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Access User Fee – Past Revenue Models and Future Projections

Increased fuel efficiency, electric vehicle adoption, and changes in miles driven are among the factors driving volatility in revenue collected from the state motor fuels tax. **The regional and statewide business community has proposed an “access user fee” concept as a potential method of replacing the gas tax to modernize and stabilize funding for transportation.**

We determined the potential value of an access user fee based on the average gas tax paid annually per vehicle, national average fuel economy, average vehicle miles traveled (VMT), and the state gas tax rate. The proposed access user fee would initially apply to gasoline, gas-electric hybrid, electric, and hydrogen-powered vehicles. These represent more than 90% of the vehicles registered in North Carolina. Diesel vehicles, the majority of which are commercial, would be treated separately from this proposal.

State gasoline taxes would be replaced by the proposed access user fee for all non-diesel-powered vehicles under this proposal, expanding on the existing, partial access user fee for EVs in North Carolina.

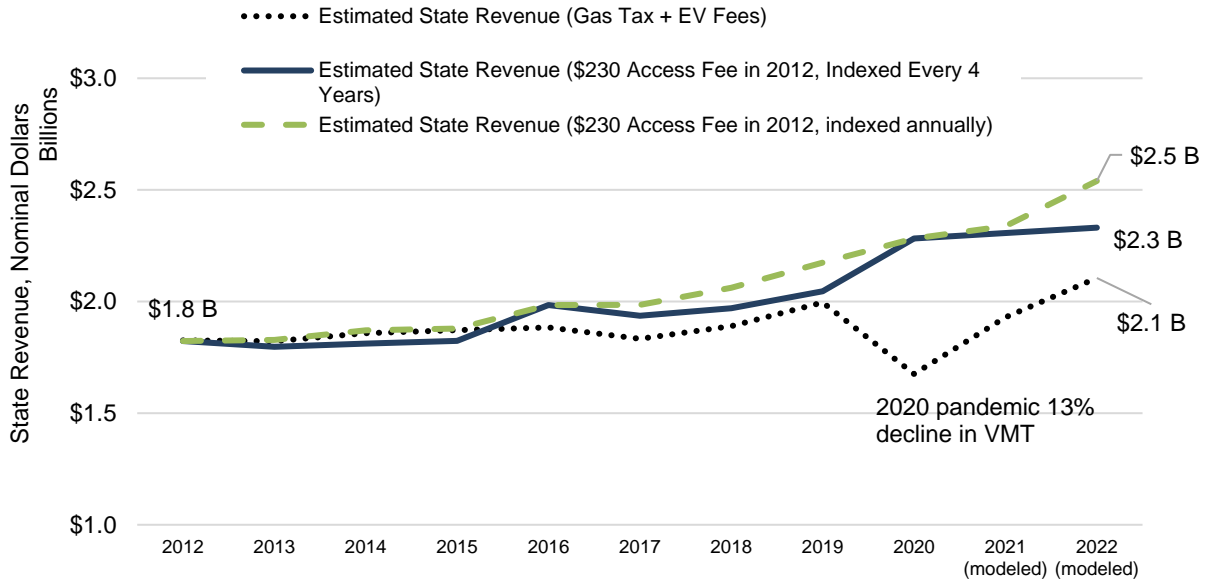
Key findings

- **An access user fee activated in 2023 for gasoline powered vehicles, in concert with a corresponding increase in existing, partial access fees for electric vehicles, would be around \$251 per year, or about \$21 per month**, assuming revenue neutrality at the time of implementation and the simultaneous elimination of the state gas tax.
- North Carolinians are paying **nearly \$50 less per vehicle** in annual gas taxes today compared to 2012, when adjusted for inflation.
- If an access fee had been implemented in 2012 (based on fuel efficiency, VMT, and gas tax rates that year), and then adjusted for inflation quadrennially (like vehicle registration fees) or annually (like gas taxes), the current access fee would be between \$261 and \$285 per year, or \$22 to \$24 per month.
- Had an access fee been in place since 2012, the state would now be collecting between **\$2.3 billion and \$2.5 billion annually**, compared to \$2.1 billion currently with the gas tax. This would have resulted in **\$1.4 billion to \$2.1 billion more in cumulative revenue** for transportation over the last decade.
 - If an access fee had been in place prior to the pandemic, the state would have retained between \$400 million and \$600 million in additional revenue during 2020 alone.
- **An access fee mitigates revenue risk** from both ongoing increases in fleet fuel economy and volatility in vehicle miles traveled due to the pandemic and economic cycles.
 - At the rates of growth of the motor fleet in North Carolina, RTI projects the access fee will generate **\$3.3 billion annually by 2033**.

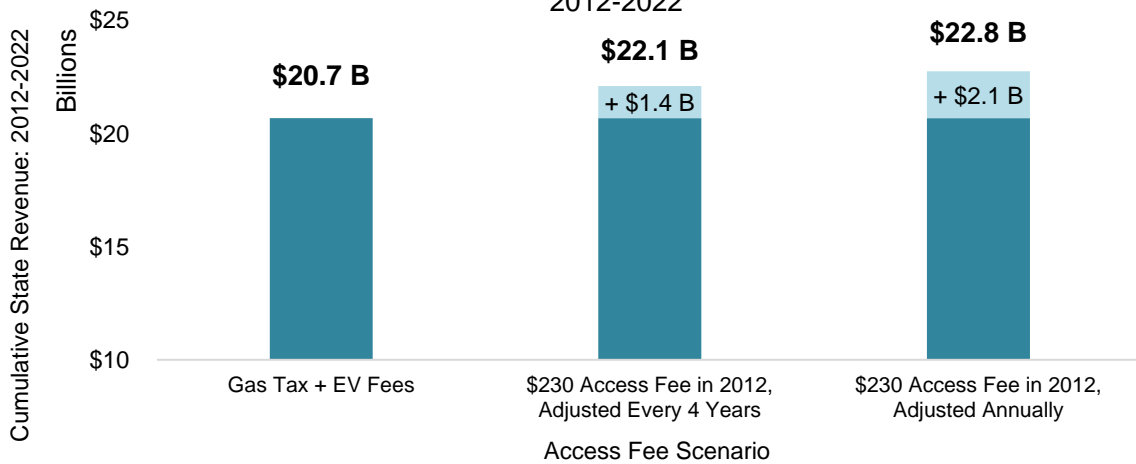
- By 2033, the proposed access fee could generate **between \$300 million and \$600 million more annually** for transportation when compared to gas taxes. While overall gas tax revenue is projected to increase due to population growth, there is a risk of volatility and declining revenue per vehicle as electric and high-efficiency vehicles become more common.
- This would translate into a potential shortfall between \$3 billion and \$6 billion over the decade from 2033-2043, which could be higher with volatility from recessions and increased rates of EV adoption.
- Activating an access fee and eliminating state gas taxes will result in lower gas prices, encouraging greater sales at convenience stores and additional state sales tax revenue – up to 6% of which will be dedicated to transportation as a result of 2022 state legislative provisions.

Key summary graphs

Estimated Annual State Revenue from Gas Tax Alternatives



Estimated Cumulative State Revenue from Gas Tax Alternatives 2012-2022



Values modeled based on data from Federal Highway Administration, EPA, NCDOR

Access Fee Calculation, Implementation and Annual Revenue

State motor fuels taxes make up approximately half of state transportation revenue. In determining the potential value of an access user fee under a revenue neutral framework, the model calculates the access fee in two ways, based on the average gas tax paid annually per vehicle (not per driver):

1. the national average fuel economy for the entire motor vehicle fleet, average vehicle miles traveled (VMT), registered passenger vehicles, and the state motor fuels tax rate per gallon.
2. The total tax revenue collected by the NCDOR, divided by the number of registered passenger vehicles in the state

The fee is calculated based solely on private, gasoline powered vehicles (excluding diesel and state-owned vehicles) to be revenue neutral in the year of implementation.

2023 access fee calculations

RTI examined the equivalent of an access user fee to replace North Carolina's existing gasoline tax of **\$0.405** per gallon in 2023. On average, each vehicle in 2022 contributed just under **\$251** per year to fund transportation through gasoline taxes in North Carolina, based on the average vehicle mileage, fuel economy, and gasoline taxes.

- 14,369 miles annual miles per vehicle based on 2019 values of 122,475 million vehicle miles traveled, with 8.5 million gasoline powered vehicles registered in North Carolina according to FHWA. Note we did not use 2020 values due to an estimated 13% decline in vehicle miles traveled due to the pandemic.
- Fuel efficiency is for the entire stock of vehicles on the road in 2019, including new and existing vehicles, as reported by EPA.

As an alternative, RTI examined NCDOR historic data, assuming the following:

- 5.6 billion gallons of gasoline purchased in the state
- 8.5 million registered gasoline-powered, private passenger vehicles in the state
- gasoline tax of **\$0.405** per gallon in 2022

This gives an average of 620 gallons of fuel purchased per vehicle per year, or just over **\$251** paid in gas taxes annually per vehicle per year which, with rounding, is identical to the result from the prior calculation.

A hypothetical uniform access user fee implemented in 2022 of **\$251 per year, or about \$21 per month**, would be revenue neutral at the time of implementation and would offset the loss of revenue from eliminating the current gas tax. In 2023, gas taxes are projected to generate an estimated \$2.3 billion in revenue for the state, which represents a slight increase above 2022 levels but remaining below pre-2020 levels of gas taxes paid per vehicle. An access fee implemented in 2023 would generate the same **\$2.3 billion** amount of revenue.

Access User Fees and Vehicle Registration Fees

Vehicle owners currently pay a base rate of \$38.75 per year to register a private passenger vehicle in North Carolina plus additional local taxes and fees; the base amount of \$38.75 works out to just over \$3 per month. An access user fee would be *in addition to* vehicle registration fees.

For ease of payment, NC DMV could consider creating a combined registration fee and access fee charge. If implemented in 2022, in concert with repeal of the state gas tax and uniform EV access fees, that would be around \$276 per year (i.e., \$39 + \$237 access fee), or about \$23 per month (i.e., \$3 + \$20 access fee).

Annual revenue impact – 10-year retrospective

A hypothetical scenario can provide potential impacts to annual revenue over the past decade. In 2012, drivers paid an average annual motor fuels tax of \$230 per vehicle, or around \$285 per vehicle in inflation-adjusted 2022 dollars. Compared with 2022 annual fuel tax payments calculation of \$237 above, this \$50 difference represents a 17% drop in annual revenue for each registered vehicle, and thus not collected by the state. The reduction in annual revenue in 2022 has been driven primarily by increases in fuel efficiency and by a gas tax rate that has increased more slowly than the overall rate of inflation. *Note that since 2017, annual adjustments to the gas tax rate are based on state population growth and the energy component of the consumer price index (CPI), which prior to 2022 grew at a slower pace than the overall rate of inflation*¹. Reduced travel during the prior years of the pandemic was not the only source of declining revenue per vehicle, which will be described in the following paragraphs and sections.

Had an access fee been in place since 2012, the state would have collected between \$1.4 billion and \$2.1 billion in cumulative additional revenue the past decade, assuming periodic inflation adjustments in the access fee rate, since the access fee substantially mitigates revenue risk from both ongoing increases in fleet fuel economy and volatility in vehicle miles traveled due to the pandemic and economic cycles.

If a \$230 access fee had been implemented in 2012, equivalent to the average motor fuels tax paid by drivers that year in 2012 dollars, and subsequently adjusted for inflation every four years (like state vehicle registration fees currently are), drivers in 2022 would now be paying an access fee of \$261/year, or about \$22/month. The increments would have been as follows:

- 2012-15: \$230 annual access user fee
- 2016-19: \$240 annual access user fee
- 2020-23: \$261 annual access user fee

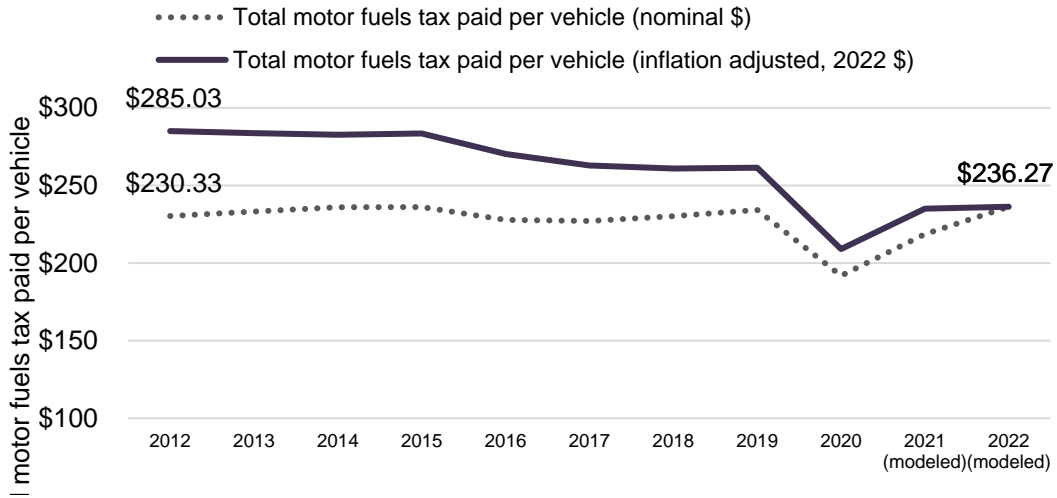
*In 2022 under this scenario, a \$261 annual access fee would be generating \$2.3 billion in annual revenue (compared to \$2.1 billion today with the gas tax), which is a 17% increase. This scenario meets the state requirements for quadrennial CPI-Based inflation adjustment under GS 20-4.02.*²

If a \$230 access fee had been implemented in 2012, and subsequently adjusted annually for inflation (like state gas taxes currently are), drivers in 2022 would now be paying an access fee of \$285/year based on annual inflation adjustments, or about \$24/month. *In 2022 under this scenario, a \$285 annual access fee would be generating \$2.5 billion in annual revenue (compared to \$2.1 billion today with the gas tax).*

¹ <https://www.ncdor.gov/taxes-forms/motor-fuels-tax/motor-fuels-tax-rates>

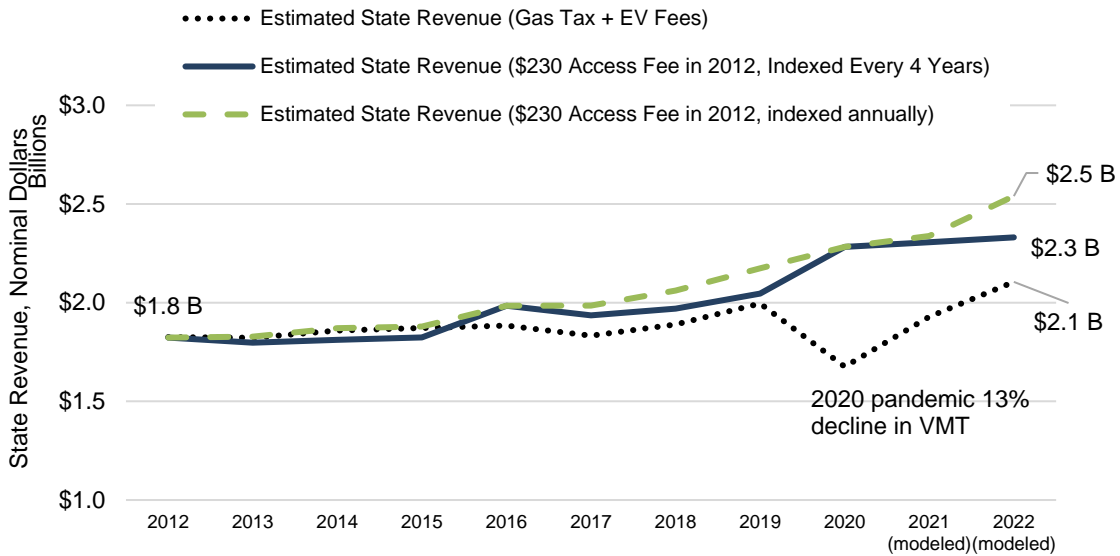
² https://www.ncleg.gov/EnactedLegislation/Statutes/PDF/BySection/Chapter_20/GS_20-4.02.pdf

Figure 1: Annual Average North Carolina Motor Fuels Tax Paid per Vehicle



Source: FHWA Highway Statistics, Bureau of Transportation Statistics Fuel Efficiency Estimates, NCDOR Motor Fuels Tax Rate. CPI from Bureau of Labor Statistics

Estimated Annual State Revenue from Gas Tax Alternatives



Values modeled based on data from Federal Highway Administration, EPA, NCDOR

Cumulative Revenue Impact – 10-year Retrospective

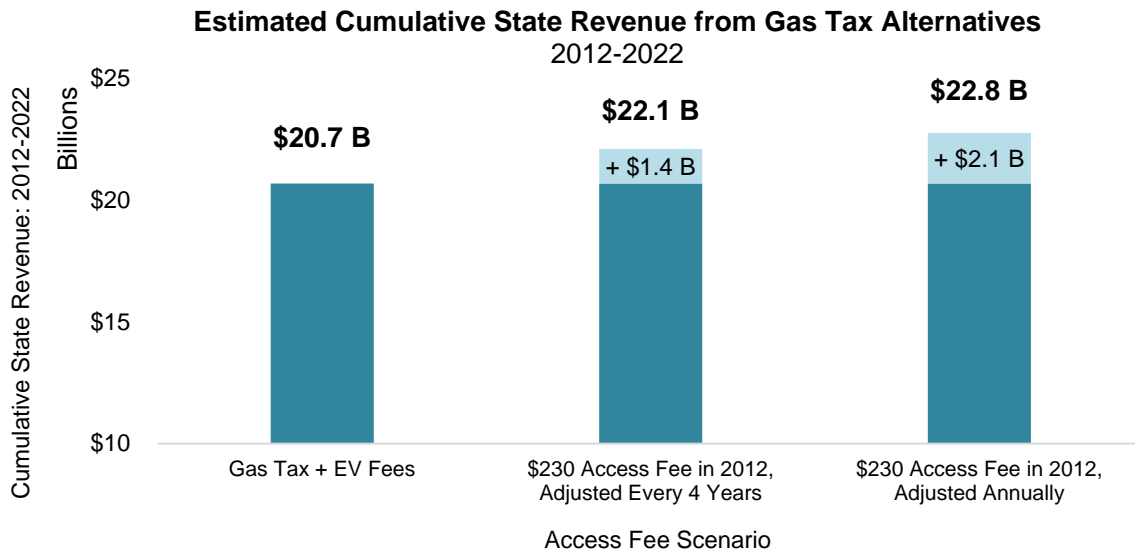
In examining the potential cumulative revenue impact of an access fee, a hypothetical scenario provides potential impacts to state revenue over the past decade. In 2012, drivers paid an average motor fuels tax of \$230 per vehicle. Adjusted for inflation, that would be equivalent to either \$261 or \$285 today, depending on whether inflation adjustments occurred quadrennially or annually.

If a \$230 access fee had been implemented in 2012 (equivalent to the average motor fuels tax paid by drivers that year in 2012 dollars), and subsequently adjusted for inflation every four years like state vehicle registration fees currently are, that would have resulted in a cumulative increase in revenue of \$1.4 billion over the ten-year period compared with revenue from state gas taxes and EV access fees paid during that time.

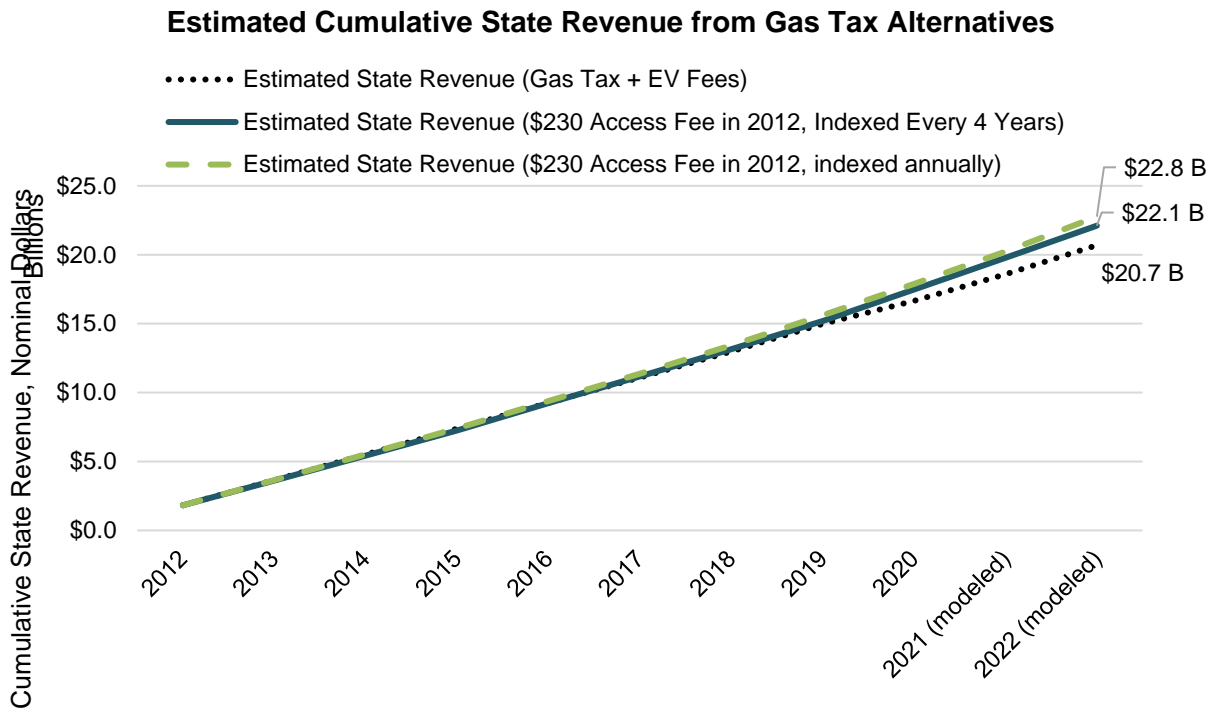
- *In this scenario, drivers in 2022 would now be paying an access fee of \$261/year based on inflation adjustments in 2016 and 2020, or about \$22/month, as noted above.*

If a \$230 access fee in 2012 had been subsequently adjusted for inflation annually like state gas taxes currently are, this would have resulted in a cumulative increase in revenue of \$2.1 billion over the 10-year period from 2012 to 2022 compared with revenue from state gas taxes and EV access fees paid during that time.

- *In this scenario, drivers in 2022 would now be paying an access fee of \$285/year based on annual inflation adjustments, or about \$24/month, as noted above.*



Values modeled based on data from Federal Highway Administration, EPA, NCDOR



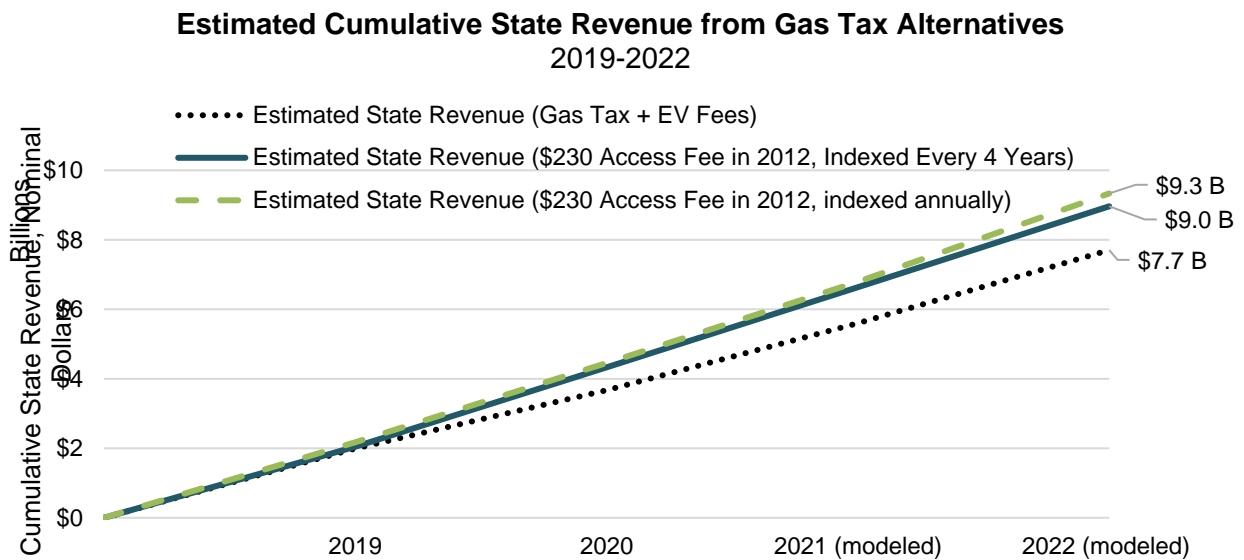
Values modeled based on data from Federal Highway Administration, EPA, NCDOR

Cumulative Revenue Impact – Focus on Pandemic Resilience

The above calculations on cumulative impact reflect the revenue resilience of the access fee under conditions of reduced vehicle miles traveled due to a pandemic and/or economic downturn.

Had an access fee been in place prior to 2020 in lieu of a gas tax and adjusted for inflation as described above, the state would have retained between \$400 and \$600 million in lost revenue from the 13% drop in vehicle miles traveled attributed to the COVID-19 pandemic, just during calendar 2020.

Over a four-year period (2019-2022), an access fee would have enabled the state to retain between \$1.3 billion and \$1.6 billion in revenue compared with what we experienced with gas taxes. North Carolina would have received either \$9.0 billion or \$9.3 billion with an access fee in place during that four-year period versus \$7.7 billion under the existing gas tax framework. The specific amount of total or additional revenue retained by an access fee depends on whether the access fee rate was indexed quadrennially (like vehicle registration fees are) or annually (like gas taxes are).



Values modeled based on data from Federal Highway Administration, EPA, NCDOR

Revenue Impact – Gas Price Reductions and Out-of-State Motorists

The access fee proposal generates questions about how much of the savings would be passed on to consumers and how out-of-state vehicles would pay for road use. This is a valid question and worthy of additional investigation. Between 2013 and 2022, various studies estimated the effect of short-term gas tax holidays on prices and cross-border travel, and found that:

- Between **50%** and **87%** of the cost savings of a temporary gas tax reduction were passed on to consumers, with the remainder going to higher prices to wholesalers, higher mileage traveled, and gas stations near state borders raising prices to generate more profit from out-of-state consumers.
- In the case of states with high cross-border travel and different state gas taxes such as Illinois and Indiana, there is little evidence to show that drivers actively go out of their way to cross state lines and buy gas at a lower price – in most cases cross-state gas purchases are a result of existing commuting or travel patterns and not active “price shopping”.

Although not necessarily 100% of savings would get passed on to consumers, eliminating state gas taxes will result in lower retail gas prices at the pump, which could potentially increase sales at convenience stores, generating more state sales tax revenue as drivers are more likely to spend more at convenience stores when gas prices are lower. In 2022, North Carolina approved 6 percent of sales tax revenue to be dedicated to transportation.

The Access Fee is proposed to be revenue neutral and reflect the average amount paid per registered vehicle in North Carolina, and overall state revenue would not be impacted by out-of-state tourists or motorists traveling to or through the state periodically. Since it is based on current vehicle registration, it would not change based on out-of-state drivers coming to the state.

Charging out-of-state vehicles an access fee is possible, but it is unknown how pricing or enforcement mechanisms would cost-effectively collect revenue from out-of-state drivers.

We explore this in more detail in a companion research brief on price effects and out-of-state purchasing. Both research briefs are available via www.letsgetmoving.org/AccessUserFee.

Future Revenue Impact

If implemented, a flat access fee would decrease volatility in transportation revenue and provide a consistent and reliable source of funding for transportation in North Carolina. Coupled with the sales tax allocation (2% of total revenue scaling up to 6%) for transportation, it generates a new potential future scenario for transportation funding at the state level. The access fee, based on the current average gas tax paid per vehicle per year would start in the range of \$251 per year and would be annually adjusted for inflation.

At the rates of growth of the motor fleet in North Carolina, RTI projects the access fee will generate **\$3.3 billion annually by 2033**. Projections by NCDOT estimate \$3 billion in revenue from gasoline taxes by 2033, but that number may vary depending on rates of EV adoption and may range between \$2.7 billion and \$3.3 billion. Gas tax revenue has been highly volatile since 2000, and future disruptions (recessions, pandemics) and changes in consumer behavior may affect future revenues. Recent research from MIT projects a 10% national decline in gas tax revenue by 2033, and an accelerated decline as EV adoption increases between 2023 and 2050.

RTI reviewed existing projections of state revenue from gas taxes and developed a model to examine alternative future scenarios. Projections of revenue from gas taxes, electric vehicle access fees, and sales tax alongside alternatives are based on several variables:

- State population growth and number of vehicles registered in the state. **Projected to increase as North Carolina's population continues to grow.**
- Fleet fuel economy in miles per gallon. **Projected to increase, slowly. New vehicles are more fuel efficient but existing vehicles remain on the road longer and consumers are buying larger and less efficient trucks and SUVs.**
- Total vehicle miles traveled (VMT) per year. **Projected to increase and surpass pre-2020 highs as the state's metro areas continue to grow and congestion increases.**
- Rates of adoption of electric vehicles. **Projected to increase, slowly. Based on a combination of federal incentives, manufacturers' offerings of electric vehicles, and consumers' adoption of vehicles based on price, usage, and charging station availability.**

NCDOT projects steady growth in gas tax revenue over the decade from 2023 to 2033, based on continued growth in vehicle registrations, miles driven, miles per gallon, and annual inflation adjustments to the state gas tax. In its scenario, fuels tax revenue will increase from \$2.5 billion in 2023 to over \$3 billion annually in 2033³. However, other research projects gas tax revenue will be less reliable in the coming decade.

³ <https://www.ncdor.gov/documents/reports/statistical-abstract-north-carolina-taxes-2021/open>

- Vehicle Miles Traveled: <https://www.fhwa.dot.gov/policyinformation/statistics.cfm>
- Registered Vehicles: <https://www.fhwa.dot.gov/policyinformation/statistics.cfm>
- Fuel Efficiency: <https://www.bts.gov/content/average-fuel-efficiency-us-light-duty-vehicles>
- North Carolina Motor Fuels Tax Rates: <https://www.ncdor.gov/taxes-forms/motor-fuels-tax/motor-fuels-tax-rates>

MIT Research on Future Gas Tax Revenue:

https://www.mmi.mit.edu/files/ugd/29d096_eb9d66f3b2394eb29e1a76ae9c8be156.pdf

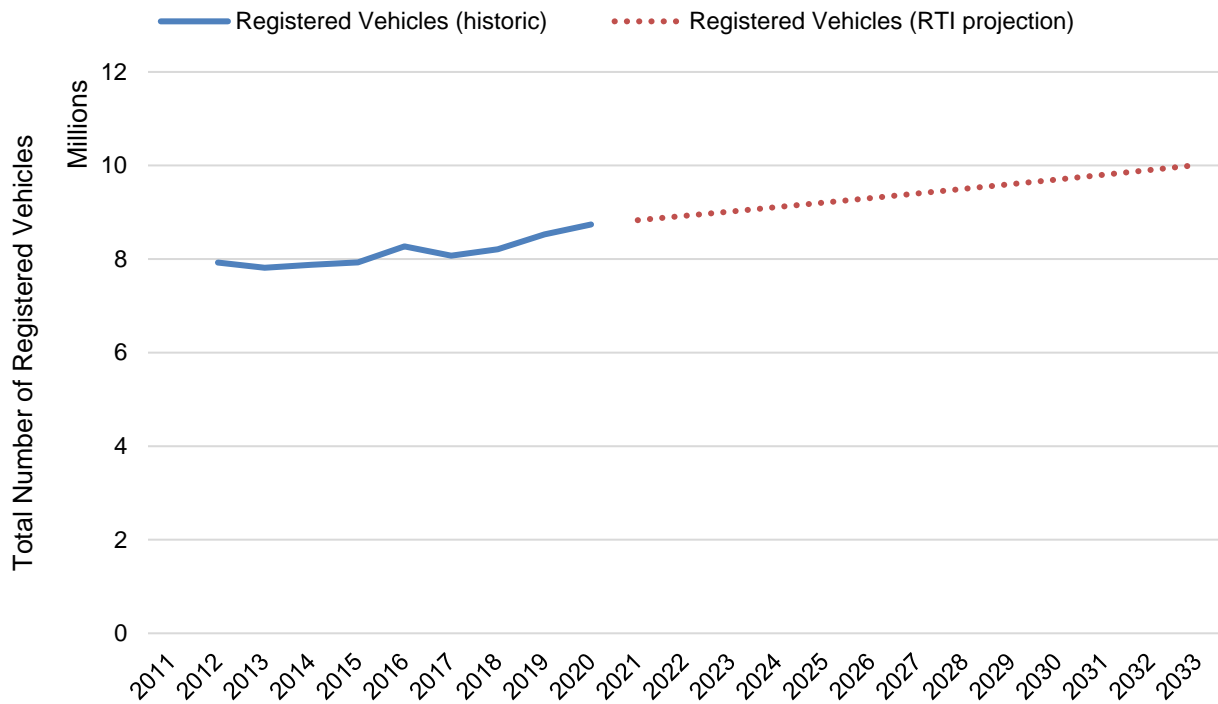
In 2023, new research is assessing the impacts of federal investments and incentives in EVs, increasing availability of EVs and EV charging infrastructure, lower prices for EVs, and the projected impacts to gas taxes. Work by the MIT Mobility Initiative and JTL Transit Lab projects that gas tax revenues will decline by 10% or more nationally over the next decade, and EVs will make up over half of the U.S. vehicle fleet by 2038. This will result resulting in a nearly \$30 billion national annual revenue decline in gas tax revenue, or over 30% of gas tax revenue at the federal and state level in 15 years, and a nearly 60% decline by 2050 which will erode the main source of revenue for road construction and maintenance in the U.S.⁴

RTI examines the projected number of vehicles registered, fuel efficiency, VMT, and rates of adoption of electric vehicles to estimate the impact to North Carolina and the access fee alternative to the state gas tax.

Vehicle Registrations

The number of registered private vehicles in North Carolina in 2023 reached an estimated 8.7 million, and RTI projects continued growth in private vehicle registrations reaching 10 million by 2033 or an estimated 85% of the state population based on historic state and national data. NCDOT cites 10.2 million vehicles, including publicly owned vehicles, registered in the state in 2023.

Historic and Projected Vehicle Registrations in North Carolina, 2011-2033



Source: NCDOT

Similarly, NCDOT projects that total gallons of fuel sold in the state will continue to rise, driving revenue from all motor fuels taxes (gasoline plus diesel) to over \$3 billion by 2034. By historic figures, this is a

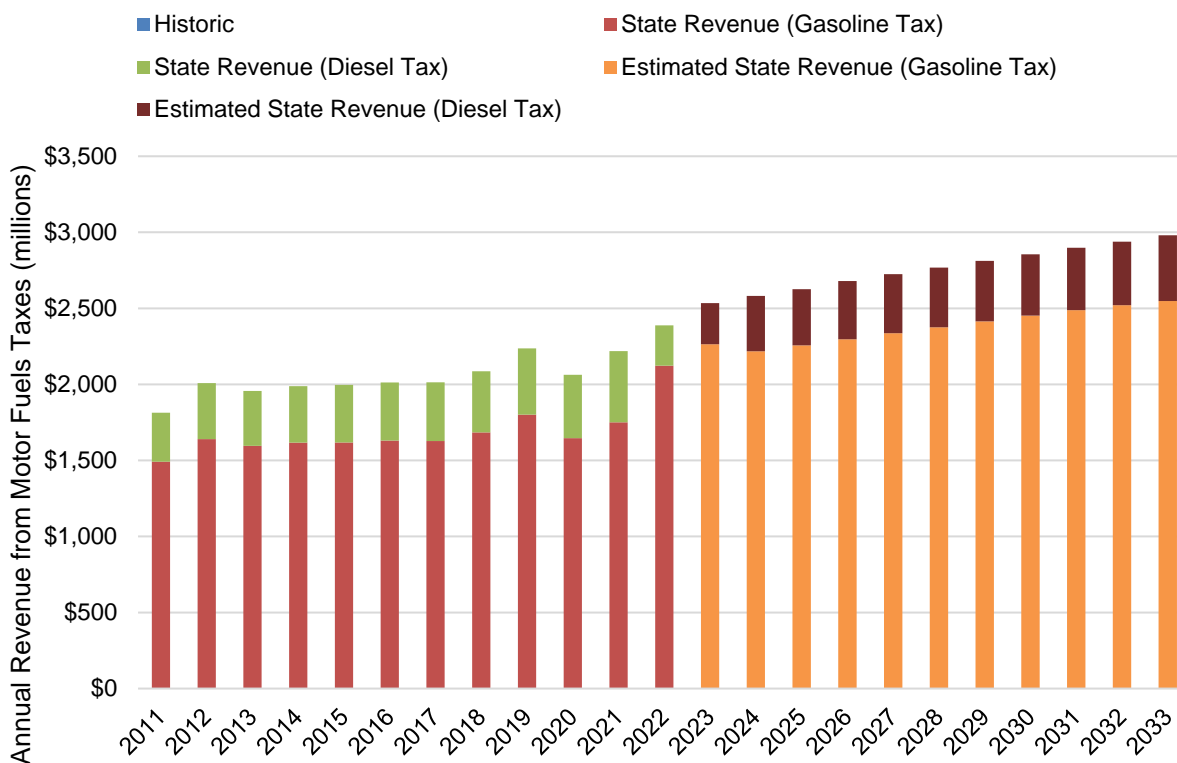
⁴ Aloisi, J. et al. *Replacing the Gas Tax: Leveraging the Electric Vehicle Transition to Build a Stronger Transportation Funding System in the United States*. MIT Mobility Initiative and JTL Transit Lab. July 2023. https://www.mmi.mit.edu/files/ugd/29d096_eb9d66f3b2394eb29e1a76ae9c8be156.pdf

plausible scenario as motor fuels taxes grew by less than 2.5 percent per year in the decade between 2011 and 2021 while NCDOT projects year-over-year growth of 1.8 percent in the next decade.

However, it is unclear how much the state has recovered its pre-pandemic levels of driving (2019) and the state assumes that by 2023 growth of motor fuels sales had recovered to its rate of growth pre-2020. Recent data from the Bureau of Transportation Statistics suggest that passenger Vehicle Miles Traveled (VMT) returned to 2019 rates by the end of 2022⁵ and freight VMT exceeded pre-2020 levels.

⁵ <https://www.bts.gov/covid-19/week-in-transportation>

Figure 2: Historic and Projected Motor Fuels Tax Revenue in North Carolina: 2011-2033

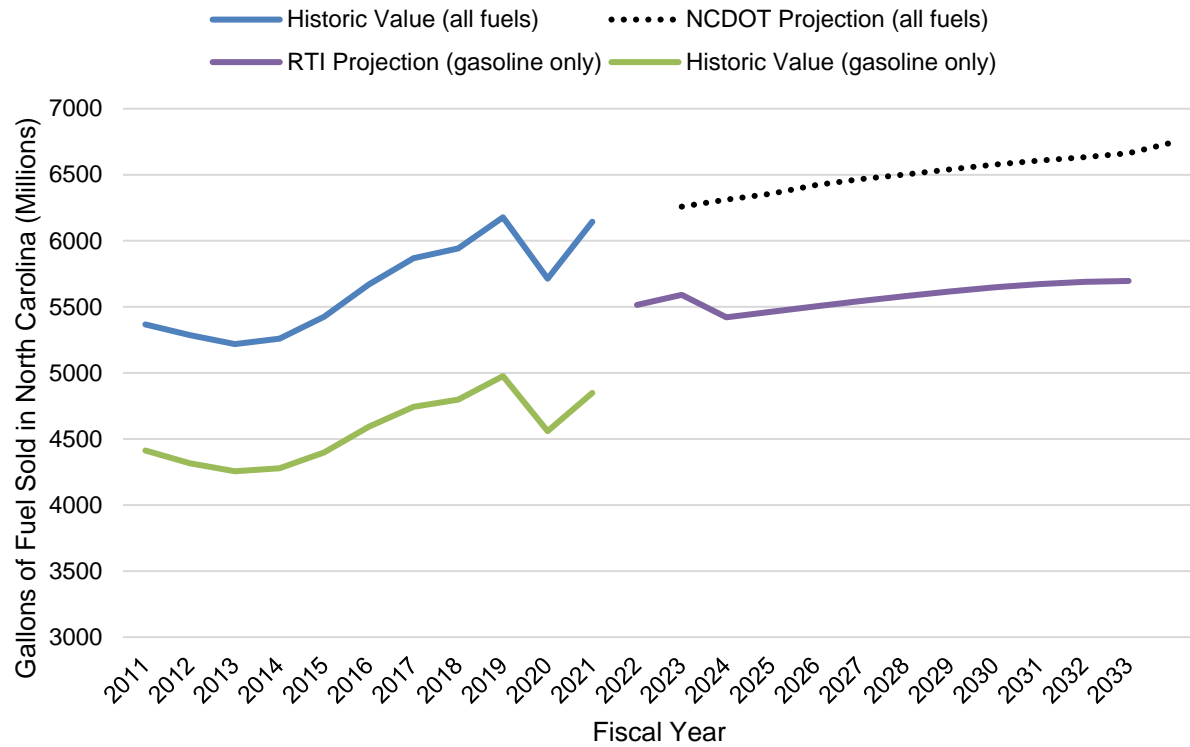


Source: Historic Figures from NCDOR FY 21 Statistical Abstract of NC Taxes, Table 53, NCDOT Projections

Since the proposed Access Fee would apply only to non-diesel-powered vehicles, RTI examined the sales of taxable gasoline in North Carolina, which historically made up about 89 percent of total taxable fuel sales in the state. *Note that this dropped to 79% in 2020 and 2021 as freight travel, the most frequent user of diesel, did not see a sharp decline during the pandemic years of 2020 and 2021.* RTI estimates that after a sharp drop in 2020 and 2021 in gasoline purchases, by 2022 consumers in North Carolina would purchase just over 5.5 billion gallons of gasoline returning to the growth trajectory pre-2020.

The state DOT estimates all purchases of fuels (gasoline & diesel) to rebound by 2023 and surpass 6.5 billion gallons by 2028. RTI estimates that gasoline’s share of total fuel purchases will grow more slowly than overall fuels: while gasoline demand is more volatile and will be greatly affected by passenger fuel efficiency, electric vehicle adoption, and passenger vehicle miles traveled (VMT), diesel fuel demand is more consistent and does not vary as much: while demand for gasoline for passenger vehicles declined in 2020, diesel fuel demand remained consistent as demand for trucking and commercial uses remained steady.

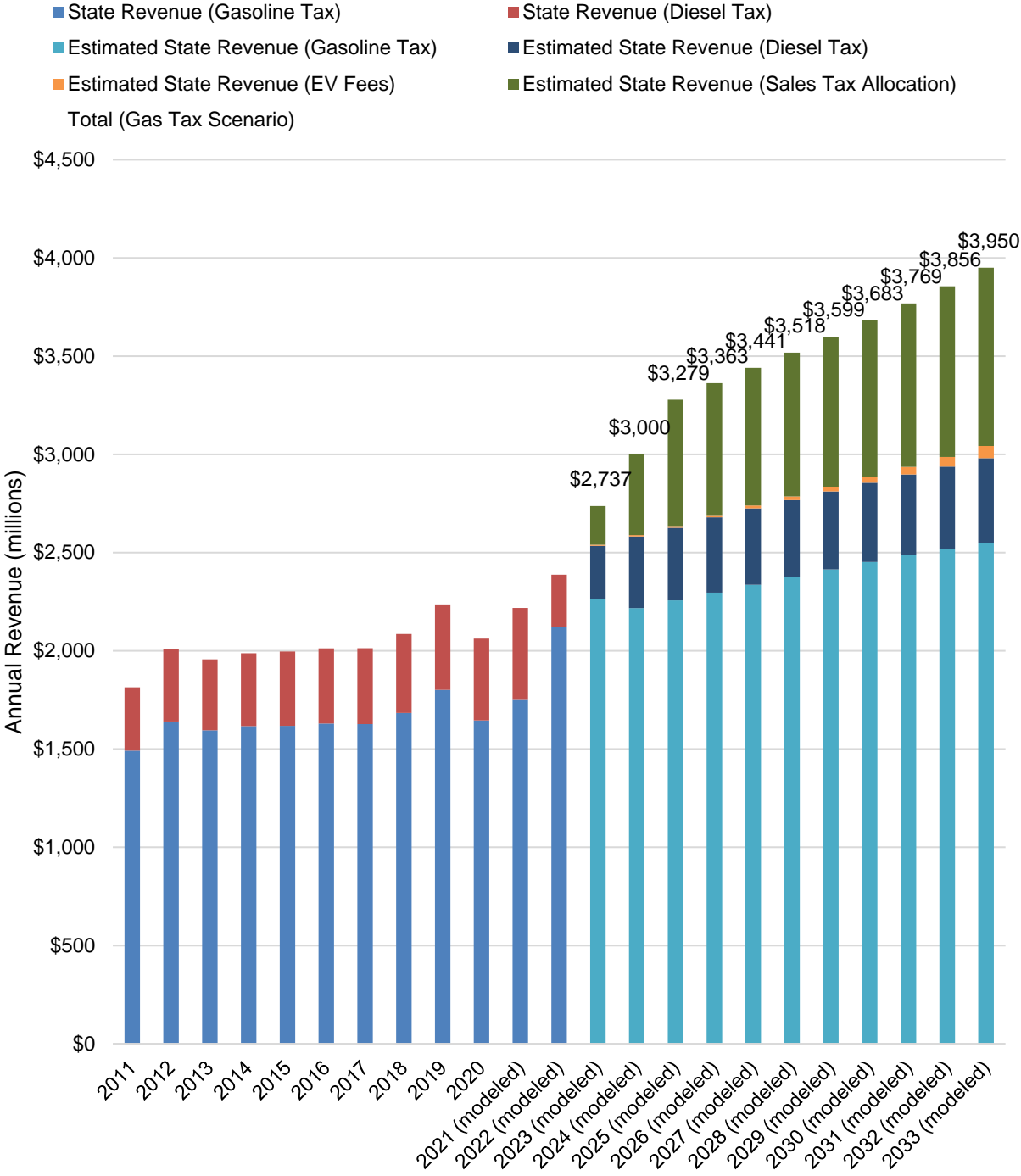
Figure 3: Historic and Projected Gallons of Fuel Sold in North Carolina: 2011-2033



Source: Historic Figures from NCDOR FY 21 Statistical Abstract of NC Taxes, Table 53, NCDOT Projections, RTI model

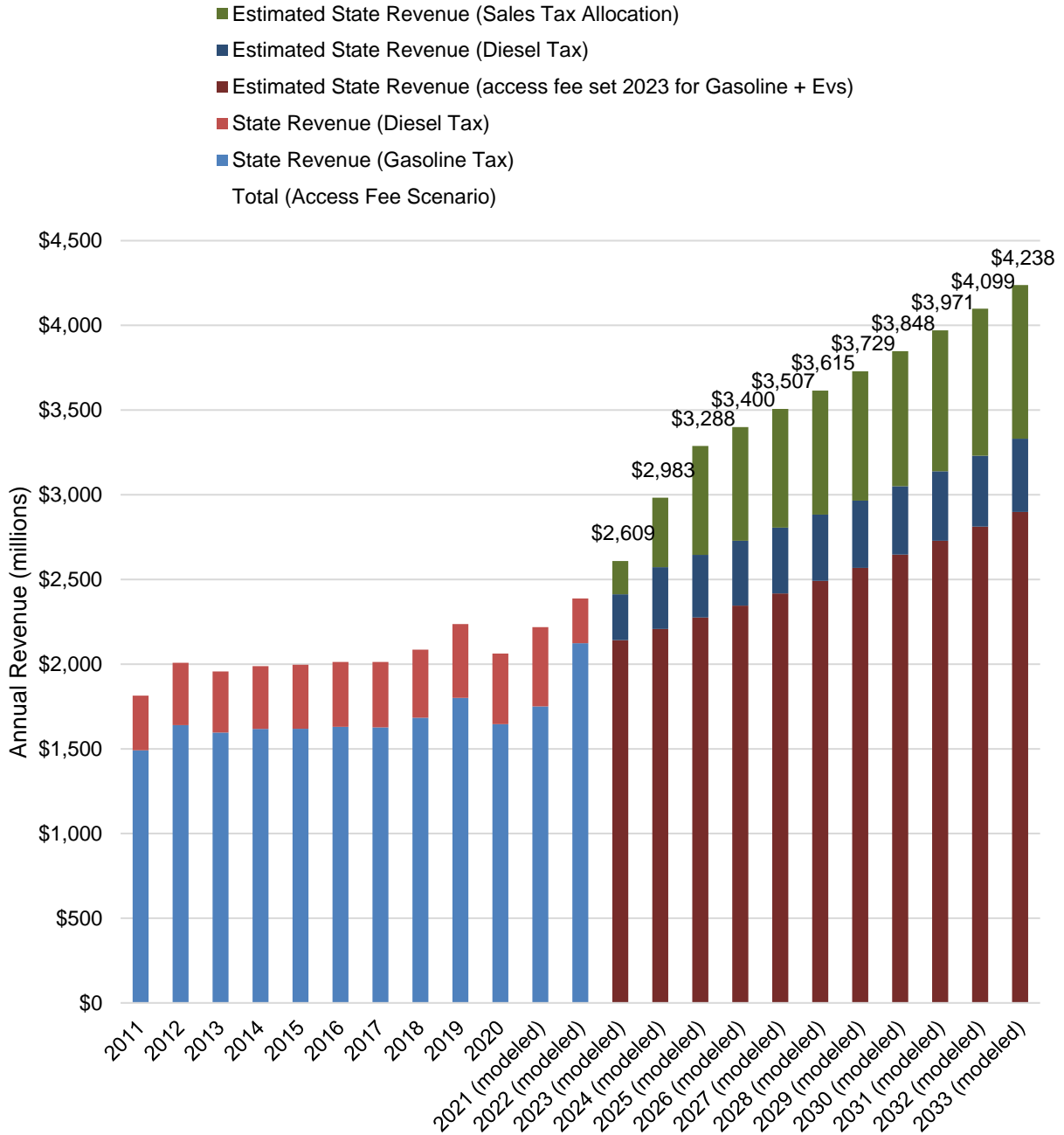
Based on historic NCDOT projections of fuel sales and the implementation of 6% of sales tax allocation to fund transportation, RTI projects that total revenue for transportation will reach just under \$4 billion by 2033. In a proposed access fee scenario, revenue will reach over \$4.2 billion by that year, with a difference of between \$200 and \$300 million.

Revenue Model: Gas Tax Scenario



Historic data from NCDOR, future projections from NCDOT, RTI Estimates

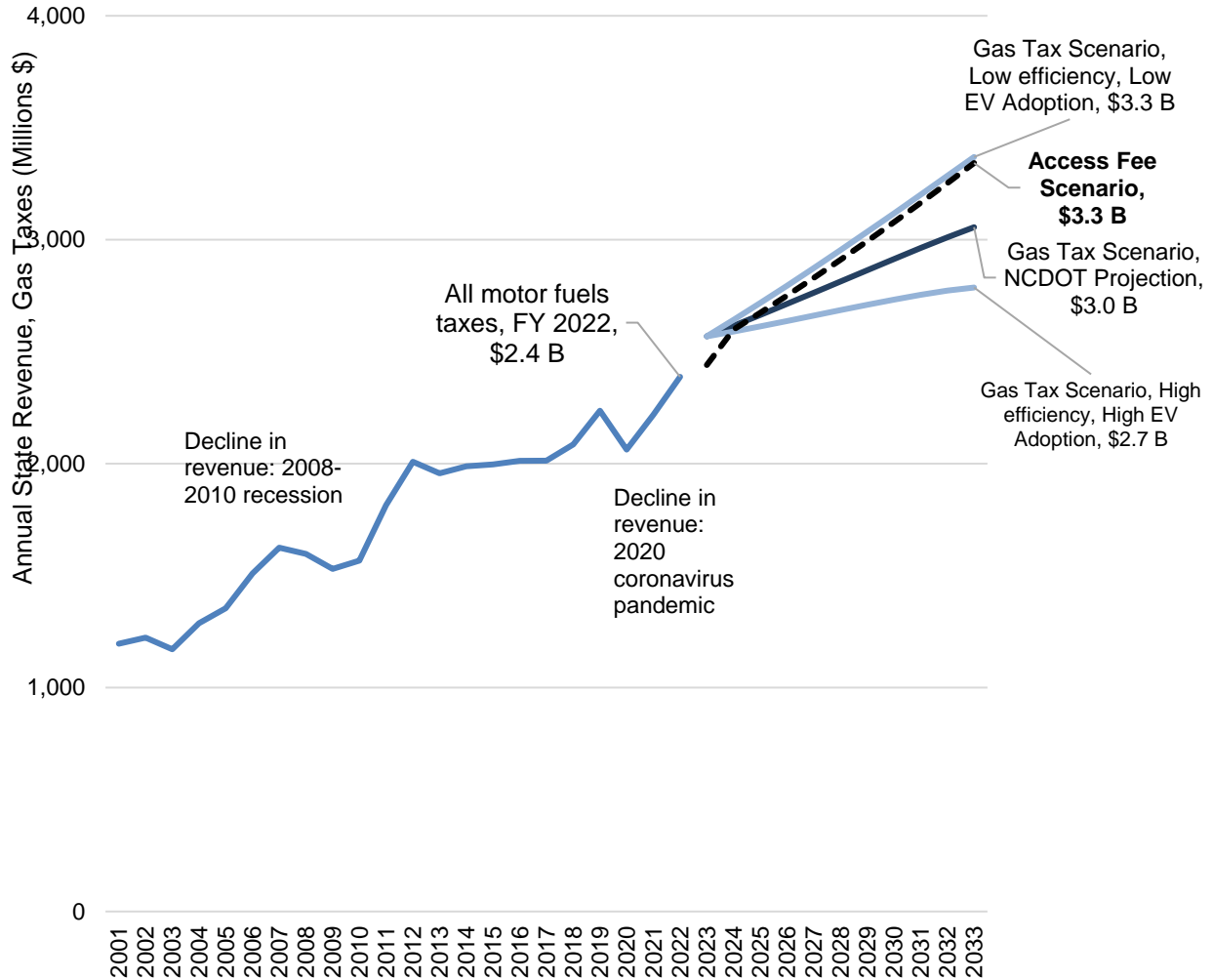
Revenue Model: Access Fee Scenario



Historic data from NCDOR, future projections from NCDOT, RTI Estimates

Finally, RTI assessed a set of sensitivity analyses, where future demand varied based on rates of vehicle efficiency improvements (low-medium-high) and electric vehicle adoption (low-medium-high). In nearly all scenarios, the proposed access fee generated more state revenue, which varied by as much as \$600 million by 2033.

Historic Revenue from Motor Fuels Taxes Future Scenarios From Motor Fuels Taxes and Proposed Access Fee



Source: NDOR Statistical Abstract of North Carolina Taxes Table 53, NCDOT-OSBM Estimates, RTI models based on variance in future fleet MPG and future EV adoption scenarios. Access fee based on 2023 estimated gas tax payments, escalated by the same rate as the North Carolina gas tax. Access fee scenario excludes diesel vehicles.

While there are several variables that would impact future revenue, more research is showing that increased efficiency and EV adoption (including plug-in hybrid and battery electric vehicles) will generate stress on the reliability of the gas tax as a revenue source and are proposing alternatives to address this future shortfall.