

A stylized graphic of a road with a dashed yellow center line and solid blue outer lines, curving upwards and to the right against a light green background.

WASHINGTON STATE ROAD USAGE CHARGE

Steering Committee Spotlight Session

RUC Financial Analysis Update

May 23, 2022



Washington State
Transportation Commission

Today's Spotlight Topics

- 1) Overview of financial analysis tasks and status
- 2) Description of methodology and data sources
- 3) Description of scenarios
- 4) Presentation of results for one policy concept across five scenarios
- 5) Next steps

RUC Financial Analysis

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CDM Smith

Status of Financial Analysis Tasks

- ✓ Data collection and analysis
- ✓ Financial model development
- ✓ Scenario development
- ✓ Scenario analysis
- ✓ Revenue projections
- ✓ Analytical tool development
- ✓ Model update per recent developments

Analytical Approach

- Develop updated financial model
- Identify factors potentially affecting travel
- Develop an integrated framework to incorporate the factors
- Analyze illustrative scenarios
- Perform scenario planning using the framework
- Incorporate scenario reflecting the ban of gasoline vehicle sales in 2030

Financial Model

Primary Data Types and Sources

- Vehicle Miles Traveled (VMT):
 - Washington State Office of Financial Management (OFM)
 - FHWA, Highway Performance Monitoring System (HPMS)
 - US Energy Information Administration (EIA)
- Commute Patterns and Work From Home:
 - Integrated Public Use Microdata Series (US IPUMS)
 - US Census Bureau, National Household Travel Survey (NHTS)
- Energy/Fuel Consumption and Electrification:
 - US Energy Information Administration (EIA)
 - Bloomberg New Energy Finance (BNEF)
 - **Industry and policy landscape changes**
- Vehicle Fleet and Fuel Efficiency:
 - Washington State Department of Licensing (DOL)

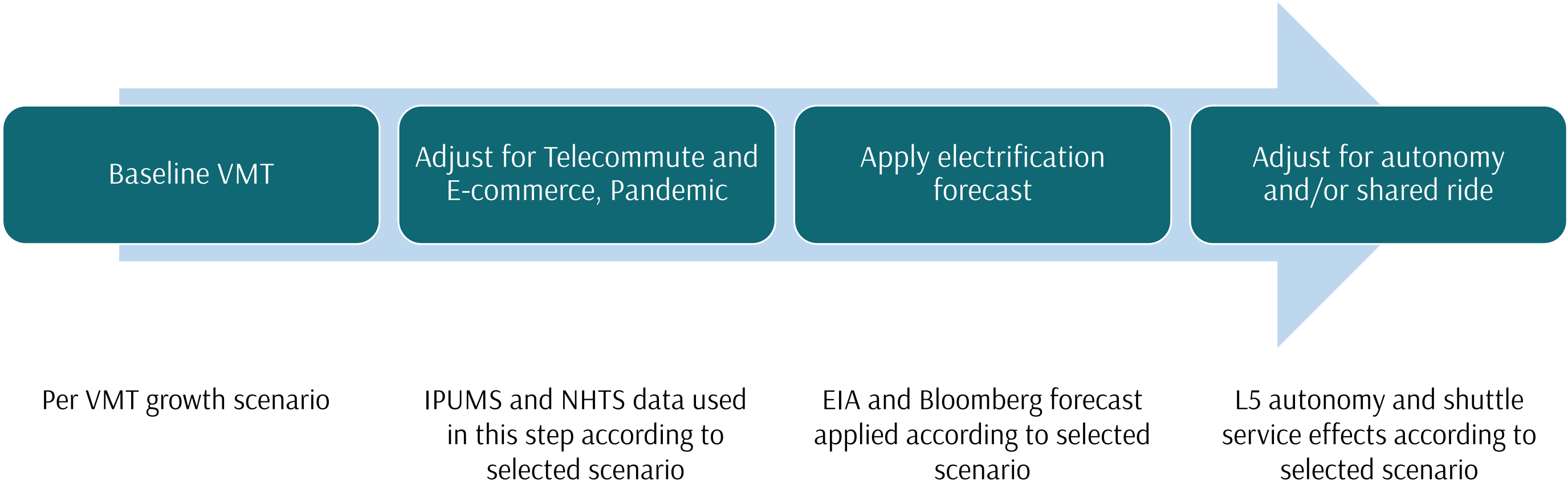
Financial Model Capabilities

Consideration of the following factors:

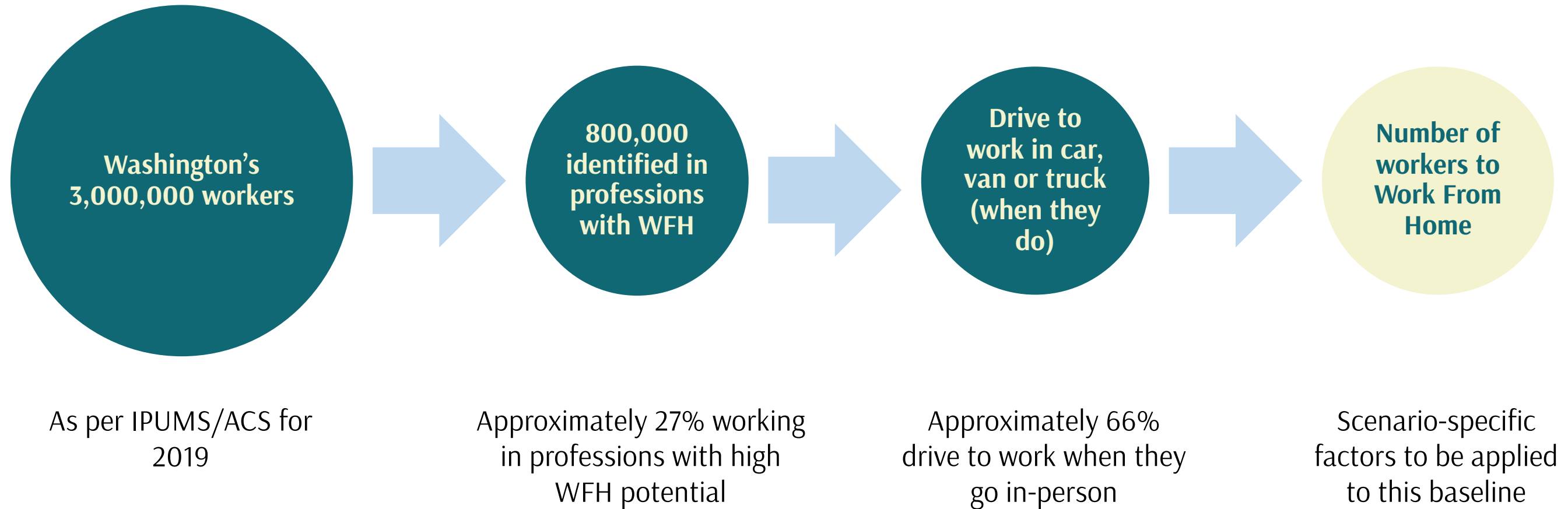
- Vehicle Miles Travelled (VMT)
- Electrification forecasts
- Potential shifts in commute patterns due to Covid-19
- A possibility of another pandemic
- Impact of E-Commerce
- Temporal and technology consideration of transition to RUC
- Impact of autonomy and/or shared mobility
- Urban and rural separation for revenue
- Vehicle fleet composition and fuel efficiency distribution
- Difference in urban and rural areas

All the above factors have been implemented in the financial model through a user-friendly interface

Adjustments to VMT



Identifying Workers/Occupations Expected to Continue Working from Home



Assumed Temporal Differences Between Urban and Rural Electrification and Autonomy

Urban L5
Autonomous
Vehicles on Road
2035

Rural L5
Autonomous
Vehicles on Road
2040

Urban Shared
Mobility Shuttles
on Road 2030

Rural Shared
Mobility Shuttles
on Road 2035

Vehicle Fleet Composition Using DOL Data

- Received Department of License (DOL) data containing Vehicle Identification Numbers (VIN) (6.7 million)
- Decoded 6.1 million VINs
- Developed algorithm to determine fuel economy by VIN
- Developed fleet composition by model year and fuel economy (miles per gallon)
- Used outputs to inform fleet composition and fuel economy forecasts

DOL Data Processing

- Acquire raw data from state's DMV which provides VIN numbers for all light vehicles
- Create a 'Squish VIN' consisting of digits 4 through 8 of the VIN
- Identify unique 'Squish VINs'
- To save time, decode only unique 'Squish VINs' (about 5% of all VINs)
- Pull attributes such as Make, Model, Year, Engine Size, Vehicle Type, Curb Weight, Primary Fuel Type, Secondary Fuel Type, Highway MPG, City MPG, and Combined MPG
- Apply the results to the entire VIN dataset

Scenario Development

Scenario Development Rationale/Goals

- Scenarios should cover a broad spectrum of future possible conditions
- Scenario creation should focus on factors that seem to have a strong impact on vehicular travel, including miles driven and fuel consumption (tax bases)
- Temporal variations to consider:
 - Telecommuting and e-commerce/online shopping
 - Technological advancements in non-fossil fuel vehicles
 - Vehicle inventory and fuel efficiency
- Scenario analysis should capture urban/rural differences

Scenario Planning Vs. Traditional Planning

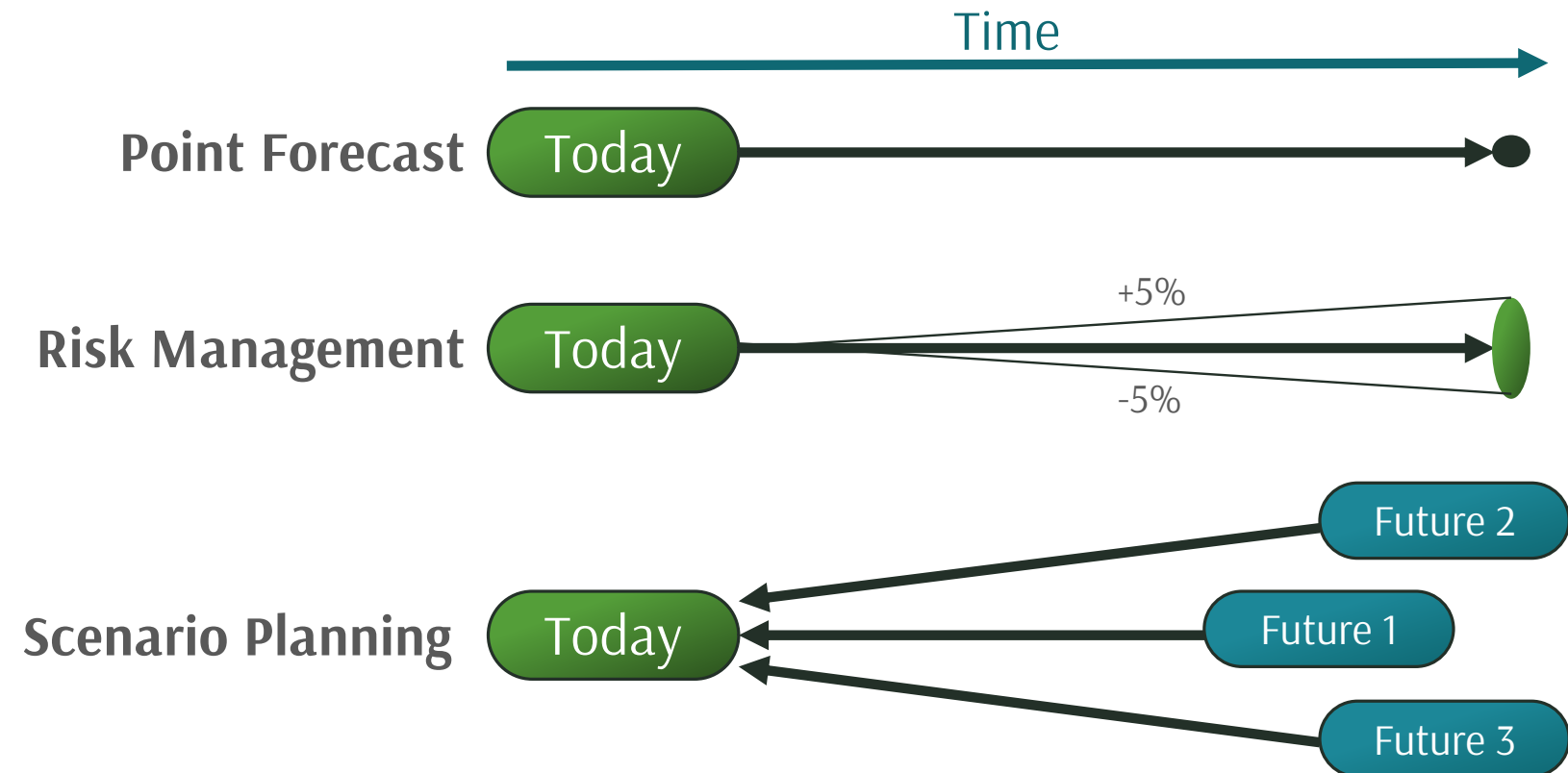
Planning Techniques

Traditional planning techniques generally focus on point forecasts

Risk Analysis generally looks at ranges of results

Scenario planning techniques shift from forecasting the future to preparing for potential depictions of future

Planning Methods



Multiple scenarios are developed and used as depictions of future

Approach to Scenario Development

- Scenarios cannot be defined by just one isolated factor, e.g., “low economic growth”
- Yet, analyzing *all* possible combinations of factors is not practical
- Define a “Baseline Scenario” using appropriate ranges for each key factor
- Identify 5 plausible combinations to develop a reasonable number of preliminary scenarios to analyze
- Select 3 scenarios to analyze in detail

Factors Defining Future Scenarios

- VMT/economic growth
- Covid/pandemic outlook
- Telecommuting trends
- E-commerce trends
- Technology adoption outlook (electrification)
- Autonomy and shared mobility adoption
- Electrification assumptions specific to Washington

Factors Defining Future Scenarios (expanded)

- Vehicle Miles Travelled (VMT)
- Electrification forecasts
- Potential shifts in commute patterns due to Covid-19
- Possibility of another (or longer) pandemic
- Impact of e-commerce
- Temporal and technology consideration of transition to RUC
- Impact of autonomy and/or shared mobility
- Urban and rural separation for revenue
- Vehicle fleet composition and fuel efficiency distribution
- Difference in commute length between urban and rural areas

Scenario Names and Descriptions

- **Neutral:** Represents a continuation of past growth and passive technology adoption
- **Cruise Control:** Represents a moderate increase of growth and slightly faster autonomous vehicles compared to Neutral
- **Over Drive:** Represents an aggressive economic growth with high electrification and technology adoption
- **Shared Drive:** Variant of Overdrive, with more adoption of shared mobility while still including aggressive growth
- **Low Gear:** Represents slow growth among electric vehicles, autonomous vehicles and shared mobility

Scenario Definition

Factors		Neutral	Cruise Control	Over Drive	Shared Drive	Low Gear
VMT Growth		Yellow	Yellow	Red	Red	Green
Pandemic Risk		Green	Green	Green	Green	Orange
Telecommuting Increase		Yellow	Orange	Red	Orange	Green
E-Commerce		Yellow	Orange	Orange	Orange	Green
Electrification		Green	Orange	Red	Red	Green
Autonomy	Traditional Vehicles	Yellow	Green	Green	Green	Red
	Private L5 Vehicles	Green	Yellow	Red	Orange	Green
	Shared Mobility	Green	Yellow	Orange	Red	Green

Low	Medium	Moderate	High
Green	Yellow	Orange	Red

EV Factors Based on Washington Legislation

- **2030 No New Gasoline Vehicle:** Represents a forecast of electrification based on 2030 achievement of a ban on fossil fuel burning vehicles
- **2035 No New Gasoline Vehicle :** Represents a forecast of electrification based on 2035 achievement of a ban on fossil fuel burning vehicles

Financial Analysis Results

Model User Interface

- Easily access and configure selections for scenarios and policy choices
- Scenarios:
 - Choose pre-defined scenarios with a single click
 - Easily customize any combination of scenario factors
- Policy choices:
 - RUC per-mile rate
 - RUC transition approach including vehicle types and timelines

Welcome to WARUC Scenario Analysis Program
(Please select parameter values and click Apply Selections. Alternatively, click any Named Scenario)

VMT Growth:	Low
Fuel Type & Electrification:	Reference Case
Commute Shifts:	25% Increase
Pandemic Scenario:	Return to Normal
E-Commerce Impact:	10%
RUC Transition Approach:	MPG and/or Year
Gas Tax Scenario:	No Change
RUC Rate (\$/mile):	0.024
Average Commute Length:	10
(Urban and Rural)	10
Scrappage:	WA Low
Transition Phase:	Phase 1
Miles Per Gallon Transition:	25
Transition Year:	2020

Apply Above Selections

Named Scenarios:

Neutral	Cruise Control	Over Drive
	Shared Drive	Low Gear

Policy Choices

- Keep gas tax in place at 49.4 cents/gal
- Credit gas tax paid toward RUC owed
- Assume mix of manual and automated reporting methods
- Introduce RUC at 2.4 cents/mi
 - Zero-emission vehicles in 2023
 - Vehicles over 35 MPG in 2027
 - Vehicles over 30 MPG in 2032
 - Vehicles over 25 MPG in 2040
 - Vehicles over 20 MPG in 2050

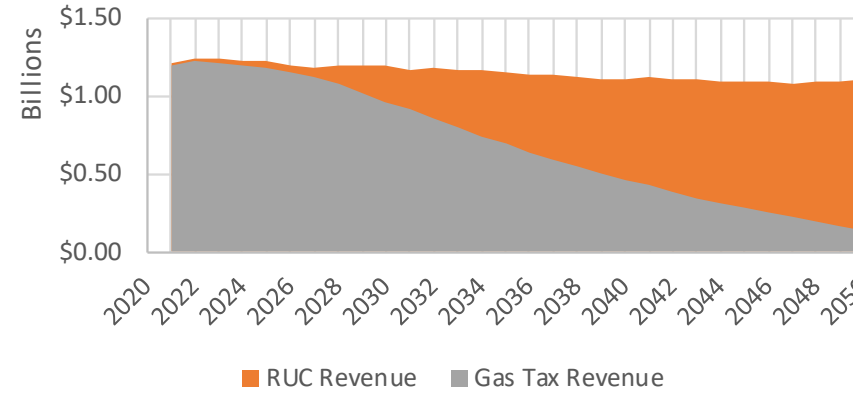
Revenue and Cost Summary : Neutral

Input Assumptions:

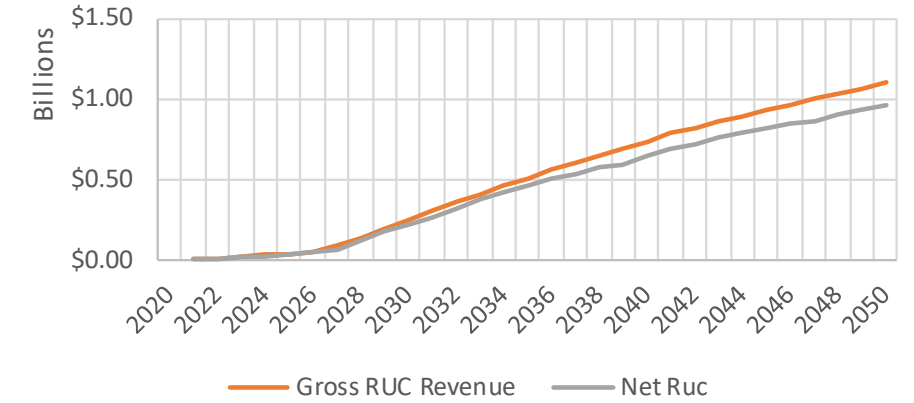
VMT Growth: Low
 Electrification: 2030 No ICE
 RUC Rate (\$/mile): 0.024
 RUC Transition: MPG and/or Year
 RUC Phase-In:

Year	MPG Threshold
2027	35
2032	30
2040	25
2050	20

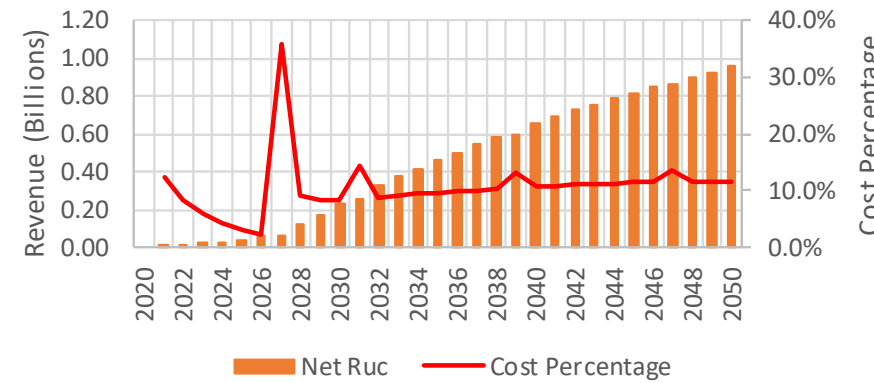
NET REVENUE FROM RUC & GAS TAX



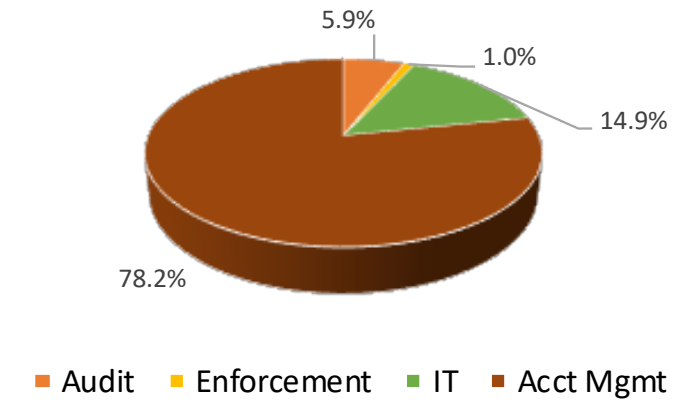
GROSS AND NET RUC REVENUE



COST AS PERCENT OF REVENUE



COST BREAKDOWN



Revenue Summary by Key Years (millions)

Revenue Type	2030	2040	2050
Fuel Tax	\$ 965	\$ 459	\$ 138
Net RUC	\$ 227	\$ 652	\$ 960
Cost	\$ 23	\$ 86	\$ 141
Net Total	\$ 1,192	\$ 1,111	\$ 1,098

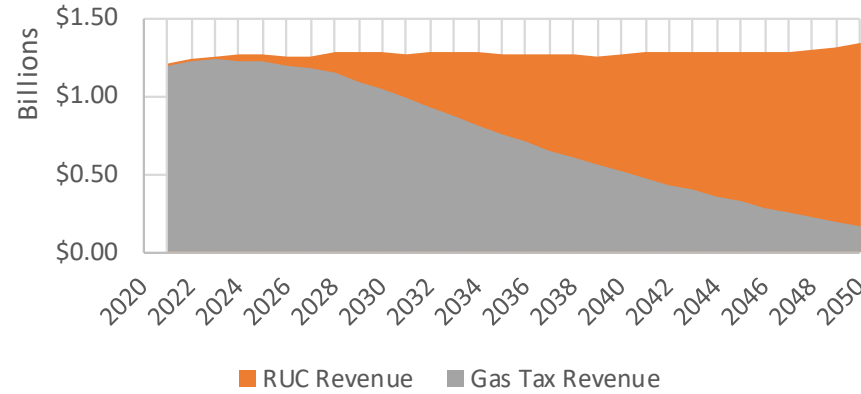
Revenue and Cost Summary : Over Drive

Input Assumptions:

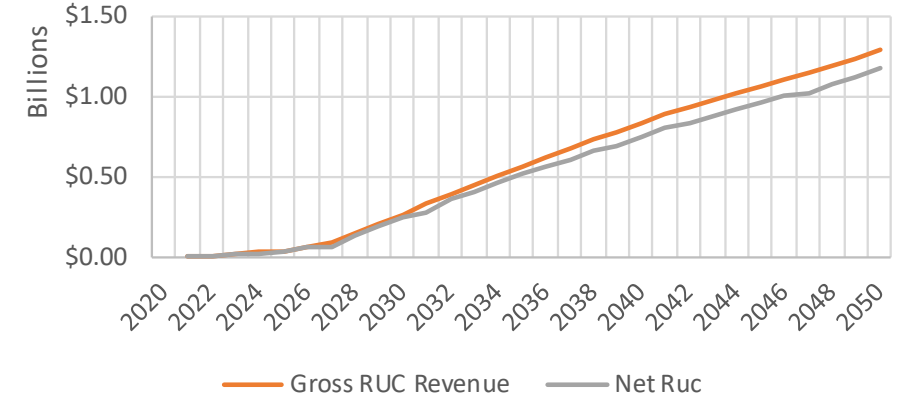
VMT Growth: High
 Electrification: 2030 No ICE
 RUC Rate (\$/mile): 0.024
 RUC Transition: MPG and/or Year
 RUC Phase-In:

Year	MPG Threshold
2027	35
2032	30
2040	25
2050	20

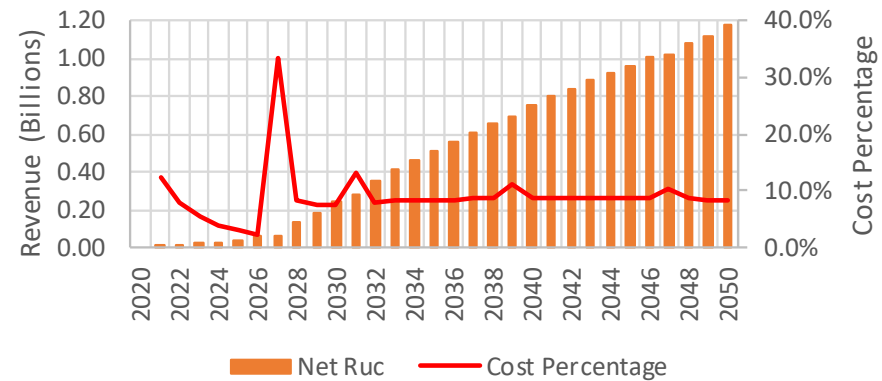
NET REVENUE FROM RUC & GAS TAX



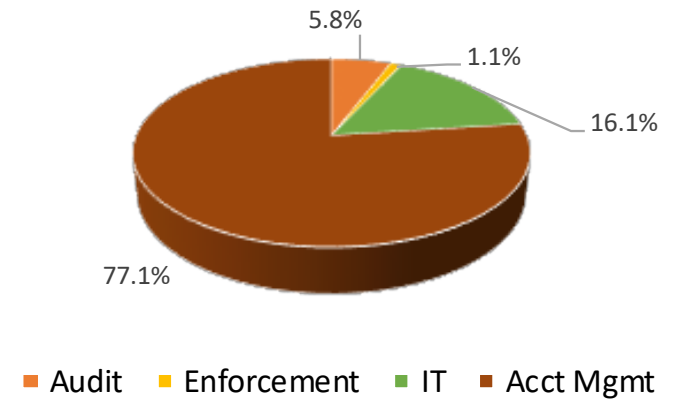
GROSS AND NET RUC REVENUE



COST AS PERCENT OF REVENUE



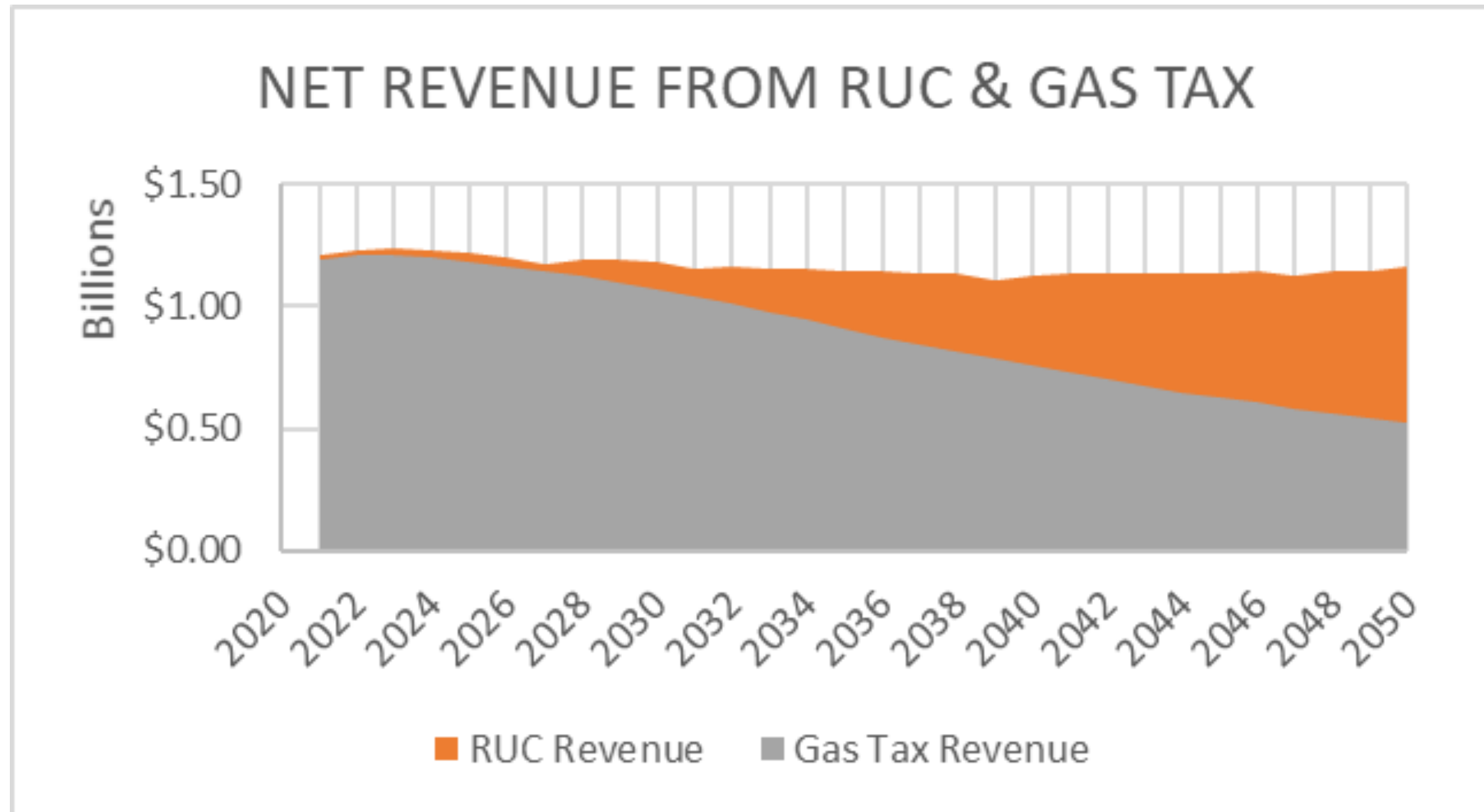
COST BREAKDOWN



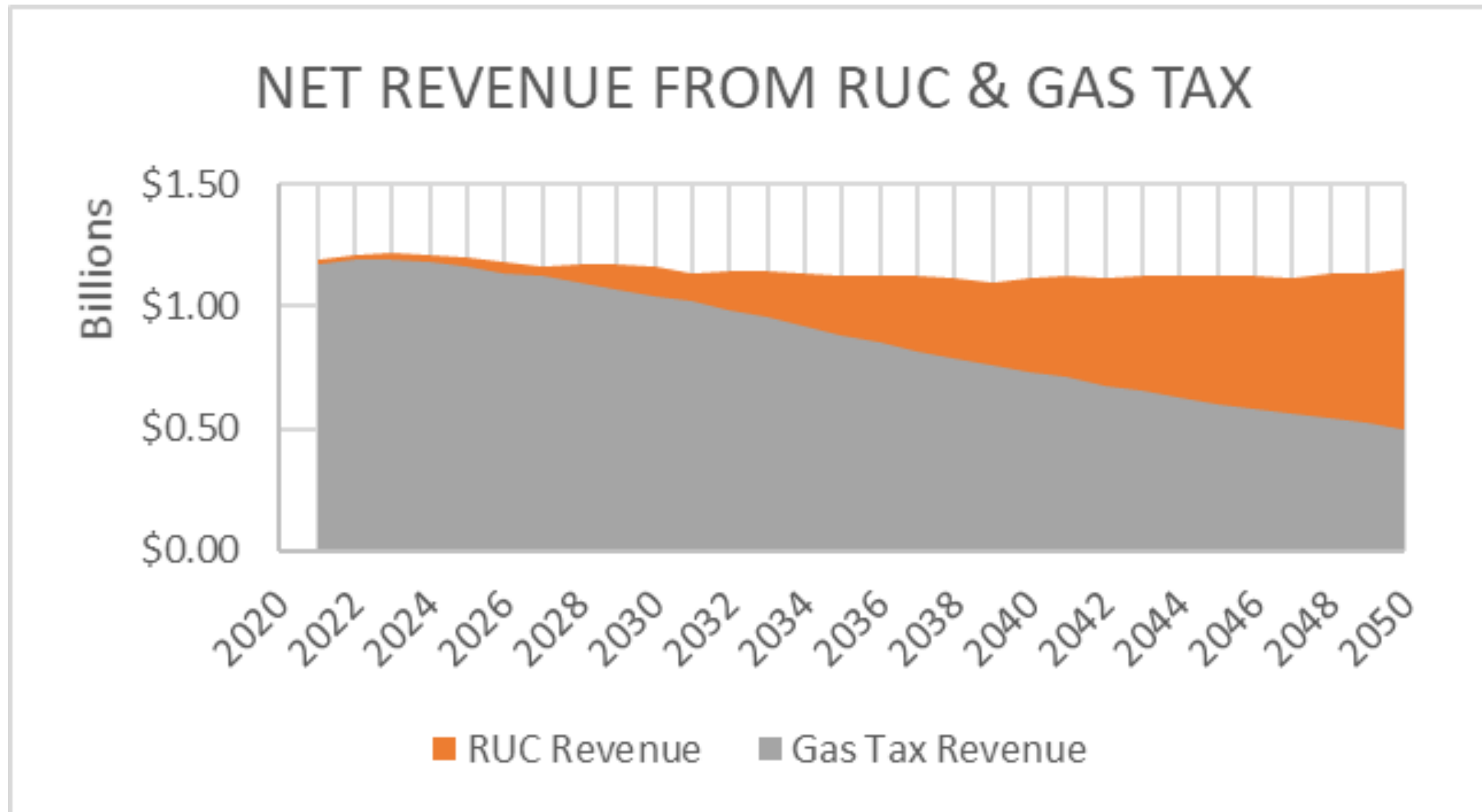
Revenue Summary by Key Years (millions)

Revenue Type	2030	2040	2050
Fuel Tax	\$ 1,041	\$ 516	\$ 162
Net RUC	\$ 246	\$ 749	\$ 1,171
Cost	\$ 23	\$ 81	\$ 118
Net Total	\$ 1,287	\$ 1,265	\$ 1,333

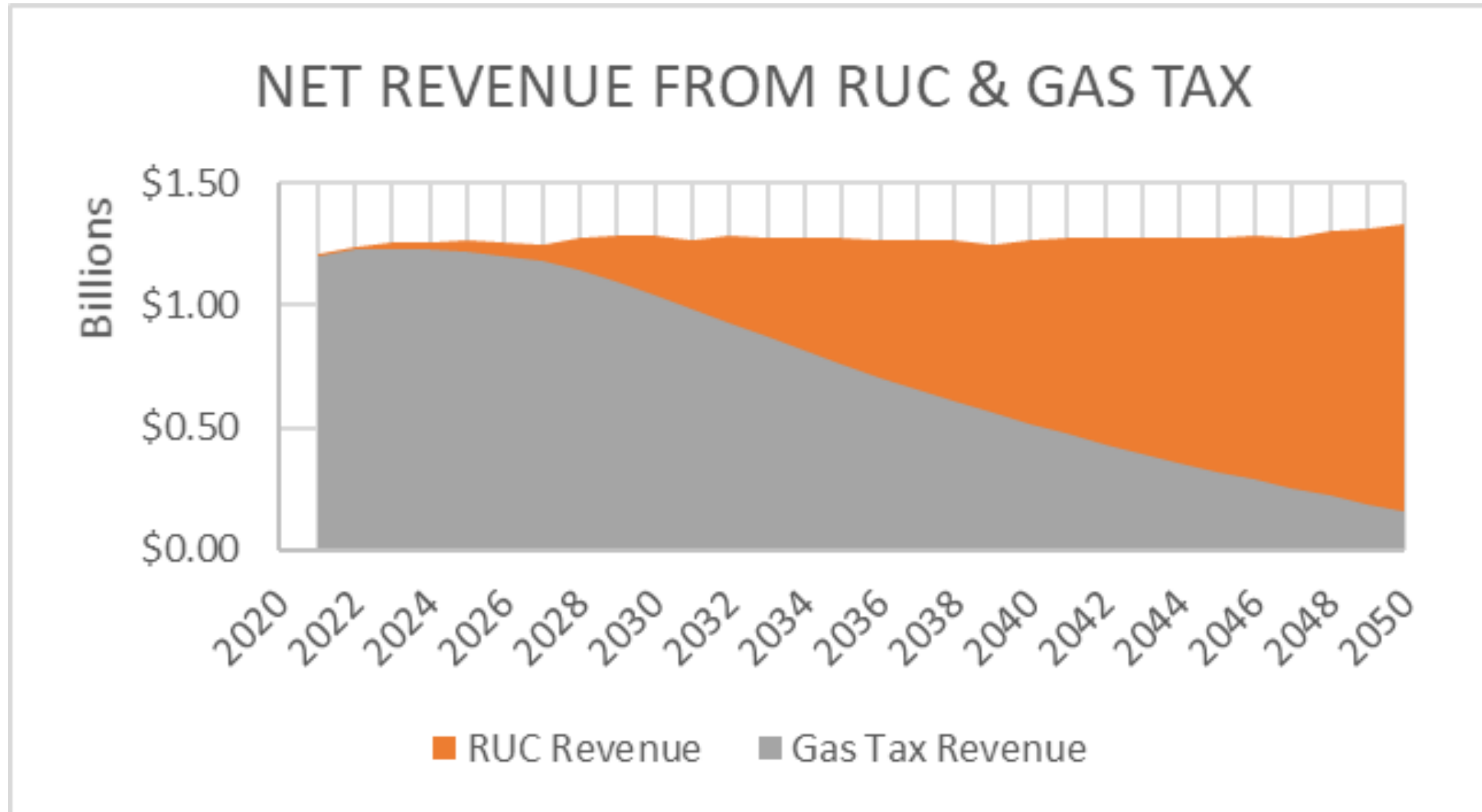
Neutral



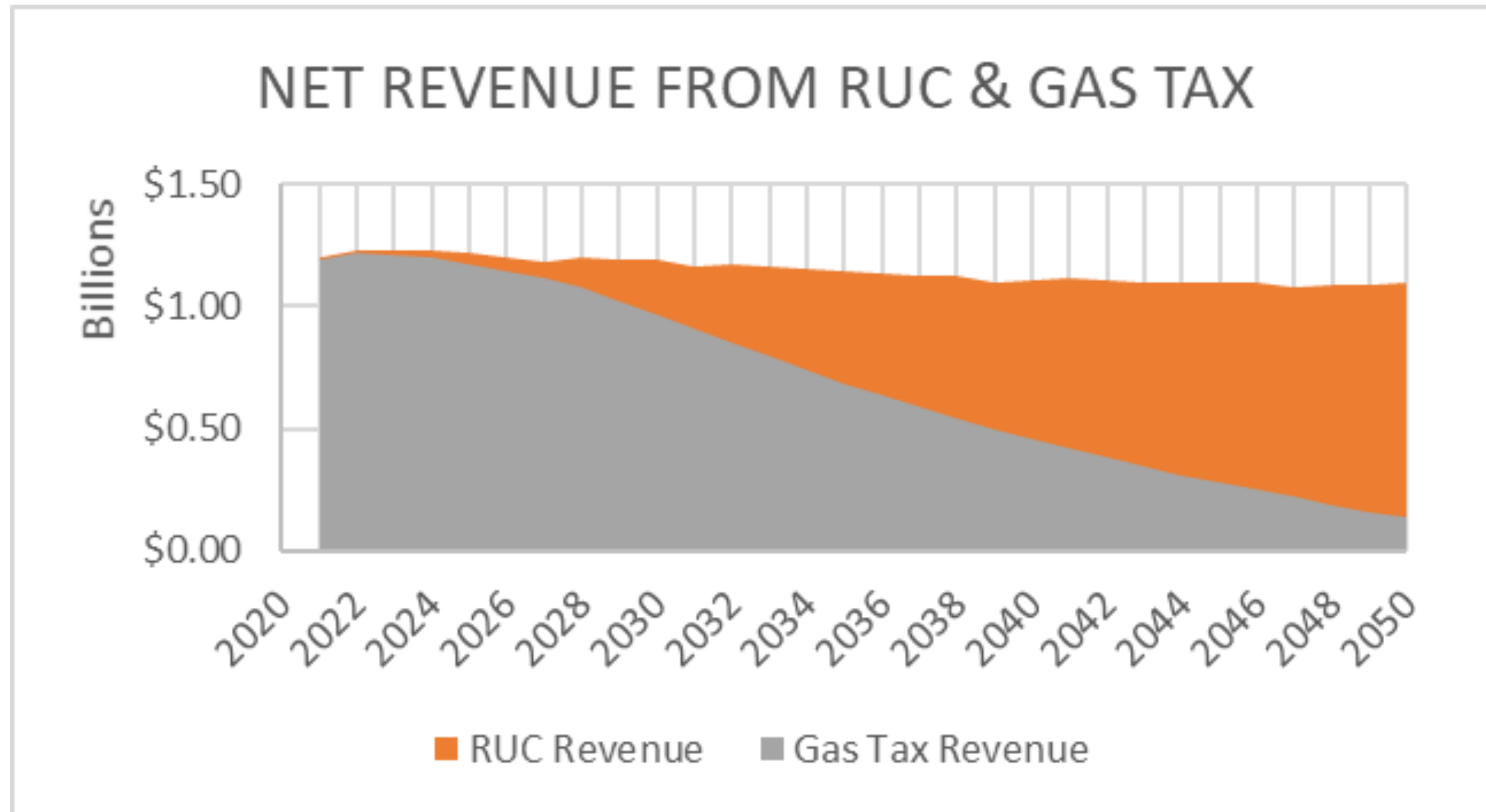
Cruise Control



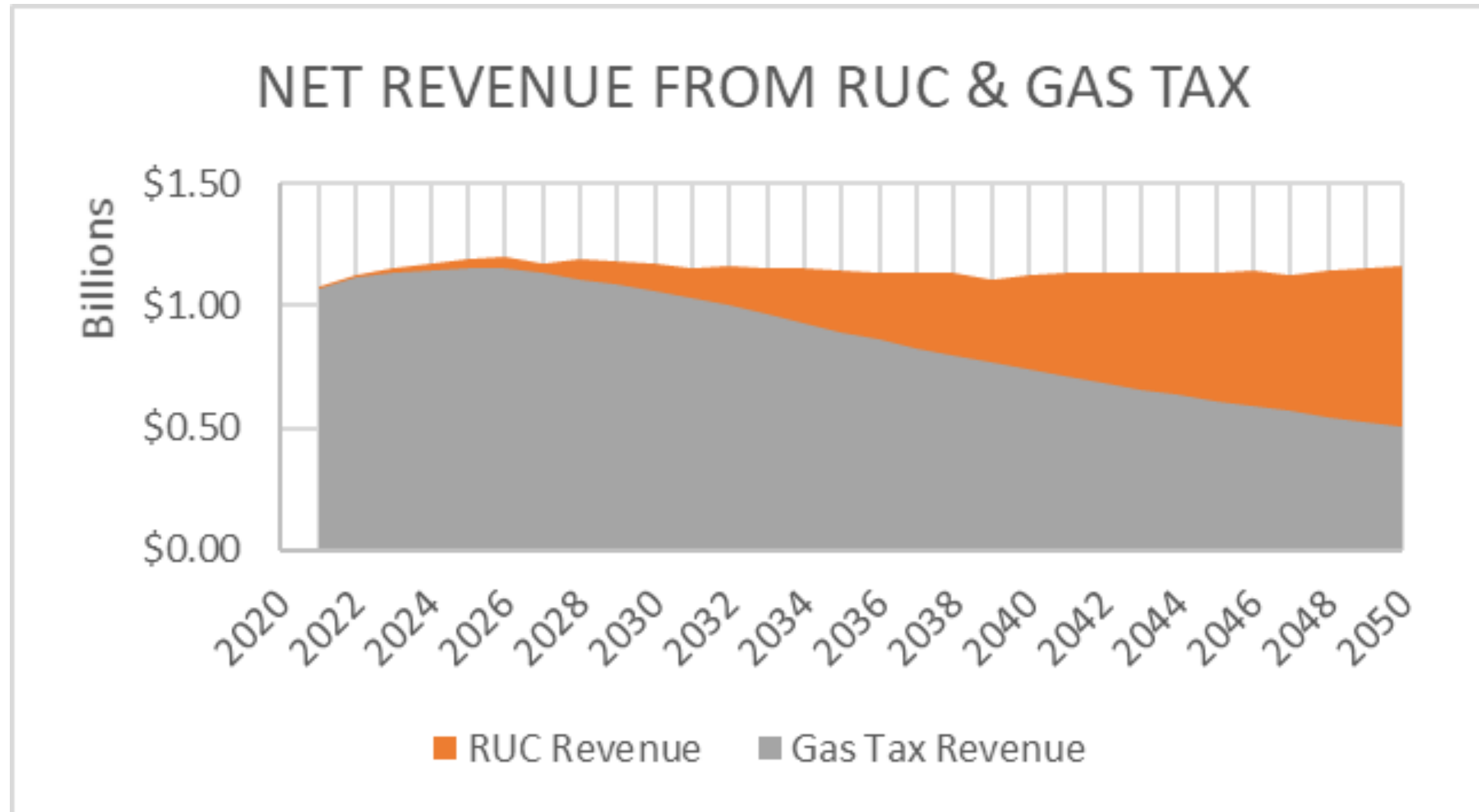
Overdrive



Neutral + 2030 Ban on Gasoline Vehicle Sales



Low Gear



Next Steps

- Financial analysis task
 - Finalize documentation (final report and user guide)
 - Utilize model to address questions about future scenarios and policy choices
- Upcoming Steering Committee activities
 - Virtual full meeting **August 16**: 2022 user research and pilot plan
 - In-person full meeting **November 17 at SeaTac**: 2022 pilot launch and status update

Questions?

Thank You!

Consultant support provided by:

The logo for CDM Smith, featuring the letters 'CDM' in a bold, blue, sans-serif font above the word 'Smith' in a similar blue font. A small green square is positioned above the letter 'i' in 'Smith'.The logo for BERK, consisting of a stylized blue 'B' icon followed by the word 'BERK' in a bold, blue, sans-serif font.The logo for enviroissues, featuring a red circle with the lowercase letters 'ei' in white, followed by the word 'enviroissues' in a lowercase, blue, sans-serif font.The logo for Yates Consulting Group, featuring a stylized blue 'Y' icon followed by the word 'Yates' in a bold, blue, sans-serif font, with 'Consulting Group' in a smaller, blue, sans-serif font below it.The logo for WA RUC, featuring a stylized green and blue icon followed by the text 'WA RUC' in a bold, blue, sans-serif font.