

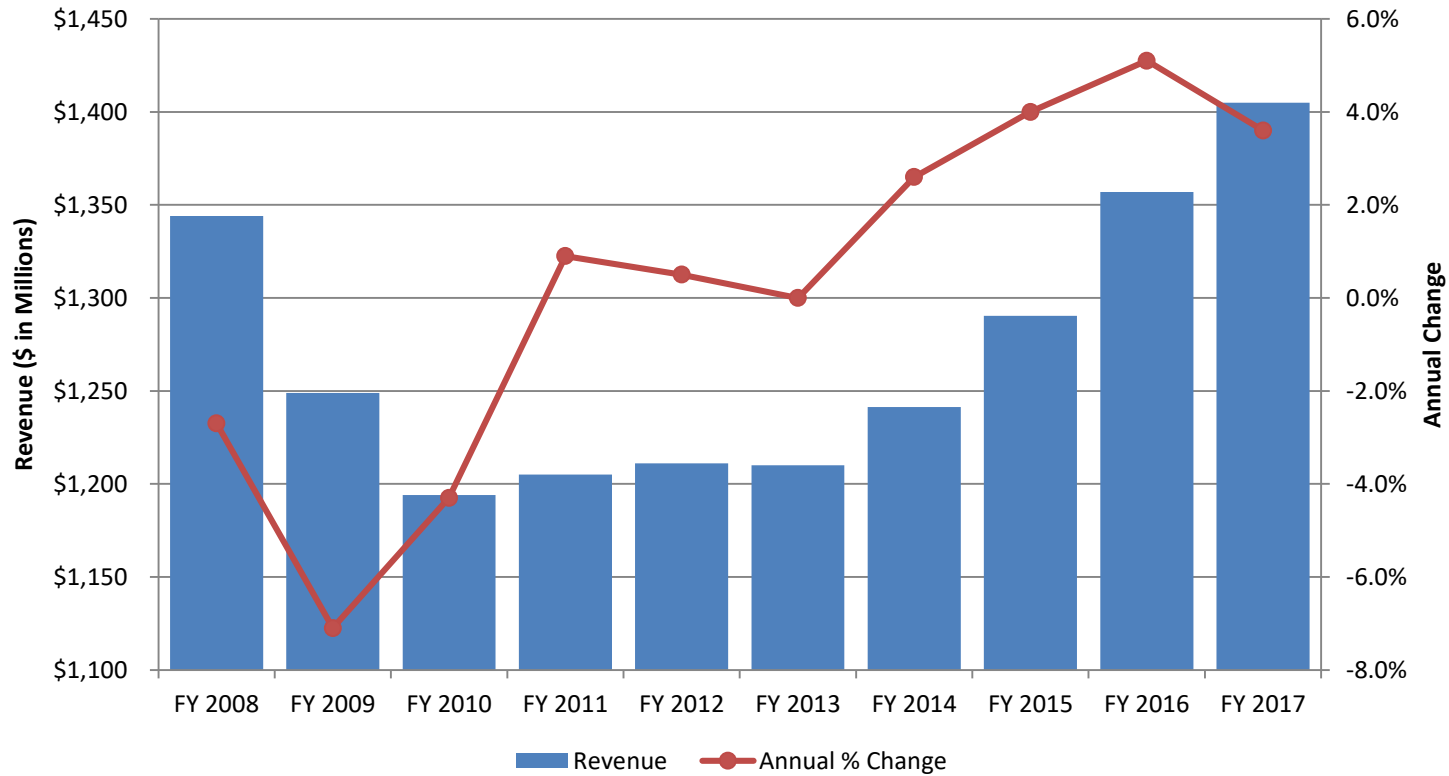
Arizona Department of Transportation

HURF and RARF Revenue Forecasting Process

March 12, 2018

Prepared by: Joshua Worley, ADOT

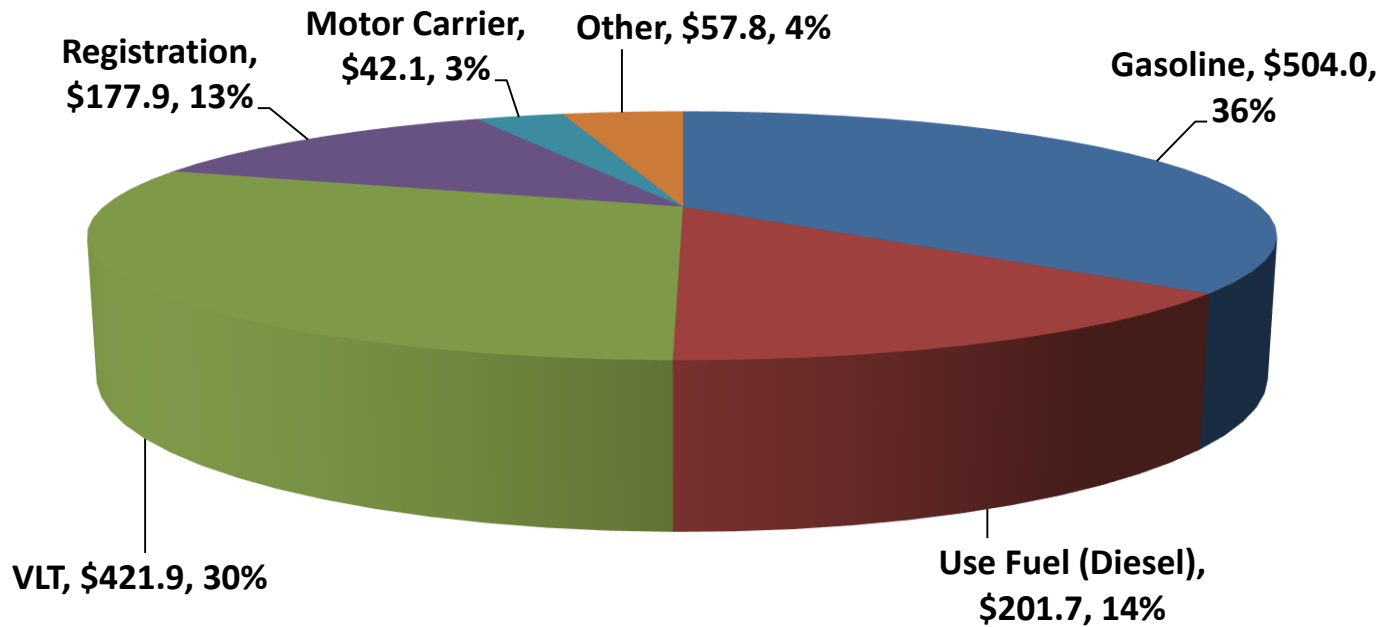
Highway User Revenue Fund (HURF): FY2017 Revenues



| | FY 2016 Actual | FY 2017 Actual | Change | FY 2017 Estimate | Change |
|--------------|---------------------|---------------------|-------------|---------------------|--------------|
| Total | \$ 1,356,752 | \$ 1,405,448 | 3.6% | \$ 1,415,600 | -0.7% |

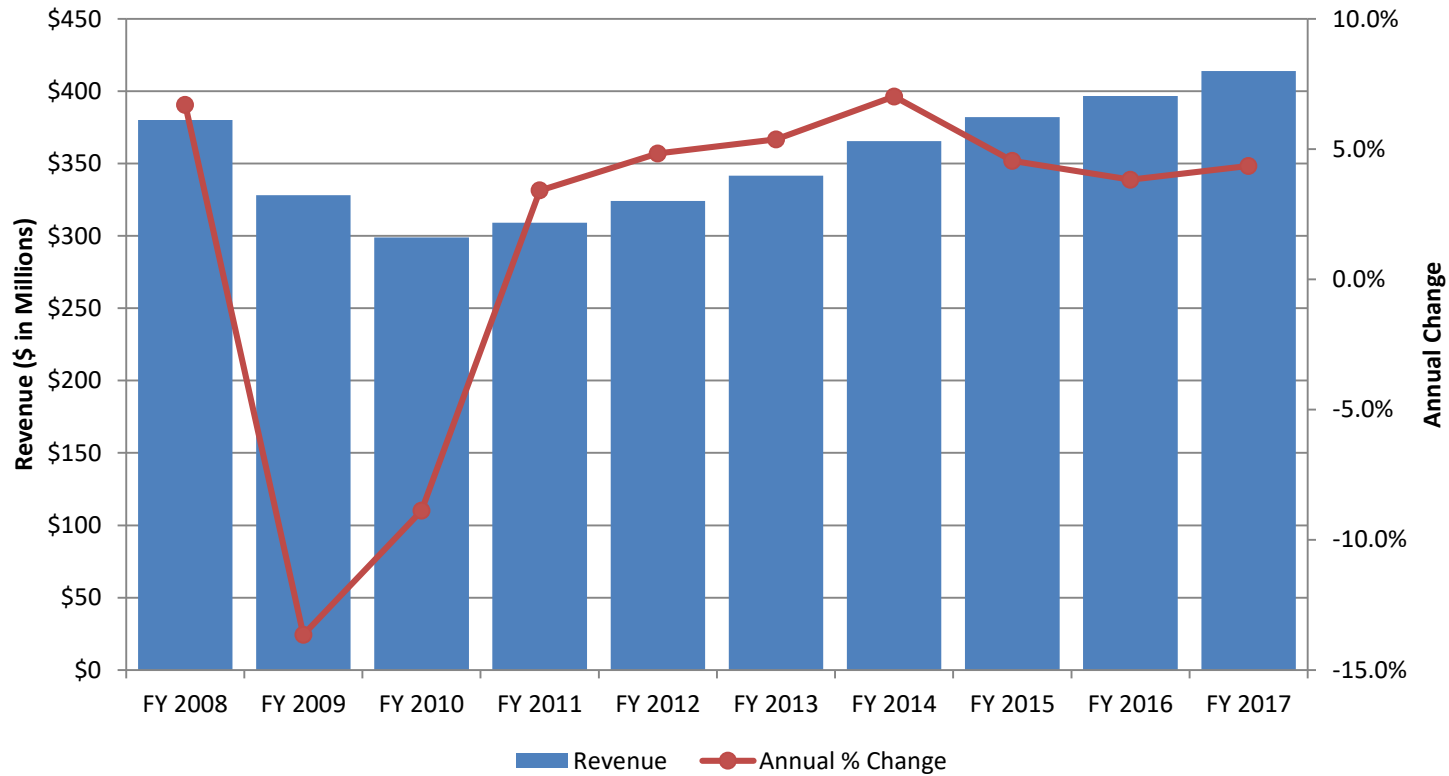
Highway User Revenue Fund (HURF): FY2017 Sources

Total: \$1,405.4 Million



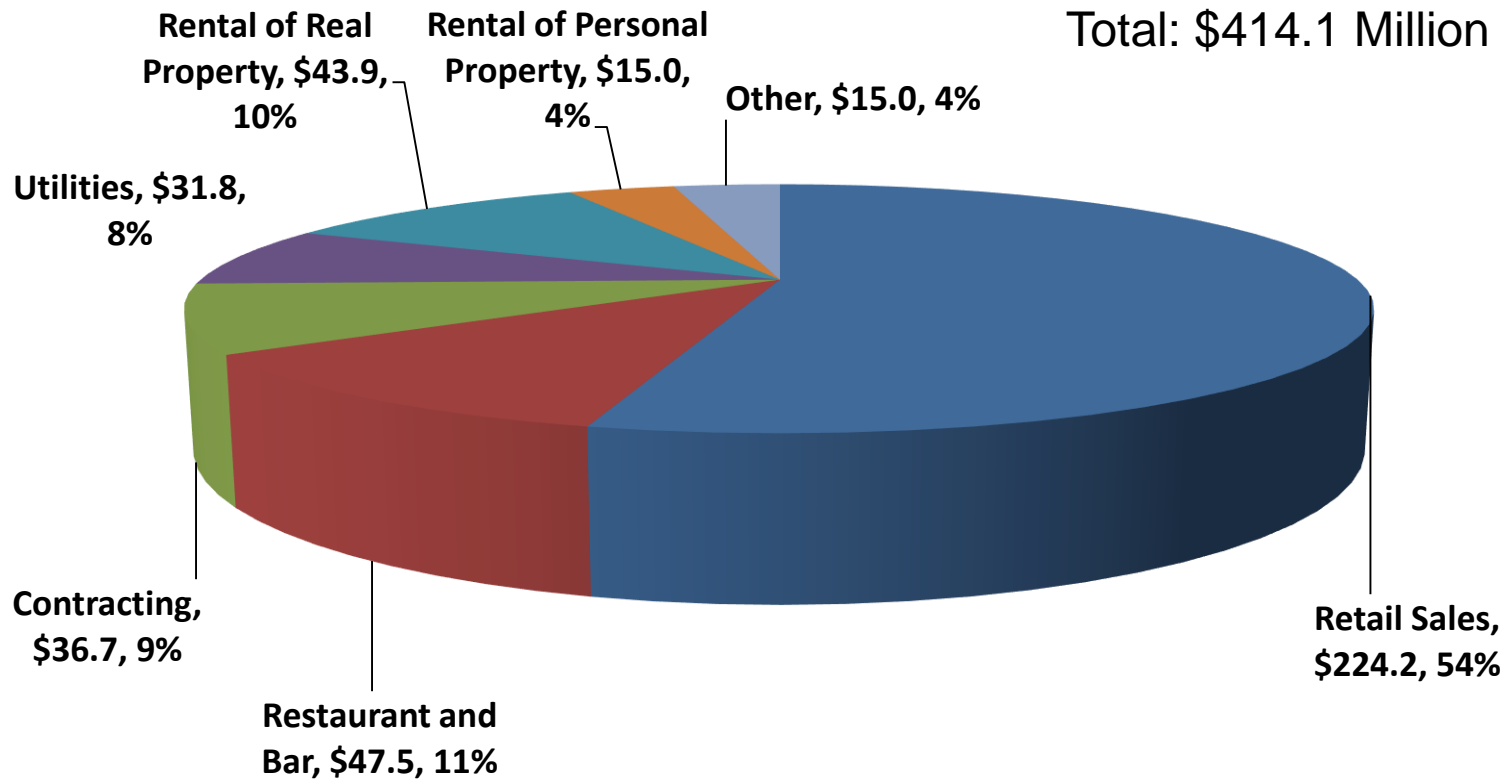
Revenue in millions

Regional Area Road Fund (RARF): FY2017 Revenues



| | FY 2016 Actual | FY 2017 Actual | Change | FY 2017 Estimate | Change |
|--------------|-------------------|-------------------|-------------|-------------------|-------------|
| Total | \$ 396,810 | \$ 414,071 | 4.3% | \$ 411,400 | 0.6% |

Regional Area Road Fund (RARF): FY2017 Sources



Revenue in millions

ADOT Forecasting Process for Each Revenue Category:

- 1. Determine factors that influence the category**
- 2. Gather historical data for each factor**
- 3. Use historical data to estimate a regression model**
- 4. Forecast each factor**
- 5. Use the forecasted factors to forecast revenue**

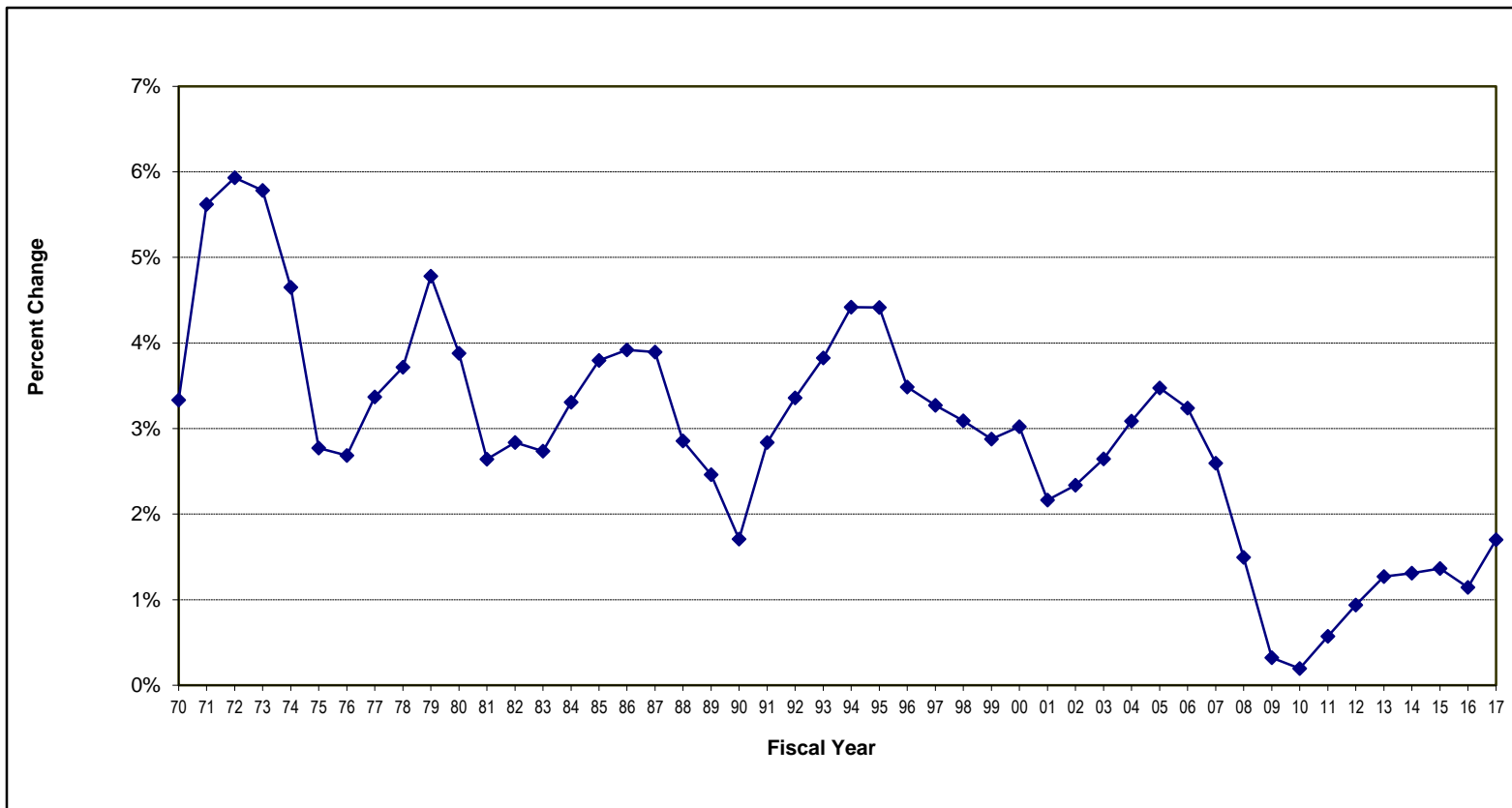
1. Determine Factors That Influence the Category: Highway User Revenue Fund (HURF)

- Population growth
- Personal income growth
- Non-farm employment growth
- Fuel economy (not forecasted by RAP panel)
- Gas price growth
- Diesel price growth

1. Determine Factors That Influence the Category: Regional Area Road Fund (RARF)

- Population growth
- Personal income growth
- Consumer price index (CPI) growth
- Non-farm employment growth
- Construction employment growth
- 30 year mortgage rate
- Airport passenger traffic growth
(Phoenix Sky Harbor and Phoenix-Mesa Gateway)

2. Gather Historical Data for Each Factor: Arizona Population Growth (for HURF)



3. Use Historical Data to Estimate a Regression Model: Gasoline Consumption

$$\begin{aligned} & \ln(\text{Gasoline Gallons}_t) \\ &= \beta_0 + \beta_1 \ln(\text{Population}_t) \\ &+ \beta_2 \ln(\text{RealPerCapitaIncome}_t) + \beta_3 \ln(\text{FuelEconomy}_t) \\ &+ \beta_4 \ln(\text{RealGasolinePrice}_t) + \rho_1 \text{AR}(1) + \varepsilon_t \end{aligned}$$

Where:

AR(1) is a first-order autoregressive term

4. Forecast Each Factor:

2017 Risk Analysis Process (RAP) Panel

- Held in August 2017
- Thirteen economic and finance experts
- Estimated factors through 2037
- Panel discussed each factor together
- Each member of the panel submitted own estimates

5. Use the Forecasted Factors to Forecast Revenue: Highway User Revenue Fund (HURF)

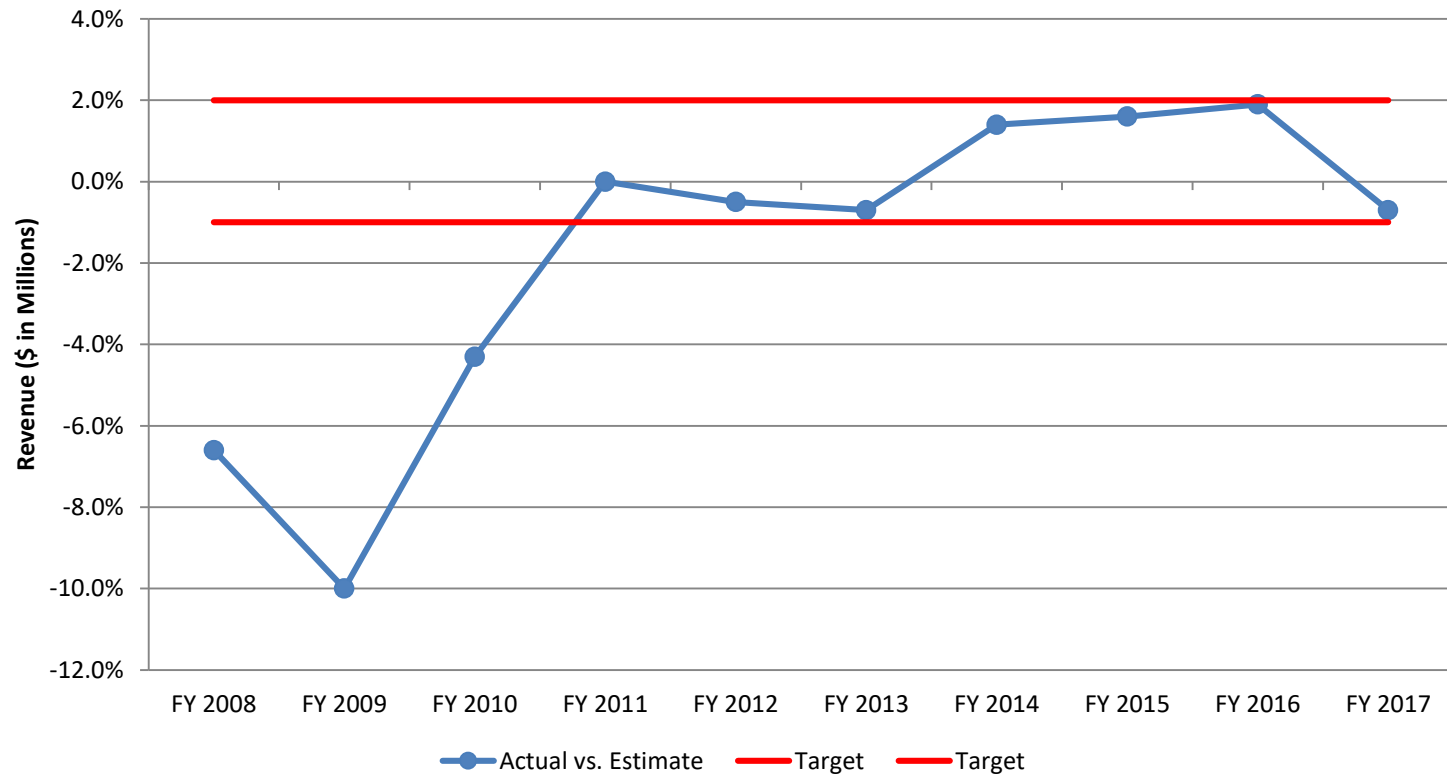
| Fiscal Year Percentile | 2017 Actual | 2018 N/A | 2019 50% | 2020 50% | 2021 50% | 2022 50% | 2023 50% | 2024 50% | 2025 50% | 2026 50% | 2027 50% |
|---------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Gasoline Tax | \$515.1 | \$519.2 | \$530.5 | \$541.9 | \$549.9 | \$558.2 | \$566.4 | \$575.0 | \$583.6 | \$592.8 | \$601.8 |
| Use Fuel Tax | 201.7 | 209.6 | 219.0 | 228.3 | 236.9 | 245.2 | 253.1 | 260.7 | 269.1 | 276.8 | 285.2 |
| Motor Carrier Fee | 42.1 | 43.8 | 44.7 | 45.9 | 47.3 | 48.9 | 50.4 | 52.0 | 53.6 | 55.2 | 56.9 |
| Vehicle License Tax | 421.9 | 448.5 | 476.6 | 505.2 | 534.9 | 565.6 | 597.4 | 629.9 | 664.4 | 700.3 | 737.2 |
| Registration | 177.9 | 183.0 | 185.9 | 188.2 | 192.5 | 197.0 | 201.5 | 206.2 | 211.1 | 216.3 | 221.3 |
| Other | 57.8 | 58.4 | 60.7 | 62.7 | 64.4 | 66.2 | 67.9 | 69.7 | 71.6 | 73.5 | 75.3 |
| Total | \$1,416.5 | \$1,462.5 | \$1,517.4 | \$1,572.2 | \$1,625.9 | \$1,681.1 | \$1,736.7 | \$1,793.5 | \$1,853.4 | \$1,914.9 | \$1,977.7 |

5. Use the Forecasted Factors to Forecast Revenue: Regional Area Road Fund (RARF)

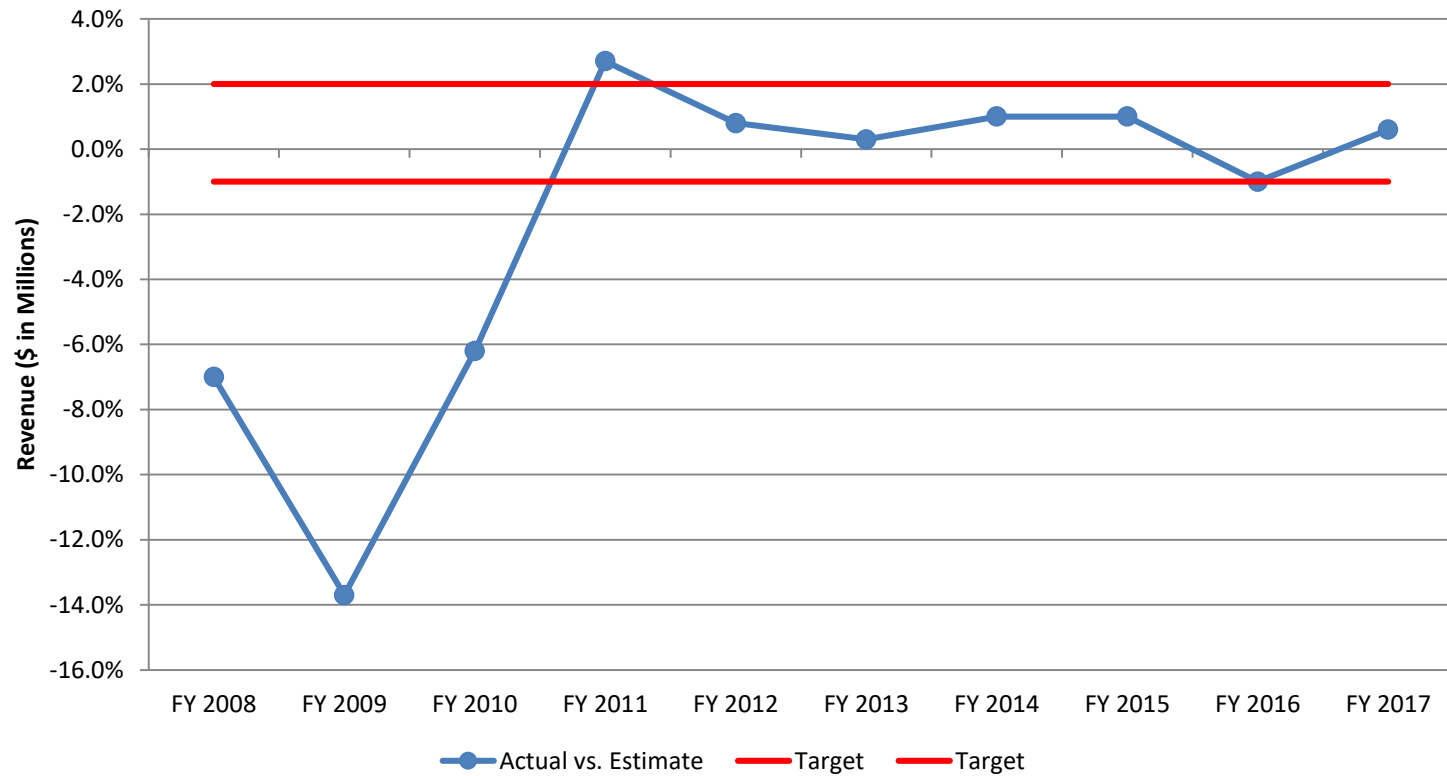
| Fiscal Year Percentile | 2017 Actual | 2018 50% | 2019 50% | 2020 50% | 2021 50% | 2022 50% | 2023 50% | 2024 50% | 2025 50% | 2026/1 50% |
|-----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Retail Sales | \$224.2 | \$233.7 | \$249.6 | \$263.5 | \$276.7 | \$291.3 | \$305.1 | \$318.5 | \$332.1 | \$202.2 |
| Contracting | 36.7 | 39.1 | 42.6 | 45.2 | 48.1 | 51.1 | 55.3 | 58.2 | 62.2 | 38.6 |
| Utilities | 31.8 | 31.9 | 32.9 | 34.6 | 35.8 | 37.0 | 38.3 | 39.5 | 41.0 | 24.6 |
| Restaurant and Bar | 47.5 | 50.8 | 53.2 | 56.3 | 59.3 | 62.4 | 65.5 | 68.9 | 72.2 | 43.9 |
| Rental of Real Property | 43.9 | 46.4 | 47.7 | 49.2 | 51.1 | 52.9 | 54.9 | 57.2 | 59.2 | 35.9 |
| Rental of Personal Property | 15.0 | 16.5 | 17.0 | 18.0 | 18.9 | 19.8 | 20.6 | 21.5 | 22.3 | 13.6 |
| Other | 15.0 | 13.6 | 13.6 | 13.6 | 13.6 | 13.6 | 13.6 | 13.6 | 13.6 | 7.9 |
| Total | \$414.1 | \$432.0 | \$456.6 | \$480.4 | \$503.5 | \$528.1 | \$553.3 | \$577.4 | \$602.6 | \$366.7 |

Note: /1 FY 2026 forecast reflects the expiration of the transportation excise tax extension on December 31, 2025

Highway User Revenue Fund (HURF): Forecast Accuracy



Regional Area Road Fund (RARF): Forecast Accuracy



ADOT Publishes Our HURF and RARF Forecast Results

<https://azdot.gov/about/FinancialManagementServices/transportation-funding/highway-user-revenue-fund>

<https://azdot.gov/about/FinancialManagementServices/transportation-funding/regional-area-road-fund>

Published reports include:

- Revenue forecasts for each category
- Historical data for each factor
- Panelist forecasts for each factor

Questions?

Joshua Worley
Arizona Department of Transportation
jworley@azdot.gov
602-712-8304