

Appendix R: Revenue Forecast



GET THERE TOGETHER.

**Kentucky's Long-Range
Transportation Vision**



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DATA INPUTS + DRIVERS

Several interrelated factors are likely to influence KYTC's future revenue through various funds, fees, and taxes. The makeup of the vehicle fleet (number of gas/diesel, electric, or hybrid passenger and commercial vehicles; the amount of vehicle miles traveled; fuel economies), Kentucky's overall economy, and Kentucky's population are all included as drivers for the KYTC Revenue Forecast Model. This section outlines the data sources, assumptions, and 2022–2045 forecasts for those data inputs and drivers.

Fleet Dynamics

The Fleet Dynamics tab estimates the future makeup and behavior of the vehicle fleet in Kentucky.

Data Source(s)

- Fuels Consumed¹
- Light Duty Vehicle Registrations & Vehicle Age²
- VMT Statistics³
- Fuel Economy⁴
- Percent Growth in VMT Forecast⁵
- Truck and Truck-Tractor Registrations⁶

Baseline Scenario Assumptions

- 3.8% turnover of passenger vehicle fleet 2022-2045
- 3.8% turnover of CMV fleet 2022-2045
- % of new passenger and commercial vehicle sales that are electric increases from 1% in 2022 by 1 percentage point each year 2022-2025 (starting at 1% in 2021) and 3 percentage points 2026-2045 (assumes 65% of new passenger car sales and commercial vehicles sales being electric by 2045)
- Fuel economy of new passenger vehicles and light trucks is 25.8 mpg in 2021 and increases by .1 mpg each year
- Fuel economy of new CMVs is 9.88 mpg in 2021 and increases by .0383 mpg each year

¹ <https://www.fhwa.dot.gov/policyinformation/statistics/2018/mf21.cfm>

² <https://www.autosinnovate.org/resources/insights/ky>

³ <https://www.fhwa.dot.gov/policyinformation/statistics/2019/ps1.cfm>

⁴ <https://www.energy.gov/eere/vehicles/articles/fotw-1177-march-15-2021-preliminary-data-show-average-fuel-economy-new-light>

⁵ https://www.fhwa.dot.gov/policyinformation/tables/vmt/vmt_forecast_sum.cfm

⁶ <https://www.fhwa.dot.gov/policyinformation/statistics/2020/mv1.cfm>



- % annual growth in passenger vehicle VMT is the same as KY Population growth (.36% annually)
- 1.92% annual growth in commercial vehicle VMT
- % annual growth in passenger vehicle registrations is the same as KY Population growth (.36% annually)
- 1.90% annual growth in commercial vehicle registrations

Scenario Inputs

	Annual Percentage Point Increase of new vehicles sales that are Electric vehicles		Percent of new car sales being EV in 2045
	2022-2025	2026-2045	2045
Baseline	1.00%	3.00%	65%
Survival Mode	1.50%	3.50%	77%
Live Work Local	1.00%	2.50%	55%
Global Market Growth	1.50%	4.00%	87%
Tech Innovations	2.00%	6.25%	100%

	Annual Percentage Point Increase of new CMV sales that are Electric vehicles		Percent of new CMV sales being EV in 2045
	2022-2025	2026-2045	2045
Baseline	1%	3%	65%
Survival Mode	1.5%	3.5%	71%
Live Work Local	1.0%	2.5%	51%
Global Market Growth	1.5%	4.0%	81%
Tech Innovations	1.5%	4.5%	90%



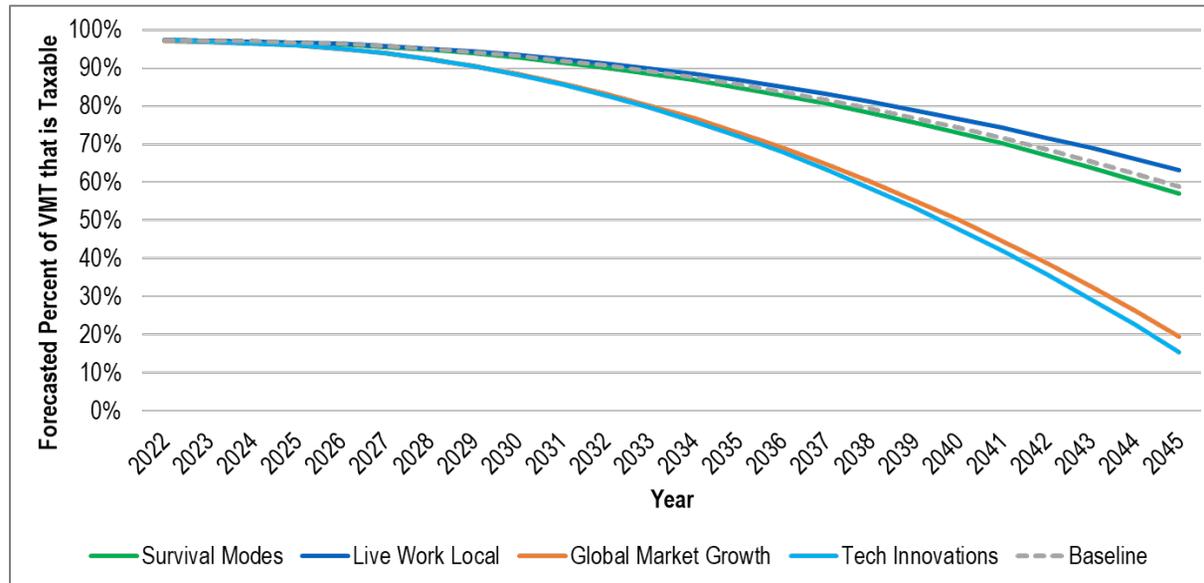
	% turnover of passenger vehicle fleet	% turnover of CMV fleet 2022-2045	Fuel Economy (2022, New Passenger Vehicles) (MPG)	Vehicle Increase MPG per year	CMV Fuel Economy (MPG)	CMV Increase in MPG per Year	% annual growth in passenger vehicle VMT	% annual growth in commercial vehicle VMT	% annual growth in passenger vehicle registration	% annual growth in commercial vehicle registrations
Baseline	3.8%	3.8%	25.9	0.1	9.9	3.83%	0.73%	1.92%	0.36%	1.90%
Survival Mode	2.8%	2.8%	25.9	0.2	9.9	4.33%	0.51%	-0.10%	0.44%	2.32%
Live Work Local	3.8%	3.8%	25.9	0.1	9.9	3.83%	0.52%	0.24%	0.40%	2.13%
Global Market Growth	4.8%	5.8%	25.9	0.2	9.9	4.33%	2.40%	3.92%	2.00%	3.00%
Tech Innovations	4.8%	4.8%	25.9	0.3	9.9	4.73%	1.60%	2.42%	1.30%	2.50%

Baseline Forecast Percent of VMT that is Taxable

- 2022: 97.33%
- 2045: 58.68%

Scenario Forecast

Figure 1: Percent of VMT that is Taxable by Scenario





KY Real GSP

The Kentucky Real Gross State Product (GSP) tab estimates the future value of Kentucky's GSP as a proxy for overall economic growth.

Source(s)

- Real Gross Domestic Product: All Industry Total in Kentucky, Millions of Chained 2012 Dollars, Annual, Not Seasonally Adjusted⁷

Baseline Assumptions

- 5% growth rate 2022-2045

Scenario Inputs

	Annual GDP Growth per Capita
Baseline	0.50%
Survival Mode	0.10%
Live Work Local	0.50%
Global Market Growth	2.25%
Tech Innovations	1.75%

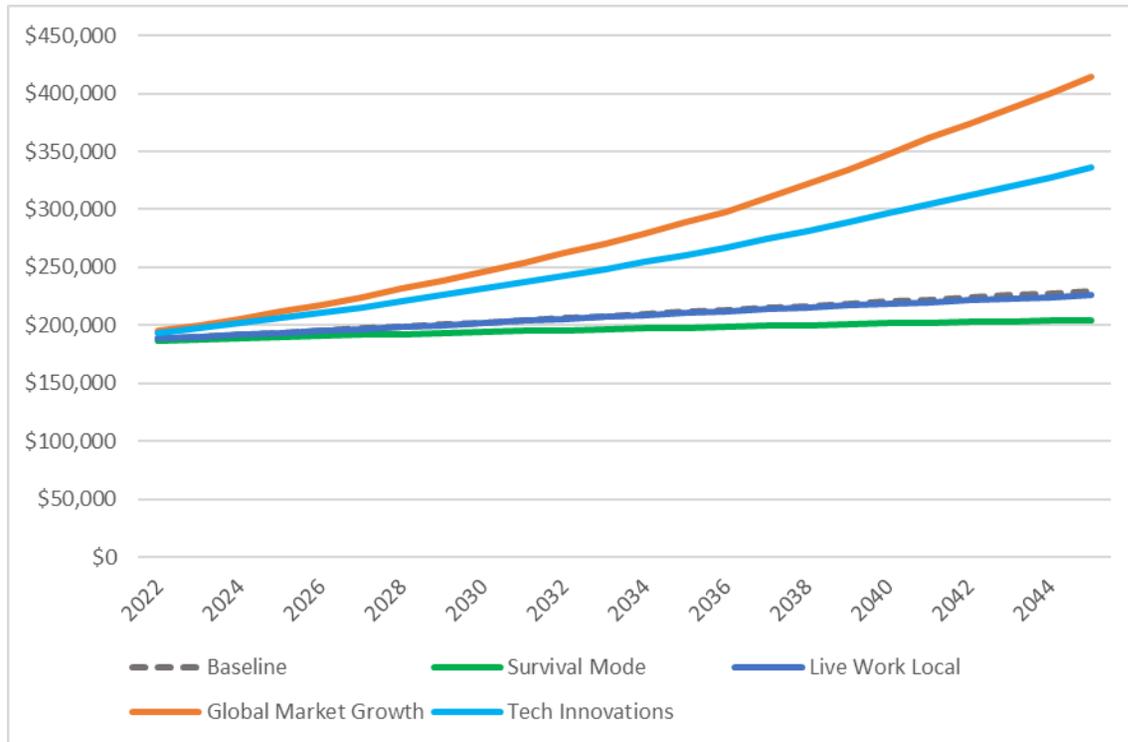
Baseline Forecast

- \$229 billion in 2045

⁷ <https://fred.stlouisfed.org/series/KYRGSP>

Scenario Forecast

Figure 2: Real GSP Forecasts by Scenario



KY Population

The KY Population tab estimates Kentucky's future population growth.

Source(s)

- Kentucky State Data Center Population Projections⁸
- Kentucky 2020 Baseline Population⁹ Baseline Assumptions:
- Growth between KSDC forecast years 2020 – 2040 (5-year increments) is linear
- Growth rate from 2040-2045 will be .30% (following trend line from existing KSDC projections)

Scenario Inputs

	Annual Population Growth Rate	2022-2025	2026-2030	2031-2035	2036-2040	2041-2045	2045 Population
Baseline	0.36%	0.44%	0.39%	0.35%	0.32%	0.30%	4,990,065
Survival Mode	0.28%	0.44%	0.34%	0.25%	0.27%	0.15%	4,903,735
Live Work Local	0.29%	0.39%	0.39%	0.30%	0.22%	0.15%	4,906,180
Global Market Growth	1.07%	0.49%	0.89%	1.00%	1.62%	1.25%	5,918,449
Tech Innovations	0.68%	0.44%	0.64%	0.65%	0.92%	0.70%	5,389,895

Baseline Forecast

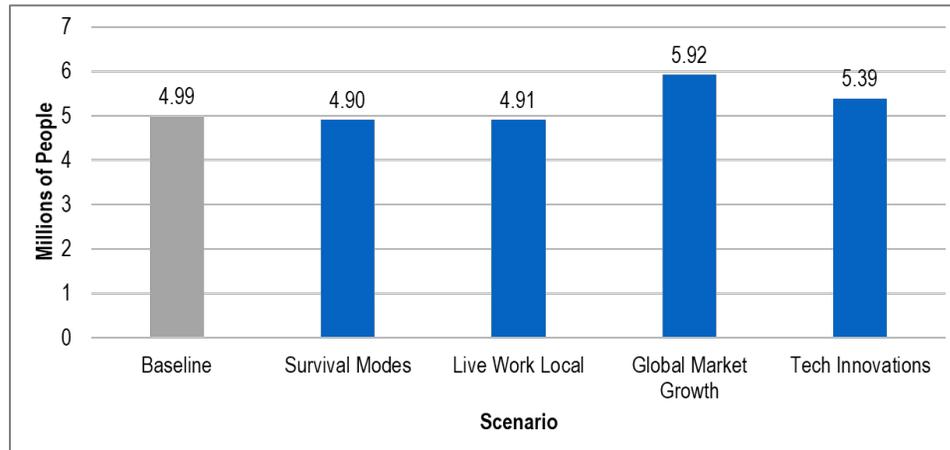
- 2045 Population 4,990,065

⁸ <http://ksdc.louisville.edu/data-downloads/projections/>

⁹ <https://www.census.gov/library/stories/state-by-state/kentucky-population-change-between-census-decade.html>

Scenario Forecast

Figure 3: Forecast 2045 KY Population by Scenario



KY Inflation

Inflation in 2021 and 2022 has been historically high. The KY Inflation tab estimates future inflation rates.

Source(s)

- Inflation Expectations, Federal Reserve Bank of New York¹⁰

Assumptions

- Annualized ~2.25% inflation
- 6.0% inflation 2022
- 3.0% inflation 2023-2024
- 2.0% inflation 2025-2045

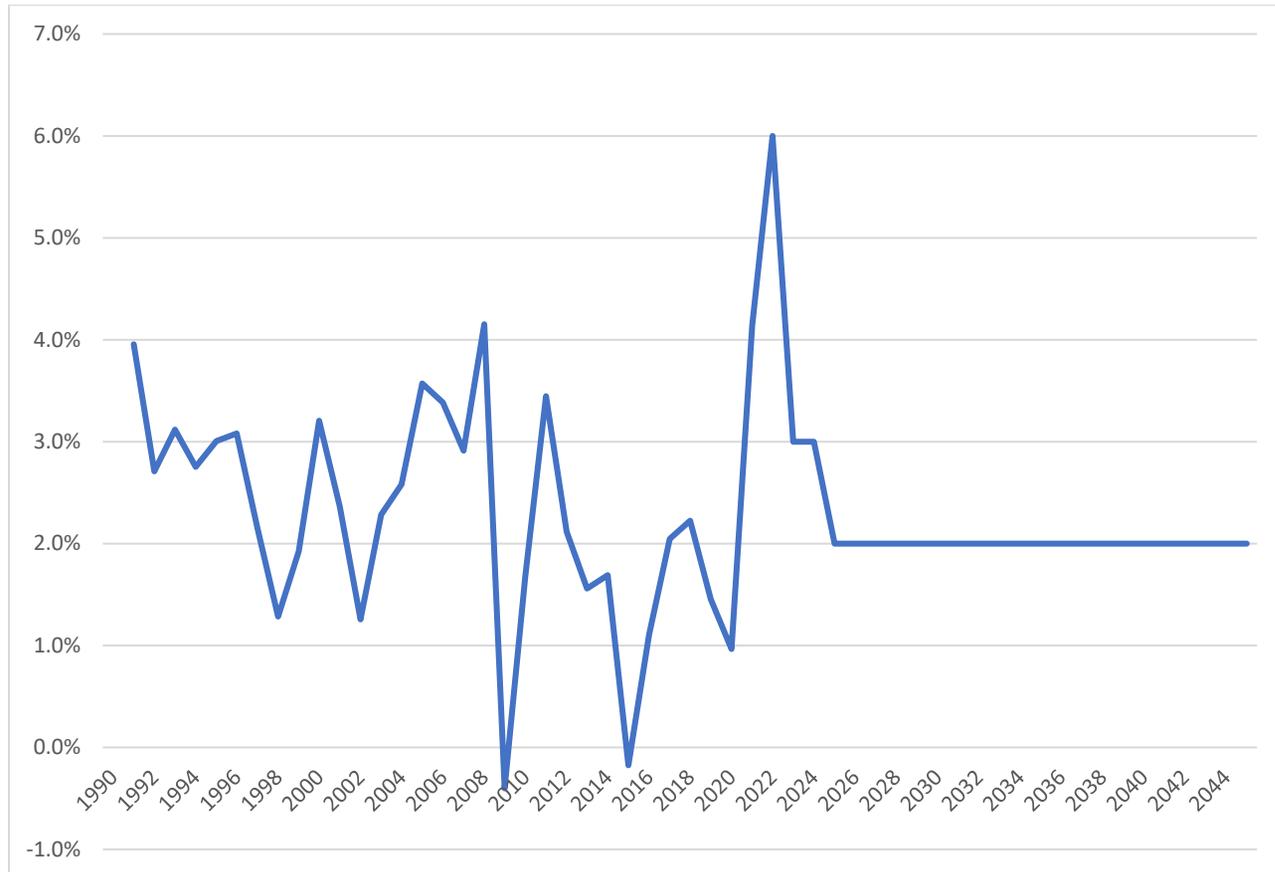
Scenario Inputs

- n/a

¹⁰ <https://www.newyorkfed.org/microeconomics/sce#/inflexp-1>

Forecast

Figure 4: Historical and Projected Inflation (Annualized)





NON-ROAD FUND REVENUE SOURCE FORECASTS

KYTC receives revenue from several sources, including Federal Highway Administration (FHWA) apportionment, transfers from Kentucky's General Fund, and the Kentucky Road Fund.

FHWA Apportionment

Source(s)

- 2022 Federal-Aid High Program Apportionments under BIL¹¹

Baseline Assumptions

- Assumes FHWA apportionment will return to approximately historic levels of \$750 million per year after IIJA (2027-2045)
- Uses TAMP forecasts for FY 2022-2027

Scenario Inputs

Scenario	Annual Change in Federal Funding after IIJA
Baseline	0.00%
Survival Mode	-1.25%
Live Work Local	0.00%
Global Market Growth	-0.25%
Tech Innovations	1.00%

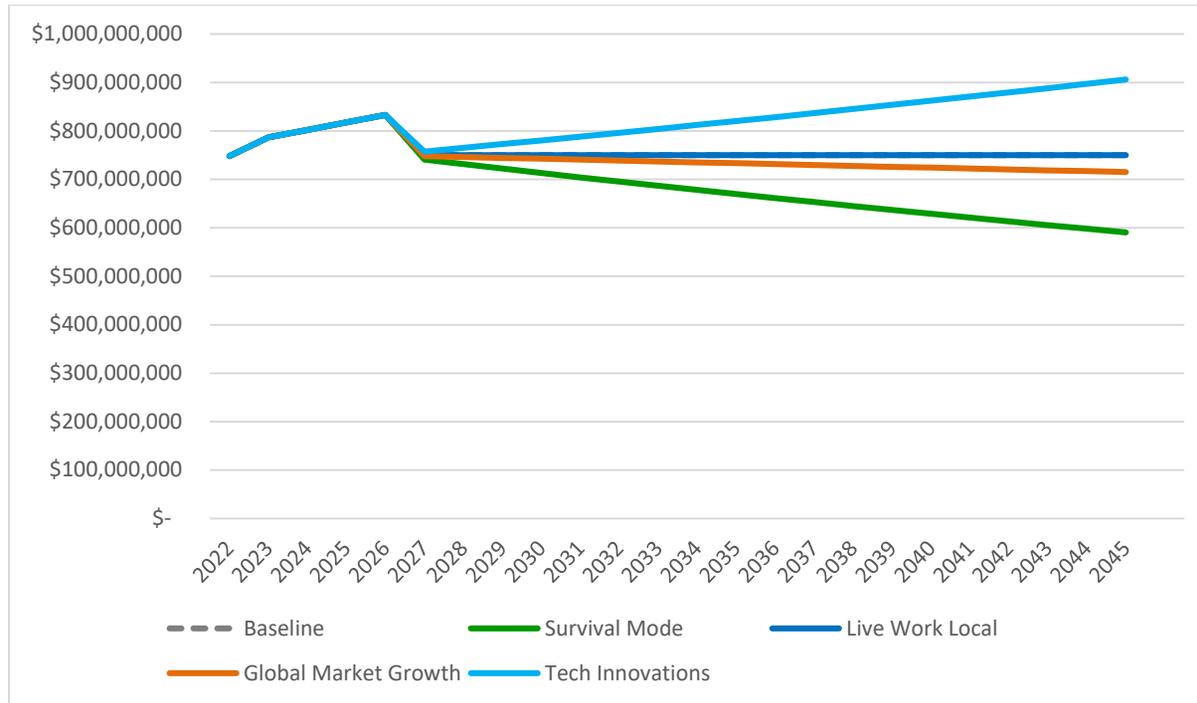
Current Forecast Total 2022-2045

- Nominal Dollars: \$18,238,0053,776
- Real (inflation adjusted) Dollars: \$14,015,484,983

¹¹ https://www.fhwa.dot.gov/legisregs/directives/notices/n4510858/n4510858_t1.cfm

Scenario Forecast

Figure 5: FHWA Apportionments by Scenario (Nominal)





Restricted Fund

Source(s)

- KYTC Transportation Budgets¹²
- Kentucky General Assembly Consensus Forecasting Group¹³

Data Dependencies

- Current Dollars tab total Road Fund forecasts

Assumptions

- Ratio of restricted fund revenue/total road fund revenue will remain at the average of 2017 – 2022 levels (9.72% from 2023-2045)

Scenario Inputs

- None (depending on total Road Fund revenue in each scenario)

Current Forecast Total 2022-2045

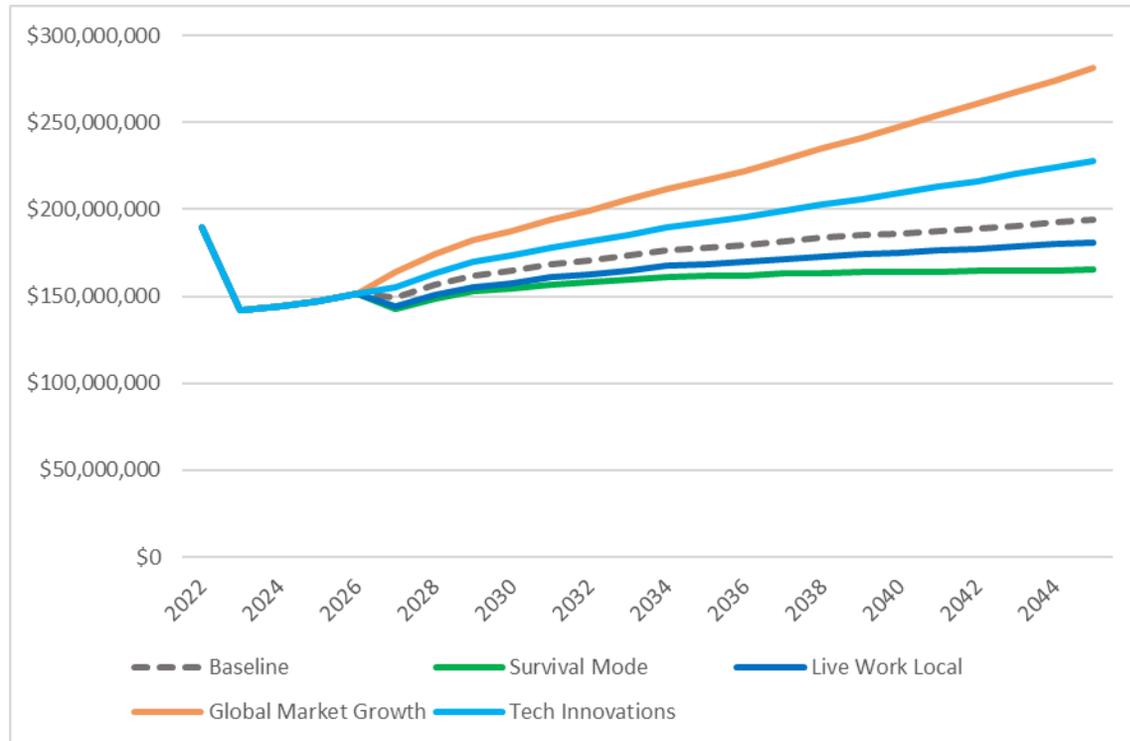
- Nominal Dollars: \$4,141,827,633
- Real (inflation adjusted) Dollars: \$3,099,497,452

¹² <https://transportation.ky.gov/BudgetFiscalManagement/Pages/default.aspx>

¹³ <https://apps.legislature.ky.gov/CommitteeDocuments/209/>

Scenario Forecast

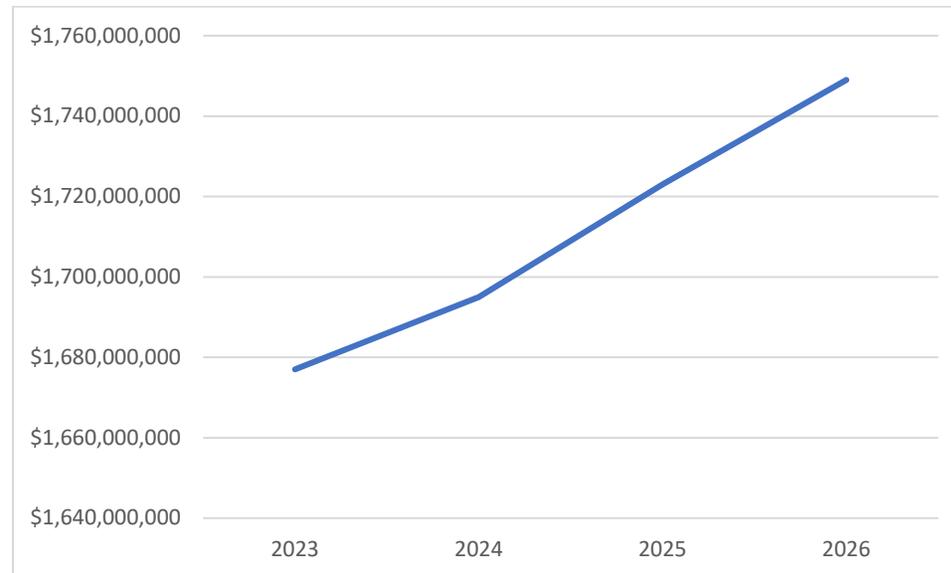
Figure 6: Restricted Fund Revenue Forecast by Scenario (Nominal)



ROAD FUND REVENUE SOURCE FORECASTS

The Road Fund total revenue estimates from 2022 – 2026 were drawn from KYTC's TAMP forecast (Figure 3). Future years (2027-2045) were modeled based on input sources to the Road fund including interest earnings, general fund transfers, Motor Vehicle Operator's License fees, Commercial Weight-Distance taxes, Motor Vehicle Usage tax, Registration fees, and Kentucky Motor Fuel taxes.

Figure 7: TAMP Total Road Fund Forecast 2023-2026¹⁴



¹⁴ Email from Robin Brewer, KYTC, January 21, 2022

Kentucky State Motor Fuel Taxes

Source(s)

- Kentucky Revised Statutes¹⁵

Data Dependencies

- Fleet Dynamics – Net Taxable Gallons Consumed

Assumptions

- Wholesale price of \$2.50 per gallon (note this is above the statutory floor of \$2.177 but aligns forecast more closely with Consensus Forecasting Group estimates)
- Gas tax rates remain the same

Motor Fuel Tax Rates	
Motor Fuel Tax	\$0.09
Wholesale floor price	\$2.500
Tax per gallon	\$0.225
Supplementary tax per gallon of gasoline	\$0.05
Supplementary tax per gallon of special fuel	\$0.02
Petroleum Storage Tank Environmental Assurance Fund	\$0.014
Commercial vehicle gas surtax	2%
Commercial vehicle gas surtax per gallon	\$0.050
Commercial vehicle special fuel surtax	4.70%
Commercial vehicle special fuel surtax per gallon	\$0.118

¹⁵ <https://apps.legislature.ky.gov/law/statutes/statute.aspx?id=49908>



Scenario Inputs

	Annual Percentage Point Increase of new CMV sales that are Electric vehicles		Percent of new CMV sales being EV in 2045
	2022-2025	2026-2045	2045
Baseline	1%	3%	65%
Survival Mode	1.5%	3.5%	71%
Live Work Local	1.0%	2.5%	51%
Global Market Growth	1.5%	4.0%	81%
Tech Innovations	1.5%	4.5%	90%

	Annual Percentage Point Increase of new vehicles sales that are Electric vehicles		Percent of new car sales being EV in 2045
	2022-2025	2026-2045	2045
Baseline	1.00%	3.00%	65%
Survival Mode	1.50%	3.50%	77%
Live Work Local	1.00%	2.50%	55%
Global Market Growth	1.50%	4.00%	87%
Tech Innovations	2.00%	6.25%	100%

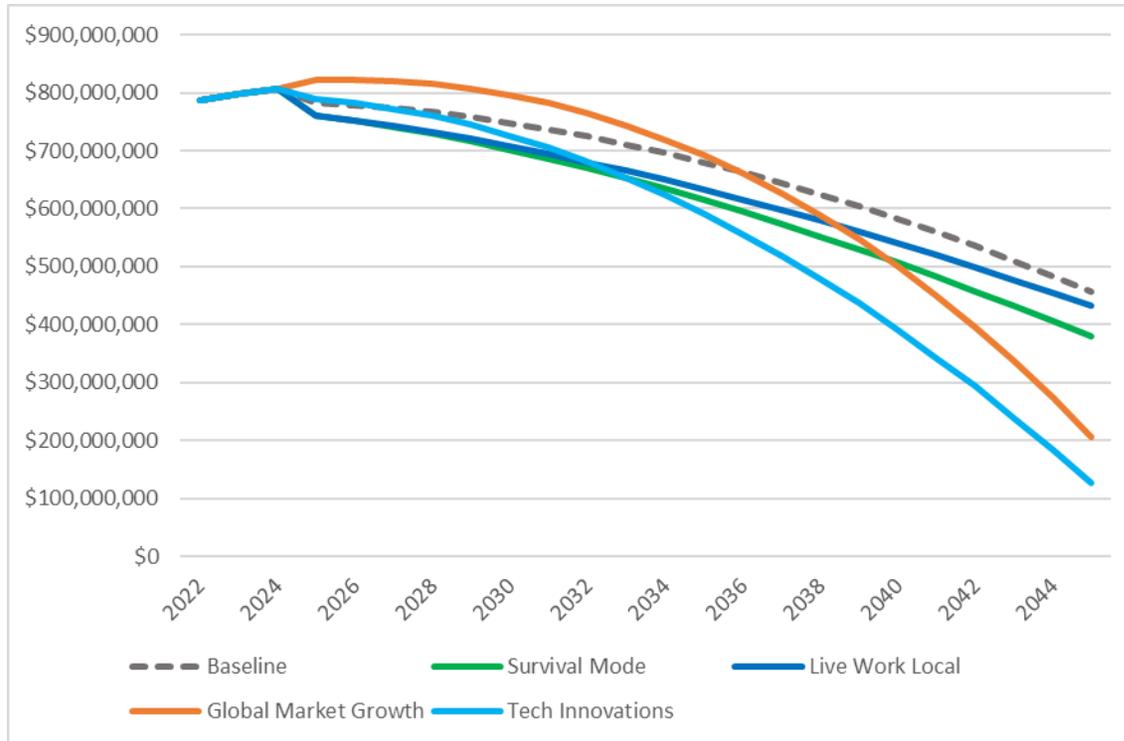
	% turnover of passenger vehicle fleet	% turnover of CMV fleet 2022-2045	Fuel Economy (2022, New Passenger Vehicles) (MPG)	Vehicle Increase MPG per year	CMV Fuel Economy (MPG)	CMV Increase in MPG per Year	% annual growth in passenger vehicle VMT	% annual growth in commercial vehicle VMT	% annual growth in passenger vehicle registration	% annual growth in commercial vehicle registrations
Baseline	3.8%	3.8%	25.9	0.1	9.9	3.83%	0.73%	1.92%	0.36%	1.90%
Survival Mode	2.8%	2.8%	25.9	0.2	9.9	4.33%	0.51%	-0.10%	0.44%	2.32%
Live Work Local	3.8%	3.8%	25.9	0.1	9.9	3.83%	0.52%	0.24%	0.40%	2.13%
Global Market Growth	4.8%	5.8%	25.9	0.2	9.9	4.33%	2.40%	3.92%	2.00%	3.00%
Tech Innovations	4.8%	4.8%	25.9	0.3	9.9	4.73%	1.60%	2.42%	1.30%	2.50%

Baseline Forecast Total 2027-2045

- Nominal Dollars: \$13,043,673,302
- Real (inflation adjusted) Dollars: \$9,777,148,530

Scenario Forecast

Figure 8: Motor Fuel Taxes by Scenario (Nominal)



Motor Vehicle Usage Tax

Source(s)

- Kentucky General Assembly Consensus Forecasting Group¹⁶
- Kentucky Revised Statutes¹⁷
- KYTC Financial Report to Management¹⁸

Data Dependencies

- KY Nominal GDP

Assumptions

- Ratio of nominal GDP to Motor Vehicle Usage Tax receipts will remain around 411.6 from 2025-2045

Scenario Inputs

	Annual GDP Growth per Capita
Baseline	0.50%
Survival Mode	0.10%
Live Work Local	0.50%
Global Market Growth	2.25%
Tech Innovations	1.75%

Baseline Forecast Total 2027-2045

- Nominal Dollars: \$17,655,971,437
- Real (inflation adjusted) Dollars: \$12,679,418,277

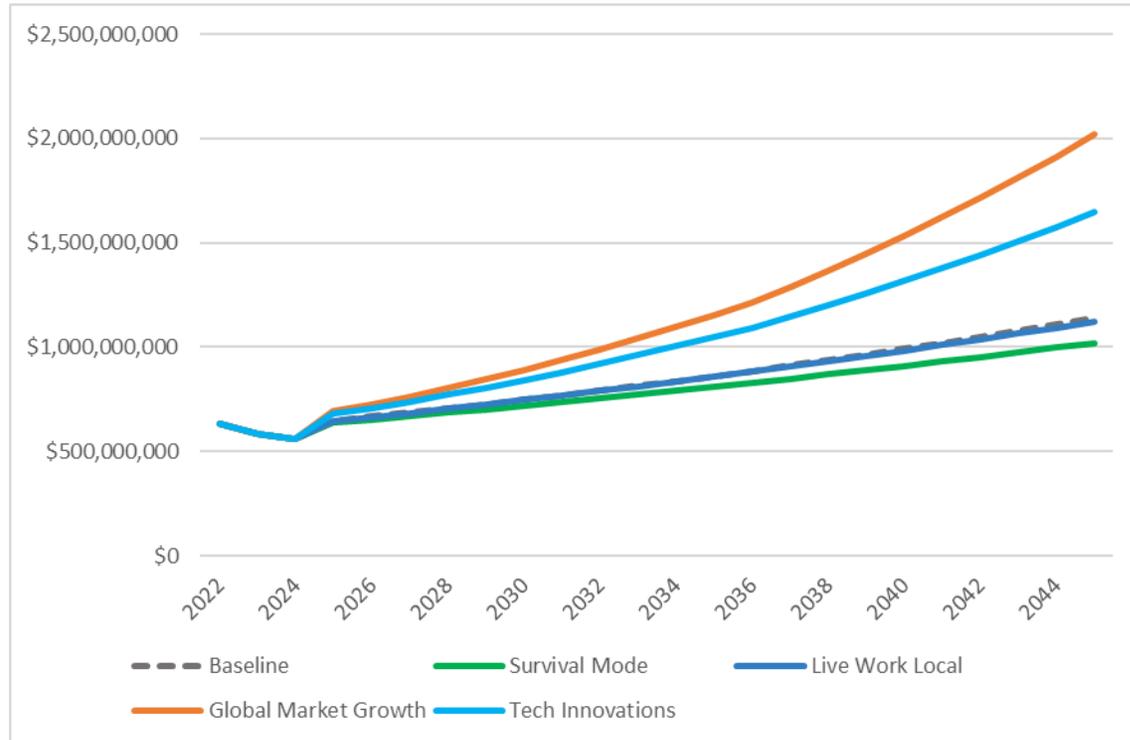
¹⁶ <https://apps.legislature.ky.gov/CommitteeDocuments/209/>

¹⁷ <https://apps.legislature.ky.gov/law/statutes/statute.aspx?id=44482>

¹⁸ <https://transportation.ky.gov/BudgetFiscalManagement/Documents/2020%20KYTC%20Financial%20Report%20to%20Management.pdf>

Scenario Forecast

Figure 9: Motor Vehicle Usage Tax & Rental Tax by Scenario (Nominal)





Motor Vehicle Operator's License

Source(s)

- Kentucky General Assembly Consensus Forecasting Group¹⁹

Data Dependencies

- KY Population

Assumptions

- Revenue per Person will increase following a linear trend of historic revenue/person

Scenario Inputs

	Annual Population Growth Rate	2022-2025	2026-2030	2031-2035	2036-2040	2041-2045	2045 Population
Baseline	0.36%	0.44%	0.39%	0.35%	0.32%	0.30%	4,990,065
Survival Mode	0.28%	0.44%	0.34%	0.25%	0.27%	0.15%	4,903,735
Live Work Local	0.29%	0.39%	0.39%	0.30%	0.22%	0.15%	4,906,180
Global Market Growth	1.07%	0.49%	0.89%	1.00%	1.62%	1.25%	5,918,449
Tech Innovations	0.68%	0.44%	0.64%	0.65%	0.92%	0.70%	5,389,895

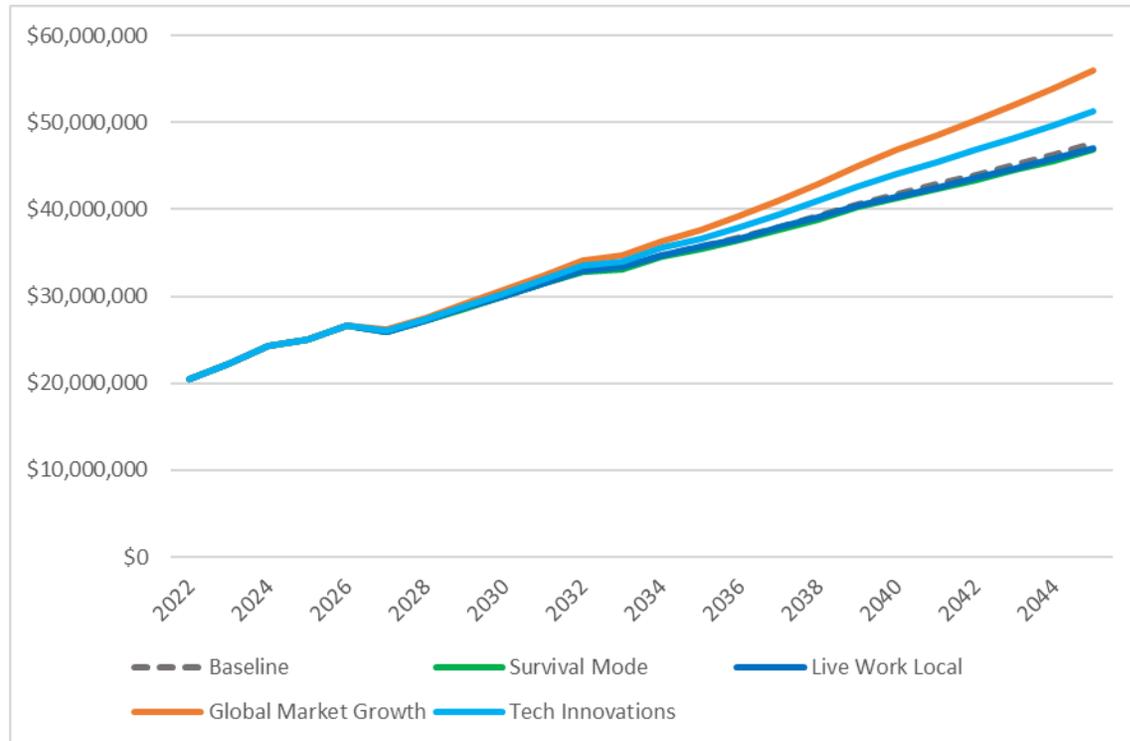
Baseline Forecast Total 2027-2045

- Nominal Dollars: \$722,636,900
- Real (inflation adjusted) Dollars: \$516,129,725

¹⁹ <https://apps.legislature.ky.gov/CommitteeDocuments/209/>

Scenario Forecast

Figure 10: Motor Vehicle Operator License by Scenario (Nominal)



Registration Fees

Source(s)

- KYTC Financial Report to Management²⁰

Data Dependencies

- KY Population
- Fleet Dynamics – Commercial VMT

Baseline Assumptions

- Passenger car registration revenue per person will remain at about \$9.79 from 2021-2045
- Truck registration revenue per commercial VMT will remain at about \$0.0102

Scenario Inputs

	Annual Population Growth Rate	2022-2025	2026-2030	2031-2035	2036-2040	2041-2045	2045 Population
Baseline	0.36%	0.44%	0.39%	0.35%	0.32%	0.30%	4,990,065
Survival Mode	0.28%	0.44%	0.34%	0.25%	0.27%	0.15%	4,903,735
Live Work Local	0.29%	0.39%	0.39%	0.30%	0.22%	0.15%	4,906,180
Global Market Growth	1.07%	0.49%	0.89%	1.00%	1.62%	1.25%	5,918,449
Tech Innovations	0.68%	0.44%	0.64%	0.65%	0.92%	0.70%	5,389,895

	% annual growth in commercial vehicle VMT
Baseline	1.92%
Survival Mode	-0.10%
Live Work Local	0.24%
Global Market Growth	3.92%
Tech Innovations	2.42%

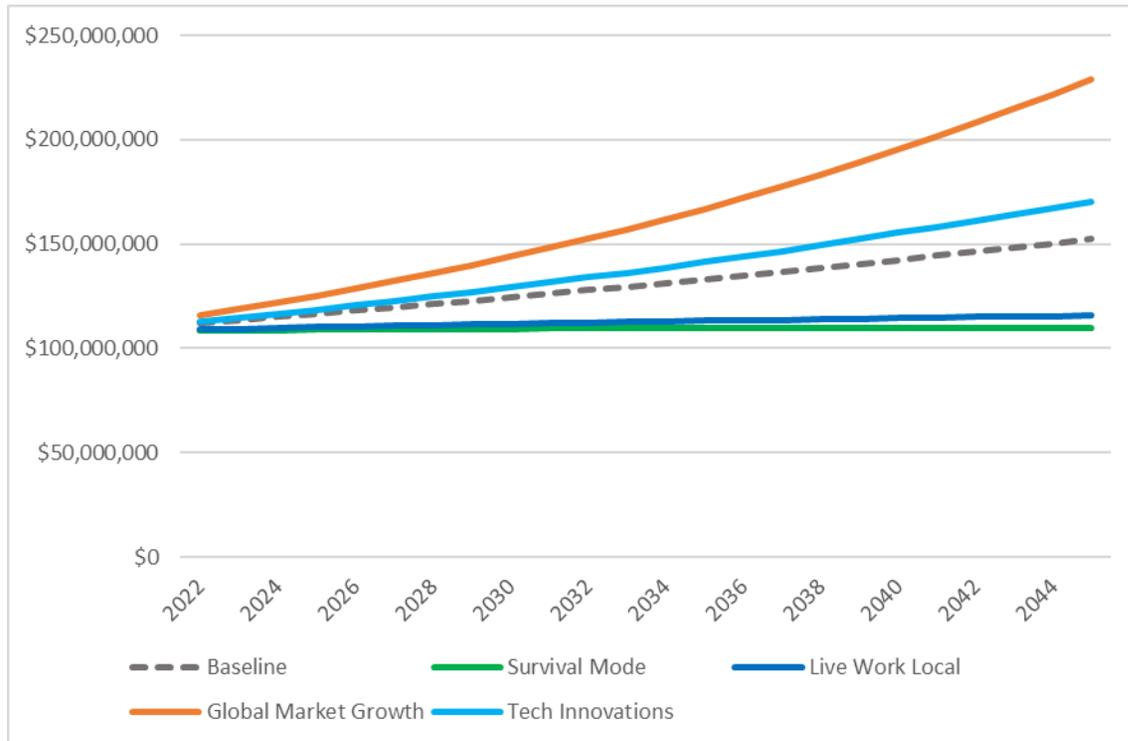
²⁰ <https://transportation.ky.gov/BudgetFiscalManagement/Documents/2020%20KYTC%20Financial%20Report%20to%20Management.pdf>

Baseline Forecast Total 2027-2045

- Nominal Dollars: \$2,682,903,628
- Real (inflation adjusted) Dollars: \$1,948,887,933

Scenario Forecast:

Figure 11: Registration Fees by Scenario (Nominal)



Commercial Weight-Distance Tax

Source(s)

- Kentucky General Assembly Consensus Forecasting Group²¹

Data Dependencies

- Fleet Dynamics – Commercial VMT

Assumptions

- Ratio of Weight-Distance eligible VMT to total Commercial VMT will remain at around .467 from 2025-2045
- Usage Tax Rate per mile will remain at .0285

Scenario Inputs

	% annual growth in commercial vehicle VMT
Baseline	1.92%
Survival Mode	-0.10%
Live Work Local	0.24%
Global Market Growth	3.92%
Tech Innovations	2.42%

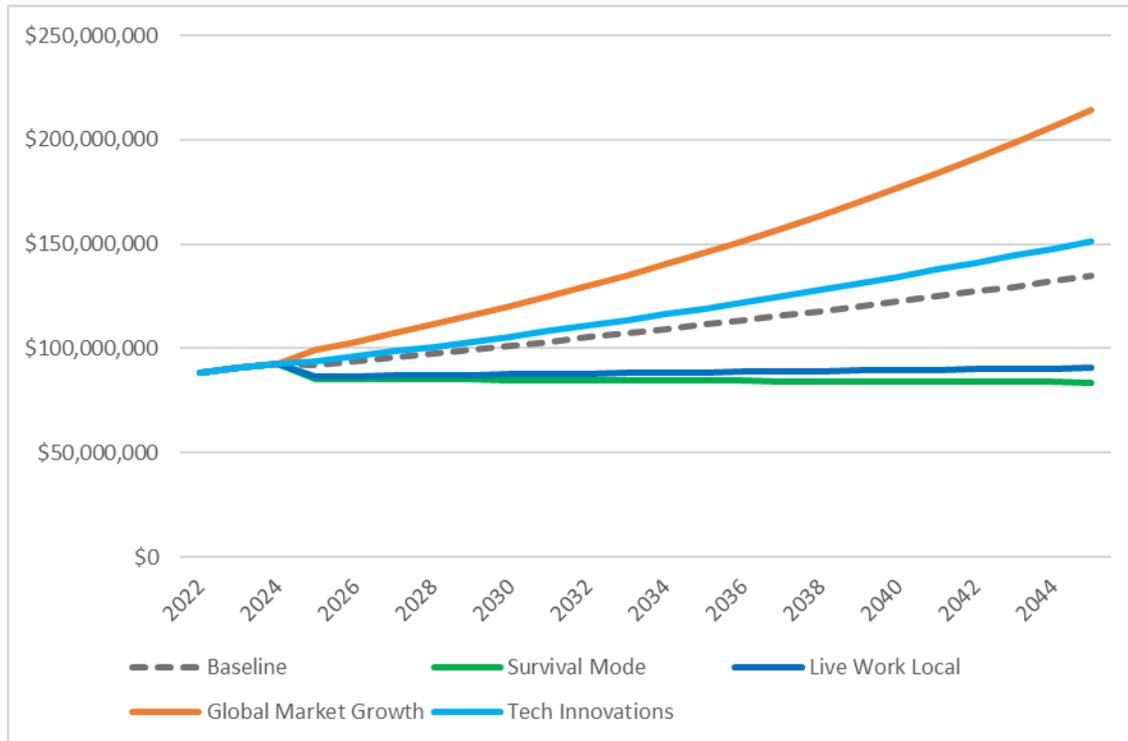
Baseline Forecast Total 2027-2045

- Nominal Dollars: \$2,256,352,584
- Real (inflation adjusted) Dollars: \$1,631,853,233

²¹ <https://apps.legislature.ky.gov/CommitteeDocuments/209/>

Scenario Forecast

Figure 12: Commercial Weight-Distance Fee by Scenario (Nominal)



Electric Vehicle Fees

Source(s)

- Kentucky Revised Statutes House Bill 8²²

Data Dependencies

- Fleet dynamics

Baseline Assumptions

	Fee
Electric Vehicle	\$120
Hybrid Vehicle	\$60

- 50% to Road Fund, 50% to General Fund

Scenario Inputs

	% turnover of passenger vehicle fleet	% turnover of CMV fleet 2022-2045	% annual growth in passenger vehicle registration	% annual growth in commercial vehicle registrations
Baseline	3.8%	3.8%	0.36%	1.90%
Survival Mode	2.8%	2.8%	0.44%	2.32%
Live Work Local	3.8%	3.8%	0.40%	2.13%
Global Market Growth	4.8%	5.8%	2.00%	3.00%
Tech Innovations	4.8%	4.8%	1.30%	2.50%

²² <https://apps.legislature.ky.gov/recorddocuments/bill/22RS/hb8/bill.pdf>

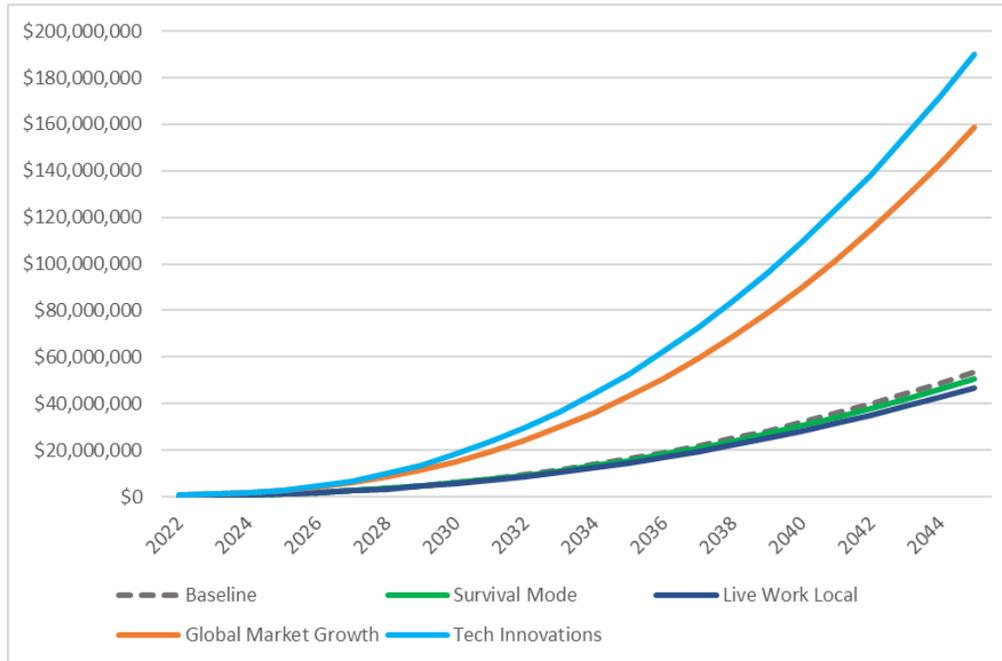


	Annual Percentage Point Increase of new vehicles sales that are Electric vehicles	
	2022-2025	2026-2045
Baseline	1.00%	3.00%
Survival Mode	1.50%	3.50%
Live Work Local	1.00%	2.50%
Global Market Growth	1.50%	4.00%
Tech Innovations	2.00%	6.25%
	Annual Percentage Point Increase of new CMV sales that are Electric vehicles	
	2022-2025	2026-2045
Baseline	1%	3%
Survival Mode	1.5%	3.5%
Live Work Local	1.0%	2.5%
Global Market Growth	1.5%	4.0%
Tech Innovations	1.5%	4.5%

Current Forecast Total 2023-2045

- Nominal Dollars: \$428,047,097
- Real (inflation adjusted) Dollars: \$284,519,058

Figure 13: Electric Vehicle Fees by Scenario (Nominal)



Interest Earnings

Source(s)

- KYTC Transportation Budget²³
- Kentucky General Assembly Consensus Forecasting Group²⁴

Data Dependencies

- Current Dollars tab total Road Fund forecasts

Baseline Assumptions

- Ratio of interest revenue/total road fund revenue will remain at around .199% from 2025-2045

Scenario Inputs

- None

Current Forecast Total 2027-2045

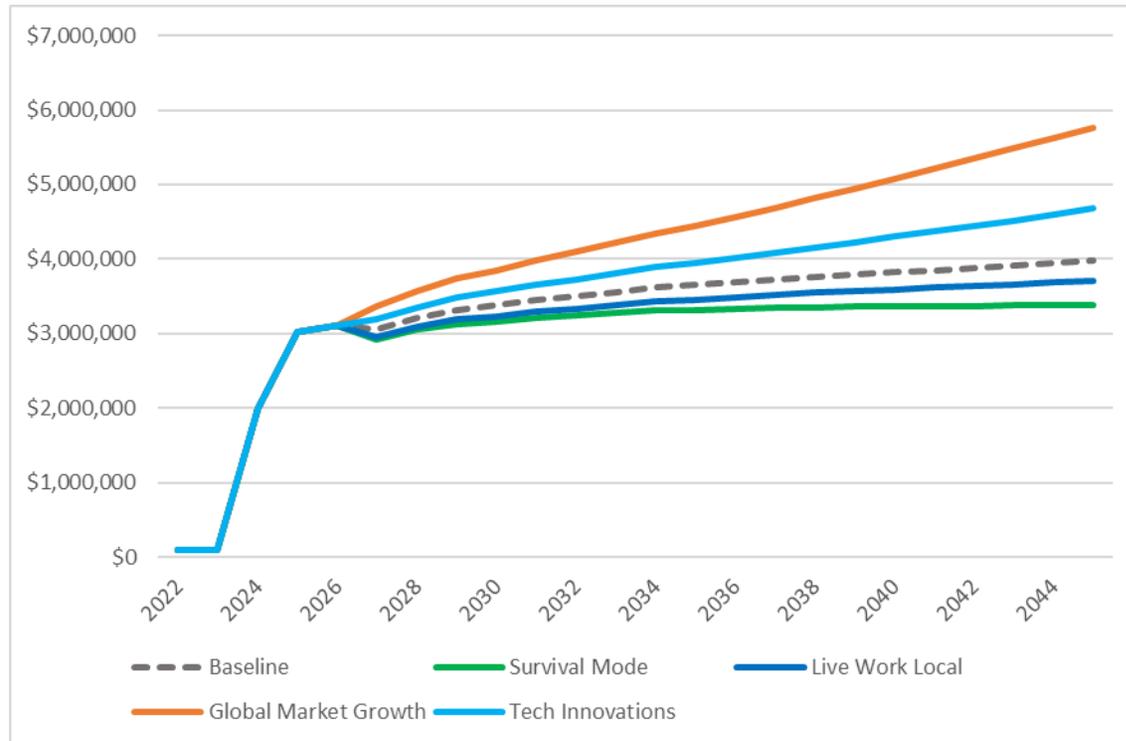
- Nominal Dollars: \$69,164,102
- Real (inflation adjusted) Dollars: \$49,537,776

²³ <https://transportation.ky.gov/BudgetFiscalManagement/Pages/default.aspx>

²⁴ <https://apps.legislature.ky.gov/CommitteeDocuments/209/>

Scenario Forecast

Figure 14: Interest Earnings by Scenario (Nominal)





General Fund Transfers

Source(s)

- KYTC Transportation Budget²⁵

Data Dependencies

- Inflation

Assumptions

- Transfers from the general fund will increase with inflation

Scenario Inputs

- None

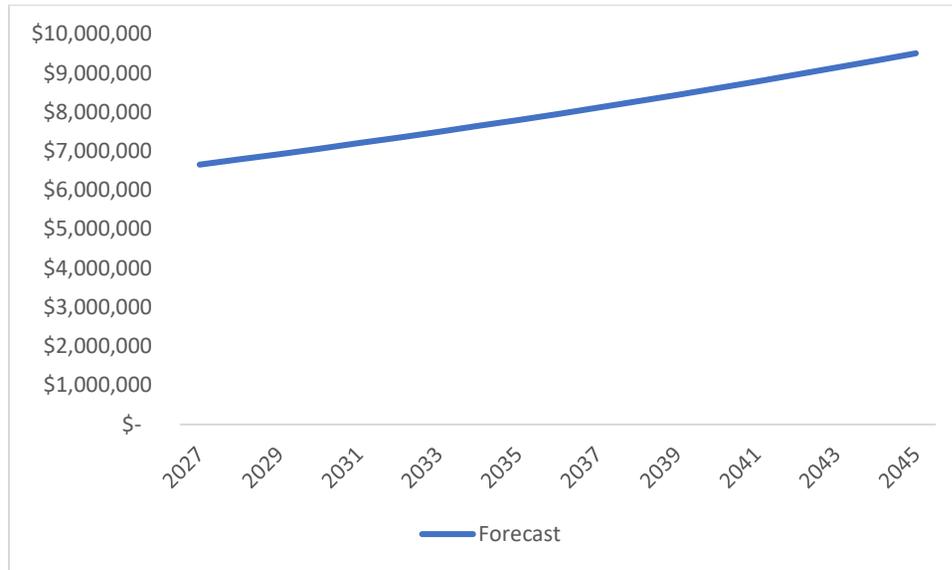
Baseline Forecast Total 2027-2045

- Nominal Dollars: \$166,505,397
- Real (inflation adjusted) Dollars: \$122,472,740

²⁵ <https://transportation.ky.gov/BudgetFiscalManagement/Pages/default.aspx>

Forecast

Figure 15: General Fund Transfers (Nominal)



Debt Service

Source(s)

- KYTC-provided data²⁶

Data Dependencies

- None

Current Assumptions

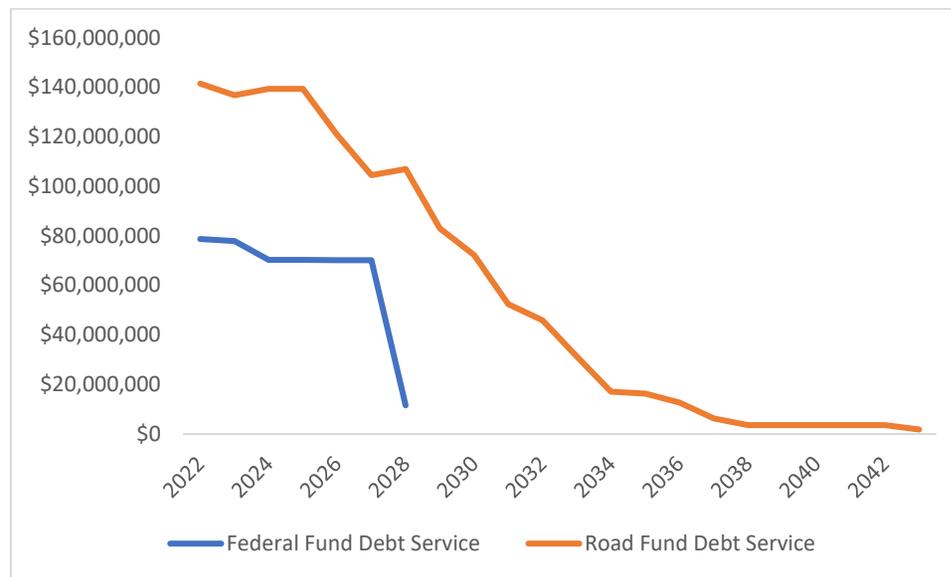
- n/a

Current Forecast Total 2022-2043

- Nominal Dollars: \$(1,696,864,293)
- Real (inflation adjusted) Dollars: \$(1,516,900,913)

Current Forecast

Figure 16: Debt Service (Nominal)



²⁶ Email from Robin Brewer, Executive Director, Office of Budget & Fiscal Management, KYTC, November 9, 2021

2022-2045 FORECASTS

Nominal Dollars

Data Dependencies

- All revenue sheets
- Debt service

Assumptions

- Revenue Sharing distribution will remain at around 24% of total revenue

Baseline Forecast Total 2022-2045

- Net of debt service and revenue sharing
- \$53,146,819,630

Constant (Real) Dollars – Purchasing Power

Data Dependencies

- Current Dollars sheet
- KY Inflation sheet

Current Assumptions

- Revenue Sharing distribution will remain at around 24% of total revenue
- Inflation rates annualized to 2.25%
 - 6.0% inflation 2022
 - 3.0% inflation 2023-2024
 - 2.0% inflation 2025-2045²⁷
- Inflation applied at an annual average rate (i.e. approximately 2.25% each year given the above assumed inflation rates).

Forecast Total 2022-2045

- Net of debt service and revenue sharing
- \$40,317,895,779

Figure 17: Revenue Forecasts (2022 Constant Dollars)

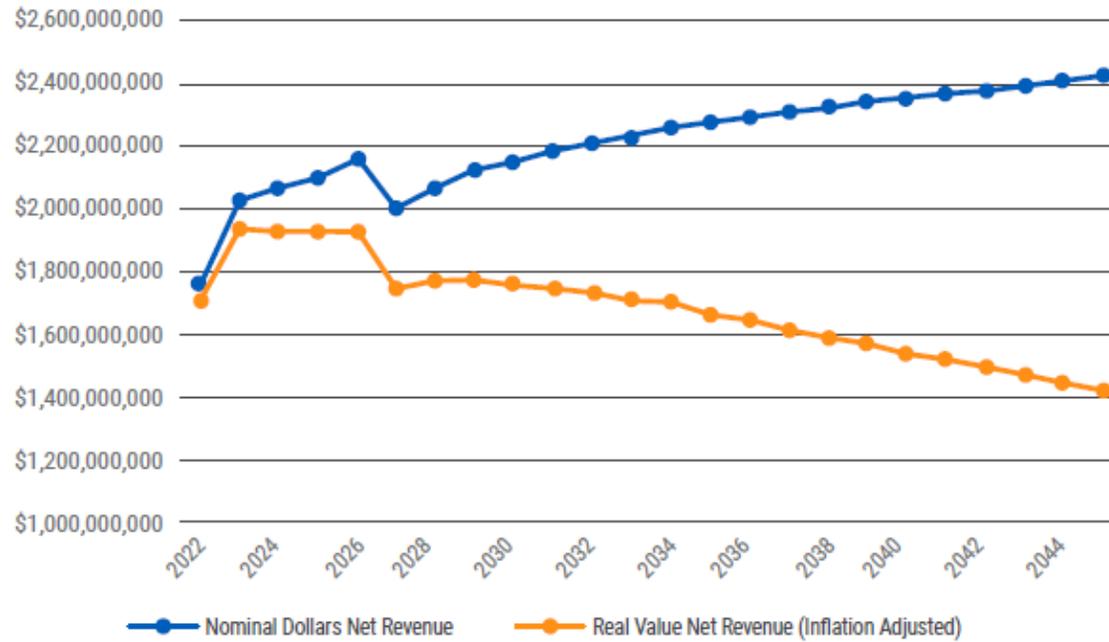


Figure 18: Gross Baseline Revenue Forecast (Nominal)

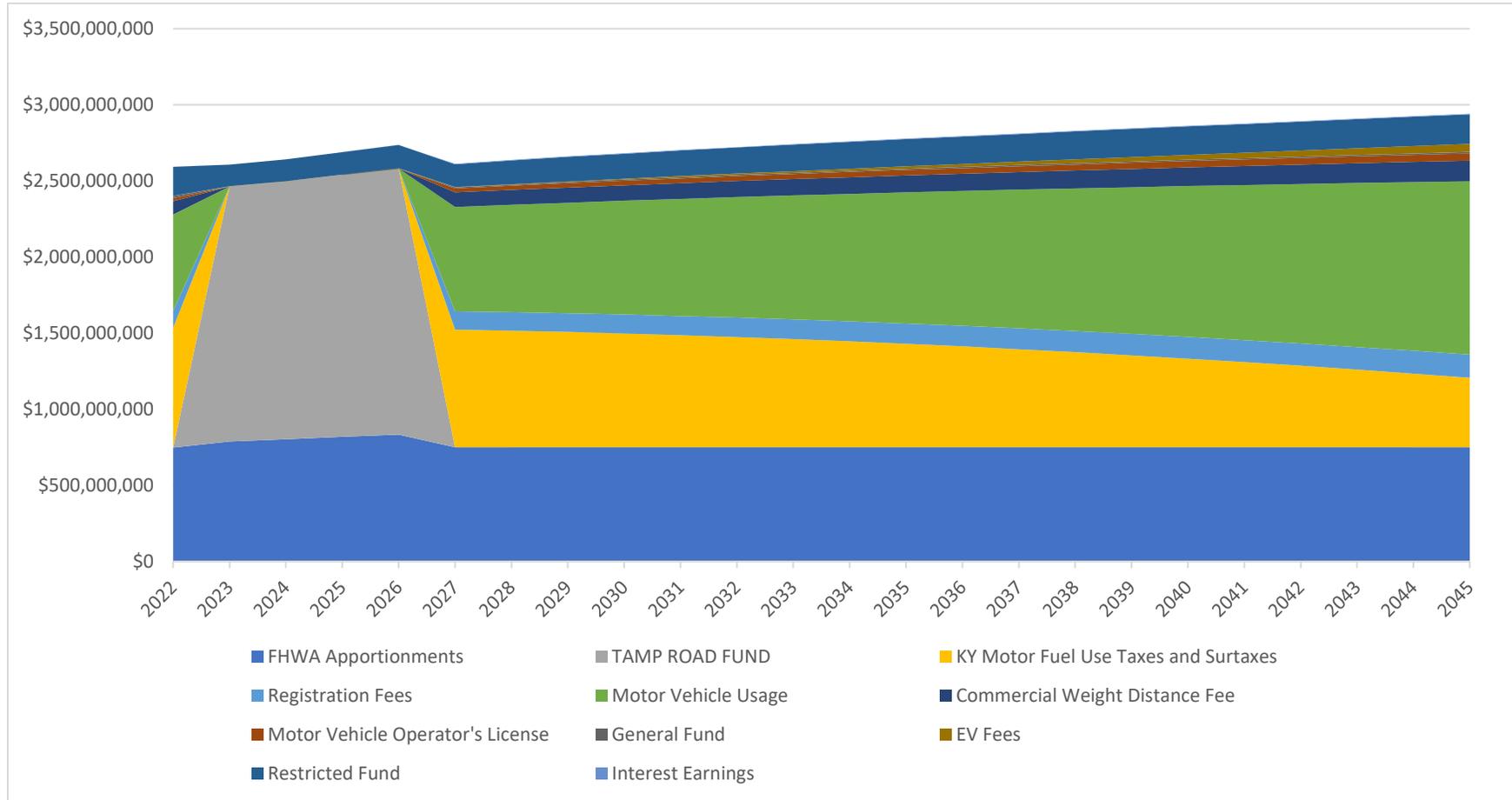


Figure 19: Gross Baseline Revenue Forecast (Real)

