



# ***Business Case Evaluation Final Report***



*Prepared for:*  
**Governor Jay Inslee**  
*and*  
**Washington State Legislature**

*January 7, 2014*



**Washington State  
Transportation Commission**



**Washington State  
Department of Transportation**

**CAMBRIDGE**  
SYSTEMATICS

**BERK**







STATE OF WASHINGTON  
TRANSPORTATION COMMISSION

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January 7, 2014

The Honorable Governor Jay Inslee  
Office of the Governor  
PO Box 40002  
Olympia, WA 98504-0002

The Honorable Curtis King  
Co-Chair, Senate Transportation Committee  
PO Box 40482  
Olympia, WA 98504-0482

The Honorable Tracey Eide  
Co-Chair, Senate Transportation Committee  
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Olympia, WA 98504-0482

The Honorable Judy Clibborn  
Chair, House Transportation Committee  
PO Box 40600  
Olympia, WA 98504-0600

The Honorable Ed Orcutt  
House Transportation Committee  
PO Box 40600  
Olympia, WA 98504-0600

Dear Governor Inslee, Senators King and Eide, and Representatives Clibborn and Orcutt:

We are pleased to submit the second installment of our Road Usage Charge Assessment, which is a culmination of work led by our stakeholder Steering Committee over the 2013 legislative interim. This assessment is being conducted to prepare our state for a future that is likely to be much different from our past. As cars become more fuel-efficient and alternative fuel vehicles become more common, the long-term sustainability of the gas tax as a primary revenue source for transportation will steadily decline.

Responding to this concern, in 2012 the Legislature and Governor directed the Washington State Transportation Commission (WSTC) to convene a stakeholder Steering Committee and assess the feasibility of a Road Usage Charge as a potential replacement for the State's gas tax.

**Business Case Evaluation, Final Report**

January 7, 2014

That work was completed last year and the key finding was that road usage charging was a feasible option for funding Washington's transportation system.

The 2013 Legislature and Governor directed this work to continue, charging the WSTC and its Steering Committee to determine if there is a business case to be made for road usage charging in Washington State. Sounds simple, but this turned out to be an extraordinarily complex undertaking to accomplish in just six months. Nonetheless, we were able to make great strides over the 2013 legislative interim and have arrived at the findings and recommendations embodied in this report.

We evaluated key policy issues, possible operational concepts, whether there was a business case to be made, and identified implementation issues. The Steering Committee identified a policy framework to guide the business case analysis, with one goal: *Identify and develop a sustainable, long-term revenue source for Washington State's transportation system to transition from the current gas tax system.*

We have tried to make the communication of this somewhat complex topic easy to digest and understand. We encourage you to read this report to fully understand the details and complexities of this possible transition. But, we have also made it easy if you have limited time: if you have five minutes, the Prologue is one page and provides a snap-shot synopsis of what we accomplished and the key findings; if you have 10 minutes, you can read the Executive Summary which boils down the work and findings in seven pages. We have also included in this report our recommended 2014/15 work plan and budget request for this work to continue. You can find this detail in Section 6 of the report.

We look forward to continuing this important work and welcome your guidance and support in the coming session and beyond.

Very truly yours,

A handwritten signature in black ink that reads "Tom Cowan". The signature is written in a cursive, slightly slanted style.

Tom Cowan  
Chair, Road Usage Charge Steering Committee  
Vice-Chair, Washington State Transportation Commission

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Appendices are provided on the enclosed CD

Appendix A: Business Case Evaluation Financial Analysis Assumptions .....	Appendix
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**Also provided on the CD** are the foundational materials used by the Steering Committee to reach the conclusions in this report. These are listed on the following page.

For more information on the Road Usage Charge Assessment, please visit the Transportation Commission's web site at: [www.wstc.wa.gov](http://www.wstc.wa.gov) or you can visit the project web site at: <http://waroadusagecharge.wordpress.com>.



## ***Additional Documents Contained on CD***

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### ***2013 Business Case Evaluation***

#### **Interim Reports: Business Case Evaluation**

- Report 4: Proposed Road Usage Charge Concepts for Business Case Evaluation, Steering Committee Meeting #6 Briefing Material, June 5, 2013
- Report 5: Briefing Materials for Discussion at Steering Committee Meeting #7, September 6, 2013
- Report 6: Preliminary Business Case Evaluation, Steering Committee #8 Briefing Material, October 7, 2013

#### **Steering Committee Presentations: Business Case Evaluation**

- Steering Committee Meeting #5, April 4, 2013
- Steering Committee Meeting #6, June 11, 2013
- Steering Committee Meeting #7, including Oregon DOT presentation, September 12, 2013
- Steering Committee Meeting #8, October 14, 2013
- Steering Committee Meeting #9, November 18, 2013

### ***2012 Feasibility Assessment***

- Final Report: Feasibility Assessment, Work Plan & Budget, January 23, 2013 (also referred to as Report 3)
- Report 1: Domestic and International Review and Policy Context, Steering Committee #1 Briefing Material, September 13, 2012
- Report 2: Potential Road Usage Charge Concepts for Washington, Steering Committee #2 Briefing Material, October 23, 2012
- Steering Committee Meeting #1 Presentation, September 13, 2012
- Steering Committee Meeting #2 Presentation, October 30, 2012
- Steering Committee Meeting #3 Presentation, December 4, 2012
- Steering Committee Meeting #4 Presentation, January 11, 2013

## ***The 2013 Steering Committee***

<b>Name and Affiliation</b>	<b>Representing</b>	<b>Name and Affiliation</b>	<b>Representing</b>
Steering Committee Chair, Commissioner Tom Cowan (WSTC Commissioner)	WSTC	Rod Brown Jr. (Cascadia Law Group PLLC)	Environmental
Commissioner Anne Haley (WSTC Commissioner)	WSTC	Pete Capell (Clark County Public Works)	Counties
Commissioner Charles Royer (WSTC Commissioner)	WSTC	Cynthia Chen (University of Washington)	Appointed by WSTC
Sen. Tracey Eide (Federal Way (D) 30 <sup>th</sup> District)	Washington Senate	Scott Creek (Crown Moving Company, Inc.)	Trucking industry
Sen. Curtis King (Yakima (R) 14 <sup>th</sup> District)	Washington Senate	Don Gerend (City of Sammamish Councilmember)	Cities
Sen. Andy Billig (Spokane (D) 3 <sup>rd</sup> District)	Washington Senate	Tom Hingson (Everett Transit)	Public transportation
Rep. Judy Clibborn (Mercer Island (D) 41 <sup>st</sup> District)	Washington House of Representatives	Sharon Nelson	Appointed by WSTC
Rep. Jake Fey (Tacoma (D) 27 <sup>th</sup> District)	Washington House of Representatives	Lynn Peterson (WSDOT Secretary)	Appointed by WSTC
Rep. Linda Kochmar (Federal Way (R) 30 <sup>th</sup> District)	Washington House of Representatives	Janet Ray (AAA Washington)	Motoring public
Rep. Ed Orcutt (Kalama (R) 20 <sup>th</sup> District)	Washington House of Representatives	Neil Strege (Washington Roundtable)	Business
Curt Augustine (Alliance of Automobile Manufacturers)	Auto and light truck manufacturers	Ted Trepanier (INRIX)	User fee technology
Kurt Beckett (Port of Seattle)	Appointed by WSTC		





## Prologue — What We Did...

*The Legislature directed us to study policy issues, refine operational concepts, and evaluate the business case for road usage charging as a possible replacement for the Washington State gas tax.*

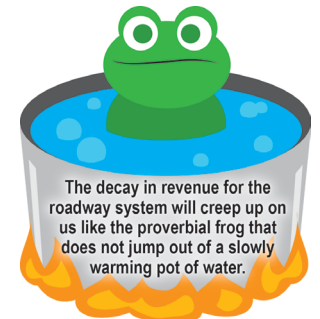
A road usage charge is a way for drivers to pay for the use and maintenance of the Washington road system based on distance traveled rather than taxing gasoline by the gallon.

Last year, we found that road usage charging was feasible in Washington. This year, we found that a business case could be made for three potential road usage charge concepts or combinations of concepts that provide drivers a choice of approaches:

- A: Time Permit** — A flat fee to drive a vehicle an unlimited number of miles for a given period of time (e.g. a month or a year);
- B: Odometer Charge** — A per-mile charge measured by odometer readings; and,
- C: Automated Distance Charge** — A per-mile charge measured by in-vehicle technology that can distinguish between in-state and out-of-state travel with periodic billing.

### Key Findings

- The road usage charge systems we evaluated will cost more to collect than the gas tax, but should generate greater and more stable net revenue over 25 years.
- Providing drivers choices 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 we evaluated, but over the long term will continue to erode in value, thus requiring frequent increases; and
- A road usage charge system with choice helps ensure everyone pays more of their fair share for using the roads, regardless of fuel source or miles per gallon.



### Next Steps

- Continue these investigations so that Washington has options developed when action may be needed in the future; and
- Refine road usage charge concepts to address policy, technical, and public acceptance issues that have been identified.



# Executive Summary

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## ***This evaluation started with a policy framework constructed by the Steering Committee, picking up where last year's feasibility evaluation left off (see Section 2).***

- Last year, we found that road usage charging was feasible in Washington. This year, we tested the business case.
- We evaluated road usage charging policy issues, operational concepts, and whether there was a business case, and identified implementation issues.
- The Steering Committee recommended a policy framework that guided the business case evaluation, with one goal and 13 guiding principles.
  - **Goal: *Identify and develop a sustainable, long-term revenue source for Washington State's transportation system to transition from the current gas tax system.***
  - **Guiding Principles** (not in priority order) on how we would implement the goal:

- Privacy
- Transparency
- Complementary policy objectives
- Cost-effectiveness

- Equity
- Data Security
- Simplicity
- Accountability
- Enforcement

- System Flexibility
- User Options
- Interoperability and Cooperation
- Phasing

- There are some principles that the Steering Committee considers to be important, but on which it deferred recommendation:
  - Whether to distinguish between travel on Washington public roads and other roads (e.g., private and outside the State).
  - Whether people from outside Washington should pay.

**A: Time Permit**

Principals buy permits to drive an unlimited number of miles for a given period (e.g., a year, a quarter, or a month).



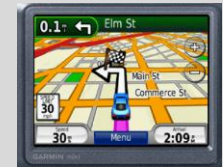
### B: Odometer Charge

Principals estimate the number of miles they expect to drive in a year and reconcile the amounts at the end of the year.



### C: Automated Distance Charge

Principals install devices in their vehicles that record mileage and transmit usage data to an entity<sup>1</sup> that submits bills and collects revenue.



### Combinations of A, B, and C

## What are “Principals”?

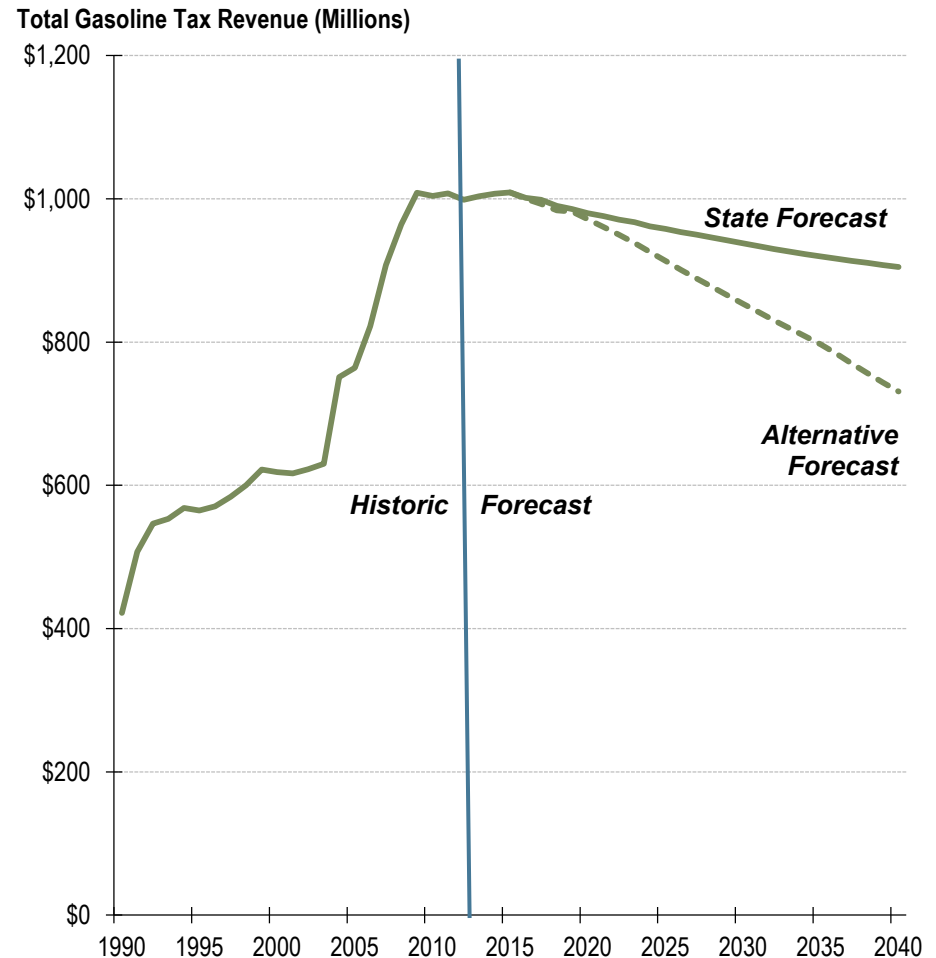
*Throughout the study, we have referred to the person responsible for paying a road usage charge as the “Principal,” recognizing that the “driver” or “owner” of a vehicle is not always the person responsible.*

<sup>1</sup> For purposes of this preliminary analysis, we assume that government is the entity billing and collecting revenue, recognizing the potential for outsourcing if private entities could bid lower prices than government is able to provide.

## ***The business case evaluation considered financial and non-financial aspects, so that policymakers can balance the two (see Section 4).***

- The Steering Committee's goals and guiding principles were the basis for performance criteria.
- Two key assumptions kept the analysis simple:
  - Road usage charges would replace the gas tax in 2015, with little transition period,<sup>2</sup> at a rate equal to expected gross gas tax revenue in 2015; and
  - Road usage charges would apply to all vehicles that do not use diesel fuel.
- We developed a financial model of costs and revenues for road usage charges and gas taxes for a range of forecast scenarios for 2015-2040.
  - Future fuel economy and resulting gas tax revenue were the most influential financial assumptions (see gas tax forecast chart at right.)

**Historic and Forecast Gas Tax Revenue  
FY 1990 to FY 2040**



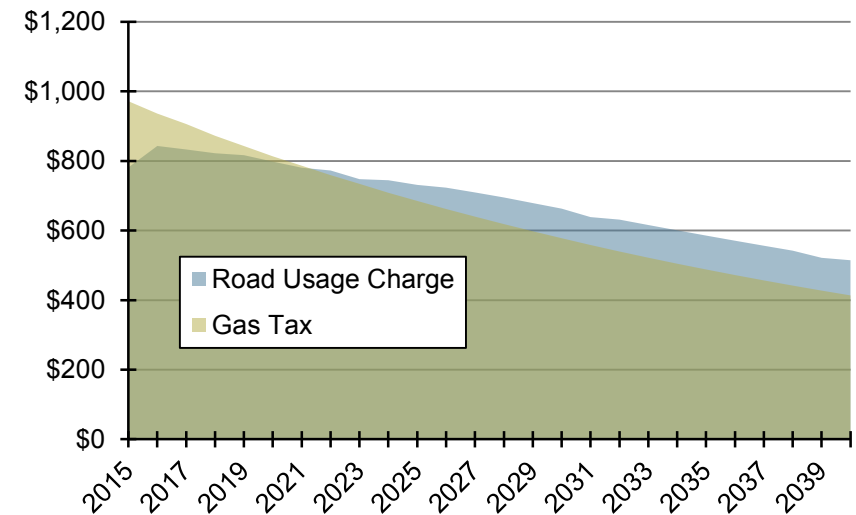
<sup>2</sup> Note that this assumption is neither likely nor desirable; it was made only to simplify the analysis.

***All of the road usage charge concepts we evaluated performed better financially than the gas tax—operating costs and fuel economy forecasts determined this outcome.***

- We estimate road usage charging to yield from \$0.3 billion to \$3.0 billion more net revenue than the gas tax between 2015 and 2040 depending on the concept and fuel efficiency forecast.
- Operating Costs.
  - Concepts A (Time Permit) and B (Odometer Charge) are least expensive (7 to 8 percent of revenue), and would generate the highest net revenue.
  - Concept C (Automated Distance Charge) is 12 to 13 percent.
  - Concept A, B, and C combination is just under 10 percent.
  - The cost to collect the gas tax is estimated at 0.4 to 0.6 percent.
  - The cost to collect the road usage charge concepts includes evasion losses and costs to recover unpaid bills—gas tax costs do not include these items.
- Net revenue from gas tax would be higher in the earlier years due to the startup costs of a new road usage charge system.
  - For the combination of Concepts A, B, and C, net road usage charge revenue is expected to exceed gas tax revenue after eight years, and the total net present value of the road usage charge would exceed that of the gas tax by \$2 billion (see chart above).
- None of the sensitivity tests we conducted changed the outcome that road usage charging would yield more net revenue over time for Washington than the gas tax.
- Changes in fuel economy assumptions had the most leverage on the outcome—using the state implied forecast for fuel efficiency changed the difference in net present value for Concept A+B+C to \$1.0 billion.

**Annual Net Revenue of Road Usage Charge Concept Combination A, B and C Compared to Gas Tax**

**\$ Millions - Present Value (2014\$)**



Note: Assumes Global Insight forecast for fuel efficiency



## ***When considering the non-financial evaluation criteria, all three road usage charge concepts tested had advantages and disadvantages.***

- No single concept tested was a clear front-runner - each has advantages and disadvantages which need to be weighed against the financial criteria.
- Different people will view these advantages and disadvantages differently.

Concept	Advantages	Disadvantages
<b>Gas Tax</b>	<ul style="list-style-type: none"><li>■ Simple</li><li>■ Easy to enforce</li><li>■ No privacy issues</li></ul>	<ul style="list-style-type: none"><li>■ Long-term declining revenue source due to increased fuel economy and decrease in driving</li><li>■ Not transparent. People recognize it as a tax, but are not aware of the amount, payment, or use</li><li>■ Imperfect proxy for road usage in that it varies greatly according to the fuel economy of individual vehicles</li></ul>
<b>Concept A: Time Permit</b>	<ul style="list-style-type: none"><li>■ Transparent</li><li>■ Relatively simple to use</li><li>■ Easy to enforce</li><li>■ No privacy issues</li></ul>	<ul style="list-style-type: none"><li>■ No relationship to road use</li></ul>
<b>Concept B: Odometer Charge</b>	<ul style="list-style-type: none"><li>■ Transparent</li><li>■ Relatively simple to use</li><li>■ Easy to enforce</li><li>■ Privacy not a significant issue (but Principals might object to mileage reporting)</li><li>■ Strong relationship to use</li></ul>	<ul style="list-style-type: none"><li>■ No differentiation between driving in-state, out-of-state or on private roads</li></ul>
<b>Concept C: Automated Distance Charge</b>	<ul style="list-style-type: none"><li>■ Transparent</li><li>■ Strongest relationship to use, recording miles driven in-state, out-of-state, or on private roads</li></ul>	<ul style="list-style-type: none"><li>■ More complicated to use than others</li><li>■ Perception of privacy infringement</li><li>■ More difficult to enforce</li></ul>

## ***The Steering Committee found that the business case for road usage charging has been made as a long-term gas tax replacement.***

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- The gas tax is still a viable source of revenue, however, all signs point toward gradual improvement in fuel efficiency of internal combustion engines, which will result in declining revenue from the gas tax.
  - The pace at which the fleet becomes more fuel efficient will determine how much better the road usage charge system would be than continuing with the current gas tax—this pace is highly uncertain, leading to uncertainty in the business case outcomes.
- In the short-term, gas tax increases can make up for the declining value of the gas tax, but the issue of declining gas tax revenue over time would remain.
- As gas-burning vehicles become more fuel efficient, these more efficient vehicles will pay less per mile in gas tax than vehicles that burn more gasoline:
  - Many people find this inequitable, but this inequality can also be seen as being consistent with other energy and emission reduction policies in Washington:
    - Greenhouse gas (GHG) emission reduction goals and requirements<sup>3</sup>;
    - Vehicle miles of travel (VMT) reduction benchmarks per capita<sup>4</sup>;
    - Installation of outlets for electric vehicle charging at State’s fleet parking and maintenance facilities<sup>5</sup>; and
    - Fuel economy standards for the State vehicle fleet.<sup>6</sup>

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<sup>3</sup> RCW 70.235.020 and RCW 70.235.050.

<sup>4</sup> RCW 47.01.440.

<sup>5</sup> RCW 43.19.648.

<sup>6</sup> RCW 43.41.130.

## ***The Steering Committee expressed broad consensus to move forward with further development of all three road usage charge concepts (see Sections 5 and 6).***

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The Steering Committee recommended:

- The work plan for 2014/2015 addresses the issues that would need to be resolved to move road usage charging forward in the 2015 legislative session.
  - **First priority** – Information to refine the concept of operations and explore transition options.
  - **Second priority** – Information to inform the 2015 Legislative session.
  - **Third priority** – Information to enable implementation, but which is not needed for the 2015 legislative session, and can be deferred.
- The work plan includes the following tasks:
  - Refine policy direction addressing the highest priority issues
  - Develop a concept of operations – the next tier of work needed before testing or implementation can occur.
  - Risk analysis
  - Financial evaluation
  - Documentation
  - Planning for a pilot/transition, which could occur in the first half of 2015, with the concurrence of the legislature.
- The Transportation Commission agreed and set forth a proposed budget to achieve the first and second priority work identified above:
  - The proposed budget to accomplish this work is \$869,000, with \$321,000 to fund work from March 2014 - June 2014 and \$548,000 to fund the remaining work from July 2014 - June 2015.
  - For further detail on the proposed budget and work plan, please refer to page 67.



# Section 1: Introduction

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***The 2013 phase of the road usage charge evaluation established policy objectives, explored operational concepts, tested whether there was a business case, and identified implementation issues.***

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- The 2013 Legislature provided funding to the Commission to evaluate the business case for a transition from a gas tax to a road usage charge system as the basis for funding the State's transportation system:
  - The funding was provided for fiscal year 2014 only.
  - The business case evaluation is due to the Governor and the Transportation Committees of the Legislature in time for inclusion in the 2014 supplemental transportation Omnibus Appropriation Act.
- The Commission was directed to:<sup>7</sup>
  - Develop preliminary road usage charge policies that are necessary to develop the business case, as well as supporting research.
  - Develop the preferred operational concept(s) that reflect the preliminary policies.
  - Evaluate the business case and assess likely financial outcomes.
  - Identify and document policy and other issues that are deemed important to further refine the preferred operational concept or concepts and to gain public acceptance. These issues should form the basis for continued work beyond this funding cycle.

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<sup>7</sup> ESSB 5024 Section 205(3).

## ***In 2012, the Legislature directed an assessment to determine the feasibility of a road usage charge.***

- The 2012 Legislature provided funding to the Commission “solely to determine the feasibility of transitioning from the gas tax to a road user assessment system of paying for transportation.”
- The Legislature also provided funding to the Washington State Department of Transportation (WSDOT) “solely to carry out work related to assessing the operational feasibility of a road user assessment, including technology, agency administration, multistate and Federal standards, and other necessary elements.” Both efforts were conducted under the guidance of a Steering Committee.

### **Overview of Legislative Directives from 2012 and 2013 and Their Outcomes**

#### **Spring 2012 – Legislature Directs:**

- *Transportation Commission to “assess the feasibility of transitioning from the fuel tax to a road user assessment method.”*
- *Department of Transportation to evaluate “operational feasibility.”*

#### **Outcome:**

- *Finding: road usage charging is feasible*
- *Commission recommends two-year work plan to get to “ready to implement.”*

#### **Spring 2013 – Legislature Directs:**

- *Transportation Commission to evaluate the business case for road usage charging, and report by December 15, 2013 (extended to January 7, 2014 by the Joint Transportation Committee).*
- *Department of Transportation to continue operational investigations.*

#### **Outcome:**

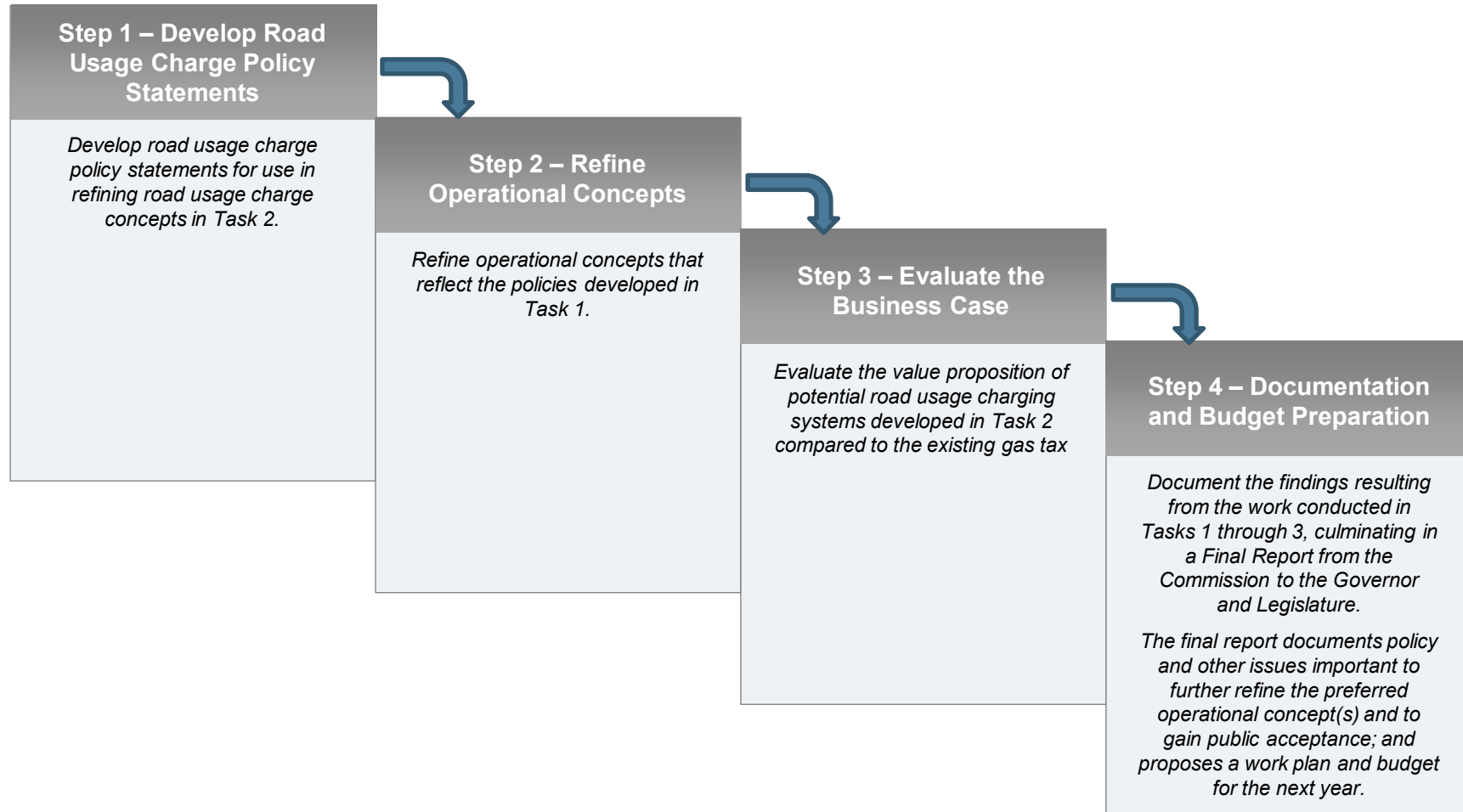
- *Developed policy framework*
- *Evaluated business case for a range of operational concepts*
- *Identified issues to be resolved*

- The Steering Committee recommended to the Commission, and the Commission agreed that road usage charging was feasible and that further work was needed to get to the “ready to implement” stage.
- The figure on this page provides an overview of the 2012 and 2013 legislative directives and outcomes.



## ***The 2013 evaluation began by clarifying policy objectives, proposing illustrative operational concepts, then evaluating the business case.***

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***The Steering Committee found that the business case for road usage charging has been made, and that continuing work should further develop the concept of operations and resolve outstanding issues.***

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- These are the key findings and recommendations, detailed on the pages that follow:
  - Gasoline consumption and tax revenue are forecast to decline due to improving fuel economy.
  - Road usage charging can be a long-term gas tax replacement.
  - The business case for road usage charging has been made.
  - The Steering Committee expressed broad consensus to move forward all three road usage charge concepts evaluated and to start addressing implementation issues.
- In the remainder of this report, we:
  - Explain the policy framework underpinning our work (Section 2).
  - Summarize the operational concepts evaluated (Section 3).
  - Provide our business case analysis, including comparisons of the effect that different road usage charge concepts would have on different types of drivers (Section 4).
  - Identify policy and other issues to further refine the preferred operational concepts and to gain public acceptance (Section 5).
  - Provide a proposed work plan and budget for 2014 and 2015 (Section 6).
- There are also appendices in a separate document:
  - A. Update of business case evaluation (quantitative and qualitative);
  - B. Forecast details; and
  - C. Business case cost evaluation.

# Section 2: Policy Framework

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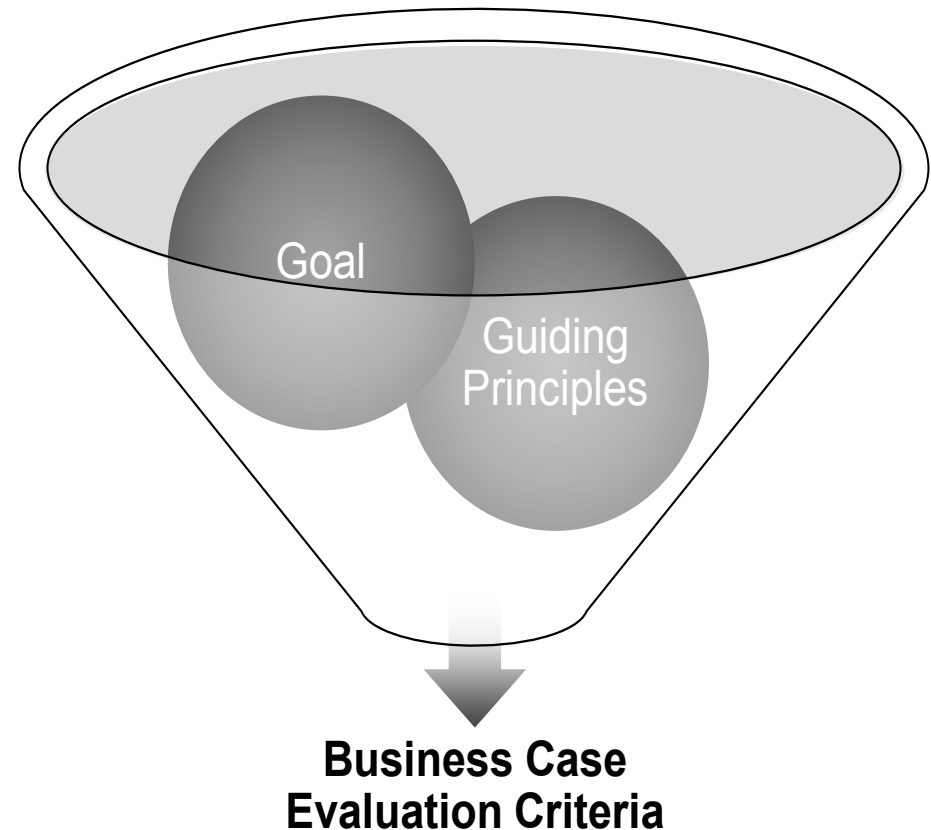




## ***The Steering Committee recommended a policy framework that guided the business case evaluation.***

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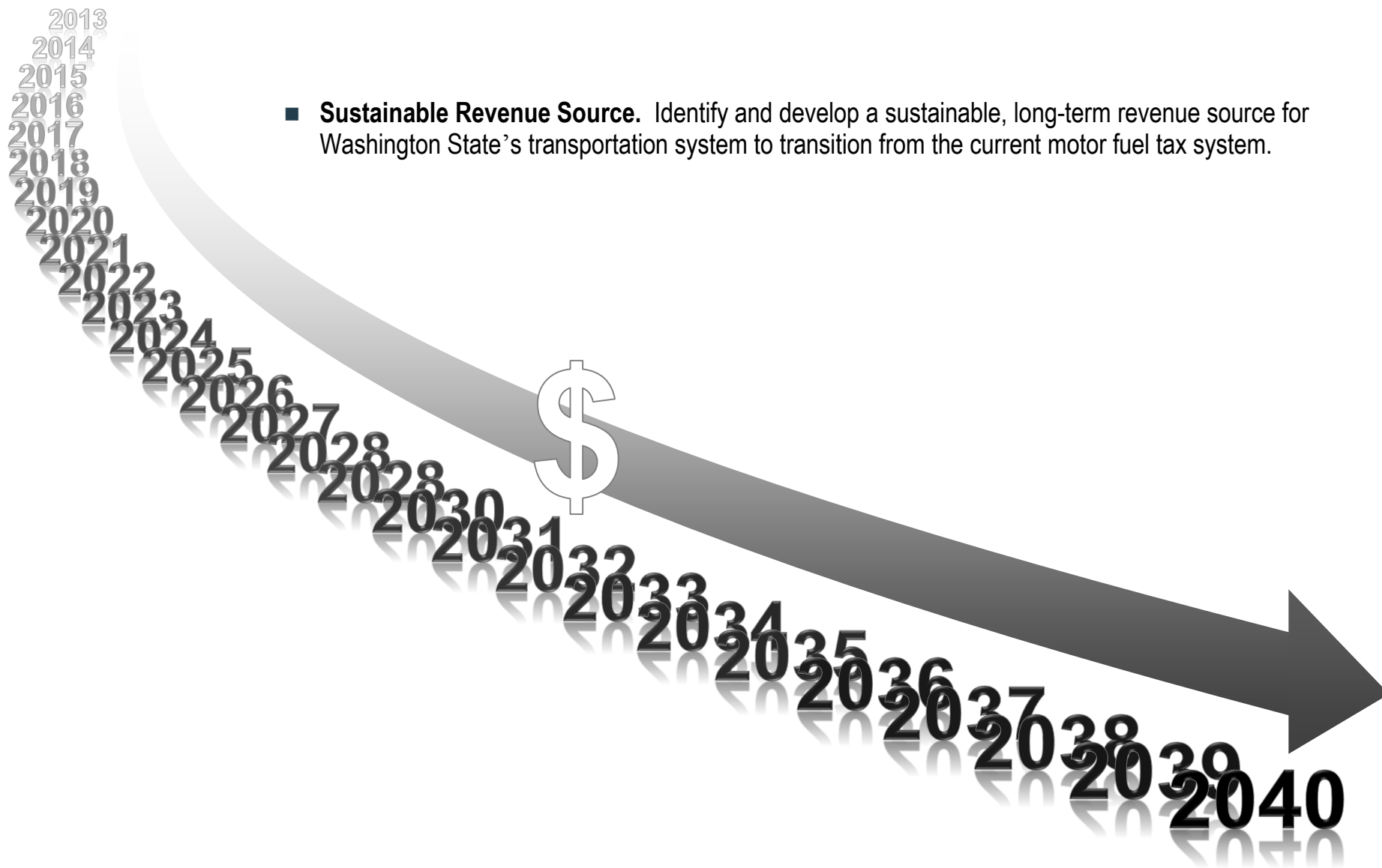
- The Steering Committee developed a single goal and 13 guiding principles to guide the business case evaluation of potential road usage charge concepts
- The goal and guiding principles were translated into performance criteria that were used to evaluate the business case for the road usage charging concepts.
- The goals and guiding principles are subject to modification over time, but provide a reasonable starting point for evaluation.
- Not all the potential road usage charge concepts are fully consistent with all the guiding principles:
  - These differences can form some of the basis for choosing among the alternative proposals.



## *The Steering Committee recommended one goal that answers the question, “why are we doing this?”*

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- **Sustainable Revenue Source.** Identify and develop a sustainable, long-term revenue source for Washington State’s transportation system to transition from the current motor fuel tax system.



## ***The Steering Committee recommended 13 guiding principles on how we would implement the goal.***

<b>Transparency</b>	A road usage charge system should provide transparency in how the transportation system is paid for.
<b>Complementary policy objectives</b>	A road usage charge system should, to the extent possible, be aligned with Washington's energy, environmental, and congestion management goals.
<b>Cost-effectiveness</b>	The administration of a road usage charge system should be cost-effective and cost efficient.
<b>Equity</b>	All road users should pay a fair share with a road usage charge.
<b>Privacy</b>	A road usage charge system should respect an individual's right to privacy.
<b>Data Security</b>	A road usage charge system should meet applicable standards for data security, and access to data should be restricted to authorized people.
<b>Simplicity</b>	A road usage charge system should be simple, convenient, transparent to the user, and compliance should not create an undue burden.
<b>Accountability</b>	A system should have clear assignment of responsibility and oversight, and provide accurate reporting of usage and distribution of revenue collected.
<b>Enforcement</b>	A road usage charge system should be costly to evade and easy to enforce.
<b>System Flexibility</b>	A road usage charge system should be adaptive, open to competing vendors, and able to evolve over time.
<b>User Options</b>	Consumer choice should be considered wherever possible.
<b>Interoperability and Cooperation</b>	A Washington road usage charge system should strive for interoperability with systems in other states, nationally, and internationally, as well as with other systems in Washington. Washington should proactively cooperate and collaborate with other entities that are also investigating road usage charges.
<b>Phasing</b>	Phasing should be considered in the deployment of a road usage charge system.

## ***There are some principles that the Steering Committee thinks are important, but deferred recommendation.***

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- Ability to distinguish between travel on Washington public roads and other roads (private and out-of-state).
- Ability to charge non-Washington residents.
  - Should a potential system be able to collect revenue from out-of-state drivers, which could add considerably to the cost of operation, but not very much to the revenue.





# **Section 3: Operational Concepts for Business Case Evaluation**

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***We evaluated three operational concepts that represent a range of potential ways to implement road usage charging, plus combinations of concepts.***

**A: Time Permit**

Principals buy permits to drive an unlimited number of miles for a given period (e.g., a year, a quarter, or a month).



**B: Odometer Charge**

Principals estimate the number of miles they expect to drive in a year and reconcile the amounts at the end of the year.



**C: Automated Distance Charge**

Principals install devices in their vehicles that record mileage and transmit usage data to an entity<sup>8</sup> that submits bills and collects revenue.



**Combinations of A, B, and C**

***What are “Principals”?***

*Throughout the study, we have referred to the person responsible for paying a road usage charge as the “Principal,” recognizing that the “driver” or “owner” of a vehicle is not always the person responsible.*

<sup>8</sup> For purposes of this preliminary analysis, we assume that government is the entity billing and collecting revenue, recognizing the potential for outsourcing if private entities could bid lower prices than government is able to provide.

## Concept A—Time Permit: Provides unlimited miles in a given period.

- Principals would buy permits for each registered vehicle to drive an unlimited number of miles for a given period of time (such as a year, half-year, quarter, or month):
  - Permits would be purchased at the same time as vehicle registration.
    - Most permits would be for a full year, but shorter periods (month, quarter, and half-year) could be available.
    - Stickers could be issued to indicate the time for which a Principal has paid. Alternatively, this time could be stored in a database.
  - If Washington decides to charge fees on out of state vehicles, Principals could pay through kiosks at the border, sales through agents (e.g., gas stations, convenience stores), or online.
- From the State’s perspective, this is similar to the procedure that the Department of Licensing currently uses to handle vehicle registration, with additional functions for account and customer relationship management.



## ***Concept B—Odometer Charge: A simple system that counts miles, but cannot distinguish miles driven inside or outside Washington.***

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- Principals would pre-pay for the amount of miles they expect to drive each registered vehicle in a given period (year, half-year, quarter, or month):
  - Stickers could be issued indicating that the Principal has paid for the given period.
  - They would self-report the number of miles actually driven at the end of the given period, and reconcile their payment.
  - Severe underestimation could result in penalties (but they can pay for additional miles to avoid penalties).
  - This is similar to how Federal income taxes are paid; taxpayers estimate their tax liabilities for the year, pay taxes in installments, and reconcile at the end of the year with their annual tax returns.
- With the odometer charge system, the tax varies directly with the amount of road use.
  - However, this system does not distinguish miles driven inside Washington from those outside Washington.
- From the State's perspective, the accounting and customer relationship management functions would be similar and slightly more extensive than the Time Permit (Concept A).







## ***Concept C—Automated Distance Charge: Involves an in-vehicle device that records miles differentiated by inside and outside Washington State.***

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- Concept C is much different from the other two in that it involves using electronic devices in people's vehicles. The devices could:
  - Be capable of recording miles, distinguishing whether they were on Washington public roads, outside Washington, or on private roads.
  - Periodically transmit usage data to an organization that will handle billing.
  - Complement other in-vehicle services, such as pay-as-you-drive insurance, navigation, and concierge services.
- For this business case evaluation, we assumed that the government would provide the in-vehicle devices and manage accounts.
  - We made this assumption because the market for private service providers is uncertain, and we do not know the kinds of terms such providers might negotiate
  - If further evaluation finds that the private sector can carry out this function more cost effectively than government, then the business case would be better than indicated in this analysis, and the full benefit of integration of road usage charge systems with existing in-vehicle services would be realized.
- This is the most technically involved of the three concepts and would require a sophisticated accounting and customer relationship management system.
- Enforcement would be through technical certification of the entity responsible for collecting the data and odometer readings:
  - From the State's perspective this would require extensive accounting and customer relationship management systems – considerably more extensive than for Concepts A and B:
    - Accounting and customer relationship management functions would be similar to tolling, but the scale of the undertaking would be considerably greater, since tolling only applies to a small proportion of drivers who use one of three tolled facilities in Washington.



## ***We also considered combinations of concepts.***

<b>Time Permit (A) + Odometer Charge (B)</b>	The time permit is simple and non-invasive requiring a lump sum fee. The odometer charge is directly proportional to road usage.	
<b>Odometer Charge (B) + Automated Distance Charge (C)</b>	The odometer charge would be proportional to usage, while the automated distance charge is a technological option that is proportional to usage and can distinguish between in-state and out-of-state miles.	
<b>Time Permit (A) + Automated Distance Charge (C)</b>	The time permit is simple and non-invasive requiring a lump sum fee each year. Automated distance charge is proportional to usage and can distinguish between in-state and out-of-state miles.	
<b>Time Permit (A) + Odometer charge (B) + Automated Distance Charge (C)</b>	Offering all three concepts provides the greatest amount of consumer choice.	

For more detail on the operational concepts, please reference Report 5 “Briefing Materials for Discussion at Steering Committee Meeting #7,” September 6, 2013.

***The rate setting process will be established by the Legislature and Governor, but we needed to make some assumptions for the business case evaluation.***

- We assumed that regardless of the tax approach selected, the road usage charge would be revenue neutral with the gas tax in terms of gross revenue in 2015, and that the rates would remain the same throughout the 2015-2040 forecast period.
- Similarly, we assumed that the current gas tax of 37.5 cents per gallon would remain the same from 2015-2040. Gas tax revenue in 2015 is forecast to be just over \$1.0 billion, to be paid by 5.812 million vehicles driving 54,150 million miles.

**Assumed Tax Rates for Business Case Evaluation**

Alternative	Rate	Unit	Basis
Existing Gas Tax	\$0.375	Gallon	Current rate.
A. Time Permit	\$172	Year	This equals the average annual Washington State gas tax forecast for 2015, which is total annual gas tax revenue divided by the number of registered non-diesel vehicles.
B: Odometer Charge	\$0.018	Mile	An amount equal to the total Washington State gas tax revenue forecast for 2015 divided by the total number of miles driven by Washington non-diesel vehicles.
C: Automated Distance Charge	\$0.018	Mile	An amount equal to the total Washington State gas tax revenue forecast for 2015 divided by the total number of miles driven by Washington non-diesel vehicles.



# **Section 4: Business Case Evaluation – Overview**

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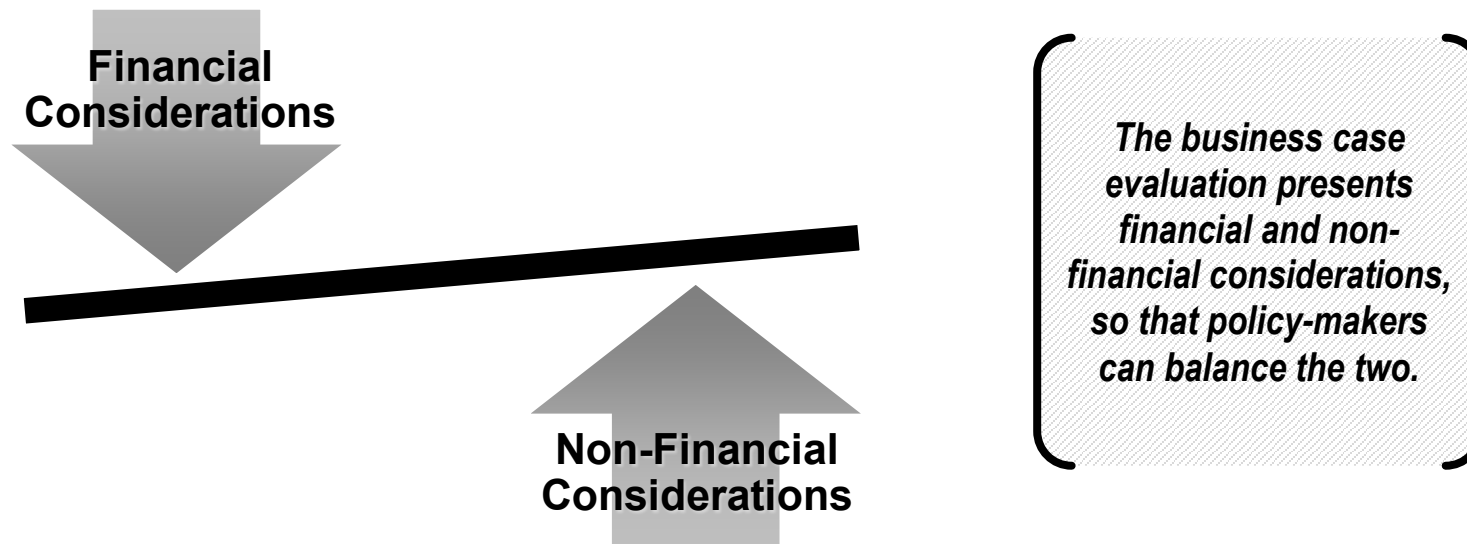




## ***The simplified business case evaluation addressed the question: Is road usage charging worth doing?***

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- The business case evaluation allows decision-makers to compare alternative policy proposals (including the status-quo scenario), enabling an informed business decision.
- This simplified business case evaluation addressed both financial and non-financial objectives.



## ***We used the goal and guiding principles articulated by the Steering Committee to define performance criteria.***

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- The goal and guiding principles translated into financial and non-financial criteria.
- Many of the performance criteria do not lend themselves to either financial or qualitative evaluation, but should be incorporated into any road usage charge system. These were not used in the business case evaluation to distinguish options, but were incorporated in the cost side of the analysis.
- The goal and guiding principles were used in these three ways in the business case evaluation.

Financial Criteria	Non-Financial Criteria	Guiding Principles That Could Be Met By Proper Design Of A New System
<ul style="list-style-type: none"><li>▪ <b>Sustainable Revenue Source</b></li><li>▪ <b>Cost-effectiveness</b></li></ul>	<ul style="list-style-type: none"><li>▪ <b>Transparency</b></li><li>▪ <b>Complementary Policy Objectives</b></li><li>▪ <b>Equity</b></li><li>▪ <b>Simplicity</b></li><li>▪ <b>Enforcement</b></li><li>▪ <b>Privacy</b></li></ul>	<ul style="list-style-type: none"><li>▪ <b>Data Security</b></li><li>▪ <b>Accountability</b></li><li>▪ <b>System Flexibility</b></li><li>▪ <b>Interoperability and Cooperation</b></li><li>▪ <b>Phasing</b></li><li>▪ <b>User Options</b></li></ul>

## ***“Equity” is a topic that seems simple, but quickly gets complex.***

- One of the Steering Committee’s guiding principles was that “All road users should pay a fair share with a road usage charge.”
- Equity can be looked at through many lenses. We identified four components of equity that addressed this principle, and evaluated each of them (see details in Appendix B):
  - Pay for what is used;
  - Urban/rural driving;
  - Regressiveness; and
  - Border/Non-Border (to address concepts that might not distinguish out-of-state travel).
- However, it is important to remember that only looking at the distribution of who pays does not provide a full picture of equity. Other specifics of how the fee is structured, how revenue is used, and what services are provided can significantly change the equity equation.

### ***The Transportation Research Board’s Committee on Equity Implications of Transportation Finance Mechanisms had this to say about equity:***

***The most important lesson from the committee’s work is that broad generalizations about the fairness of HOT lanes, cordon tolls, and other evolving mechanisms oversimplify the reality and are misleading. Equity can be assessed in many ways (e.g., in terms of income or geography and across generations). Furthermore, the specifics of policy instrument design, revenue usage, and service delivery can change equity outcomes as judged by any equity criteria. Thus, the fairness of a given type of finance mechanism depends on how it is structured, what transportation alternatives are offered to users, and which aspects of equity are deemed the most important. It is impossible to draw reliable conclusions about the equity of a particular type of finance mechanism without delving into the details.***

## ***We translated the financial oriented goals and guiding principles into two performance measures.***

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### **Net Present Value of Cash Flow**

- Net present value (NPV) is an accepted method of comparing cash flows over a long time horizon. It recognizes the time value of money, putting higher value on cash spent or received today than in later years.
  - NPV adds up the present value of revenue and subtracts the present value of cost over the course of the entire evaluation period.
- The time period for evaluation was 2015-2040.
- We assumed annual cost inflation of 2 percent per year based on historical averages.
- We used a discount rate of 3 percent based on published guidance from the US Office of Management and Budget.

### **Cost of Collection as a Percentage of Gross Revenue**

- The present value of cost divided by the present value of revenue tells us what percentage of the revenue is consumed by costs.
- This is a simple indicator of cost-effectiveness.

## ***We evaluated the non-financial criteria on a scale from zero through four stars, with comments to provide additional insights.***

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- The ratings are the subjective judgment of the consultant team and were employed to provide a starting point for the Steering Committee's consideration.
- We assessed how well each of the three operational concepts achieved the criteria on a standalone basis, along with commentary explaining our rationale.
- The Steering Committee identified two considerations that they did not treat as guiding principles, but were important nonetheless. We treated these considerations similarly to the non-financial criteria, but in a separate category:
  - Ability to distinguish between travel on Washington public roads and other roads (private and out-of-state).
  - Ability to charge non-Washington residents.
- Details of these evaluations are in Appendix B.

## ***The business case evaluation started with two key assumptions.***

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**The road usage charge would replace the gas tax in 2015, with little transition period**

- Note that this assumption is neither likely nor desirable; it was made only to simplify the analysis. There are numerous ways to transition from the gas tax to a road usage charge system, and the number of permutations would overwhelm this simplified business case evaluation. Road usage charges would be set at a rate that would result in the same gross revenue in 2015 as would be generated by the gas tax.
- If there is a business case to be made for any of the alternatives, the implications of different transition approaches can be evaluated in the next phase of work, if the Legislature directs further study.

**The road usage charge would apply to all vehicles that do not use diesel fuel**

- The legislative directive was to transition from the gas tax, so we assumed that road usage charges would apply to all vehicles that do not use diesel fuel.
  - In other words, gasoline, gasoline hybrids, plug-in hybrids, and electric vehicles would be subject to the road usage charge. We refer to these as “non-diesel vehicles”.
  - Diesel vehicles would continue to pay the diesel tax, and would not pay a road usage charge.
- Our initial approach to only charge “cars” (i.e., light duty vehicles) and not trucks proved problematic, since approximately 25 percent of trucks use gasoline.
  - Our assumption avoids the difficulty of trying to distinguish cars from trucks at the gas pump, or creating other means of refunding gas taxes.
  - Gasoline fueled trucks represent only one percent of all gasoline vehicles.



## ***We developed a financial model that estimates costs and revenues for a range of forecast scenarios for 2015-2040.***

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### **The forecast scenarios are based on forecasts of:**

- Registrations of non-diesel vehicles.
- Gasoline consumption.
- Vehicle miles of travel (VMT).
- Fuel efficiency of non-diesel vehicles.

### **Important operational and economic assumptions include:**

- Expected adoption rates of each operational concept.
- Account audit rates.
- Salary costs.
- Information Technology (IT) equipment costs.
- Credit card merchant fees.
- Inflation and discount rates.

### **Financial results are expressed as:**

- Net present value of gross revenues minus capital and operating costs (including the cost of developing the systems, compliance, and enforcement).
- Cost as a percentage of revenue.
- Amount the gas tax would need to be raised to yield the same net revenue as a road usage charge concept.



# **Section 4a: Business Case Evaluation – Forecasts**

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## ***A key element of the business case analysis involved forecasts of vehicles, vehicle miles of travel (VMT), fuel efficiency and consumption, and gas tax revenue.***

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- We started with forecasts provided by WSDOT and the Washington State Department of Licensing (DOL) based on data developed by the State's Transportation Revenue Forecast Council, and refined them to identify characteristics of non-diesel vehicles only:
  - These forecasts are based on the adopted June 2013 Transportation Economic and Revenue Forecast, the most recent quarterly transportation forecast available when we conducted the analysis.<sup>9</sup>
  - These forecasts rely on a variety of sources, including forecasts purchased from Global Insight, a private economic forecasting firm.
  - The consultant team did further analysis to create forecasts of the vehicles, VMT, fuel efficiency and consumption, and gas tax revenue for non-diesel vehicles. Details are provided in Appendix C.
- We created alternative forecasts of future travel and demographic trends for sensitivity testing.

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<sup>9</sup> Quarterly Transportation Revenue Forecasts have been released subsequent to this report, but they do not meaningfully change the outcome of the business case evaluation.

**Vehicle Registrations: Non-diesel registrations are expected to increase in line with historical trends, but our alternative forecast assumes fewer registrations.**

**State Forecast of Non-Diesel Vehicles**

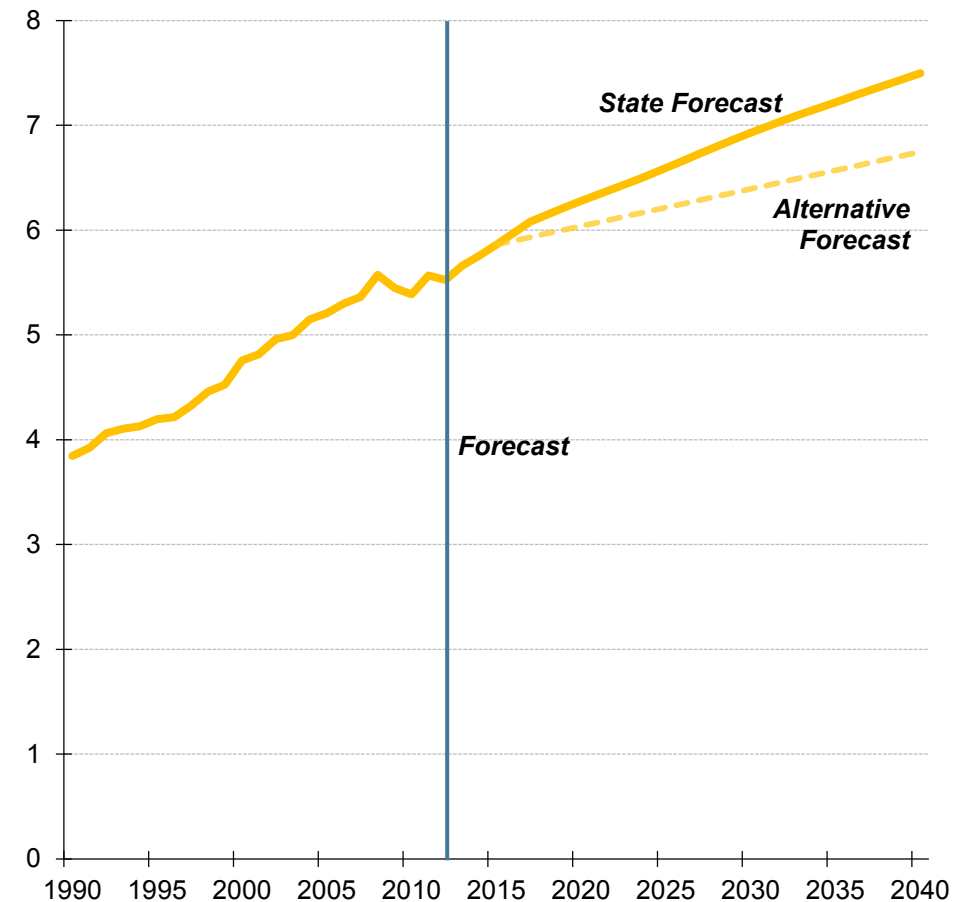
- Non-diesel vehicles climbed from 1990-2008, growing 2.1 percent per year, but fell during the Great Recession.
- The State forecasts a recovery, at lower growth rate of 1.0 percent per year from 2015-2040.

**Alternative Forecast**

- We prepared an alternative estimate that is 10 percent below the State forecast by 2040 (with a constant rate of change from 2015 to 2040), to capture potential variations in the growth of non-diesel vehicles.
- This lower-bound estimate, while arbitrary, is an illustrative reduction for purposes of the simplified business case analysis.

Historic and Forecast Non-Diesel Vehicle Registrations  
FY 1990 to FY 2040

Total Non-Diesel Vehicles  
(Millions)



## ***VTM Growth: The state forecasts lower VMT growth rates than in the past for non-diesel vehicles.***

### **State Non-Diesel VMT Forecast**

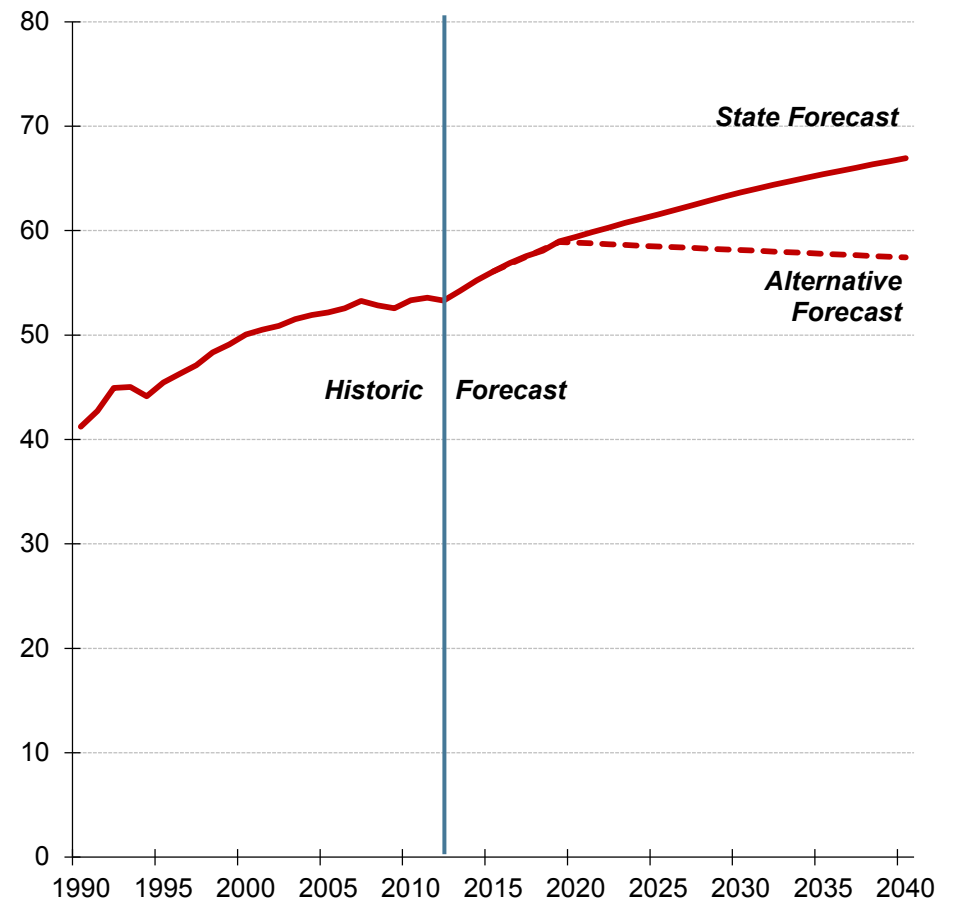
- VMT grew steadily at a rate of 1.4 percent per year from 1990 to 2008, but faltered from then to 2012.
- The State forecasts modest (0.7 percent per year) growth from 2015 to 2040.
- Slower growth of VMT in Washington is consistent with national trends.

### **Alternative Forecast**

- The alternative forecast is based on the VMT reductions from RCW 47.01.440, passed in 2010, which requires reductions in light duty vehicle VMT per capita of 18 percent by 2020, 30 percent by 2035, and 50 percent by 2050 against a baseline value set at 75 billion VMT in 2020.
- The State forecast does not reflect these benchmarks.
- The alternative forecast shows the effect of these reductions, which dampens VMT so that it is only 2.4 percent higher in 2040 than in 2015.

**Historic and Forecast VMT for Non-Diesel Vehicles  
FY 1990 to FY 2040**

**VMT per Non-Diesel Vehicles (Billions)**



## ***Fuel Economy: The State forecasts implies modest fuel economy improvements through 2040—but other forecasts are more aggressive.***

### ***Fleet Fuel Economy and CAFE Standards***

- Fleet fuel economy reflects the fuel efficiency of the entire on-road fleet in any particular year, which changes slowly.
- The 54.5 CAFE standard is somewhat misleading – it translates to an EPA sticker fuel economy of 36 mpg.<sup>10</sup>

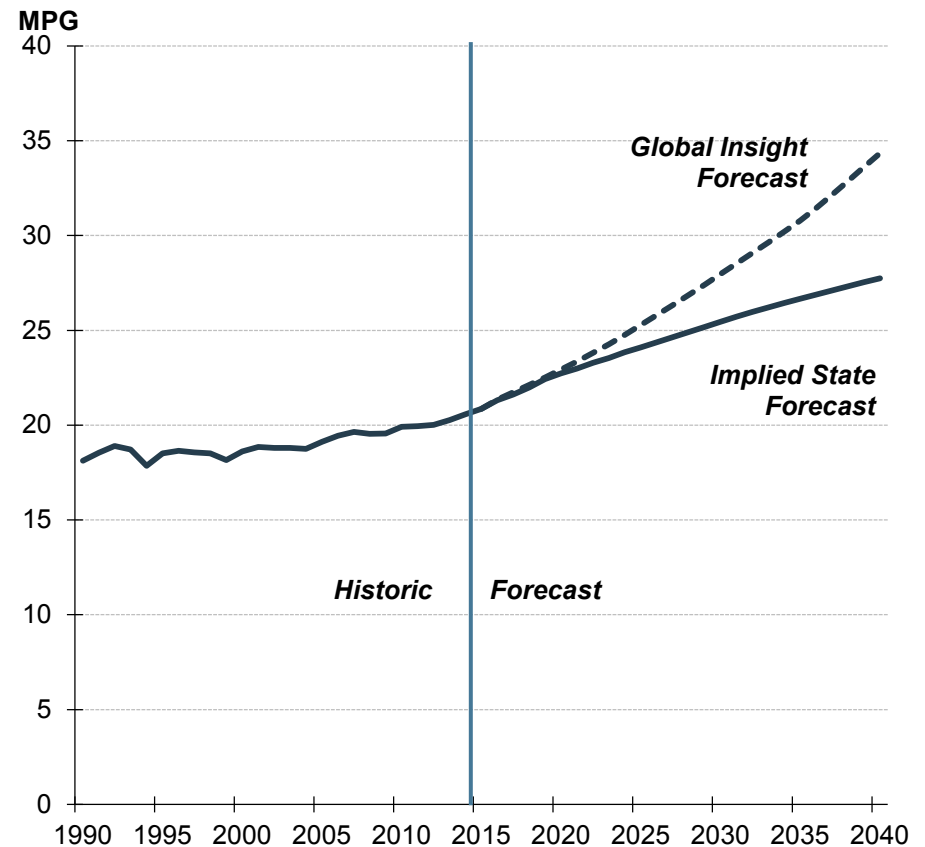
### ***Implied State Forecast of Fuel Economy<sup>11</sup>***

- The implied State forecast is for on-road fuel efficiency to steadily increase from 2015 levels of 20.9 mpg to 27.7 mpg by 2040 for gasoline vehicles.

### ***Alternative Forecast***

- The Global Insight forecast of on-road fuel efficiency shows fuel efficiency improvements of 34.3 mpg by 2040, which is in line with forecasts by the U.S. Energy Information Agency (EIA).

Historic and Forecast Fuel Efficiency  
FY 1990 to FY 2040



<sup>10</sup> “The talked-about 2025 CAFE standard — usually described as 54.5 mpg — amounts to a figure of 36 mpg Combined on a window sticker.” An excellent summary of how the CAFE standards apply to real world mpg can be found at <http://www.edmunds.com/fuel-economy/faq-new-corporate-average-fuel-economy-standards.html>.

<sup>11</sup> The State provided forecasts of total VMT and fuel consumption that incorporate forecasts from Global Insight. The consulting team had to make additional assumptions to derive non-diesel VMT. When dividing the resulting non-diesel VMT by the fuel consumption, we arrived at a forecast of fuel efficiency “implied” by the estimates provided by the State.



## **Fuel Consumption: The State forecasts declining fuel consumption—the alternative forecast is for an even steeper decline.**

### **State Forecast of Gasoline Consumption**

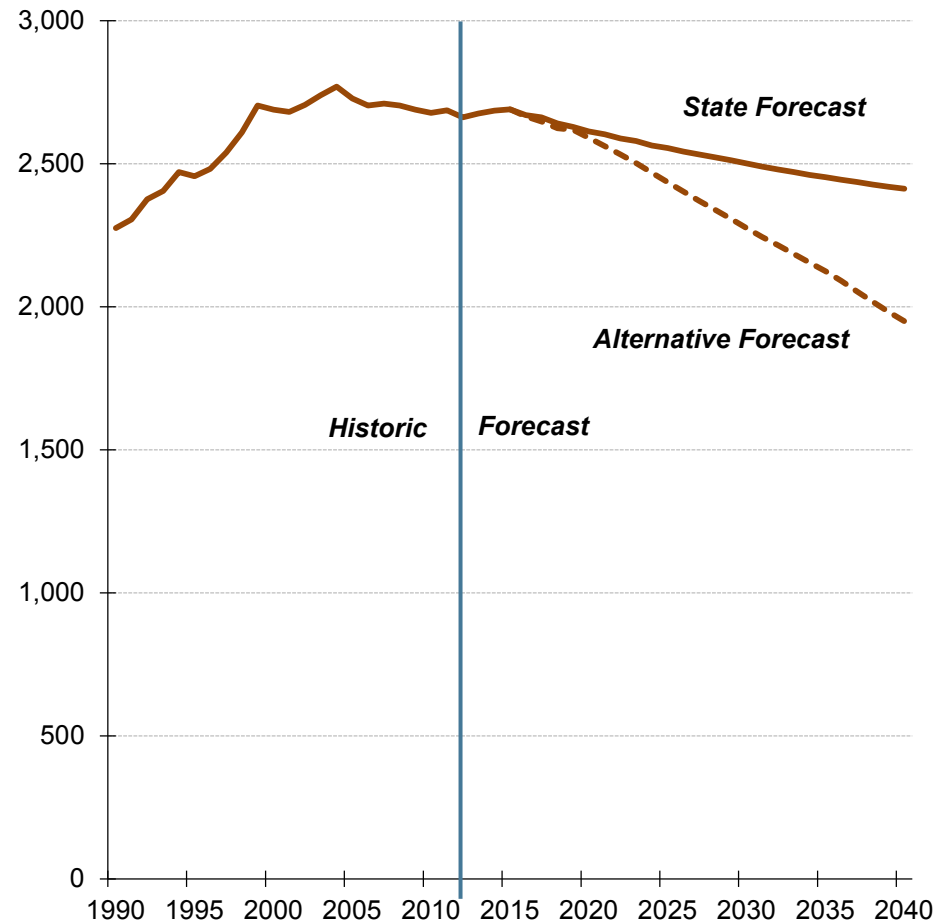
- Gasoline consumption has historically been uneven and reflects:
  - Short-term changes in economic activity;
  - Long-term changes in fleet fuel efficiency; and
  - Changes in traveler behavior (e.g., transit use).
- The State forecasts indicates that 2015 will be the last year of positive growth, with the amount consumed in 2040 being 10 percent less than that consumed in 2015.

### **Alternative Forecast**

- The alternative forecast takes the State VMT forecast of non-diesel vehicles and divides it by fuel economy values from Global Insight. This results in an alternative forecast for gasoline consumption.

Historic and Forecast Gasoline Consumption  
FY 1990 to FY 2040

Total Gas Consumption (Millions of Gallons)



## **Gas Tax Revenue: The State forecasts a steady decline in gas tax revenue—the alternative forecast reflects an even greater decline.**

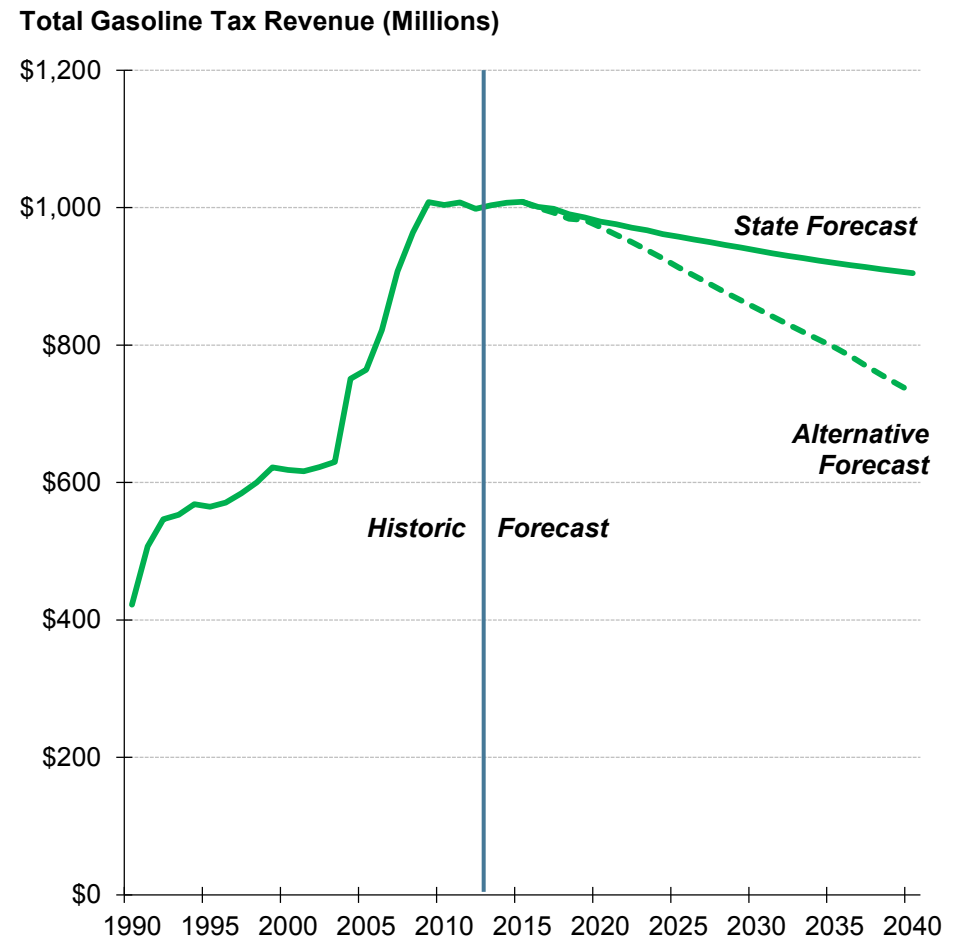
### **State Forecast of Gas Tax Revenue**

- Gas tax revenue generally increased in the past due to VMT growth and flat fuel efficiency.
- Big increases from 2005 to 2010 are the result of two State gas tax increases (the 2003 “nickel” and 2005 Transportation Partnership program).
- The State forecasts revenue to remain flat between 2009 and 2016 before declining by approximately 10 percent by 2040, caused by slower growth in VMT and fuel economy improvements.

### **Alternative Forecast**

- Using the Global Insight forecast for fuel efficiency results in gas tax revenue that is 28 percent lower than the State forecast by 2040.

Historic and Forecast Gas tax Revenue  
FY 1990 to FY 2040



# **Section 4b: Business Case Evaluation – Financial and Non-Financial Evaluation**

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***For the financial evaluation, we estimated eight categories of road usage charge costs.***

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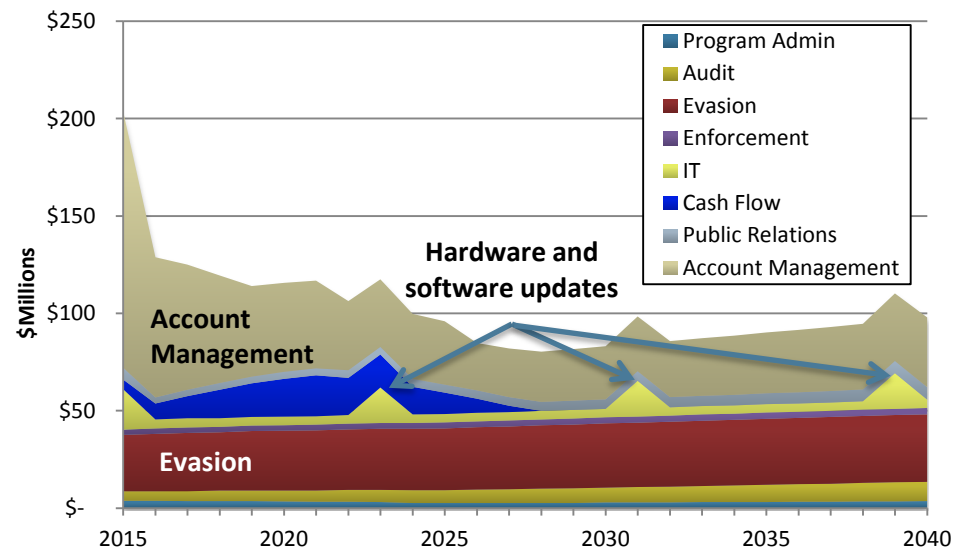
<b>Cost Categories</b>	
<b>Program Administration</b>	Management salaries and overhead.
<b>Account Management</b>	Cost to maintain accounts, invoice, and process payments.
<b>Information Technology</b>	Cost to build and maintain computer systems.
<b>Evasion</b>	Lost revenue due to non-payment.
<b>Collections</b>	The cost to recover unpaid bills.
<b>Audit</b>	The cost to investigate the possibility of fraud.
<b>Public Relations</b>	Informing the public about the road usage charge program.
<b>Cash Flow</b>	Short-term borrowing to make up for net revenue shortfalls compared to the gas tax in early years of operation.

Details regarding the cost categories can be found in Appendix D.

## Over two-thirds of the costs for road usage charging fall into two categories: account management and evasion.

- The figure at right shows the cost to implement road usage charges from 2015-2040, for the combination of Concepts A, B, and C; the other concepts show similar trends.
- **Account Management:**
  - The key driver is expected to be labor to process transactions.
  - We expect these costs to decline over time as consumers opt for web-based account management and payment.
  - Account management cost might be reduced through the use of private service providers. However, there are no guarantees that private companies would be willing to handle those transactions, so we assumed that government would handle account management.
- **Evasion:**
  - We assume a substantial loss due to evasion because people will have to make a conscious decision to pay the charge (as opposed to the gas tax, which they pay each time they refuel).
  - Roadside enforcement and account audit processes may help reduce evasion, but the added cost of such efforts may not be worthwhile.

Estimated Annual Road Usage Charge Costs by Category: 2015-2040



*While we estimate evasion for the road usage charge concepts, we do not include evasion as a cost of gas tax collection. This is one area where we do not have an “apples to apples” comparison because we do not have good data for fuels tax evasion. However, various national studies, and a study done in Washington State, indicate a fuels tax evasion rate of roughly two percent of revenue.*

***The cost to collect the gas tax is estimated at 0.8 percent of revenue, but this does not include the cost of evasion.***

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**Estimates of  
cost to collect  
the gas tax**

- DOL's analysis of monthly fuel tax reports to the State Treasurer and its biennial study of fees, concluded that the cost to collect the motor fuel tax in 2013 was just under \$3.2 million, or about 0.32% of gross revenues.
- Other studies around the country dating back to the 1990s have shown that motor fuel tax costs are about one percent of revenue.
- A 2011 National Cooperative Highway Research Program (NCHRP) Report titled "Costs of Alternative Revenue-Generation Systems",<sup>a</sup> supports the estimate of about one percent. This is the most robust research to date on the cost to collect the gas tax.

**Costs of  
evasion are  
difficult to  
come by**

- Various national studies, and a study done in Washington State, indicate fuels tax evasion rate of roughly 2 percent of revenue.

<sup>b</sup> NCHRP Report 689, "Costs of Alternative Revenue-Generation Systems," Transportation Research Board, Washington DC, 2011.

## Using the State forecasts of travel characteristics, we estimate road usage charging to yield up to \$2.1 billion more than the gas tax between 2015 and 2040.

- **Concept A (Time Permit)** would have the biggest advantage over the gas tax: \$2.0 billion more net revenue on a discounted basis, with the cost of collection plus evasion at 6.9 percent of expected revenue.
- **Concept C (Automated Distance Charge)** would have a \$0.3 billion advantage over the gas tax, with the cost of collection representing 12.7 percent of expected revenue.
- **The combination of Concepts A, B and C** would generate \$1.9 billion more than the gas tax, with the cost of collection plus evasion at 9.7 percent of expected revenue.

### Forecast Revenues and Costs of Different Concepts

Present Value from 2015-2040

*VMT and Fuel Efficiency Based on State Forecast (27.7 mpg by 2040)*

Concept	Revenues (\$B)	Costs + Evasion (\$B)	Net (\$B)	Net Difference from Gas Tax (\$B)	Cost + Evasion as a % of Revenue <sup>a</sup>
Gas Tax	\$17.1	\$0.1	\$17.0	N/A	0.4% <sup>b</sup>
A: Time Permit	\$20.4	\$1.4	\$19.0	\$2.0	6.9%
B: Odometer Reading	\$19.8	\$1.6	\$18.2	\$1.2	8.0%
C: Automated Distance Charge	\$19.8	\$2.5	\$17.3	\$0.3	12.7%
A+B	\$19.8	\$1.7	\$18.1	\$1.1	8.6%
A+C	\$20.1	\$2.0	\$18.1	\$1.1	9.9%
B+C	\$19.8	\$2.1	\$17.7	\$0.7	10.5%
A+B+C	\$19.8	\$1.9	\$17.9	\$1.9	9.7%

<sup>a</sup> Gas tax value does not include evasion.

<sup>b</sup> The reason the gas tax collection cost is 0.4% of revenue rather than the 0.3% indicated on the previous page is that gas tax revenue is forecast to decline over time, while costs will increase in line with inflation.



## Using higher fuel economy forecasts, we estimate road usage charging to yield up to \$3.1 billion more than the gas tax between 2015 and 2040.

- **Concept A (Time Permit)** would have the biggest advantage over the gas tax: \$3.0 billion more net revenue on a discounted basis, with the cost of collection plus evasion representing 6.9 percent of revenue.
- **Concept C (Automated Distance Charge)** would have a \$1.4 billion advantage over the gas tax, with the cost of collection plus evasion at about 12.2 percent of revenue.
- **The combination of Concepts A, B and C** would generate \$1.9 billion more than the gas tax, with the cost of collection plus evasion at about 9.6 percent of expected revenue.

### Forecast Revenues and Costs of Different Concepts

Present Value from 2015-2040

*VTM Based on State Forecast, Fuel Efficiency Based on Global Insight Forecast (34.3 mpg by 2040)*

Concept Adoption Rates	Revenues (\$B)	Costs + Evasion (\$B)	Net (\$B)	Net Difference from Gas Tax (\$B)	Cost + Evasion as a % of Revenue <sup>a</sup>
Gas Tax	\$16.1	\$0.1	\$16.0	N/A	0.6% <sup>b</sup>
A: Time Permit	\$20.4	\$1.4	\$19.0	\$3.0	6.9%
B: Odometer Reading	\$19.8	\$1.6	\$18.2	\$2.2	8.0%
C: Automated Distance Charge	\$19.8	\$2.4	\$17.4	\$1.4	12.2%
A+B	\$19.8	\$1.6	\$18.3	\$2.3	7.9%
A+C	\$20.1	\$2.0	\$18.1	\$2.1	9.7%
B+C	\$19.8	\$2.0	\$17.8	\$1.8	10.3%
A+B+C	\$19.8	\$1.9	\$17.9	\$1.9	9.6%

<sup>a</sup> Gas tax value does not include evasion.

<sup>b</sup> The reason the gas tax collection cost is 0.6% of revenue rather than the 0.3% indicated on the previous page is that gas tax revenue is forecast to decline over time, while costs will increase in line with inflation.

***The biggest reason we expect road usage charges to have a more favorable financial outcome than gas tax is improved fuel economy – different assumptions result in considerably different outcomes.***

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- Average Washington fleet fuel economy is forecast to be 20.9 mpg in 2015:
  - The implied State forecast is for this to improve to 27.7 mpg by 2040.
  - Global Insight forecasts mpg to be 34.3 mpg by 2040.
  - Future fleet fuel economy is uncertain, and past forecasts have been unreliable indicators of the future.
- Federal standards call for new cars to have a corporate average fuel economy (CAFE) of 54.5 mpg by 2025, which translates to an EPA sticker fuel economy of 36 mpg.
- The difference between these fuel economy forecasts has an enormous influence on the financial outcomes.

***Projecting future vehicle fuel economy is a risky business. The recent history of such endeavors makes it clear that the chances of being very wrong are very high. In the late 1970s and early 1980s, a number of studies attempted to project fuel economy levels for automobiles and light trucks through 1990. Most of the studies overestimated fleet fuel economy levels by a substantial amount. Estimates for 1990 passenger cars ranged from approximately 30 to 40 miles per gallon (mpg), but the actual fuel economy level was 28 mpg; estimates for light trucks ranged from 20 to 30 mpg, compared with the actual 20 mpg (U.S. Department of Transportation, 1991).***

Automotive Fuel Economy, HOW FAR SHOULD WE GO? Committee on Fuel Economy of Automobiles and Light Trucks, Energy Engineering Board, Commission on Engineering and Technical Systems, National Research Council, NATIONAL ACADEMY PRESS, Washington, D.C., 1992

## ***There is considerable difference in costs between the three road usage charge concepts we evaluated.***

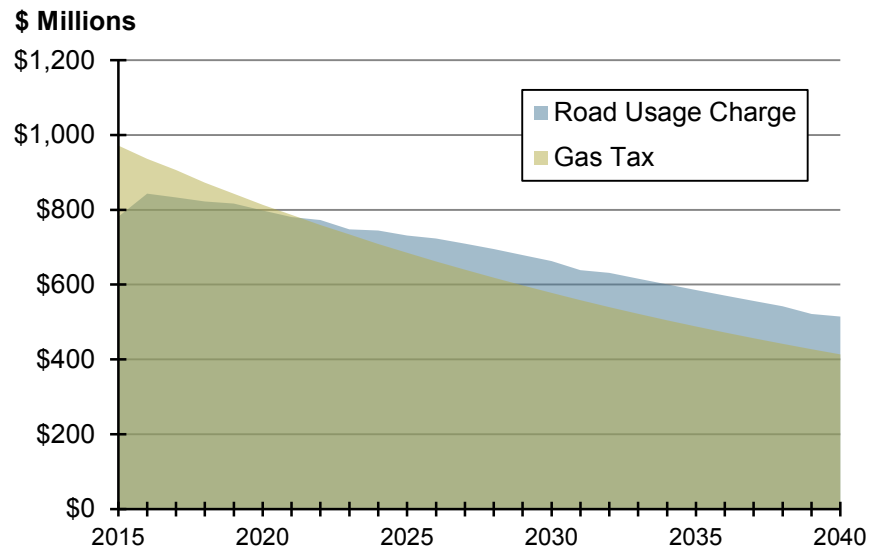
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- Concepts A and B are least expensive, and therefore generate the highest net revenue. We estimate the cost of collection plus evasion as follows:
  - **Concept A:** about 7 percent of expected revenue;
  - **Concept B:** about 8 percent of expected revenue;
  - **Concept C:** between 12 and 13 percent of expected revenue; and
  - **The combination of Concepts A, B, and C:** just under 10 percent of expected revenue.
- The cost estimates for the road usage charge concepts include evasion losses and bad debt recovery costs.
- All road usage charge concepts have significant startup costs—Concept C has the most significant startup costs.
- The cost to collect the gas tax is estimated at 0.3 percent in 2013, but it does not include an estimate of evasion:
  - Evasion is the one area of our analysis where we were not able to do an “apples to apples” comparison.

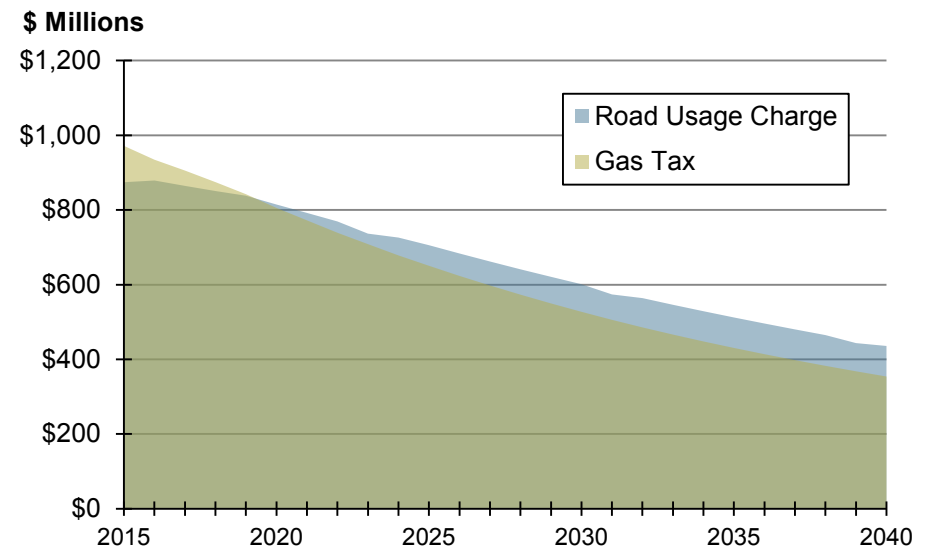
## ***It will take several years for the net revenue of the road usage charge to exceed the net revenue value of the gas tax.***

- Two examples of the net cash flow comparisons:
  - It will take eight years for the present value of the most extensive road usage charge concept—the combination of Concepts A, B, and C—to exceed the gas tax in a single year (Figure 1).
  - For Concept B alone, it will take six years (Figure 2).
- Revenue declines for the road usage charge are due to discounting of future amounts, since we did not assume the tax rate to rise with inflation.
  - Revenue declines for the gas tax are also due to fuel economy improvements.

**Figure 1** Annual Net Revenue of Road Usage Charge Concept Combination A, B and C Compared to Gas Tax



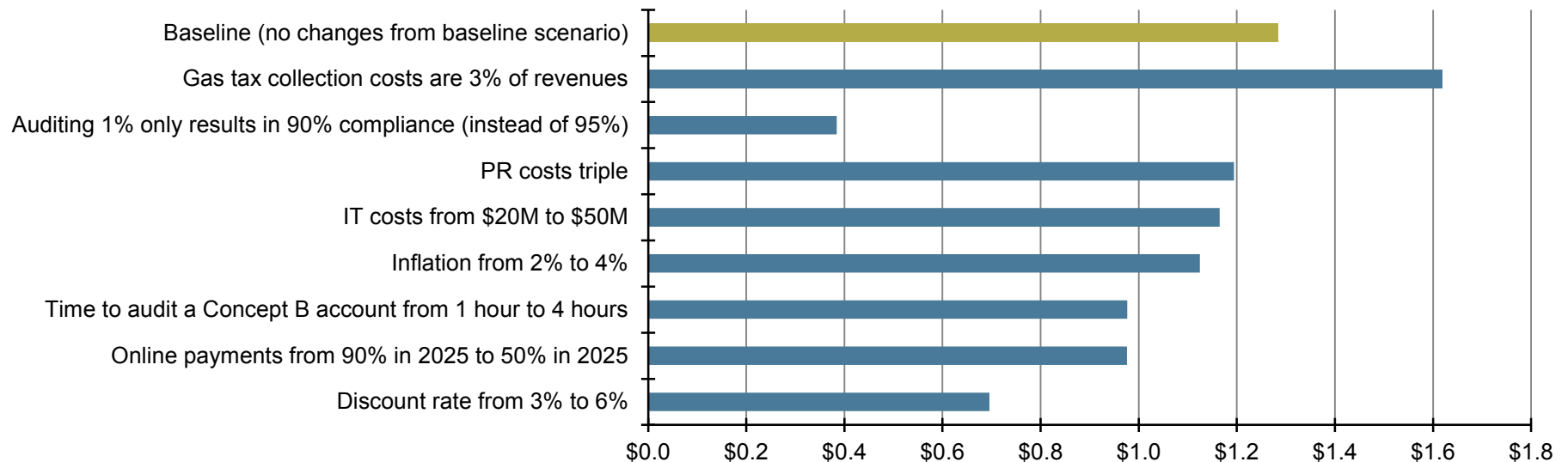
**Figure 2** Annual Net Revenue of Road Usage Charge Concept B Compared to Gas Tax



## ***The basic findings of the financial evaluation did not change when conducted sensitivity tests of key assumptions.***

- Using Concept B, Odometer Reading, as an example, we evaluated how the financial outcomes would change with a variety of different assumptions (see figure below).
- We found that none of these sensitivity tests changed the outcome that road usage charging would yield more revenue for Washington than the gas tax from 2015-2040, although in some cases the difference narrowed when we used the State forecast.
- The biggest influence came from our assumptions about compliance:
  - Our evaluation assumed 95 percent compliance. Should that drop to 90 percent the difference in net present value would be expected to drop to under \$0.4 billion (from \$1.3 billion).

### **Net Revenue Differences Between Gas Tax and Concept B Road Usage Charge Sensitivity Tests**



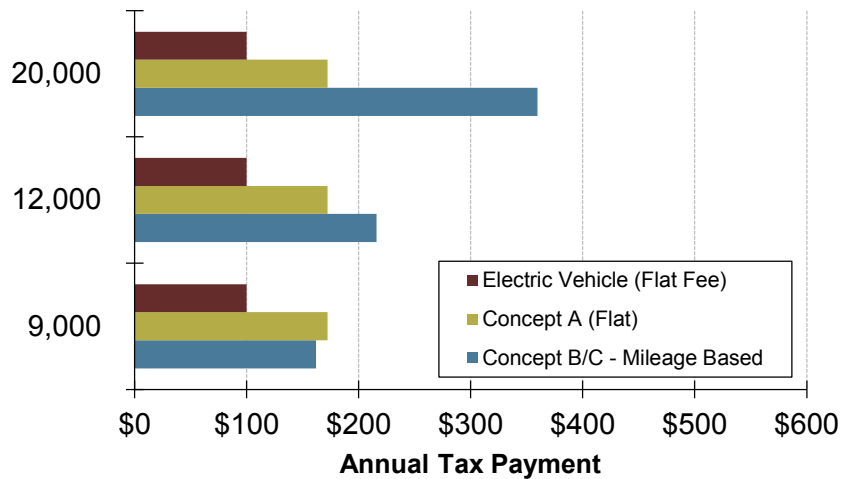
**Non-Financial Evaluation: None of the concepts clearly outperforms the others when considering the non-financial evaluation criteria.**

- Each has advantages and disadvantages which need to be weighed against the financial criteria (see Appendix B for details).
- Different people will view these advantages and disadvantages differently.

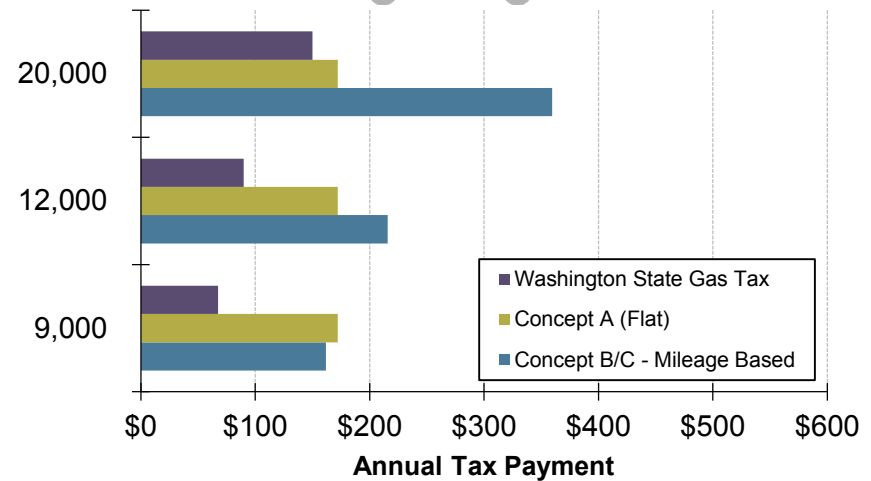
Concept	Advantages	Disadvantages
<b>Gas Tax</b>	<ul style="list-style-type: none"> <li>• Simple.</li> <li>• Easy to enforce.</li> <li>• No privacy issues.</li> </ul>	<ul style="list-style-type: none"> <li>• Long-term declining revenue source due to increased fuel economy and decrease in driving.</li> <li>• Not transparent. People recognize it as a tax, but are not aware of the amount, payment, or use.</li> <li>• Imperfect proxy for road usage in that it varies greatly according to the fuel economy of individual vehicles.</li> </ul>
<b>Concept A: Time Permit</b>	<ul style="list-style-type: none"> <li>• Transparent.</li> <li>• Relatively simple to use.</li> <li>• Easy to enforce.</li> <li>• No privacy issues.</li> </ul>	<ul style="list-style-type: none"> <li>• No relationship to road use.</li> </ul>
<b>Concept B: Odometer Charge</b>	<ul style="list-style-type: none"> <li>• Transparent.</li> <li>• Relatively simple to use.</li> <li>• Easy to enforce.</li> <li>• Privacy not a significant issue (but Principals might object to mileage reporting).</li> <li>• Strong relationship to use.</li> </ul>	<ul style="list-style-type: none"> <li>• No differentiation between driving in-state, out-of-state or on private roads.</li> </ul>
<b>Concept C: Automated Distance Charge</b>	<ul style="list-style-type: none"> <li>• Transparent.</li> <li>• Strongest relationship to use, recording miles driven in-state, out-of-state, or on private roads.</li> </ul>	<ul style="list-style-type: none"> <li>• More complicated to use than others.</li> <li>• Perception of privacy infringement.</li> <li>• More difficult to enforce.</li> </ul>

## Illustrative Comparison of Annual Tax Payments by Vehicle Type and Annual Miles.

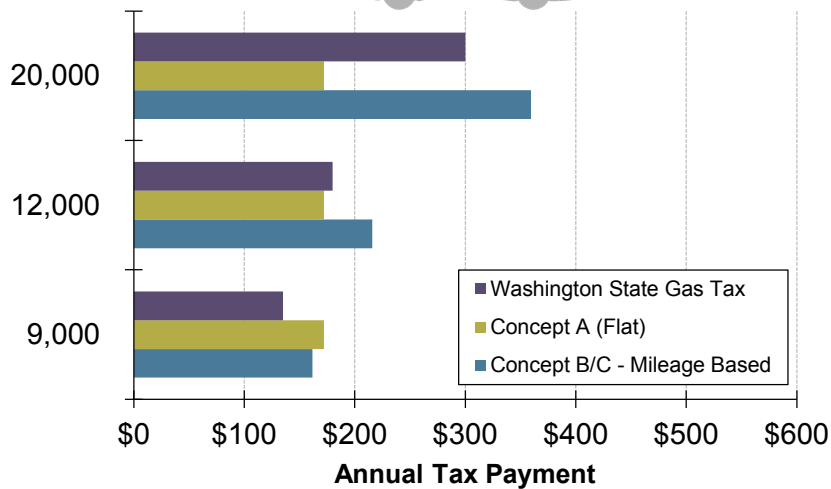
### Electric Vehicle



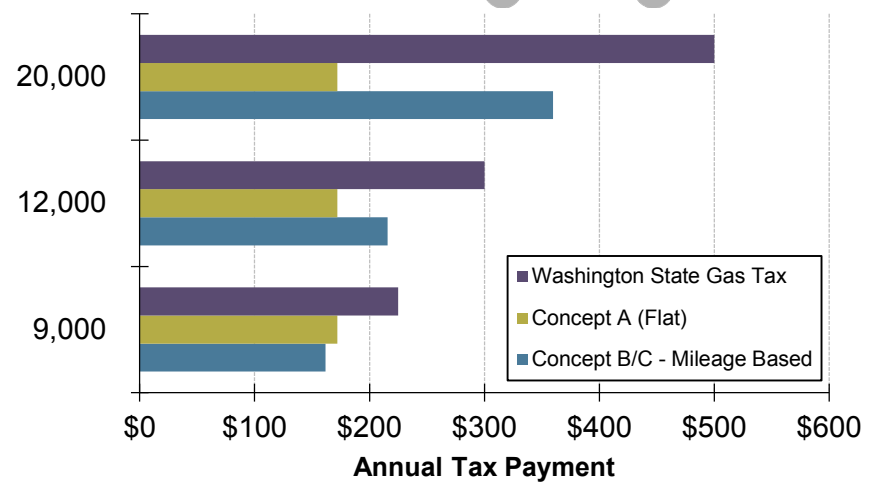
### Hybrid (50 mpg)



### Midsize (25 mpg)



### Pickup/SUV (15 mpg)



## How much gas tax increase achieves the same financial result as a road usage charge?

- We gain another perspective on the financial component of the business case by considering what gas tax increase would be needed to achieve the same financial outcome as a road usage charge.
- The answer varies widely, and depends on:
  - The road usage charge concept selected for comparison (we chose the combination of A, B, and C since it had the highest cost of implementation and lowest present value of revenue).
  - Fuel economy forecasts (we show both the implied State forecast and the Global Insight forecast).
  - How you define “same financial result,” and how you try to achieve it—we looked at two approaches:
    - Incremental gas tax increases every five years, starting in 2022, where the gas tax increase ranged from 9.0 cents per gallon by 2040 for the implied state fuel economy forecast by 2040 of 27.7 mpg, and 20.1 cents for the Global Insight forecast of 34.3 mpg.
    - A one-time increase in 2015 to achieve the same net present value by 2040, where the gas tax increase ranged from 2.0 cents for the implied state fuel economy forecast to 4.8 cents for the Global Insight forecast.

**Gas Tax Needed by 2040 to Equal Net Road Usage Charge Revenue for Concept A+B+C**

Fleet Fuel Economy Forecast by 2040	Gas tax increase (cents)	Gas tax amount (cents)
<b>Incremental increases every 5 years, starting in 2022 – final amount of increase by 2040</b>		
Global Insight Forecast (34.3 mpg)	20.1	57.6
Implied State Forecast (27.7 mpg)	9.0	46.5
<b>One time increase in 2015</b>		
Global Insight Forecast (34.3 mpg)	4.8	42.3
Implied State Forecast (27.7 mpg)	2.0	39.5

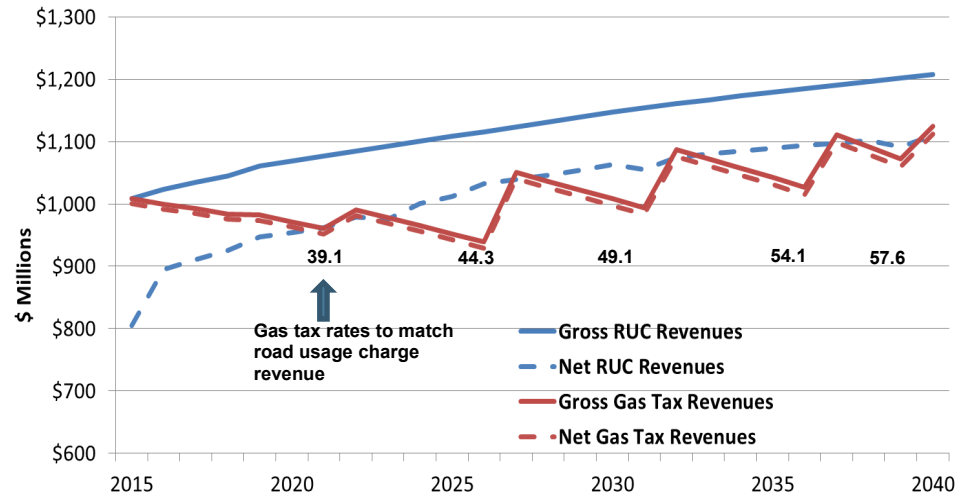
*Continued...*



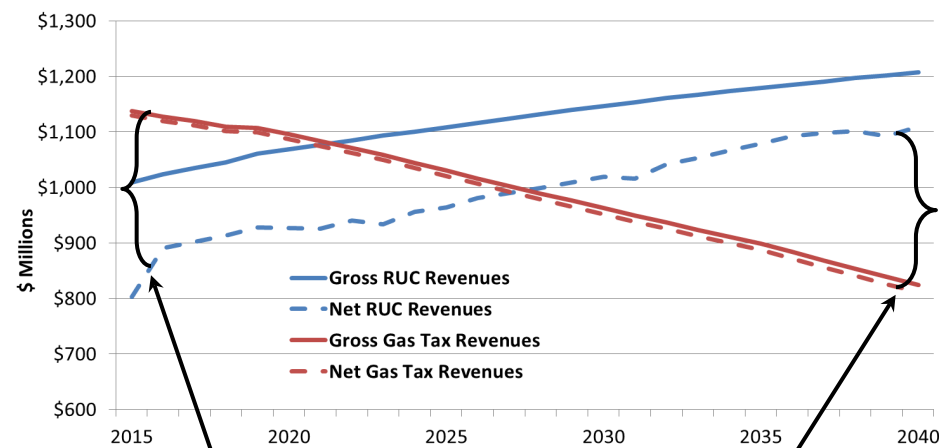
## How much gas tax increase achieves the same financial result as a road usage charge? (continued)

- Cash flows for the two gas tax increase scenarios are at the right:
  - They highlight the impact of the up-front investment cost of the road usage charge.
- A relatively small gas tax increase in 2015 (4.8 cents) can yield the same net present value as the road usage charge:
  - But gas tax revenue will decline over time, requiring a large increase in 2040.
  - The cash flow would be heavily front-loaded.
- Incremental gas tax increases would achieve the same present value result as a road usage charge, but not require a big increase in 2040.
- This comparison:
  - Emphasizes the declining ability of the gas tax to generate a sustainable revenue stream without periodic increases.
  - Emphasizes the up-front investment cost of the road usage charge approach
  - Encourages an examination of the non-financial performance criteria as well.

Cash Flow Comparison-34.3 mpg with increases every five years starting in 2022



Cash Flow Comparison-34.3 mpg with a single increase of 5 cents in 2015



With a single gas tax increase, the gas tax yields considerably more than the road usage charge in the early years. These early year revenues are worth more than later year revenues on a present value basis

The gas tax would lag the road usage charge in later years. To get back on track after 2040, another increase would be needed, getting to the same level as in the sawtooth increases: 57.6 cents and 46.5 cents, depending on the fuel economy scenario



# **Section 5: Remaining Policy and Other Issues**

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## ***Although “the business case has been made,” there are numerous issues to resolve before road usage charging can move forward in Washington.***

- These issues did not affect the initial Steering Committee finding that road usage charging was feasible in Washington, nor the finding in this report that the business case has been made:
  - As a result, the Steering Committee put them in a “parking lot” – deferring research on these issues raised by the Steering Committee until a later time.
- Any of these issues could have significant bearing on important facets of a road usage charge system.
- We organized the parking lot issues into categories based on when analysis and decision-making should occur.

<i>Address in time for 2015 Legislative Session</i>		<i>Defer for now</i>
<i>First Priority: Refine Concept of Operations</i>	<i>Second Priority: Inform 2015 Legislative Session</i>	<i>Third Priority: Enable Implementation</i>
<ul style="list-style-type: none"><li>▪ Which vehicles are subject to a road usage charge?</li><li>▪ Should out-of-state drivers be charged, and how?</li><li>▪ Which Principals should be exempt, if any?</li><li>▪ How should we transition from the gas tax?</li></ul>	<ul style="list-style-type: none"><li>▪ What are the implications for existing and upcoming gas tax bonds?</li><li>▪ How should revenue be used?</li></ul>	<ul style="list-style-type: none"><li>▪ How should rates be set?</li><li>▪ What is the potential role of private service providers?</li><li>▪ What is the extent of interoperability with other jurisdictions or systems?</li><li>▪ Which agency(ies) should have responsibility, and how that new role integrate with current functions?</li><li>▪ What are the legal details and ramifications?</li></ul>

## ***First priority issues: refine the concept of operations.***

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### ***Which Vehicles Should be Subject to a Road Usage Charge?***

- Up until now, we assumed that only gasoline-powered, hybrid, and electric vehicles will pay the road usage charge—and not diesel vehicles.
- Additional analysis of the evolution of the vehicle fleet can reveal whether this is an appropriate assumption or whether alternative approaches are preferable:
  - The answer will affect both the revenues and costs of the road usage charge system as well as existing revenue mechanisms such as gasoline and diesel taxes.
  - The answer will also affect the refined concept of operations for a road usage charge system.

### ***Should Out-of-State Drivers be Charged, and How?***

- Our business case evaluation assumed that out-of-state drivers would not be required to pay the road usage charge.
- This has implications for both revenues and costs. For example, the cost of collecting from out-of-state drivers could be substantial, and may not prove to be cost-effective.
- It will also have implications for public acceptability in communities near the State border.
- Direction on this issue will help define the concept of operations.

### ***Who Should be Exempt?***

- Exemptions from payment of the gas tax include current tribal members, transit buses, and school buses.
- So far, we have not factored these exemptions into our analysis. If it is necessary to extend these refunds to a road usage charge, there will be implications for the concept of operations.

## ***First priority issues: refine the concept of operations (continued).***

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### ***What are Various Approaches to Transition to a Road Usage Charge System, and Which Are Preferable?***

- To simplify the analysis, the work to date has not accounted for transition in our policy recommendations or financial model, assuming a “big bang” start in 2015 in which all gasoline-powered vehicles begin paying a road usage charge, and the State discontinues its collection of the gas tax.
- Such a start carries significant political, programmatic, revenue, and technical risks, and it may be more desirable to gradually add drivers to the road usage charge system over a period of several years.
- However, a gradual transition would likely increase costs by operating two systems at once and other costs, such as paying out gas tax refunds or other offsets to road usage charge payers.

## ***Second priority issues: inform the 2015 legislative session.***

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### ***What are the Implications for Existing and Future Gas Tax Bonds?***

- Many recently issued Washington State bonds have gas tax revenue pledges.
- We need to clarify whether additional revenue sources such as road usage charging can be used to service the bonds and, if not, whether refunding existing bonds is possible and the relevant implications (e.g., legal, financial) of doing so.

### ***How Should Revenue Be Used?***

- There seems to be a general expectation that road usage charge revenue would be used in the same way as the gas tax revenue.
- However, use of the gas tax revenue is governed by the 18<sup>th</sup> Amendment to the Washington State Constitution, which dedicates motor fuel tax collections to “highway purposes,” and by statutes that allocate funds by formula to different uses, such as counties<sup>12</sup> and cities and towns<sup>13</sup> for roadway programs that are not part of the State highway system.
- This raises the question as to whether that restriction and allocation should continue, either in statute or in the Constitution.

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<sup>12</sup> RCW 46.68.120.

<sup>13</sup> RCW 46.68.110.



## ***Third priority issues: to enable implementation; these issues can be deferred beyond 2015.***

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### ***How Should Rates be Set?***

- Our work to date assumed “gross revenue neutrality,” which is setting the rate for each operational concept based on achieving the same amount of revenue expected to be raised by the gas tax in 2015:
  - These are arbitrary rates, based on the revenues that the gas tax generates.
- Other rate policies are possible, such as:
  - Indexing for inflation; and
  - Setting the rate based on budgetary needs.
- Other related topics include:
  - Whether gas tax rates should be adjusted during a potential transition period.
  - Whether rates should reflect environmental goals, such as reducing emissions, reducing congestion, charging by vehicle weights per axle, distinguishing between rural and urban driving, or differential rates for various road types.
- The rate-setting process will be established by the Legislature and the Governor, but it would be appropriate for the Steering Committee to discuss and make a recommendation on this important, complicated, and potentially contentious topic.

### ***Potential Role of Private Service Providers***

- We assumed that a road usage charge system would be run by a state agency and the continued use of Department of Licensing subagents to handle some road usage charge transactions.
- More extensive use of private service providers, in particular related to Concept C, should be explored.

***Continued...***

## ***Third priority issues: enable implementation (continued).***

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### ***Extent of Interoperability with Other Jurisdictions or Systems***

- Other jurisdictions are considering road usage charges, including Oregon and British Columbia.
- This presents both opportunities and constraints that need to be addressed.

### ***Which Agencies Should Have Responsibility and Accountability and How Does a Road Usage Charge System Integrate With Current Functions?***

- The simplified business case evaluation assumed that a Washington State agency would add road usage charging into its current functions:
  - Further work is needed to address the specifics of account management, road usage charge management, compliance and enforcement, and overall program authority.
- Our operational assumptions include the expectation that road usage charging will be integrated in some way with vehicle registration. There are other processes with which integration is possible in Washington, and it is even possible that a new process could be implemented to handle road usage charging.
- It may be desirable to coordinate computer system upgrades for existing agencies to coincide with implementation of road usage charging, which would impact the transition toward road usage charges and the timeline of the business case.

***Continued...***

## ***Third priority issues: enable implementation (continued).***

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### ***Legal Details***

- Among the legal issues identified so far are:
  - **Distance Measurement Instruments.** Odometers, GPS systems, cell phones or other devices may or may not qualify as legal measurement instruments, unless specifically recognized as such.
  - **Commerce Clause.** The applicability of the Commerce Clause of the U.S. Constitution may need to be evaluated if special provisions are made to collect fees from out-of-state drivers.
  - **Enforcement.** The enforcement mechanisms used to monitor drivers (e.g., cameras) may need to be legally recognized.
  - **Data Security.** Data security standards may need to be consistent with existing regulations under the Washington State Public Records Act.

### ***Public Outreach and Education***

- Public communication prior to legislative debate will be key to get the public prepared for the switch to a road usage charge.



# **Section 6: Proposed Work Plan and Budget for March 2014-June 2015**

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## ***The proposed work plan will address policy issues and develop a concept of operations to inform the 2015 Legislative session.***

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- The work plan has these objectives:
  - Address some of the “parking lot” issues that guide a specific concept of operations and to inform potential legislation.
  - Create a concept of operations for a potential road usage charge system, and for a potential pilot or phased implementation plan.
- After this work plan is completed, more work would be needed to implement a road usage charge, such as:
  - Public education and outreach;
  - Rate setting;
  - Allocation of implementation responsibility among agencies;
  - Detailed technical requirements/standards;
  - Detailed transition strategy; and
  - Pilot or market testing of implementation options.

## ***A “concept of operations” differs from the “operational concepts” developed for the business case evaluation.***

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- A concept of operations provides much more detail and is sufficient to develop a system requirements document:
  - This is a key step toward a pilot or market testing of specific aspects of the system design and how it will work.
  - It will expand upon the three operational concepts described in this report: A- time permit, B- odometer charge, and C- automated distance charge
- A concept of operations is a formal systems engineering document:
  - It will define the entire operation of the road usage charging system from the perspective of the user.
  - It is a detailed technical document that follows a specified industry-accepted format.<sup>14</sup>
  - It generally contains:
    - Policy background, which will be as complete as the policy issues developed by this stage of work;
    - Statement of system goals and objectives as defined by the Steering Committee;
    - Description of system environment and constraints (e.g., external limitations to the system);
    - List of participants and stakeholders, their interactions, and stakeholder responsibilities as best as can be determined;
    - Description of system components and high-level architecture (e.g., mileage recording, accounting, user account management); and
    - Operational scenarios, including situations in which the system must operate (e.g., registering with the system, using the system (driving), canceling or changing vehicle registration).

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<sup>14</sup> We anticipate using guidelines from the Institute of Electrical and Electronics Engineers (IEEE 1362-1998).



## ***The work plan includes the following tasks.***

Task	Purpose	Description
Task 1	<b>Refine Policy Direction Addressing High Priority Issues.</b> Support the Legislature, the Commission, and the Steering Committee in establishing a road usage charge policy for Washington State.	<p><b><i>The following policy issues will influence the concept of operations and need to be addressed early:</i></b></p> <ul style="list-style-type: none"> <li>■ Which vehicles should be subjected to a road usage charge? <ul style="list-style-type: none"> <li>• Was our assumption that “all non-diesel vehicles should pay” a good assumption?</li> <li>• What are the implications for costs?</li> </ul> </li> <li>■ Should out-of-state be drivers be charged, and if so, how?</li> <li>■ Which Principals should be exempt, if any?</li> <li>■ How should the State transition from the current system?</li> </ul> <p><b><i>These policy issues are not critical for the concept of operations, but are important to resolve:</i></b></p> <ul style="list-style-type: none"> <li>■ What are the implications for existing and future gas tax bonds? <ul style="list-style-type: none"> <li>• Work with the Commission, WSDOT, and Office of the State Treasurer, with the analytical work by the Treasurer.</li> </ul> </li> <li>■ Research urban/rural equity issues <ul style="list-style-type: none"> <li>• Conduct surveys of urban and rural residents to understand travel patterns and characteristics that will influence how much different types of users will pay for different systems</li> </ul> </li> </ul>

Task	Purpose	Description
Task 2	<b>Develop a Concept of Operations.</b> Define how system users will experience the system when driving and paying charges.	<ul style="list-style-type: none"> <li>■ Develop a single concept of operations that combines Concepts A+B+C<sup>15</sup> that reflects the policy recommendations from Task 1.</li> <li>• Develop as if for a complete system, and then potentially create a limited version for use in a pilot.</li> <li>• Consider, at a very high level, potential transition approaches (with further detail deferred to later phases).</li> </ul>
Task 3	<b>Risk Analysis.</b> Identify risks and potential mitigation measures to minimize adverse impacts and the costs of such impacts.	<ul style="list-style-type: none"> <li>■ Conduct workshops with State agencies:                             <ul style="list-style-type: none"> <li>• Develop an inventory of technical, operational, cost, communications, legal, and policy risks and threats to the development and implementation of a road usage charge.</li> <li>• Identify mitigation measures to alleviate uncertainty in the execution of the system.</li> <li>• Identify potential costs of risks</li> </ul> </li> </ul>
Task 4	<b>Financial Evaluation.</b>	<ul style="list-style-type: none"> <li>■ Build upon the existing business case model to incorporate more detailed cost and revenue data based on decisions taken in Tasks 1, 2, and 3, including:                             <ul style="list-style-type: none"> <li>• Initial recommendations on transition; and</li> <li>• Updated information on the costs of gas and diesel tax collection (if possible).</li> <li>• Risk mitigation measures</li> </ul> </li> </ul>

<sup>15</sup> A- time permit, B- odometer charge, and C- automated distance charge

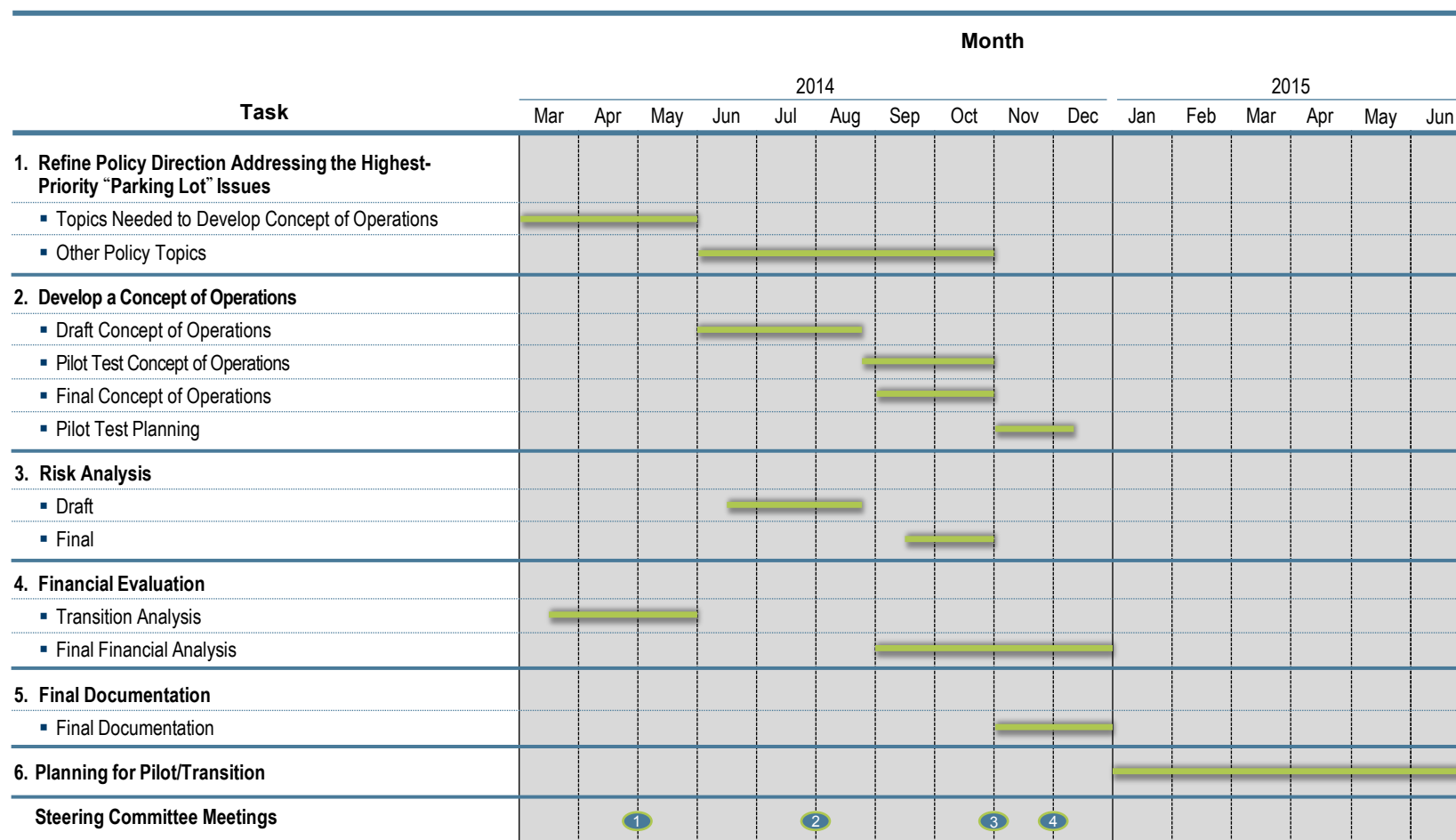
Task	Purpose	Description
Task 5	<b>Final Documentation.</b>	■ Produce a final report and presentations.
Task 6	<b>Planning for Pilot/Transition</b>	Potential efforts could include working with staff to develop grant proposals for federal pilot programs, focus groups to vet the concept of operations, or further planning for pilot tests or market tests, and initiating transition planning.

The work plan assumes four Steering Committee meetings, Legislative and Governor briefings, and coordination with government agencies such as Department of Licensing, Department of Revenue, Department of Transportation, and Office of the State Treasurer.

## We plan to work through 2014 to develop recommendations in time for the 2015 legislative session.

- Assuming the work starts in March 2014, recommendations and final documentation will be done by late Fall 2014. Work can continue on pilot test/transition planning in early-mid 2015.

### Road Usage Charge Schedule



## ***Estimated Budget.***

- We developed a budget based on the expected level of effort needed to be done for each of the above tasks, with estimates for the amount needed for the remainder of FY 2014 (through June 2014) and for FY 2015 (July 2014-June 2015).
- The total budget estimate is \$869,000, with \$321,000 for the remainder of FY 2014 and \$548,000 for FY 2015.

<b>Task</b>	<b>March 2014- June 2014</b>	<b>July 2014- June 2015</b>	<b>Total</b>
<b>1. Refine Policy</b>	\$114,500	\$ 69,400	\$183,900
<b>2. Concept of Operations</b>	81,600	81,600	163,200
<b>3. Risk Analysis</b>	–	105,600	105,600
<b>4. Financial Evaluation</b>	85,100	120,100	205,200
<b>5. Final Documentation</b>	39,800	60,700	100,500
<b>6. Planning for Pilot /Transition</b>	–	105,600	110,600
<b>Total</b>	<b>\$321,000</b>	<b>\$548,000</b>	<b>\$869,000</b>



# Appendices

Provided on CD for printed versions, and for download on the Steering Committee's web site:  
<http://waroadusagecharge.wordpress.com/>.

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Appendix A: Business Case Evaluation Financial Analysis Assumptions

Appendix B: Business Case Evaluation Non-financial Analysis

Appendix C: Forecast Details

Appendix D: Road Usage Charge Administration Cost Categories









**Washington State  
Transportation Commission**



**Washington State  
Department of Transportation**

**CAMBRIDGE**  
SYSTEMATICS

**BI BERK**



**D'ARTAGNAN  
CONSULTING**