

Washington State Road Usage Charge Assessment

Transportation Commission
Briefing

CAMBRIDGE SYSTEMATICS **BERK**



Washington State Transportation
Commission



Washington State
Department of Transportation

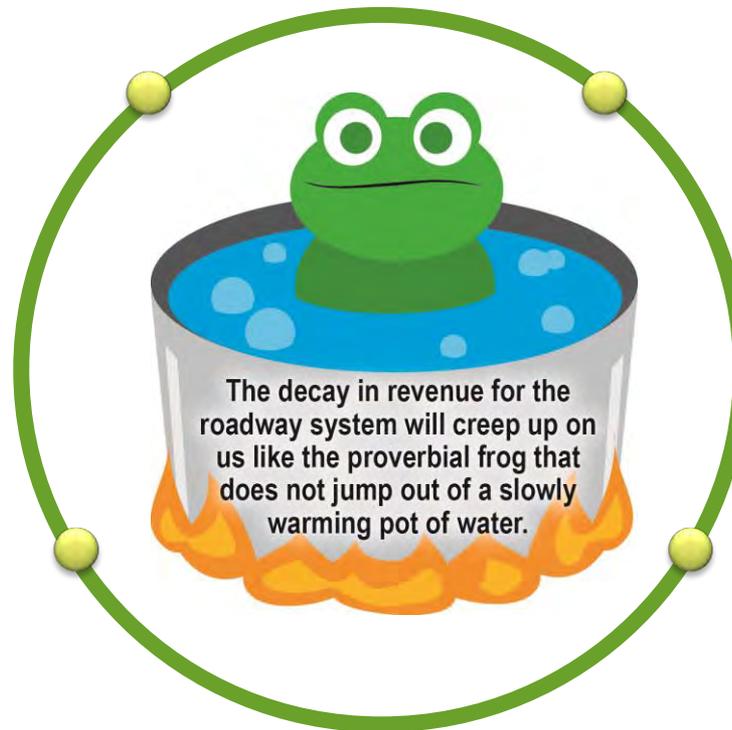
December 9, 2014

BACKGROUND

Key findings from prior work

The road usage charge systems evaluated will **cost more to collect than the gas tax**, but will have **greater and more stable net revenue over 25 years**.

Providing drivers **choice** as to how they pay a road usage charge will help **improve public acceptance** and mitigate privacy concerns.



Gas tax increases can raise more net revenue in the **short term** than the road usage charges evaluated, but over the long term will continue to **erode in value**, thus **requiring frequent increases**.

A road usage charge system ensures **everyone pays their fair share** for using the roads, regardless of fuel source or miles per gallon.

Key Points from the 2014 Budget Proviso

- **Keep the Steering Committee as it is.**
- **Develop refined initial policy inputs.**
 - » **Phasing and staging of a road usage charge system relating to:**
 - **Types of vehicles; and**
 - **Nature and manner of transition period.**
- **Develop concept of operations.**
- **Financial analysis.**
- **Supplemented by:**
 - » **Work delegated to WSDOT on interstate coordination and WSDOT and the State Treasurer’s Office on evaluating the impacts on fuel tax bond holders; and**
 - » **Work delegated to WSTC on urban/rural financial impact and equity, “within existing resources.”**

Phase 3 work plan

Further Refine Policy Issues

- Transition approaches
- Urban/rural equity issues
- Implications for gas tax bonds

Develop Concept of Operations

- Based on a combination of concepts **A** **B** **C**



Findings
to
Legislature

???

Demo

Refine

- Financial Analysis

Now through Dec 2014

Jan 2015

2016

**UPDATED ASSUMPTIONS:
POLICY, PHASING, TRANSITION**

Updated policy assumptions

Assumption	Last year	This year
Vehicles subject to road usage charges	Only non-diesel vehicles pay road usage charges.	Three scenarios
Fuel tax status	Stop collecting the gasoline tax, but keep collecting the diesel tax.	Keep collecting all fuel taxes (gasoline and diesel), but refund fuel taxes to vehicles that pay road usage charges.
Per-mile rate	Rate is revenue neutral with gross gasoline tax revenues in 2015.	Set the rate to be revenue neutral with gross fuel tax revenues from light vehicles in 2015.
Road usage charge start date	2015	July 1, 2018 (start of FY2019).
Transition	All-at-once.	Two scenarios
Methods of collection	Consider Methods A, B, and C independently and in combination.	All methods (A, B, C, and D) available. D treated similarly to B from a cost perspective.
Private account management	Not assumed.	Not assumed, but acknowledged as an option.
Evasion	Evasion treated as a “cost” for road usage charge concepts.	Evasion treated as a subtraction from gross revenues

Which vehicles should be charged?

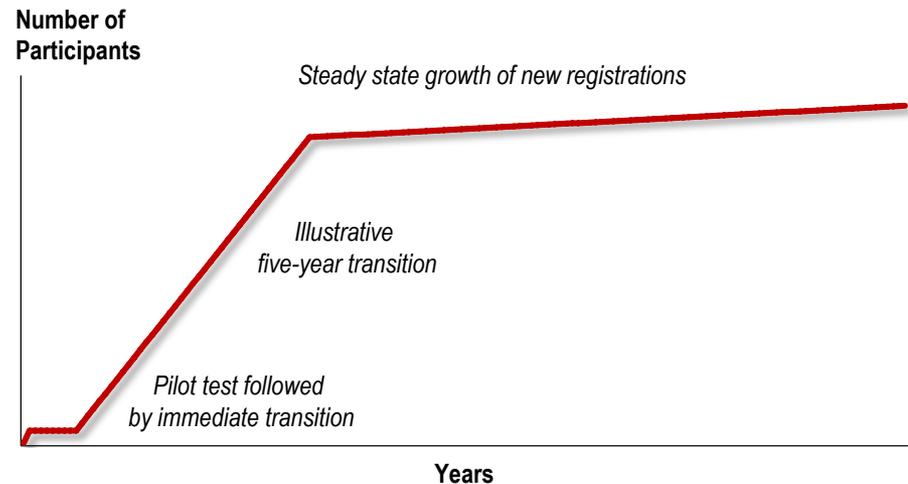
- **We investigated numerous options:**
 - » **All non-diesel vehicles;**
 - » **All passenger cars;**
 - » **Vehicles below 26,000 pounds gross vehicle weight rating (GVWR) regardless of fuel type;**
 - » **Vehicles 10,000 pounds GVWR or less regardless of fuel type;**
 - » **Highly fuel efficient vehicles; and**
 - » **Vehicles above the average fuel economy rating.**
 - » **Charge all new vehicles 10,000 pounds GVWR or less regardless of fuel type beginning with model year 2019.**

Which vehicles should be charged?

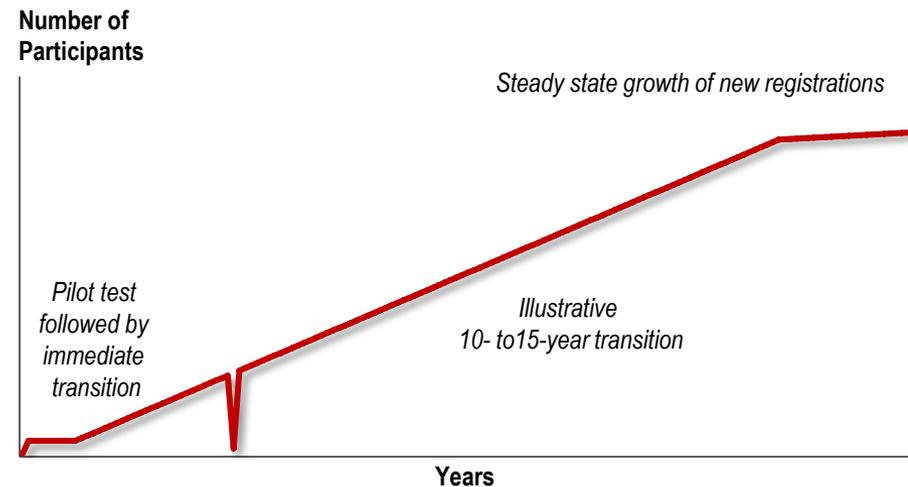
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 - » **Charge all new vehicles 10,000 pounds GVWR or less regardless of fuel type beginning with model year 2019.**
- **We evaluated the three concepts in green, above.**

Potential transition approaches

- **Enroll at annual registration**
 - » **One-year transition**



- **Enroll at title transaction**
 - » **10-15 year transition**



CONCEPT OF OPERATIONS

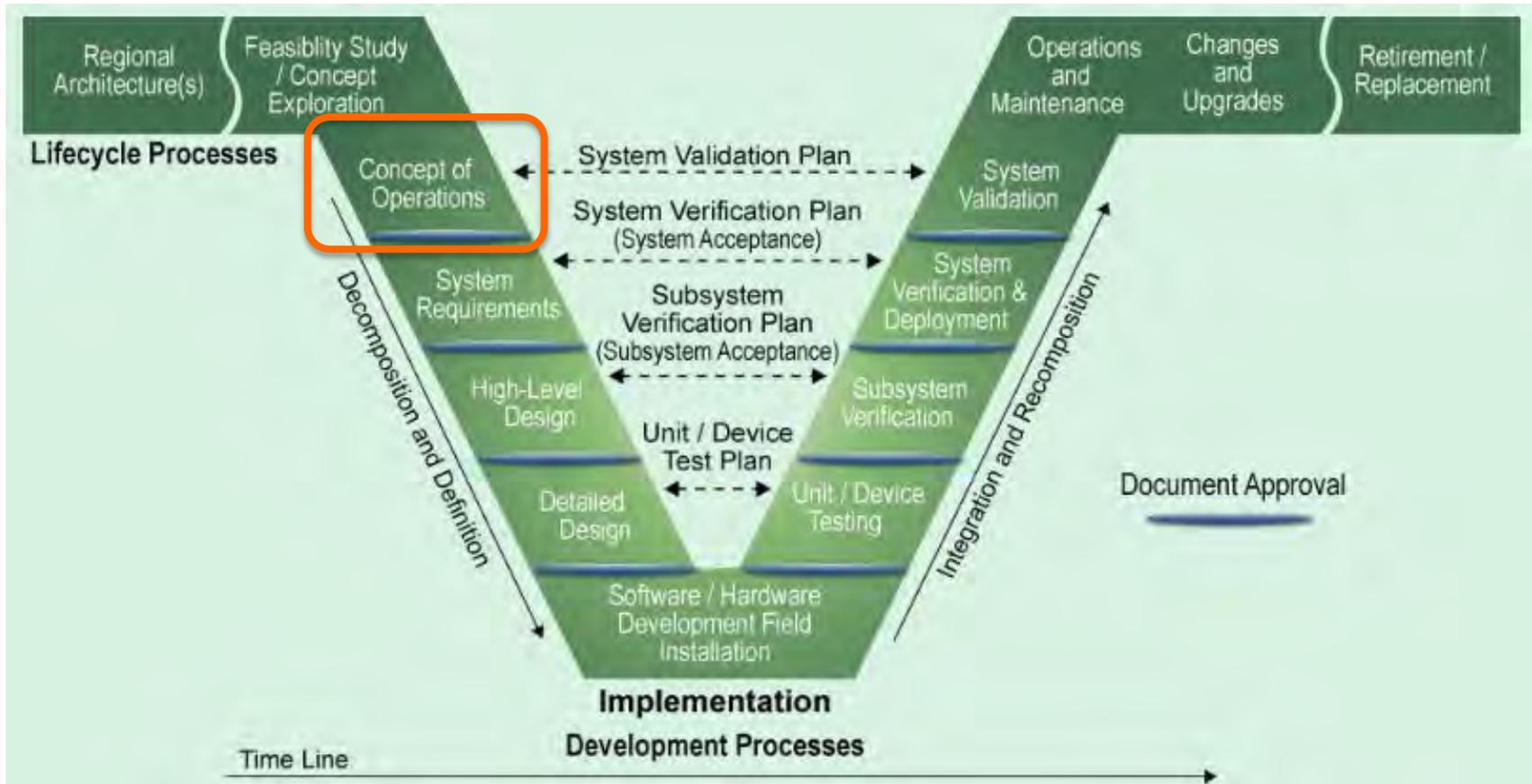
Concept of Operations Agenda

- **What is a Concept of Operations (ConOps)?**
- **Policy Direction and Stakeholders**
- **Road Usage Charge System Components**
- **Methods of Road Usage Charge Collection (formerly Operational Concepts)**
- **System Usage Scenarios**
- **Key Takeaways**

What is a Concept of Operations?

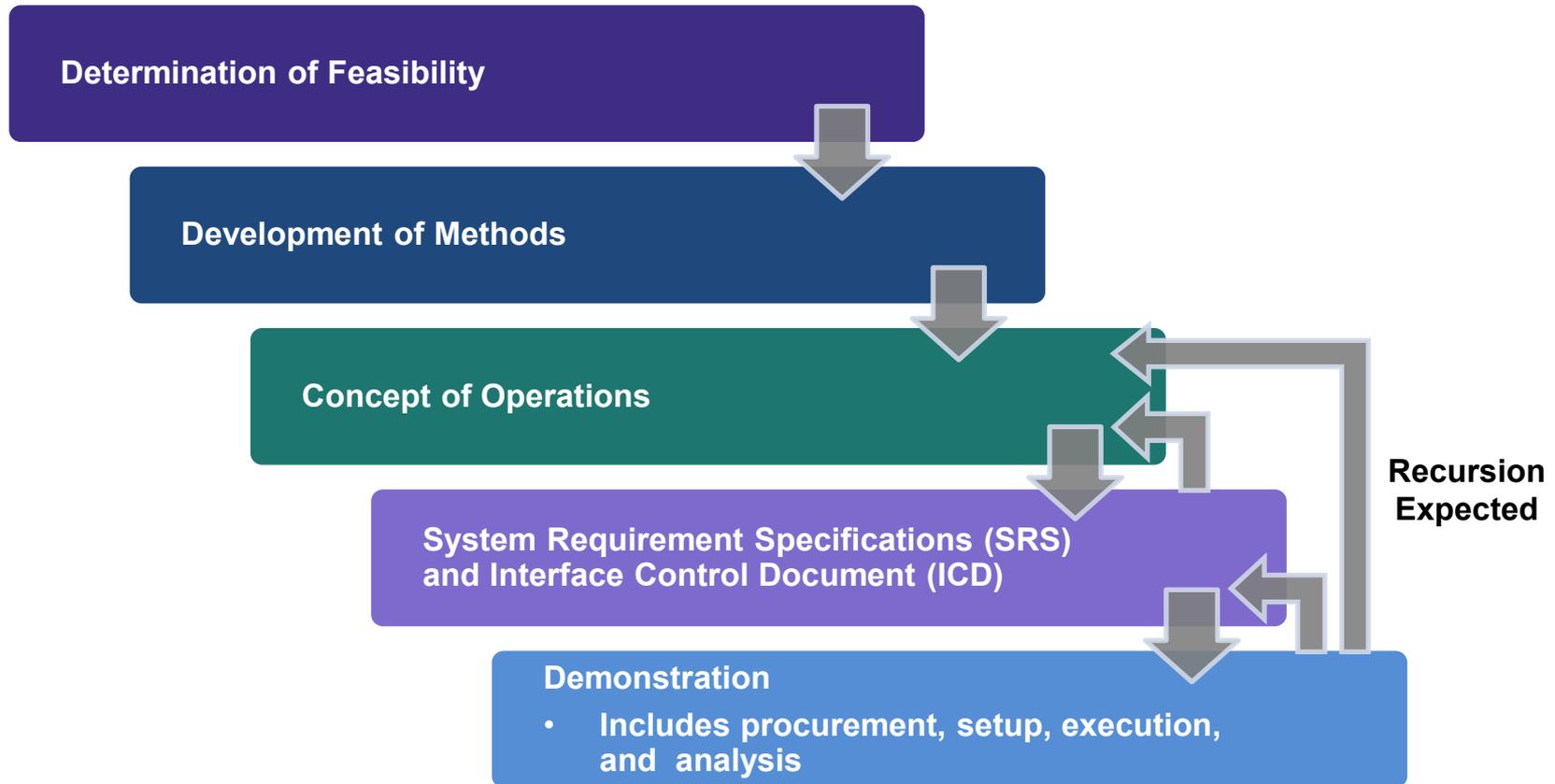
- **Generally the first systems engineering document produced**
- **Description of how the system will be used**
- **Relatively nontechnical**
- **Presented from the viewpoints of the various stakeholders**
- **Reasons for creating a ConOps:**
 - » **Get stakeholder agreement on general system operation**
 - » **Describe system operation at a high-level**
 - » **Define the environment in which the system will operate**
 - » **Provide the basis for validation of the completed system**
 - » **Base document that initiates the system specifications and interface control documents**
 - » **Generally describes what to procure and how it will be used**

The Systems Engineering Process



Source: FHWA, "Developing and Using a Concept of Operations in Transportation Management System," 2005

Expected Technical Development Process



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Policy Direction

- **Primary policy direction:** Identify a sustainable, long-term transportation revenue source
- **Guiding principles:**

Transparency	Accountability
Complementary policy objectives	Enforcement
Cost-effectiveness	System Flexibility
Equity	User Options
Privacy	Interoperability and Cooperation
Data Security	Phasing
Simplicity	

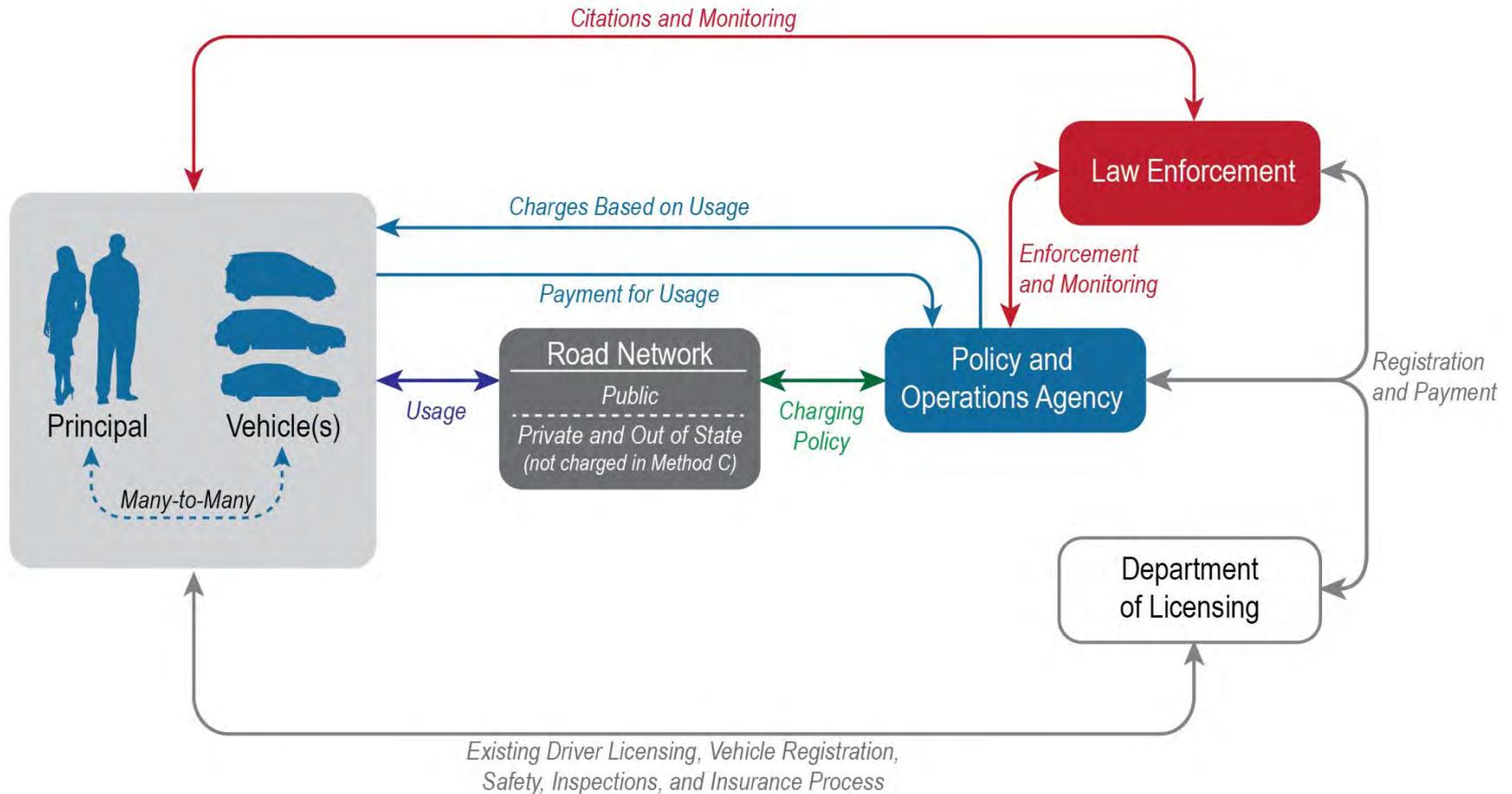
Major Stakeholders

- **Principals**
- **Policy and Operations Agency (Existing or new)**
- **Legislators**
- **WSTC**
- **WSDOT**
- **DOL**
- **OST**
- **Law Enforcement Agencies**
- **Private Industry**

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Road Usage Charge System Overview



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The ConOps allows Principals to choose one of four charging methods

- A** Time Permit
- B** Odometer Reading
- C** Automated Distance Charge
- D** Smartphone Application

Method D – Smartphone Application Road Usage Charge Measurement



- **To begin, the Principal:**
 - » **installs application on smartphone**
 - » **Sets up an account**
 - » **Pairs the device with the vehicle’s Bluetooth network.**
- **After initial Setup:**
 - » **Phone automatically pairs with vehicle when turned on & in vehicle**
 - » **When vehicle moves, application computes distance traveled**
 - » **Application updates miles traveled over the cellular connection**
- **Principals may not have smartphone (or not charged). To cover:**
 - » **Initial odometer image is required at first pairing**
 - » **Principals must provide regular photos of their odometers, taken using the application on the smartphone. These are watermarked by the bluetooth signature for each vehicle, which is unique.**

More...

Method D – Smartphone Application

Road Usage Charge Measurement (Continued)



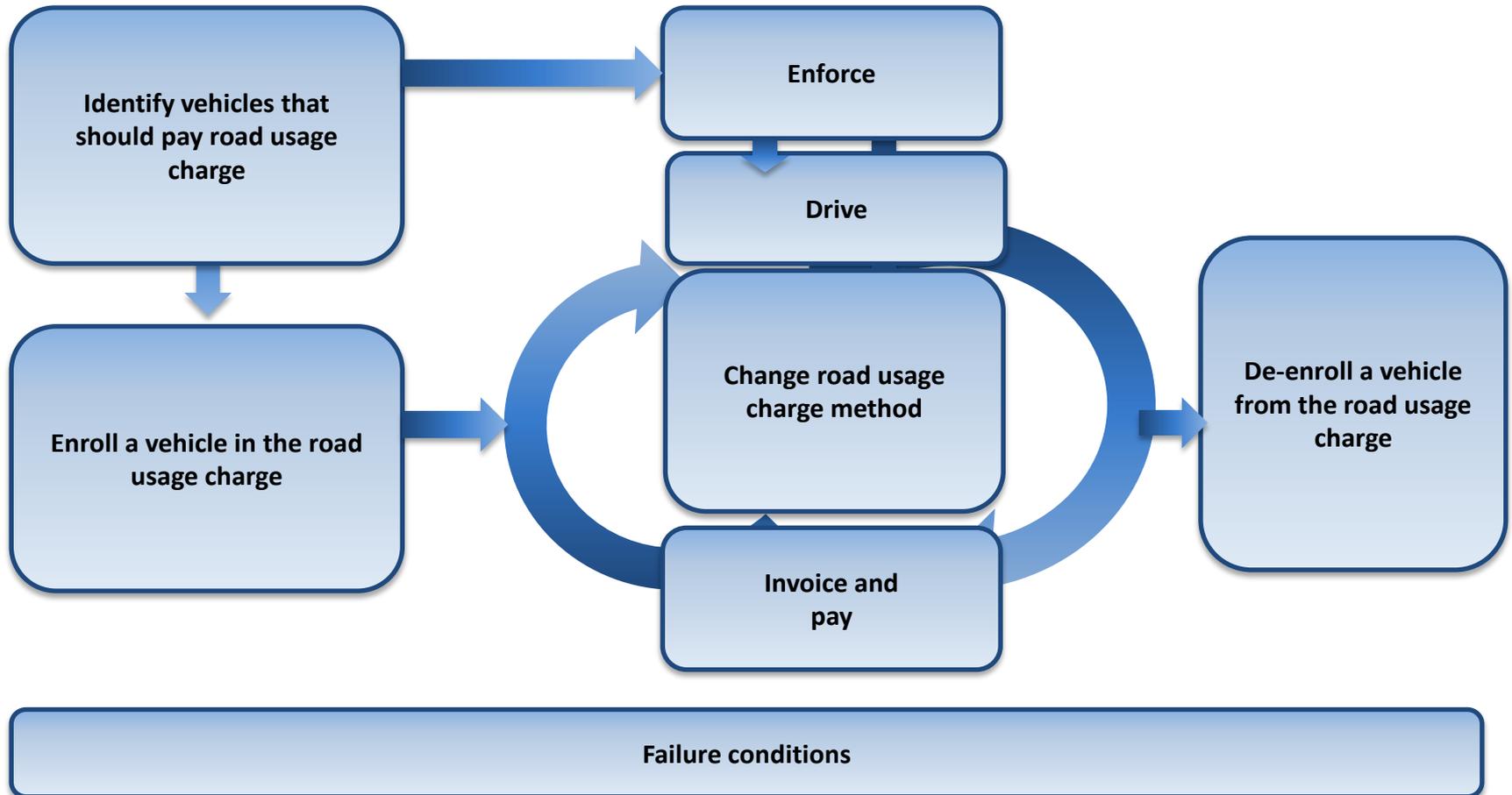
- The State can invoice for mileage similarly to Method B.
- The smartphone application can also be used with Method C:
 - » Smartphone uses GPS location data
 - » Principal can enable/disable use of location data
 - » Privacy is protected since User opts into type of phone and having control to switch location data on/off.
- Principal perspective
 - » Requires smartphone of Principal's choice
 - » Most likely prepay, like Method B
- Agency perspective
 - » Applications are currently offered by two private vendors who may wish to operate as service providers
 - » Requires extensive account management and CRM

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Road Usage Charging System

Usage Scenarios



For each scenario / sub-scenario

- **Context**
- **Principal Activities**
- **Policy and Operations Agency Activities**
- **Private Account Management Entity Activities**
- **Issues**
- **Possible Changes Over Time**

Concept of Operations Agenda

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Key Takeaways

- **The ConOps:**
 - » **Fulfills Legislative and Steering Committee guidance**
 - » **Is the technical basis for the financial model**
 - » **Provides the technical framework for a pilot or revenue generating road usage charging system**
 - » **Basis for further system specifications and interfaces**
 - » **Provides input into procurement of equipment and services**
- **All four methods work well together and would be implemented in parallel**
- **There are still several issues to resolve**

FINANCIAL ANALYSIS

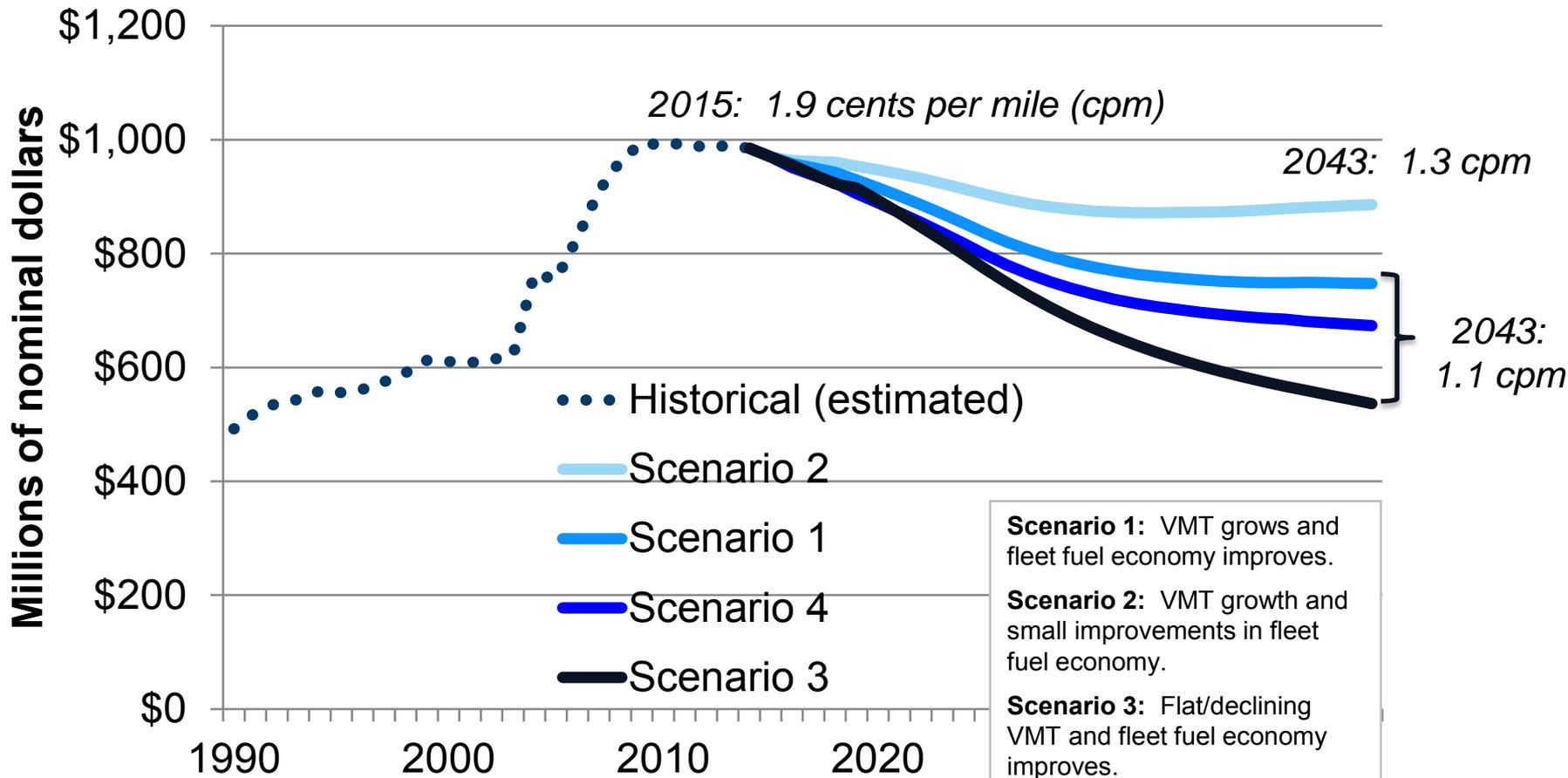
The Future is Uncertain

So We Created Economic Scenarios

Economic Scenario	Characteristics
1	VMT grows and fleet fuel economy improves
2	VMT grows and small improvement in fleet fuel economy
3	Flat/declining VMT and fleet fuel economy improves
4	VMT grows and fleet fuel economy improves, but fewer vehicles

Estimated Light Vehicle Fuel Tax Revenues in Four Economic Scenarios

Fuel Tax Revenues from Light Vehicles



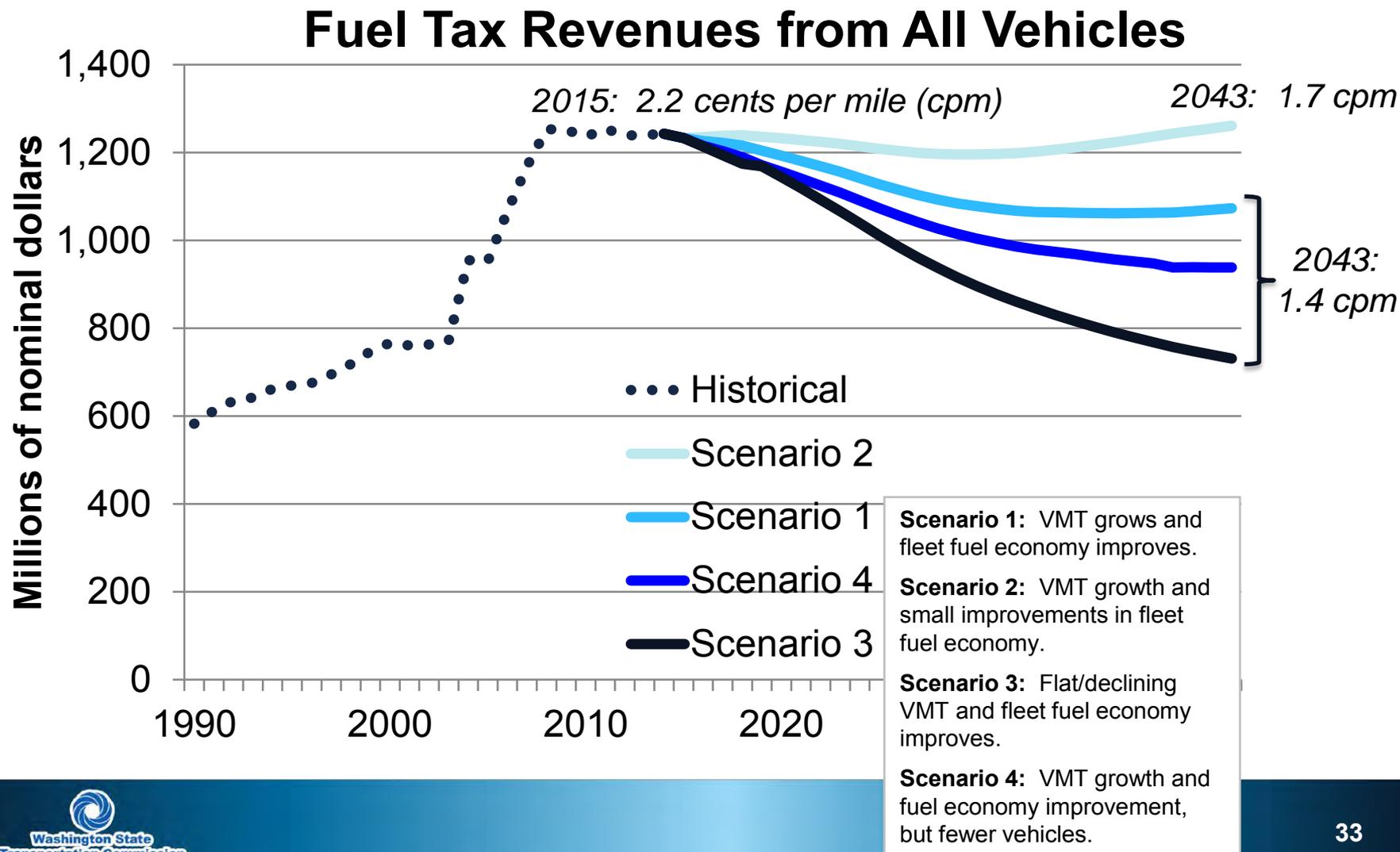
Scenario 1: VMT grows and fleet fuel economy improves.

Scenario 2: VMT growth and small improvements in fleet fuel economy.

Scenario 3: Flat/declining VMT and fleet fuel economy improves.

Scenario 4: VMT growth and fuel economy improvement, but fewer vehicles.

Fuel Tax Revenue for All Vehicles (Light + Heavy) in Four Economic Scenarios



Other Uncertainties Relate to Policy Choices

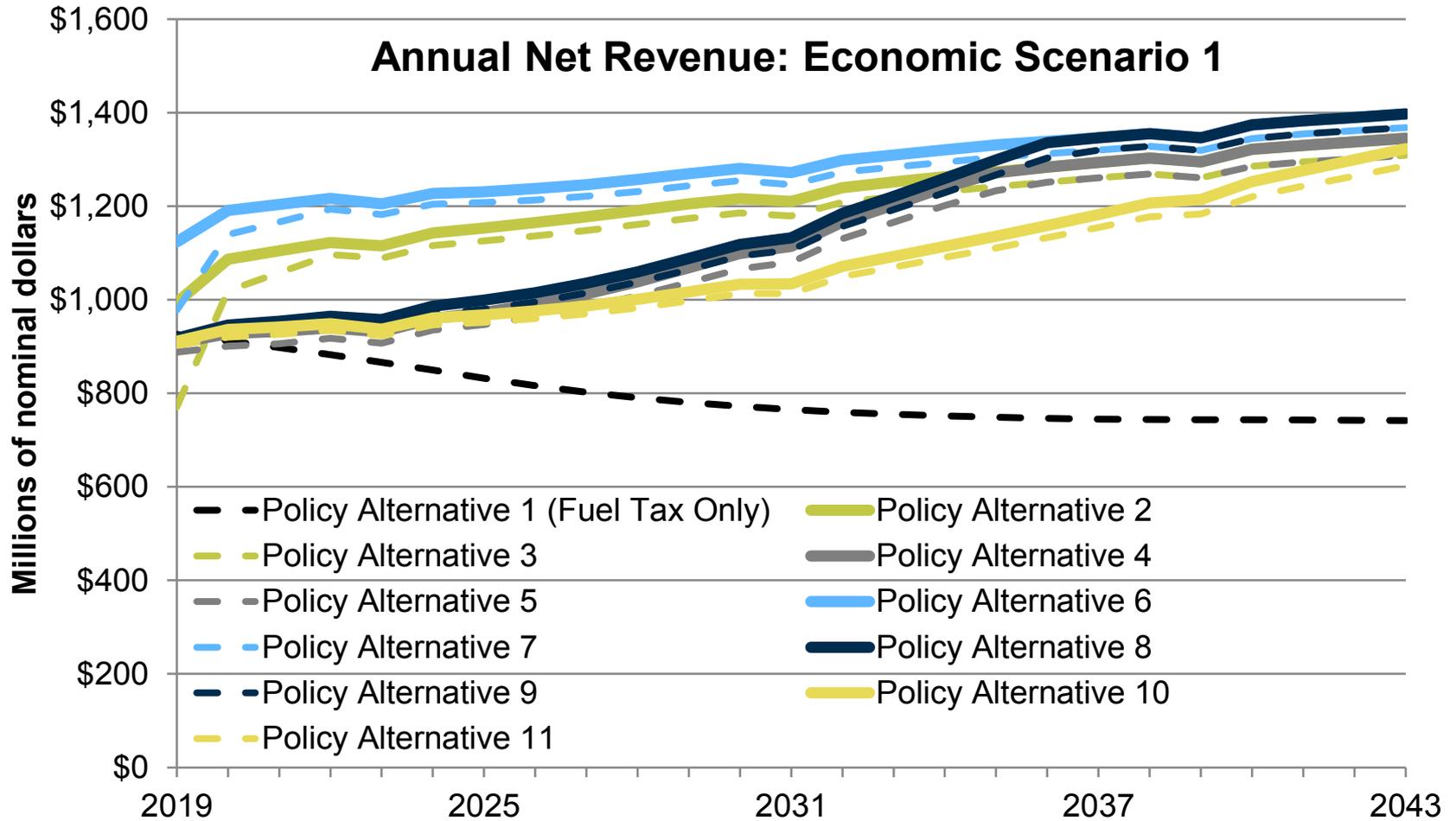
- **Policy choices for fuel tax**
 - » Which vehicles will remain on the fuel tax only
 - » Per-gallon rate
- **Policy choices for road usage charging**
 - » Transition approaches
 - » Vehicles that will be subject to the road usage charge
 - » Per-mile rate
 - » Road usage charge collection methods
 - » Whether to continue collecting fuel tax upstream
 - » Whether to use commercial account managers

We Analyzed 11 Policy Alternatives Under Each of the Four Economic Scenarios

- One fuel-tax option with fuel tax holding steady at 37.5 cents per gallon
- Ten road usage charge options
 - » Rate of ~1.9 cents per mile (revenue neutral with fuel tax in 2015)
 - » Options vary in terms of
 - Vehicles subject to charge
 - Transition strategy
 - Adoption of various charge methods
 - » All vehicles subject to road usage charges that consume fuel will continue to pay fuel taxes
 - Any fuel tax paid would be credited toward road usage charges owed

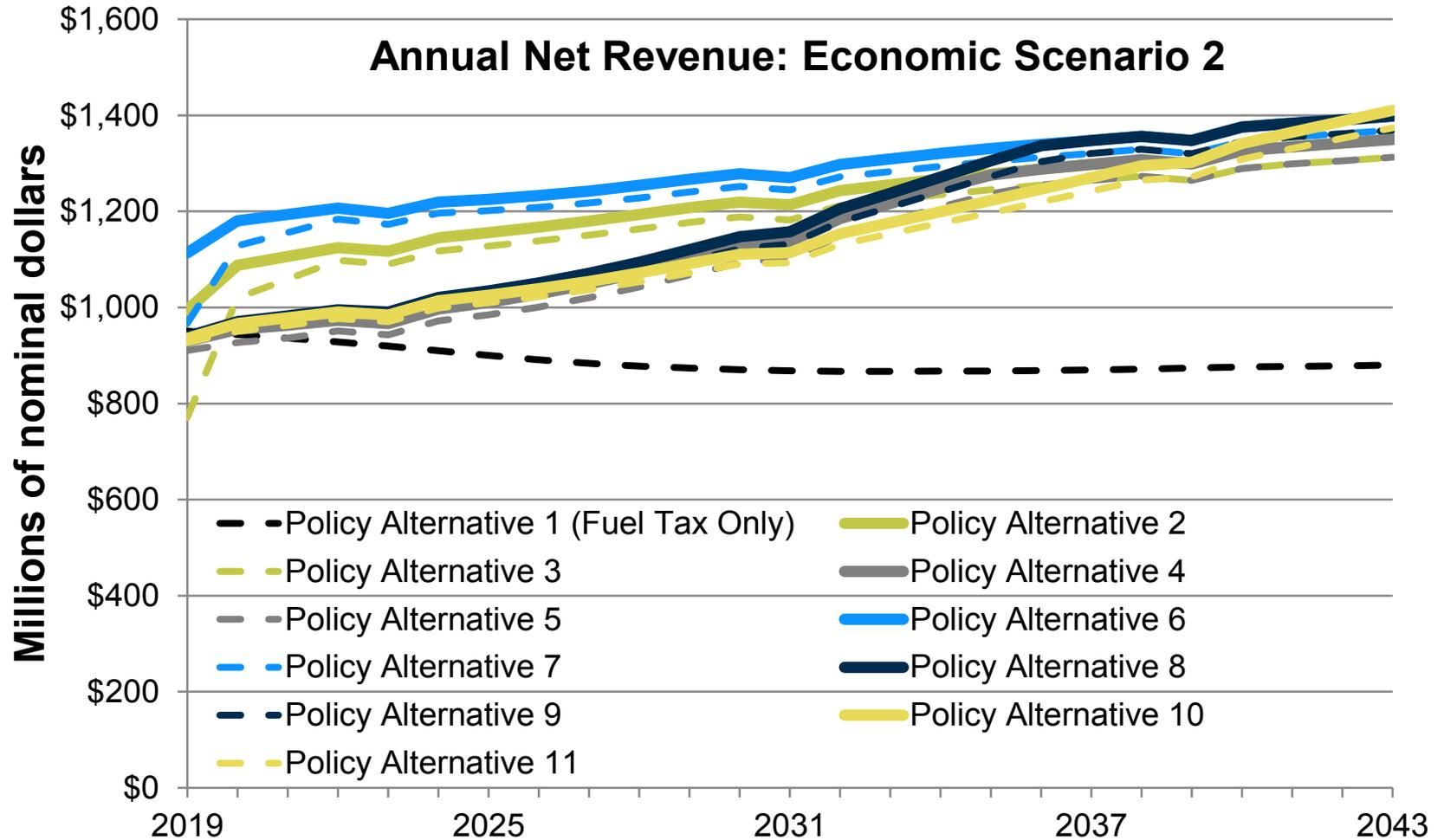
Economic Scenario 1

Road Usage Charge Net Revenue Outperforms Fuel Tax if MPG Improves as Expected



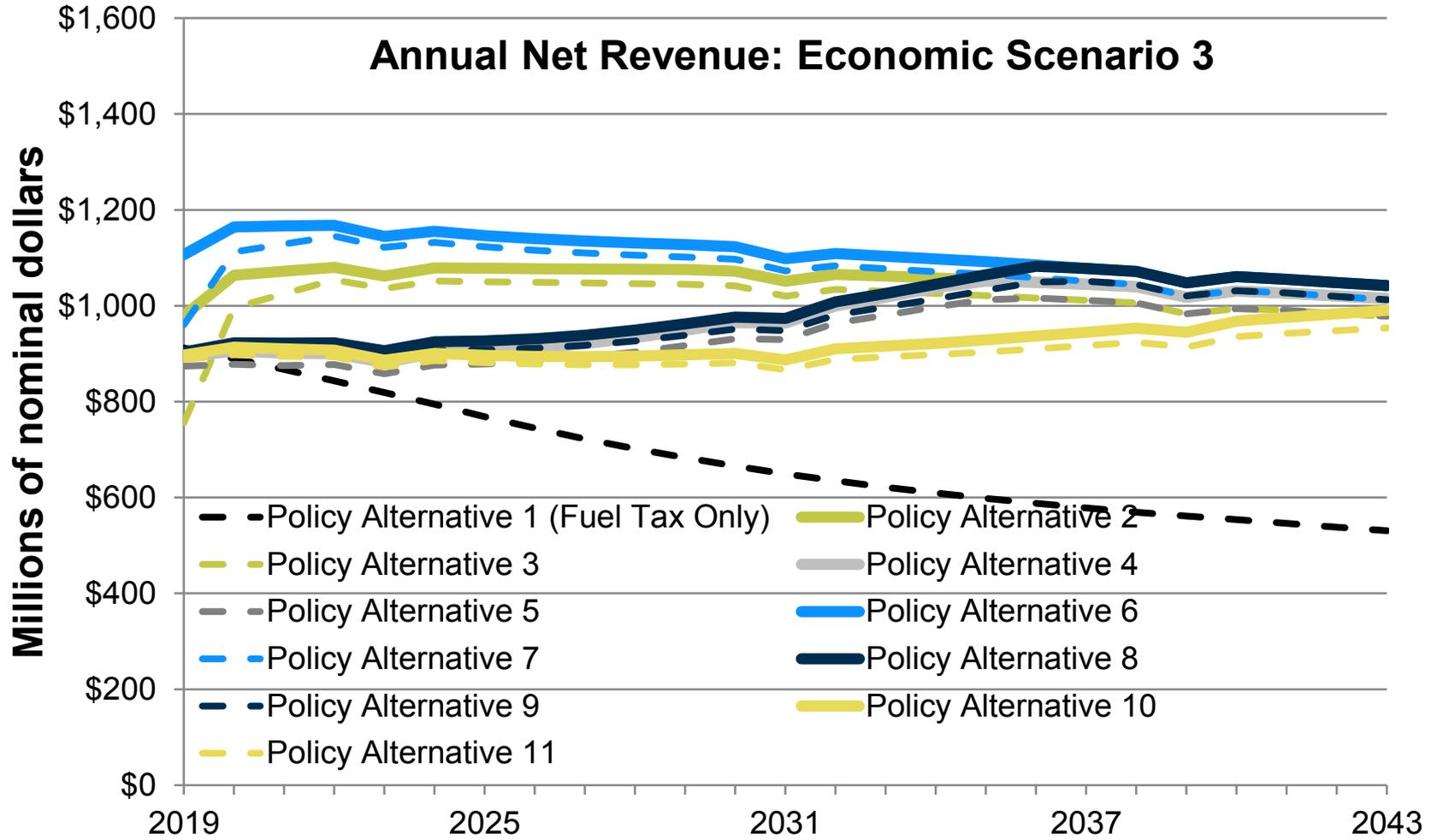
Scenario 2

Road Usage Charge Net Revenue Outperforms Fuel Tax with More Modest Fuel Economy Improvements



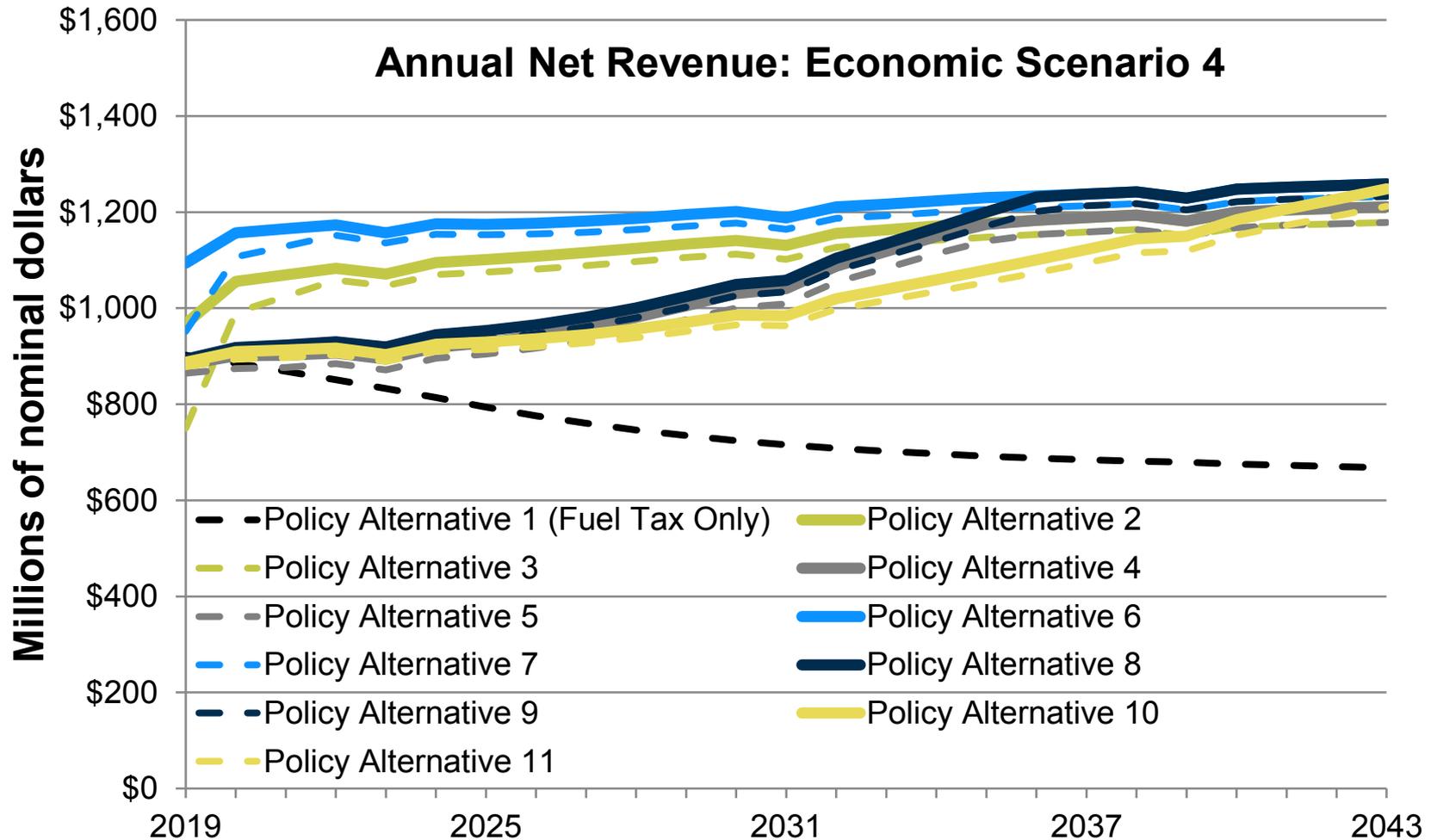
Scenario 3

Road Usage Charge Net Revenue Outperforms Fuel Tax if VMT Declines



Scenario 4

Road Usage Charge Net Revenue Outperforms Fuel Tax if Fleet Growth is Slower Than Expected



Road Usage Charge Net Revenue Expected to Outperform Fuel Tax Despite Higher Costs

- Light vehicle fuel tax collection cost is <1% of revenue
- Road usage charge cost estimates vary
 - » Total operational costs over 25 years range from 3.2-9.7% of revenue
 - » All costs over 25 years (capital + operations) range from 3.4-11.0%
 - » All costs above include cost of continuing to collect fuel tax
- Policy choices that drive road usage charge costs
 - » Whether to continue collecting fuel tax
 - » How to enforce, including penalties
 - » Whether to allow commercial account managers

In all ten road usage charge policy alternatives, we assumed that all drivers will continue to pay the fuel tax. This means that Washington will continue to bear the cost of collecting the fuel tax under all alternatives. These costs and revenues are reflected in the financial analysis.

What Fuel Tax Increase Would Result in the Equivalent Cash Flow of Road Usage Charge?

- **If rates were increased annually**
 - » **Road usage charge on light vehicles preserves revenue at ~1.9 cents per mile driven**
 - » **If fuel economy increases in line with EIA forecast, road usage charging accomplishes the same thing as raising the fuel tax**
 - **An average of 1.2 cents per gallon per year on light vehicles, 2019-2043; or**
 - **An average of 0.9 cents per gallon per year on all vehicles, 2019-2043.**

What Fuel Tax Increase Would Result in the Equivalent NPV of Road Usage Charge?

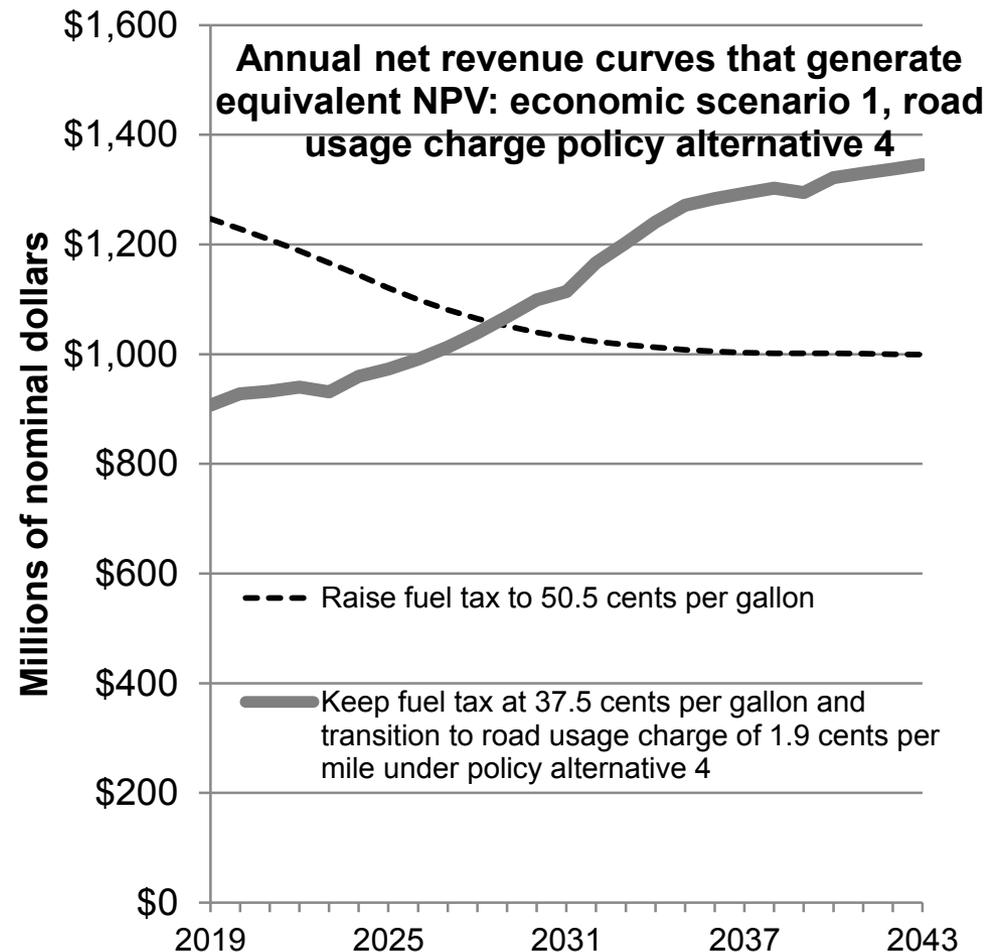
- **One time increase**

- **If fuel economy increases in line with EIA forecast, road usage charging accomplishes the same thing as**

- Raising fuel tax 10.0 – 21.5 cents per gallon on light vehicles; or
- Raising fuel tax 7.5 – 16.5 cents per gallon on all vehicles.

- **However, a one-time increase of fuel tax does not resolve the declining revenue curve**

- Rates would need to rise again in 2043
- Requires a conceptual “trust” to save excess revenue in early years to be made available in later years



Key Takeaways

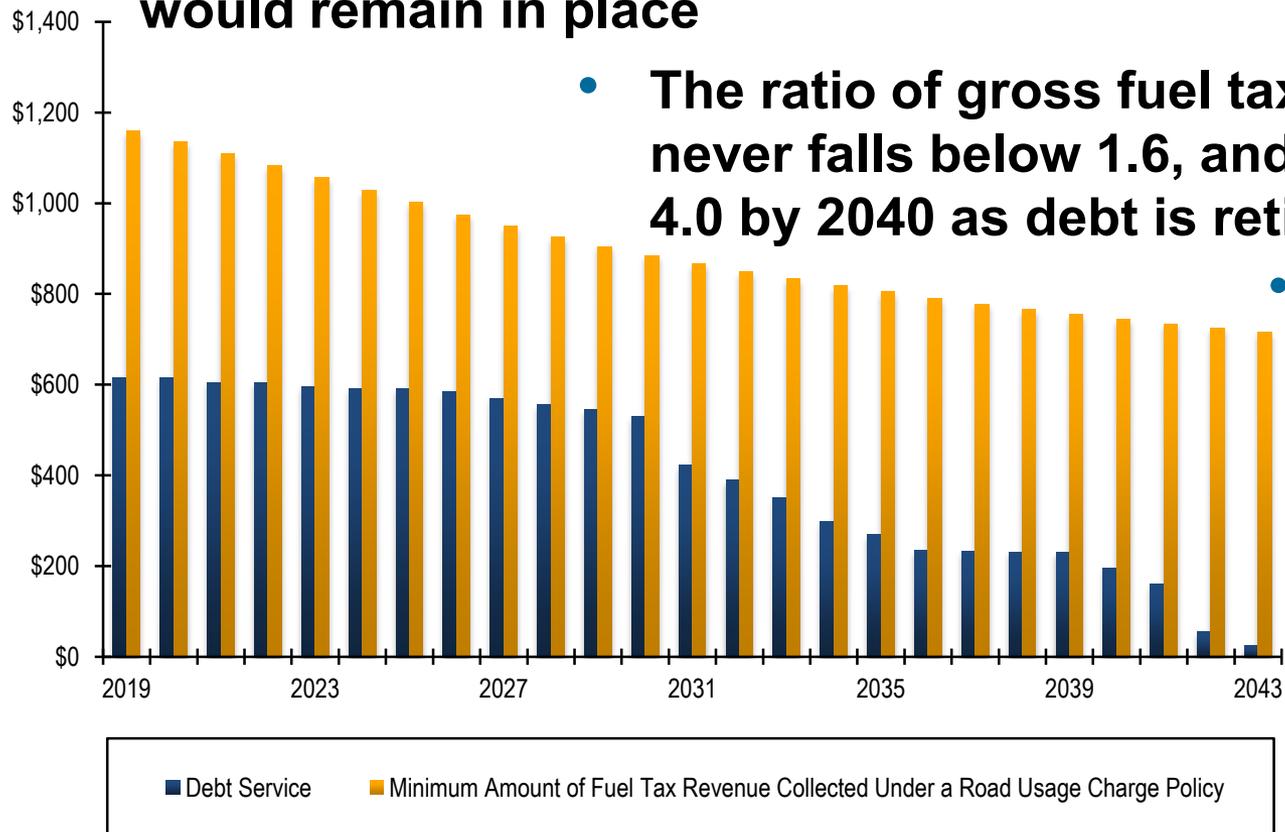
- **Fuel economy improvements (and alternative fuel adoption) threaten to undermine fuel tax revenues**
- **Under all scenarios we created, fuel tax revenue is expected to be flat or declining**
- **Road usage charges are estimated to be more costly to collect than fuel tax**
- **However, road usage charges are estimated to generate more net revenue than fuel tax under all scenarios and policy alternatives analyzed, by a margin of 21-57% more, measured in NPV**
- **If fuel economy increases in line with expectations, road usage charging accomplishes the same thing as raising fuel tax about 1.2 cents per gallon per year on light vehicles or 0.9 cents per gallon per year on all vehicles, 2019-2043**

Fuel tax revenues should be more than sufficient to service outstanding fuel tax bond debt

- Under road usage charging policy alternatives, we assumed the fuel tax would remain in place

- The ratio of gross fuel tax to debt service never falls below 1.6, and rises to nearly 4.0 by 2040 as debt is retired

- Although bond payments are covered, but funds available for operations, maintenance, and new projects are still inadequate



REMAINING QUESTIONS AND PROPOSED WORK PLAN

Numerous Questions Still Remain

- **Our “parking lot” is pretty full**
 - » **Eight pages in the draft report – 17 questions**
 - » **Many more likely to follow if this work continues**

How to operationalize the four road usage charge methods.	How will people react to the proposed road usage charge system?	Public understanding and acceptance of a proposed system.
Per-mile rate setting.	Rate setting for time-based permit.	Vehicles subject to charge.
Charging out of state drivers.	Exemptions.	Refunds.
Dedication of road usage charge revenue.	Motor fuel tax bonds.	Legal issues.
Institutional roles.	Private account managers?	Interoperability with other states.
Interoperability with toll system.	State IT needs.	

We Identified A Few that Will Help Decide Whether To Proceed

- Most can wait till “later”
- But these will help with a go/no-go decision



How to operationalize the four road usage charge methods.	How will people react to the proposed road usage charge system?	Public understanding and acceptance of a proposed system.
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Institutional roles.	Private account managers?	Interoperability with other states.
Interoperability with toll system.	State IT needs.	

The proposed work plan has three key activity areas for the 2015 to 2017 biennium

Demonstration

• Objectives:

- Expose Washington motorists to road usage charging policy and concepts,
- Raise awareness of transportation funding issues,
- Test road usage charge operations,
- Identify organizational challenges, and
- Refine cost estimates.

• Activities:

- Plan, execute, and evaluate a demonstration of road usage charging methods.

Public Attitude Assessment

• Objectives:

- Evaluate how well the public understands transportation funding sources and needs,
- Assess public understanding of road usage charging, and
- Identify questions, concerns, and reasons for support and opposition.

• Activities:

- Polling,
- Surveys,
- Focus groups,
- Stakeholder meetings, research, and
- Analysis.

Public Communications and Engagement

• Objectives:

- Communicate the purpose and details of the demonstration,
- Address questions about road usage charging, and
- Stimulate and monitor public discussion of transportation funding.

• Activities:

- Recruit participants;
- Provide Q&A to demonstration participants, public, and media;
- Provide speakers to community groups; and
- Maintain web and social media presence.

Demonstration tests from the perspective of the Principal and the operating agency(s)

- **Front-end testing**
 - » How do the methods operate in practice?
 - » How easy are the methods to use?
 - » How accurate are they? How easy or difficult are they to evade?
 - » How do they impact user's perception of privacy? simplicity?
 - » Which methods do users prefer? Do users prefer commercial account managers or government account managers?
- **Back-end testing :**
 - » What existing agency processes and systems can support road usage charging?
 - » What system and process modifications are necessary?
 - » How might agencies work together?
 - » How much will different processes and components cost?
 - » How does the relationship work between agencies and commercial account managers?

How big a demonstration does Washington need?

- **Considerations:**
 - » **Several months to one year.**
 - » **Methods to be offered/tested**
 - » **Geographic distribution**
 - » **Representative sample size of diverse regions**
 - » **Hundreds to thousands of participants**
 - » **Multijurisdictional collaboration**

Public Attitude Assessment Approach

- **Baseline views:**
 - » How well do the public and key stakeholders understand transportation funding sources and needs?
 - » How does the public react to road usage charging as an alternative funding policy?
 - » What questions and concerns does the public have about road usage charging? What are their reasons for support and opposition?
- **After learning more about road usage charging:**
 - » The same questions as above, but the respondents will have more information from which to develop responses.
 - » Evaluate differences in responses.
 - » Possible follow-up interviews and/or surveys to drill down on specific issues and understand attitudes affecting any noticeable change in attitudes or responses.

Public Attitude Assessment *Components*

- **Market research**
 - » **Focus groups**
 - » **Surveys**
 - **VOWS and/or independent**
- **Stakeholder interviews**
- **Report**

Public communications and engagement

- **Objectives:**
 - » **Communicate the purpose and activities of the demonstration;**
 - » **Address questions about road usage charging arising from the media and key stakeholders; and**
 - » **Stimulate and monitor public discussion of transportation funding in media and public forums**
- **Components**
 - » **Communications plan**
 - » **Communications content**
 - » **Public outreach and stakeholder briefings**
 - » **Print and broadcast media engagement**
 - » **Social media engagement**
 - » **Educational video shorts and infographics**
 - » **Branding**

Proposed work plan

Schedule and budget range

Stage of the Work Plan	Stage 1: Planning	Stage 2: Setup	Stage 3: Execution	Stage 4: Evaluation	Cost (millions)
Demonstration	Develop budget and detailed demonstration plan, including technical documents.	Procure technology vendors and set up necessary systems.	Conduct demonstration and collect evaluation data.	Evaluation analysis and reporting, including findings and recommendations.	\$2.4 to \$4.5
Public Attitude Assessment	Baseline assessment via web surveys, focus groups, and stakeholder interviews.	Attitudinal surveys.	Participant surveys.	Comprehensive report on attitude assessment.	\$0.3 to \$0.5
Communications and Engagement	Prepare communications plan, manage communications, and begin media outreach.	Recruit demonstration participants and engage media.	Proactive communications during demonstration.	Continue media engagement and report on findings.	\$0.3 to \$0.5
Project Management	Coordinate and manage the project deliverables. Direct and provide policy interface, reports and presentations.	Coordinate and prepare the agreed plans for executing and testing the demonstration plan.	Manage and monitor the execution of the demonstration and reporting status to Legislature.	Prepare and present final reports and analysis.	\$0.3 to \$0.4
Timeframe	6 to 8 months	6 to 12 months	6 to 12 months	6 to 9 months	26 to 41 months
Cost (millions)	\$0.8 to \$1.0	\$0.6 M to \$1.2	\$1.4 to \$3.0	\$0.6 to \$0.9	\$3.3 to \$6.0

Decision to continue or not

Progress reports to Legislature

Demonstration

Factors that affect cost, schedule, and outcomes

Dimension	Range	Considerations
Methods to be offered/tested	Methods A, B, C, and D	Mechanisms will be in place to ensure a minimum number of participants select each method.
Number of participants	1,000-2000	For meaningful feedback, each method should be tested by at least 300 participants. Up to 100 participants may test multiple methods for comparison (e.g., a household with four vehicles would test one on each method); such participants would also be asked to provide more detailed feedback than participants testing only one method.
Geographic distribution	3-5 selected locations or regions	Locations selected for the demonstration should be representative of the entire state.
Timeframe	21-39 months from project initiation	Initiation is assumed to be September 2015. Timeframe includes 6-12 months of live demonstration. If all steps go as quickly as possible, the entire demonstration can be accomplished within the 2015-2017 biennium. More likely, some activities will spill over into the 2017-2019 biennium.
Multijurisdictional collaboration	Potentially Oregon and/or California	If such collaboration provides cost and/or time savings or allows for testing of multijurisdictional frameworks for road usage charging, including measurement, reporting, payment, and reconciliation, without compromising Washington's ability to achieve its own objectives on its preferred schedule.
Organizational framework	Operations handled by a third party(-ies)	Procured by the Commission, but overseen by a working group with project management authority comprising representatives of the Commission, DOL, and WSDOT.

Attitudes and communications

Factors that affect cost, schedule, and outcomes

Dimension	Considerations
Type, number of surveys and sample sizes	One would be appropriate at the beginning and one at the end of the demonstration to test movement of attitudes among the public. If done with the VOWS instrument, the cost is reduced but there may be value to an independent survey company to eliminate self-selection bias.
Number and location of focus group sets	Ideally would correspond with the potential locations of the demonstration sites, but not necessarily. A distribution of locations is beneficial to get a sense of the whole state. Focus groups are normally done in sets to avoid coming to conclusions from a limited sample.
Branding	Extent and iteration of branding exercise.
Informational graphics and videos	As many or few as deemed necessary.
Communications intensity	From proactive to entirely reactive

The next phase of work will benefit from participation from several state agencies

- **WSTC, WSDOT, DOL and OST have participated**
- **The proposed work plan would entail higher level of involvement including:**
 - » **Observation of demonstration planning, setup, and execution,**
 - » **Input in developing road usage charge systems;**
 - » **Potential involvement in some aspects of road usage charge data and revenue collection.**
 - » **Participation in working group meetings; and**
 - » **Potential support in development of public communications media and survey instruments.**
- **The cost estimates provided earlier do not reflect any additional costs associated with agency participation.**

NEXT STEPS

Next Steps

- **Finalize report based on WSTC comments**
- **Present to Legislature early next year**

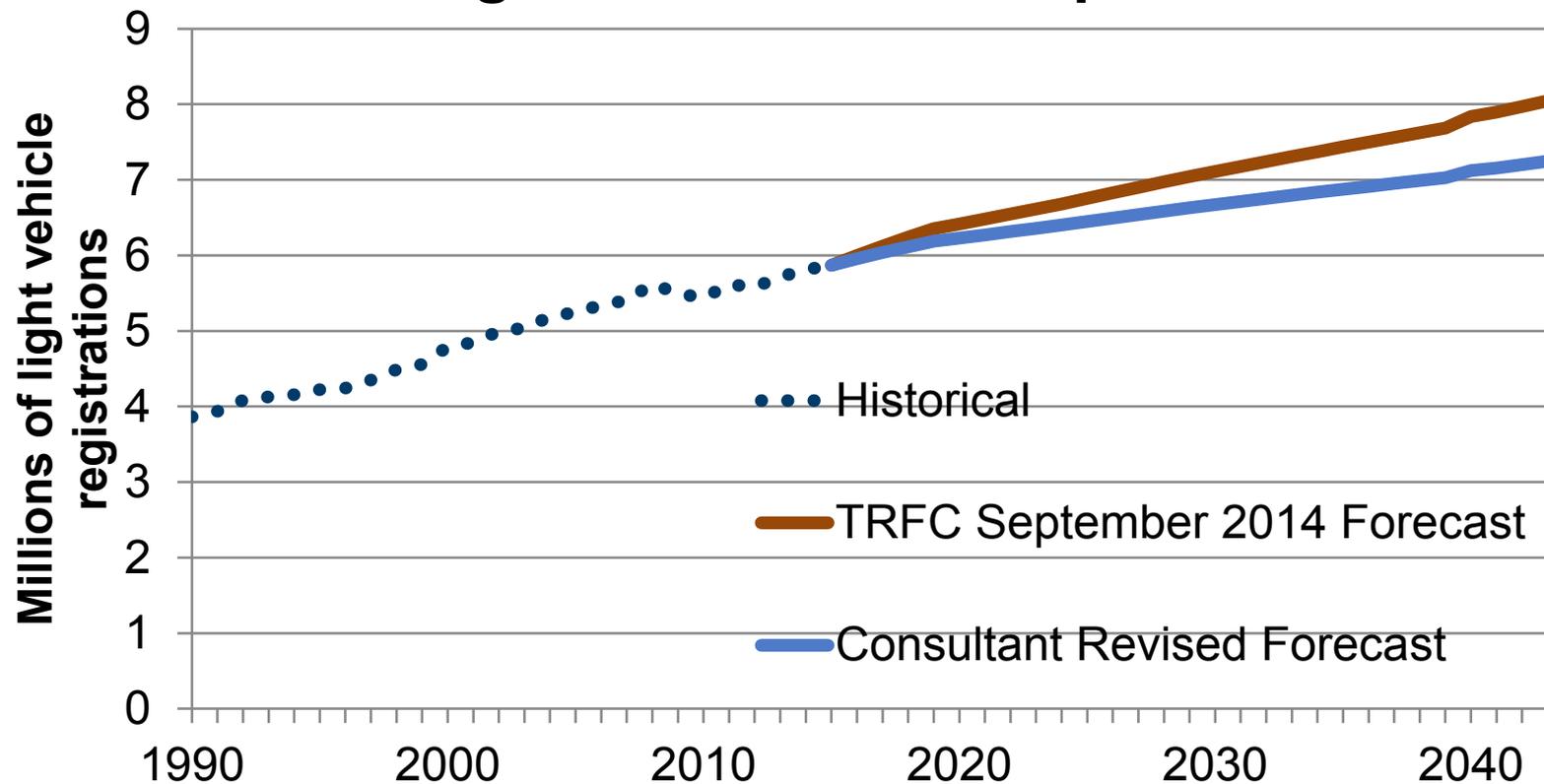
THANK YOU

BACKUP SLIDES

The Future is Uncertain

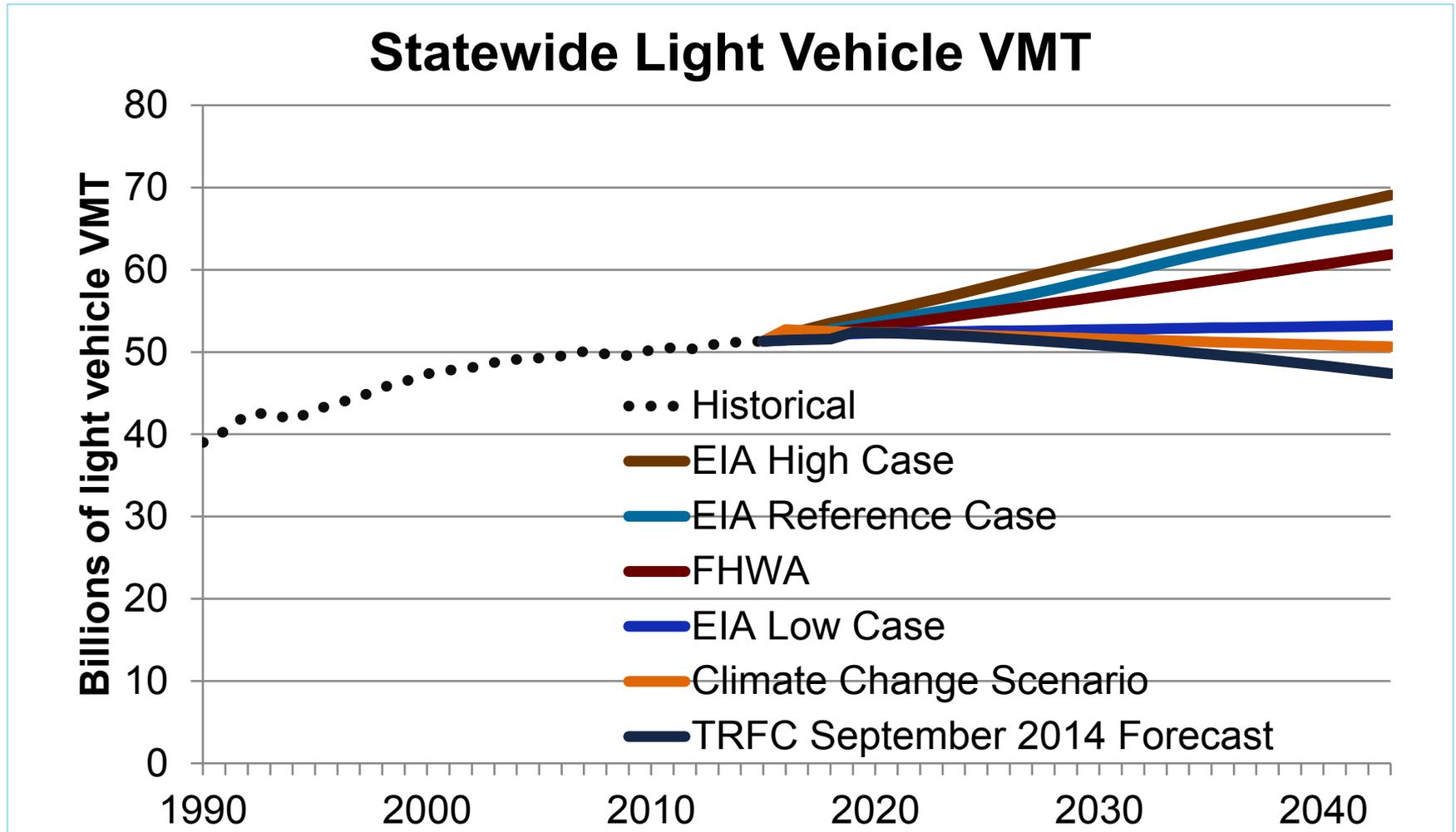
Demographics

Light Vehicle Fleet Population



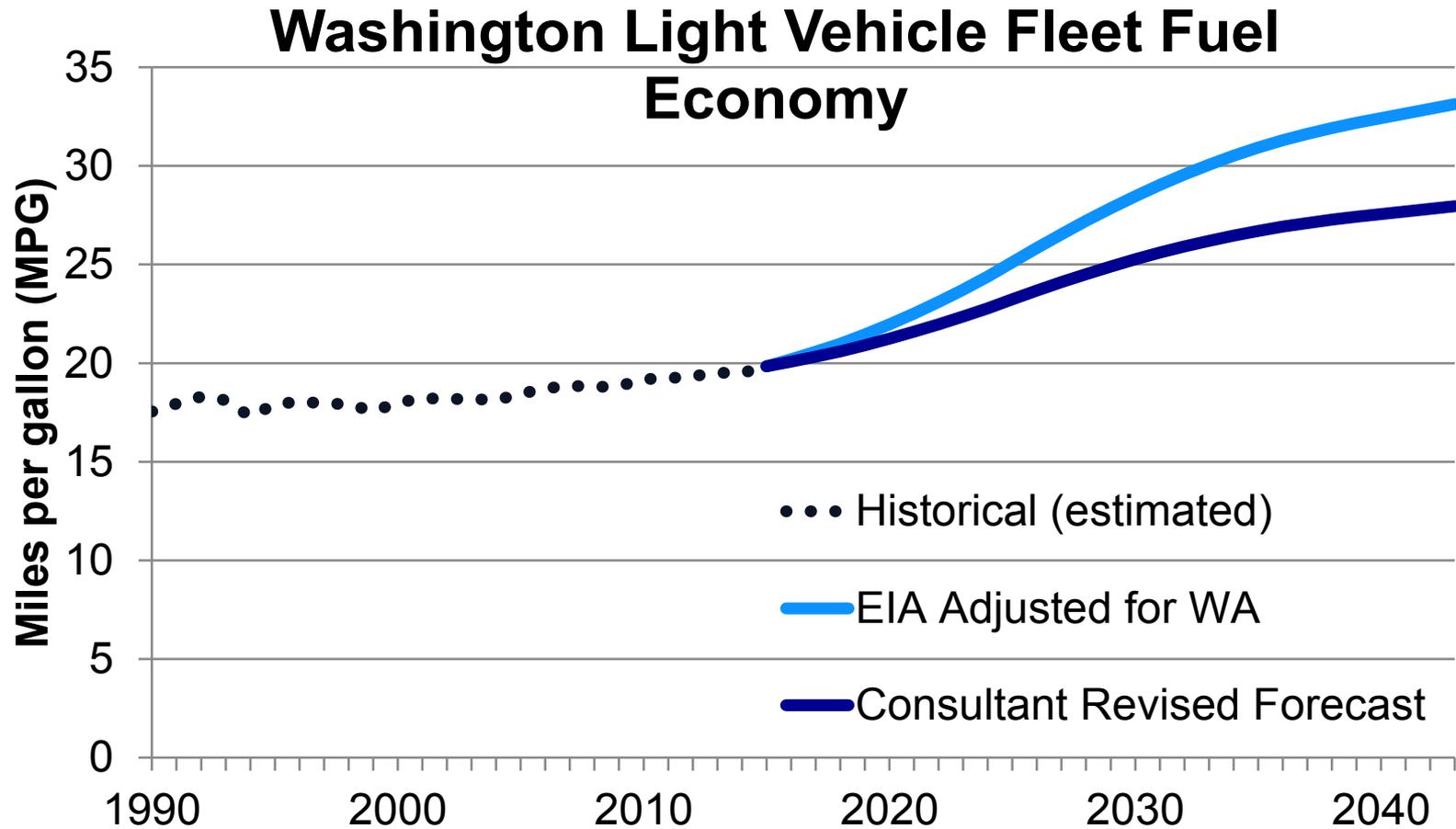
The Future is Uncertain

Behavior



The Future is Uncertain

Technology



We evaluated 11 policy alternatives using each of the four economic scenarios

- Policy alternative 1 represents status quo: keep the fuel tax only.
- Policy alternatives 2 through 11 represent road usage charge approaches.

Policy Alternative	Vehicles subject to road usage charge	Vehicles not subject to road usage charge	Transition Approach	Percent of Motorists Choosing		
				Method A	Method B	Method C
1	None	All	N/A	0%	0%	0%
2	All	None	Tab renewal	5%	75%	20%
3	All	None	Tab renewal	5%	20%	75%
4	All	None	Title transaction	5%	75%	20%
5	All	None	Title transaction	5%	20%	75%
6	>19.5 MPG	<19.5 MPG	Tab renewal	5%	75%	20%
7	>19.5 MPG	<19.5 MPG	Tab renewal	5%	20%	75%
8	>19.5 MPG	<19.5 MPG	Title transaction	5%	75%	20%
9	>19.5 MPG	<19.5 MPG	Title transaction	5%	20%	75%
10	MY 2019 or newer	MY 2018 or older	Model year	5%	75%	20%
11	MY 2019 or newer	MY 2018 or older	Model year	5%	20%	75%