all income levels to be able to participate in the

system. That means it must parallel the pay-as-you-go feature of the gas tax, where drivers pay the tax as they drive.

Low income drivers may not be able to pay a fee every year or even quarter once their mileage has accumulated. Some option for payment is needed to keep the fee low and close to the pay-as-you-go feeling and application.

Finally, while this report only reviews revenue and the need to transition away from fuel taxing, Congress must also revisit its spending policies. The declining revenue is only one half of the solvency problem.

Spending is a political and governance issue. We focus on the revenue side, because it is governed and influenced in part by changes outside of the government's control like innovation and technological change. The revenue policy must be able to account for these. But it is imperative to public safety that roads and bridges are repaired and maintained, which means that spending must be addressed with all deliberate speed and care.

**There are two horizons to address: the immediate plan to address looming insolvency, and the longterm plan to achieve fairness, consistency, and Fund independence**

## Conclusion

Ultimately, there are two major problems sinking the Highway Trust Fund. The first is a revenue problem, and the second is a spending problem.

Revenue has long been supported by a federal excise tax on gasoline and diesel fuel, but due to innovation and changing vehicle features, this no longer brings in a proportionate amount of money for the wear and tear actually taking place on our roadways. It also fails to account for all drivers, meaning the road-use intention is not being fulfilled.

The second problem is spending. Rather than use the Fund narrowly to maintain and repair roadways that are worn down by drivers, the Fund has been obligated to spend high volumes, in some cases linked to expected revenue rather than actual revenue. More vexing to some is that resources from the Fund have been allocated to a range of transportation projects.

Diverting these funds to median beautification, bike lanes, walking paths, transit rail, and others has taken a toll on the Highway Trust Fund.

Here, we analyzed factors behind the revenue decline. That is critical no matter what the expenditure side of the equation looks like, especially given the maintenance needs amassing across the country.

Congress may prefer to use the Highway Trust Fund as a general transportation resource. In that case, shoring up revenue is even more important.

The fuel tax, at every level, needs to be addressed. This 20th Century policy no longer achieves what it sought and is increasingly inequitable as well as ineffective. It should be definitively scheduled for retirement.

In the interim, new funding policies can be phased in alongside a sunseting fuel tax. These must be crafted to account for innovation, dynamic enough to extract wear-and-tear-proportionate fees from vehicles in line with their weight, number of tires, efficiency, fuel type, and miles driven.

This new policy must also account for privacy and security concerns if it is mileage based, have strong compliance, and be both actually and perceived as fair by all drivers. That means recreating a pay-as-you-go strategy from the ground up, invulnerable to innovation that may diminish revenue or cause the tax burden to become unfair and disproportionate. 

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