


How do we Rebuild the Federal Highway Fund's Finances?

A Proposal by Energy Guidance Group's Mark Burlingame

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The United States' federal highway system's finances are no longer self-sustaining. Originally set up in 1956, the "Highway Trust Fund", was intended to fund 100% of federal highway construction and maintenance. Since 2008, the fund has been operating at a deficit. It is funded by taxes on gasoline and diesel fuel with the deficit covered by transfers from General Fund of the U.S. Treasury.¹ Funding problems will only get worse with:

- Continuously improving gas mileage;
- Increasing adoption of hybrids and electric vehicles; and
- The effects of inflation.



Finances will worsen as electric vehicles replace internal combustion engine vehicles.

The State of Oregon recognized a similar challenge to its highway funding as early as 2015. Oregon has a voluntary program called "OReGO", in which the state tracks miles-driven through devices implanted in vehicles. The state then charges a fee of 1.9 cents per mile in lieu of fuel taxes.²

Energy Guidance Group proposes an alternative to fuel taxes and GPS tracking of vehicles. This alternative would bring funding back in balance while more fairly spreading the costs. An additional benefit is avoidance of a "big brother" effect of government GPS monitoring of vehicles.

¹ https://en.wikipedia.org/wiki/Highway_Trust_Fund

² <https://www.myorego.org/>

Why has funding not kept up with needs?

Let's discuss just why funding has not kept up with needs

First, some "Stats":

- According to the Environmental Protection Agency, the average fuel economy for all light vehicles on the road today is 22.0 miles per gallon (mpg). The average annual miles driven is 11,484 miles.³
- In 1956, the average fuel efficiency of cars was 14.5 mpg. And the average car drove 9,496 miles.⁴
- The current Federal tax on gasoline is 18.4 cents per gallon, and each state has a gasoline tax, ranging from 8.95 cents in Alaska to 58.7 cents in Pennsylvania.⁵
- In 1956 the fuel tax was 3 cents per gallon.⁶
- The number of registered passenger cars increased from 54,210,901 in 1956⁷ to 275, 924,440 in 2020.⁸
 - There are 1,454,480 EVs registered in the USA.⁹
 - There are 5,407,900 hybrid vehicles registered in the USA.¹⁰
- According to phys.org, hybrid cars average 48-60 mpg.¹¹

Fuel tax collections, tied to gasoline consumption, are adversely affected as internal combustion engine (ICE) cars become more efficient. In particular, the advent of hybrids and electric vehicles (EV) over the past two decades further eroded fuel tax collections.

³ <https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle#:~:text=A%20typical%20passenger%20vehicle%20emits%20about%204.6%20metric,burned%20creates%20about%208%2C887%20grams%20of%20CO%202>

⁴ <https://www.fhwa.dot.gov/ohim/summary95/vm201a.pdf>

⁵ <https://www.energy.gov/eere/vehicles/articles/fotw-1110-december-2-2019-average-annual-gasoline-taxes-paid-vehicle-state#:~:text=The%20Federal%20tax%20on%20gasoline,the%20course%20of%20a%20year>

⁶ <https://time.com/4803516/gas-tax-history/>

⁷ <https://www.energy.gov/eere/vehicles/articles/fotw-1110-december-2-2019-average-annual-gasoline-taxes-paid-vehicle-state#:~:text=The%20Federal%20tax%20on%20gasoline,the%20course%20of%20a%20year>

⁸ <https://www.statista.com/statistics/183505/number-of-vehicles-in-the-united-states-since-1990/>

⁹ <https://afdc.energy.gov/data/10962>

¹⁰ <https://afdc.energy.gov/data/10861>

¹¹ <https://phys.org/news/2006-01-hybrid-cars-pros-cons.html>

The next table illustrates and summarizes these funding disparities.

Table 1 - Owners of EVs pay no highway taxes; and hybrid vehicles pay less than half the taxes of internal combustion engine (ICE) vehicles.

	Average ICE 1956	Average ICE 2022	Average Hybrid 2022	Average EV 2022
Annual Miles Driven	9,500	12,000	12,000	12,000
Average Miles per Gallon	14.5	22	48	NA
Avg. Gallons Consumed per Year per Vehicle	655.17	545.45	250.00	NA
Tax \$/Gallon	\$0.03	\$0.184	\$0.184	\$0.184
Annual Taxes Paid	\$19.66	\$100.36	\$46.00	\$0.00

Revenue Details

According to taxpolicycenter.org:

“Before 2008, highway tax revenue dedicated to the trust fund was sufficient to pay for outlays from the fund, but that has not been true in recent years. Since 2008, Congress has sustained highway spending by transferring over \$140 billion of general revenues to the fund, including \$70 billion in the Fixing America’s Surface Transportation Act in 2015.

This continued through 2020.¹²

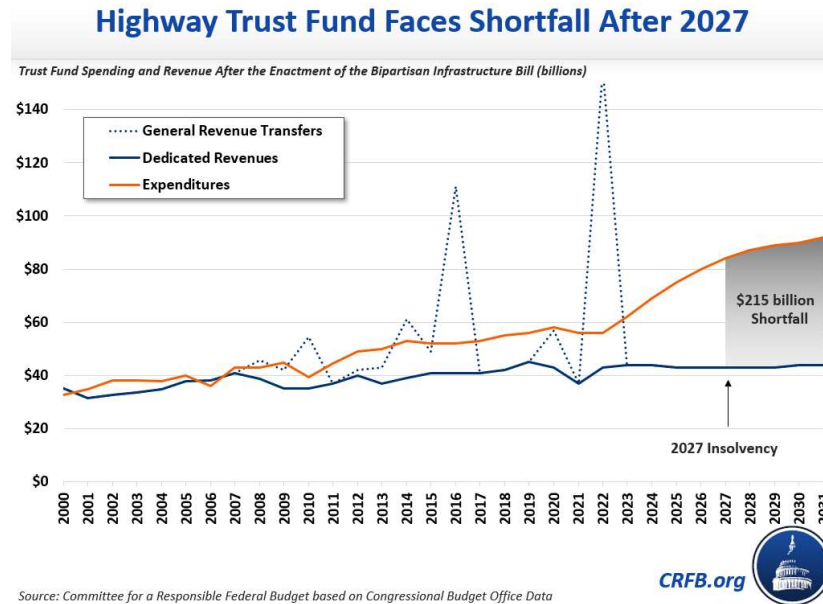
According to the Committee for a Responsible Federal Budget, the Infrastructure Investment and Jobs Act of 2021,

“...included a one-time transfer of general revenues into the Highway Trust Fund, extending its near-term solvency by five years through 2027. The bill also authorized higher spending levels that have negatively impacted the program’s long-term financial outlook. If spending levels from the infrastructure bill are maintained, dedicated revenue coming into the Highway Trust Fund over the coming decade will be sufficient to cover only about half of ongoing spending, and the trust fund will face a \$215 billion cumulative shortfall through 2031.”¹³ (See Figure 1)

¹² <https://www.taxpolicycenter.org/briefing-book/what-highway-trust-fund-and-how-it-financed>

¹³ <https://www.crfb.org/blogs/infrastructure-bills-impact-highway-trust-fund>

Figure 1 - Since 2008 Congress has applied a series of temporary band-aids to the fiscal hemorrhaging of the Highway Trust Fund.

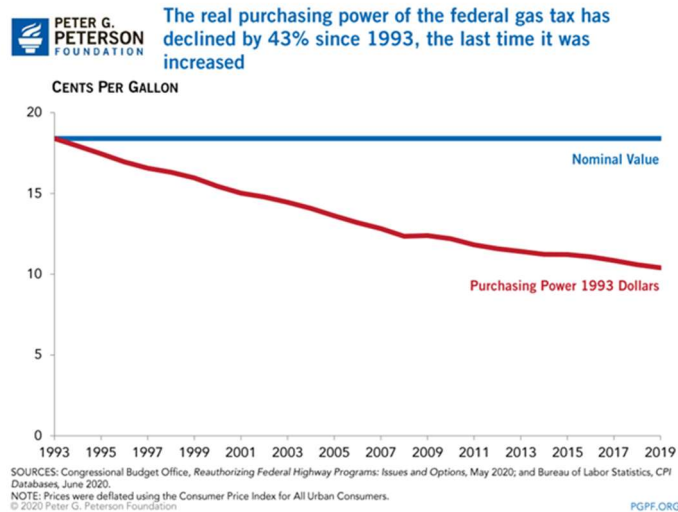


Inflation

According to the Peter G. Peterson Foundation, the real purchasing power of the fund fell, “Because the federal gas tax is not pegged to inflation, the purchasing power of the revenue has eroded over time — 18.4 cents buy 43 percent less in 2019 than it did in 1993.”¹⁴

¹⁴ <https://www.pgpf.org/budget-basics/budget-explainer-highway-trust-fund>

Figure 2 - Inflation further erodes the highway trust fund



Furthermore, as illustrated in Table 2, adjusting for differences between **1956** and 2022, the effects of inflation result in shortfalls of \$113.68 per year per ICE vehicle. It's worse for EVs and hybrids.

Table 2 – Inflation's effects assuming 1956 dollars and 2022 avg. mpg and 2022 avg. miles driven

	Average ICE 1956	Average ICE 2022	Average Hybrid 2022	Average EV 2022
Annual Miles Driven	9,500	12,000	12,000	12,000
Average Miles per Gallon	14.5	22	48	NA
Avg. Gallons Consumed per Year per Vehicle	655.17	545.45	250.00	NA
Tax \$/Gallon	\$0.03	\$0.184	\$0.184	\$0.184
Annual Taxes Paid	\$19.66	\$100.36	\$46.00	\$0.00
Inflation Adjusted Taxes per Vehicle (1956 dollars)	\$19.66	\$214.04	\$214.04	\$214.04
Shortfall from Original 1956 taxes	\$0.00	-\$113.68	-\$168.04	-\$214.04

EGG offers a solution.

What if we begin a phased-in change to the tax code? What if we *tax tires instead of gasoline* or diesel for all vehicles?

Here's how it might work.

According to Bridgestone, a tire should last about 60,000 miles¹⁵. According to cars.com, tires should last 50,000 miles.¹⁶ According to FamilyHandyman.com, Goodyear estimates tires last three to four years¹⁷

¹⁵ <https://www.bridgestonetire.com/learn/maintenance/how-long-a-tire-lasts/>

¹⁶ <https://www.cars.com/articles/how-long-do-tires-last-1420668941828/>

¹⁷ <https://www.familyhandyman.com/article/increase-tire-lifespan/>

Estimates vary, but let's assume the average light vehicle drives 12,000 miles per year. Let's also assume that the average ICE light vehicle gets 22 miles per gallon. Finally, let's assume tires last five years.

At 18.4 cents per gallon of gasoline, the average ICE light vehicle pays about \$100 per year in federal highway taxes. Over five years, the owner of an average vehicle would pay about \$500 in federal highway taxes, or about \$125 per tire (See next Table).

Table 3 - EGG's proposed change to tax tires on a per miles driven basis results in a tax \$0.0084/mile driven.

Miles driven	12,000
÷ Miles per gallon	22.0
= Gallons consumed per year	545.45
Federal fuel taxes paid per year at 18.4 cents per gallon (545.45 x 0.184)	\$ 100.36
Assume tires last 5 years - total taxes paid (5 x 100.36)	\$ 501.82
Taxes paid per mile Assume 12,000 miles per year (100.36 ÷ 12,000)	\$ 0.0084

Some implementation alternatives:

- We could substitute a tax of \$0.0084 per mile driven for the current fuel tax.
- Or we could levy a tax of \$125 per tire each time tires are purchased.
- We could require tire sellers to keep records of tires sold, with corresponding mileage on the vehicle's odometer, use it to calculate the tax at say \$0.0084 per mile and track it in a national database linked to a vehicle's vehicle identification number (VIN).
- Tire sellers would then collect and remit the taxes to the Highway Trust Fund. To aid compliance, the government would reimburse the tire seller for the cost of collecting the tax.

Of course, there are further issues to be worked out, but none are insurmountable.

E.g., how would we tax diesel fueled semi-trucks? How would a change in the tax structure be phased in to fairly allocate costs per vehicle over time? The Highway Trust Fund has been in an operating deficit since 2008. Would we need to raise this tire tax slightly to account for the effects of inflation since 1956? If so, how much? How do we avoid a regressive tax that hurts the less fortunate among us?

Conclusion

The US federal Highway Trust Fund is in a downward spiral. Congress has yet to implement a permanent fix. The nature of driving and the vehicles driven are changing. These changes are expected to accelerate over the next 10-20 years. EVs do not pay into the Highway Trust Fund. Hybrids pay half that of conventional ICE vehicles. Clearly, changes are needed in how we fund our Highway Trust Fund.

Changing the tax structure for the Highway Trust Fund from dollars-per-gallon to dollars-per-tire should not result in increased taxes to ICE vehicle owners. Furthermore, as the increasing number of EVs and hybrids begin to shoulder their fair share of highway taxes, trust fund revenues would increase. Lastly, the Highway Trust Fund would be brought back into balance and return to self-sustainment.