

Redefining
transportation
funding in an era
of growing needs
and receding motor
fuels tax

In brief:

- ▶ Continually underspending infrastructure requirements: Governments are facing ever-increasing demands on road maintenance and construction budgets, with a backlog estimated in the hundreds of billions of dollars.
- ▶ Some help is on the way: Current funding is insufficient to cover today's road funding needs, and further investment – even beyond the recently passed Infrastructure Investment and Jobs Act (IIJA) – will be necessary.
- ▶ New ways of work, policy and technology impacts: Inflation has negatively impacted the spending power of motor fuel tax receipts. An accelerating shift toward hybrid and electric vehicles, increasing CAFE standards, and the potential for decreased commutes will impact collections outright in the coming years.
- ▶ New thinking: Governments need to be flexible and forward-thinking in how they reform fuel-tax-focused funding mechanisms for transportation construction and maintenance that can meet the needs of transportation projects for decades to come.





Check engine light – a growing maintenance backlog

For the last half century, roads and bridges in the United States have experienced chronic underfunding, leading to a continued and pronounced deterioration of system conditions. As of 2021, approximately 40% of the nation's roads are in poor or mediocre condition, and over 231,000 bridges need repair and preservation work.¹ The status of the nation's road network frequently makes headline news – with 2021 headlined by a nearly three-month closure of the Hernando de Soto Bridge that carries Interstate 40 across the Mississippi River. As of 2014, the value of the investment backlog in roads and bridges was estimated at approximately \$786 billion.² This amount is on top of the nearly \$2 trillion of additional requirements projected through the mid-2030s. Addressing these amounts would require spending levels nearly 30% higher than current spend for the next two decades (an additional \$30 billion per year).³ The recently passed IIJA extends the baseline funding from the Fixing America's Surface Transportation (FAST) Act and provides an additional \$110 billion for roads and bridges over FAST Act baselines. While the IIJA is a significant additional investment, this will address only a portion of the total estimated repair backlog.



Financing flat tire – funding fails to keep pace with needs

The majority of funding for surface transportation in the United States comes from motor fuel taxes at both the federal and state level. In 2020, state governments collected in excess of \$51 billion⁴ from motor fuel taxes, and the federal government collected an additional \$37 billion.⁵ While some states divert a portion of these funds to other purposes, the vast majority is appropriated for use on road construction and maintenance.

However, while fuel tax revenues have increased in recent years, their ability to meet the maintenance and improvement demands of the nation's road system has dwindled, driven by improving fuel economies, growth of the electric vehicle market and inflation.

Since the United States last increased the federal gas tax in 1993, total revenues have increased from \$15.9 billion to over \$37 billion.⁶ However, the real purchasing power of this growth (assuming constant 1993 dollars) has grown to only \$20.8 billion – an increase of just 31%. Over the same period, total vehicle miles traveled has increased 41%.⁷ Even without the impacts of inflation, each driver on the road today is paying less in federal motor fuel taxes than they were in 1993, as the growth in average fuel economy has outpaced the growth in miles traveled.

Further evidence of the inability of motor fuel tax revenues to meet spending needs is seen in the amount of transfers required to keep the federal Highway Trust Fund solvent. In addition to the motor fuel tax revenues it receives, over \$140 billion in additional funds have been transferred from the General Fund since 2008 to keep the Highway Trust Fund solvent. The IIJA authorizes an additional \$90 billion transfer,⁸ which is projected to keep the Highway Trust Fund in a positive balance until 2026. However, once the five-year surface transportation reauthorization in the IIJA expires, any legislation to extend surface transportation funding will likely require another, even larger transfer of funds.

Below the federal level, while the fuel tax rates vary significantly, a number of states face the same impacts as the federal government. Thirty-one states and the District of Columbia have enacted legislation to increase gas taxes since 2013. However, only 22 states and the District of Columbia have a variable motor fuel tax rate that varies based on certain factors (typically consumer price index inflation, population or fuel prices).⁹ Alterations to the motor fuel tax in any of these remaining states would require legislative action.



Emissions check – future changes will expedite transportation funding issues

Simply put, the current funding framework for surface transportation is not aligned with the future of transportation. While states may be able to enact a near-term fix by adding inflation/other indexing features to their current motor fuel tax or passing periodic increases, these measures will prove to be only a temporary solution.

In the near term, pandemic-related impacts have forever changed the typical commute. Increases in telework and work-from-home arrangements have introduced permanent lifestyle changes that reduce commute mileage. Recent data from early 2023 suggests that in-office levels in the top 10 US cities have plateaued around 48% of pre-pandemic levels – having been at essentially the same level for over six months. Additionally, this varies throughout the week, with the lowest occupancy day of the week around 34% of pre-pandemic levels and the highest occupancy day near 56%.¹⁰

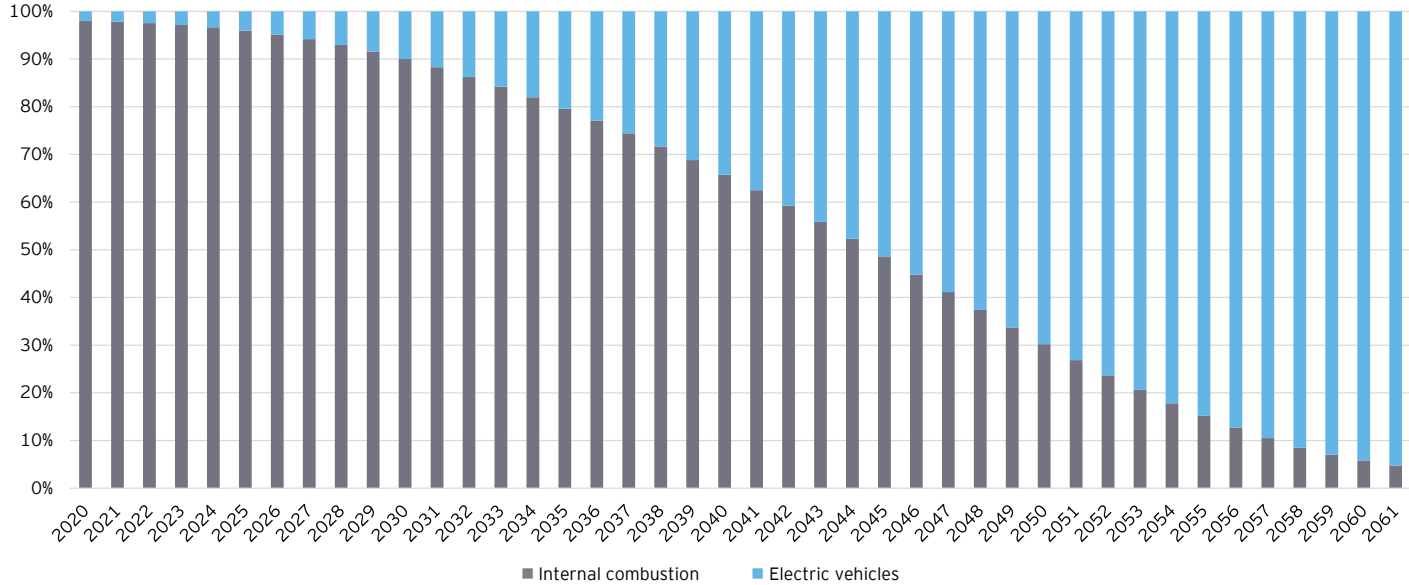
In the longer term, adoption of electric vehicles (EVs) will continue to increase. Even in a scenario where customers opt more for hybrid electric vehicles (HEV) or plug-in hybrid electric vehicles (PHEV), the average fuel economy of the nation's auto fleet will continue to increase, lowering overall motor fuel demand and directly impacting federal and state motor fuel tax collections. Automakers have set ambitious targets regarding their fleet mix, providing a preview of just how quickly the electrification of the nation's auto fleet may transpire. In many cases, these targets align with those in an executive order signed by the Biden Administration in August 2021, setting a goal that, by 2030, half of new vehicle sales will be all-electric models. Individual states are also announcing EV transition goals, with both California and New York planning for an end to gas-powered vehicle sales in 2035. EVs currently represent approximately 2% of the new car market, but, should these targets be met, that number is set to increase rapidly.¹¹



In an EY-Parthenon developed scenario, where new auto sales in the United States will be 100% electric by 2050, the nation’s active auto fleet could be composed of as little as 5% internal combustion powered vehicles in the 2060s. This would represent a complete inversion of the current mix in

as little as 40 years. While a full transition will take decades, governments will begin to feel the monetary impacts of less fuel consumption much sooner, with the shift to electric vehicles increasing rapidly through the 2030s.

Figure 1: 40-year projected United States auto fleet mix



Source: EY-Parthenon analysis; assumes new vehicles on the road an average of 15 years and EV adoption rates on new car sales grow over time (~7% in 2023 to 100% by 2050).

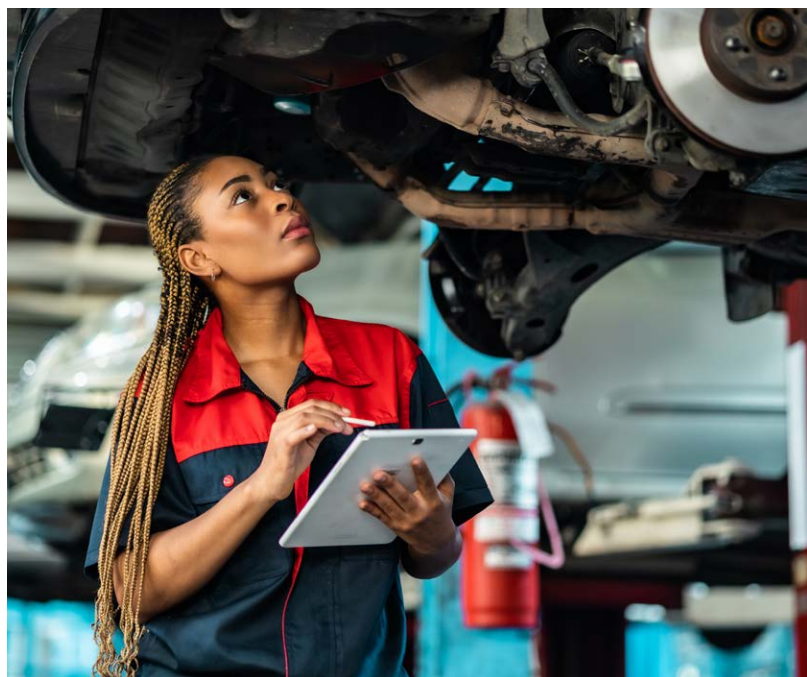
The mechanic is in – potential fixes

Over the coming decades, the motor fuel tax base will erode as fuel efficiency continues to increase and EVs become the majority share of the nation's auto fleet. Governments have a variety of potential options when working to modernize transportation funding and decouple it from motor fuel consumption. Some solutions simply augment tax structures currently in place (e.g., sales tax increase specifically for transportation), while others would require an entire new tracking and enforcement regime (e.g., vehicle miles traveled taxes).

When evaluating the potential alternatives, there are some key metrics that legislatures and policymakers should utilize to determine what funding mechanism (or mix thereof) is best suited for their situation:

- ▶ **Fairness/“user pay”:** For decades, the motor fuel tax has been a simple, straight-forward approach to address transportation funding needs. Most importantly, the motor fuel tax is a variable use tax – ensuring that each user of the roads paid their proportionate share of necessary upkeep and investment. Maintaining this user-pay philosophy that has been a core tenet of transportation funding for decades is the best way to ensure fairness in any transportation funding structure.
- ▶ **Investments and administrative costs:** The levy and collection of motor fuel taxes is a relatively simple activity. Sales volumes are easy to measure and report, which makes the overall calculation of taxes a simple process. Many alternative funding structures will require more reporting, tracking and administrative efforts, as well as significant capital investment, to monitor road usage and charge drivers accordingly.

- ▶ **Impact of inflation:** As previously detailed, inflation can negatively impact how far governments are able to stretch their transportation investment dollars. In fact, it has been the single largest factor negatively impacting the returns on transportation spending over the past half-century. - While a number of jurisdictions index motor fuels taxes to CPI or inflation, the ability of any tax and funding structure to adjust automatically without additional legislative involvement is an important component of “future-proofing” transportation funding.
- ▶ **Revenue stability:** Transportation funding needs are constant. Road maintenance is a 24/7/365 task, and construction projects are typically measured in years. This requires a steady, predictable source of funding. Variability in funding can lead to swings in the amount of work available, disrupting contractor relationships and negatively impacting the health of the contractor base and completion timelines of construction and maintenance activities. In states that utilize “cash flow” financing and borrow from future years' revenues/appropriations to fund projects, this is critical as a year of low revenues could significantly constrain new project starts.



Alternative/additional funding structures:

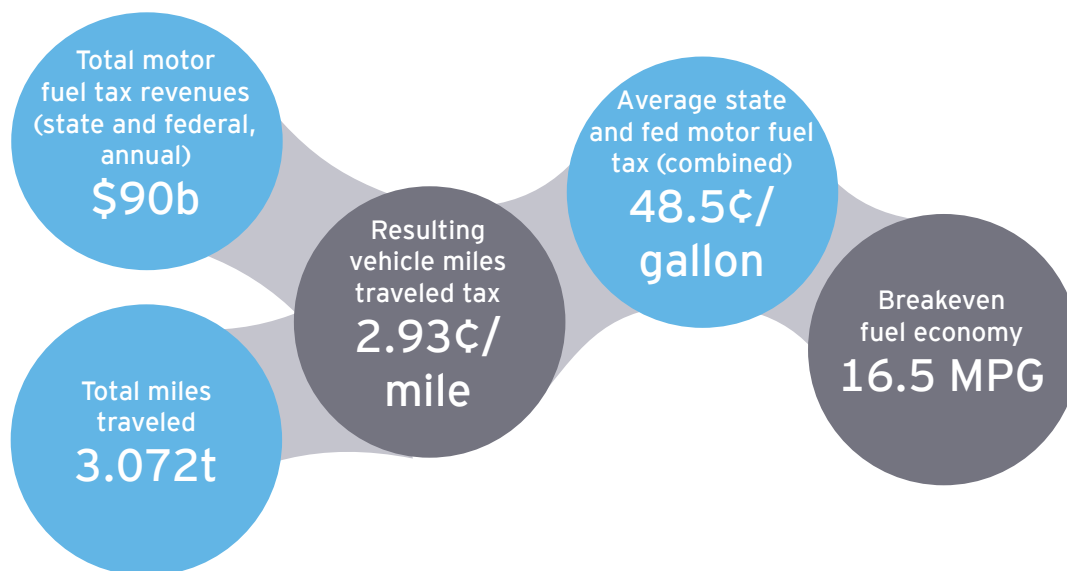
Legislatures and departments of transportation (DOTs) have a number of potential revenue-generating mechanisms that could be utilized in an update of transportation funding. While not an exhaustive list, the following options have the potential to raise significant revenues and should be evaluated as part of any transportation funding modernization:

► **Dedicated sales tax:** As compared to other potential alternatives, implementing a sales tax for transportation funding is a relatively straightforward option. Governments can utilize their current sales tax structure and levy a portion that is specifically dedicated for transportation funding needs. The percentage rate required would vary by state, but even a relatively small increase could raise significant revenues. Currently, fewer than 10 states utilize sales tax revenues as a source for transportation funding,¹² so it generally remains an unused tool by most jurisdictions that could be employed in the right situation.

► **Vehicle miles traveled tax:** Perhaps the most direct way to maintain the user-pay philosophy in replacing the motor fuels tax is to levy a miles traveled tax. Odometer certification could be done as part of an annual registration renewal process, with taxes charged as part of the renewal. However, there are two notable downsides of such a structure. First, there are cash flow timing implications, as taxes would be collected at the end of a year of driving, as opposed to throughout the year as a driver purchases fuel, potentially putting working capital constraints on DOTs, especially in the first year of implementation. Additionally, this once-a-year payment will become more “visible to drivers. As opposed to paying a few dollars at each fill-up, those taxes would be paid all at once, which could be more difficult for those with lower incomes and those on a monthly budget.

To completely replace all of the receipts currently that are realized through the motor fuels tax, the combined federal and state per mile rate would need to be approximately 2.9 cents, assuming approximately \$90 billion in annual revenues needed. At that rate, the driver of a car with fuel efficiency over 17 MPG that drove the average number of miles per year would end up paying more than they do in motor fuel taxes today.

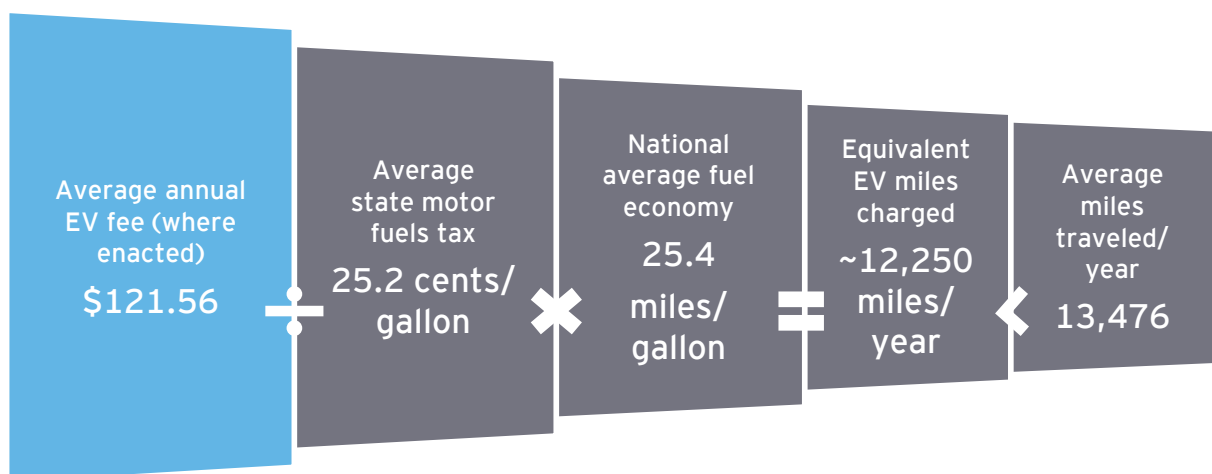
Figure 2: Motor fuel tax revenue and vehicle miles traveled comparison



Source: St. Louis Fed – FRED Economic Data – Moving 12-Month Total Vehicle Miles Traveled (M12MTVUSM227NFWA), EY-Parthenon analysis.

- ▶ **Increased EV fees:** Currently, 28 states¹³ charge an additional annual fee on EV registrations in an effort to replace the lost motor fuels tax revenue from those vehicles. However, these fees are typically insufficient to fully recover what would have been received if that EV were an average fuel-economy internal combustion vehicle. The average vehicle travels 13,476 miles per year.¹⁴ However, the average EV fee (in states that have one enacted) taxes these cars as though they drive only ~12,250 miles per year, almost 10% below the national average.
 - ▶ **Increased highway tolling:** Expanded use of tolling could provide additional funding, though tolling structures typically permit funds to be spent on only the limited set of roads on which the tolls are collected and not to support transportation construction and maintenance for the system as a whole. Additionally, states may be limited in the number of toll projects that they are allowed to undertake. While there is one advantage in that this option can capture revenue from out-of-state drivers, the disadvantages are likely to outweigh this. The implementation of additional tolling projects would be more capital-intensive than other alternatives considered here; given their revenue limitations, they would replace only a small portion of the motor fuels tax.
 - ▶ **Hybrid strategy (motor fuels tax with EV equivalent payments):** Another alternative would keep the motor fuels tax in place and aim to make the tax technology neutral. For gasoline-powered cars, nothing would change. However, EV drivers would pay an annual fee based on a calculation of their miles driven and the miles-per-gallon (MPG) equivalent of their respective vehicle. The fee would equate to what the EV driver would have paid if they were driving a gas-powered vehicle with an equivalent MPG rating. Given the impacts of inflation already detailed, building an inflation factor into the motor fuels tax is an important step of this hybrid strategy and its ability to future-proof funding.
- However, as inflation or other legislative changes impact the motor fuels tax, EV owners would feel their proportionate share. The technology-neutral aspect would make it so that fuel taxes/fees were neither an incentive nor a disincentive in the EV purchasing equation. As the vehicle mix shifts more toward EVs in the coming years, this hybrid strategy has the ability to continue to generate consistent revenues, assuming that total miles driven is unchanged.

Figure 3: Motor fuel tax revenue and vehicle miles traveled comparison



Source: EY-Parthenon analysis, aggregation of states published EV fees and motor fuels taxes.



► **Electricity tax:** Another alternative to the motor fuels tax would be taxing the “fuel” for EVs, providing a more direct correlation between usage and taxes paid than a flat EV fee. However, implementation of a tax on electricity used for vehicle charging presents certain challenges. Most notably, how can the tax be restricted to just electricity used for vehicle charging? Over 90% of EV charging takes place at home – where electricity usage is commingled with that of an entire residence. States could levy a tax on electricity used at public charging stations – Iowa is one example, with a rate of 2.6 cents/kwh, which started in 2023. However, this tax will miss the vast majority of vehicle charging and is on top of already increased EV registration fees.

Figure 4: Funding alternatives and evaluation criteria

		Evaluation metric			
		“User-pay” philosophy	Revenue stability	Impact of inflation	Investment/admin costs
Funding alternative	Dedicated sales tax	➤	↙	↗	↙
	Vehicle miles traveled tax	↗	↙	↙	➤
	Increase EV fees	↘	➤	↘	↙
	Increased tolling	➤	➤	↘	↘
	Hybrid strategy	↗	↗	↙	➤
	Electricity tax	↘	➤	↘	➤

Key:

↘ Very poor
 ↘ Poor
 ➤ Fair
 ↙ Good
 ↗ Ideal

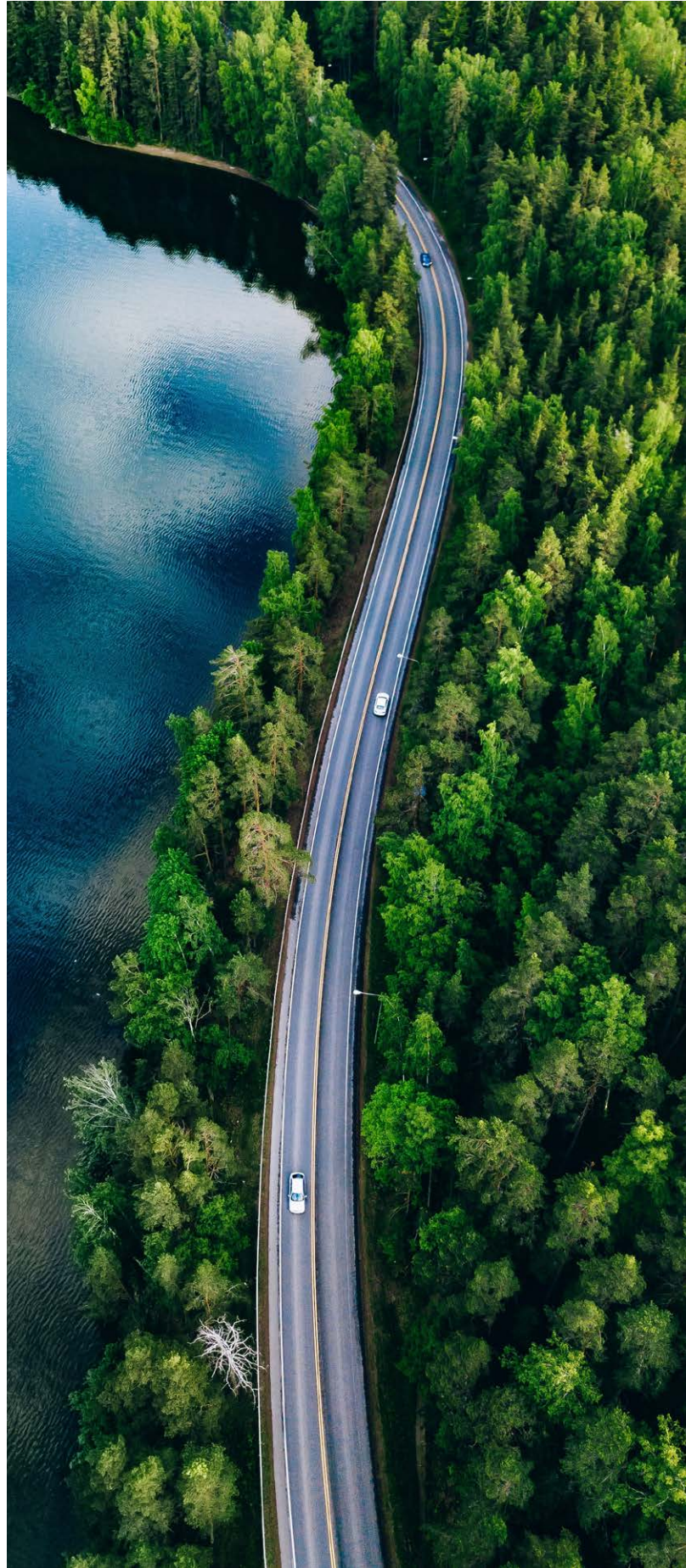
Source: EY-Parthenon analysis.

The road ahead

There is no “one-size-fits-all” approach to motor fuel tax reform. Even today, fuel tax structures vary from state to state, so it’s safe to say that it will continue to be the case through the EV transition and after. In fact, given the number of potential alternatives, it’s possible that tax structures will grow to be more varied than they are today. When undertaking an effort to modernize transportation funding, it is critical that lawmakers and state DOTs perform a wide-ranging and robust analysis of the potential options to identify the best fit for their respective situation.

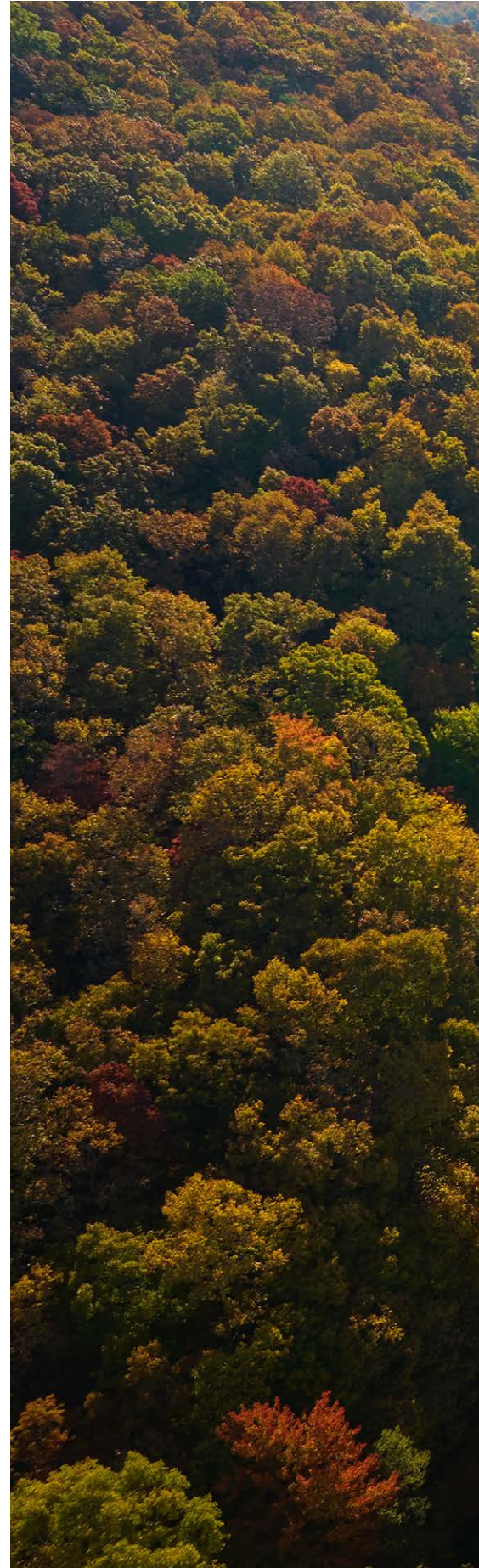
How we can help

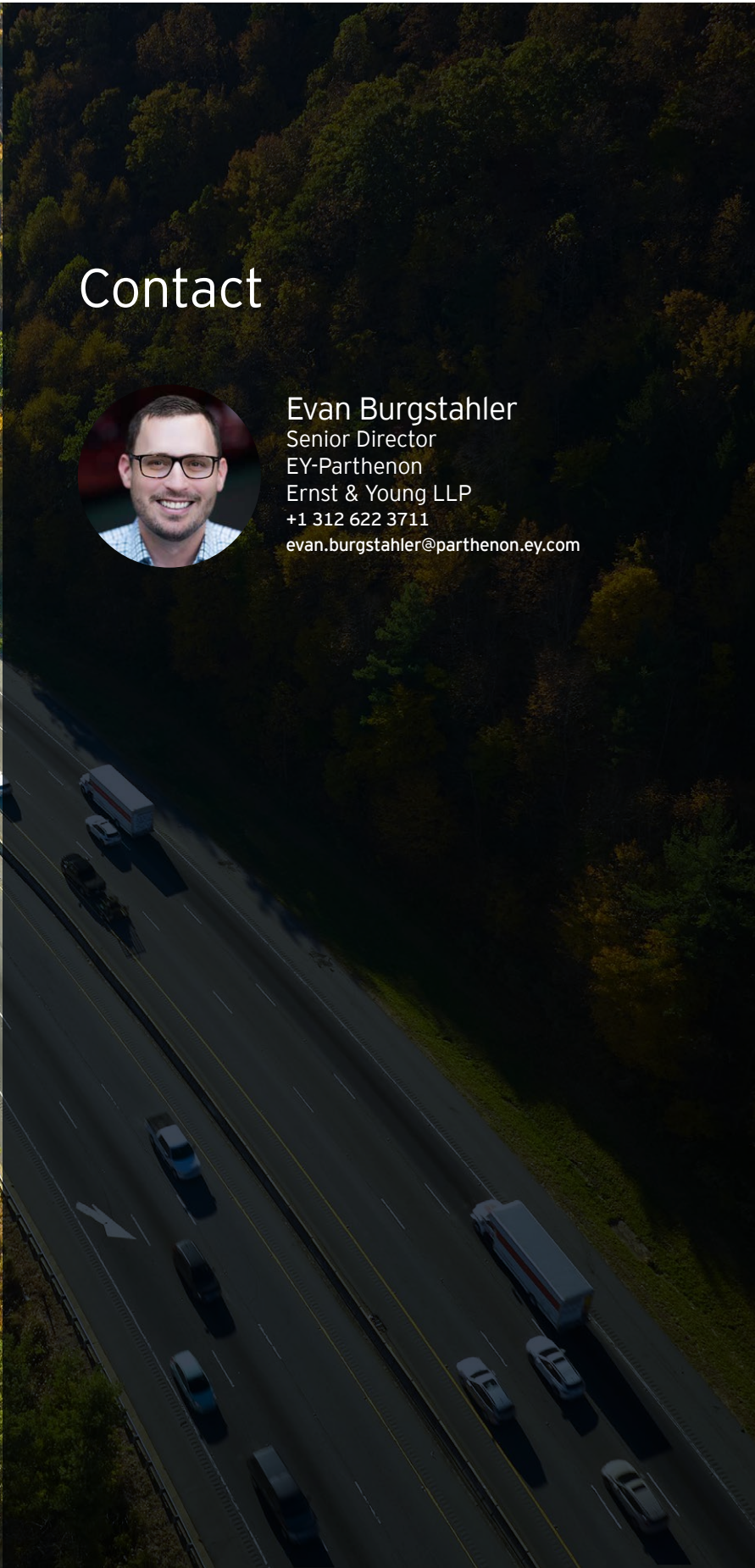
- ▶ **Analysis:** Our deep analytics team can create the benchmarks and models that support future funding model decisions. This analysis includes impact on communities, workforce and businesses.
- ▶ **Stakeholder management:** Our economic development advisory team focuses on building support in communities, legislatures and advocates for new innovative models.
- ▶ **Finance:** Many clients do not have the capacity to develop models that evaluate the potential new sources of funding and their impacts. Our finance advisory team can help shape the needed adjustments to the CFO’s arena.
- ▶ **Grants and funding:** Our infrastructure advisory team advises on the development of multisource funding packages, including road charging, tolling, grants, matches and financing.
- ▶ **Controls and systems:** New funding models require the right process controls and data systems to support them. Our technology consulting and process controls teams bring full lifecycle systems implementation experience.
- ▶ **Organization and change management:** Any change, especially changes to funding models, require substantial focus on assisting impacted employees in adapting to the change.



Endnotes

- 1 American Society of Civil Engineers (ASCE) – 2021 Report Card, A Comprehensive Assessment of America’s Infrastructure.
- 2 US Department of Transportation, Federal Highway Administration – Status of the Nation’s Highways, Bridges, and Transit 23rd Edition, Chapter 7 – Highway and Bridge Investment Backlog.
- 3 US Department of Transportation, Federal Highway Administration – Status of the Nation’s Highways, Bridges, and Transit 23rd Edition, Chapter 7 – Improve Conditions and Performance Scenario.
- 4 United States Census Bureau, Annual Survey of State Government Tax Collections – 2020, <https://www.census.gov/programs-surveys/stc.html>.
- 5 United States Department of Transportation, Status of the Highway Trust Fund, <https://www.fhwa.dot.gov/highwaytrustfund/>.
- 6 US Department of Transportation, Federal Highway Administration – Highway Statistics Series, Table FE-210.
- 7 FRED Economic Data, Federal Reserve Bank of St. Louis – Vehicle Miles Traveled (TRFVOLUSM227NFWA).
- 8 AASHTO Journal – <https://aashtojournal.org/2021/08/27/fhwa-briefs-state-dots-on-highway-trust-fund-contingency-plan/>.
- 9 National Conference of State Legislatures (NCSL) – Variable Rate Gas Taxes – Summary as of 7/14/2021.
- 10 *Crain’s Chicago Business*, aggregation of Kastle Systems data - <https://www.chicagobusiness.com/workplace/return-to-office-tracking-chicago>.
- 11 EVs currently represent approximately 2% of the new car market, but, should these targets be met, that number is set to increase rapidly.
- 12 AASHTO – BATIC Institute: http://www.financingtransportation.org/tools/state_by_state/map.aspx.
- 13 National Conference of State Legislatures: <https://www.ncsl.org/research/energy/new-fees-on-hybrid-and-electric-vehicles.aspx>.
- 14 FHWA, Average Annual Miles – <https://www.fhwa.dot.gov/ohim/onh00/bar8.htm>.





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