




A-17

WASHINGTON STATE RUC FEASIBILITY
ASSESSMENT, WORK PLAN, & BUDGET

Washington State Transportation Commission // January 23, 2013

 **WA RUC**



Washington State Road Usage Charge Assessment

*Feasibility Assessment,
Work Plan, and Budget*

*Report to the Legislature
by*

*Washington State
Transportation Commission*

January 23, 2013



Washington State Transportation
Commission



Washington State
Department of Transportation

CAMBRIDGE
SYSTEMATICS

BERK

NATALIE
QUICK
CONSULTING

ARTAGNAN
CONSULTING



STATE OF WASHINGTON
TRANSPORTATION COMMISSION

*PO Box 47308, Olympia WA 98504-7308 • 2404 Chandler Ct SW Suite 270, Olympia WA 98502
(360) 705-7070 • Fax (360) 705-6802 • transc@wstc.wa.gov • <http://www.wstc.wa.gov>*

January 23, 2013

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
PO Box 40482
Olympia, WA 98504-0482

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

Dear Governor Inslee, Senators King and Eide, and Representative Clibborn:

As cars become more fuel-efficient and alternative fuel vehicles such as biodiesel, electricity and natural gas 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 Transportation Commission 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. The initial work is now complete and the Transportation Commission concurs in the Steering Committee's finding that a Road Usage Charge is a feasible option for funding Washington's transportation system. Whether or not it makes sense and is desirable for Washington State will require additional work.

A Road Usage Charge is a direct user fee, collected from drivers based upon the actual miles driven or through a permit valid for a specified period. This is in contrast to the gas tax, which is an indirect fee based upon how much fuel is burned. While the shift away from petroleum-dependent transportation is critical for energy security, the environment and our economy, it will adversely affect transportation in Washington State if our 1920's-era funding system does not evolve as well.

The Honorable Governor Jay Inslee
The Honorable Curtis King
The Honorable Tracey Eide
The Honorable Judy Clibborn
January 23, 2013
Page 2

Another side effect of remaining dependent upon the gas tax is that over time, inequities in tax payments among drivers may be exacerbated. Under the current system, a person who must drive a lower-MPG vehicle (such as an older pickup truck, minivan or all-weather vehicle) will pay much more in taxes than someone who can afford to purchase the newest high-MPG vehicles. This discrepancy will become even sharper once the new federal fuel economy standards (CAFE) of 54.5 mpg take effect in 2025.

Washington is not alone in considering whether and how to develop a Road Usage Charge. Oregon, the first state to enact a gas tax, is now concluding its second pilot test of road usage charge concepts. In December, the Government Accountability Office (GAO) issued a report that found that a mileage-based user fee is a desirable alternative funding mechanism for transportation.

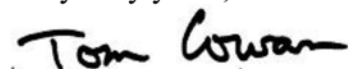
The Commission is recommending a work plan that includes in-depth research and investigation of several critical issues that were identified by the Steering Committee in order for a Road Usage Charge to become a realistic transportation funding alternative for Washington State. These issues include:

- Whether a Road Usage Charge should replace, supplement or transition away from the gas tax;
- Whether revenue from a Road Usage Charge should be spent solely on highway purposes or more broadly on transportation needs;
- How to account for miles driven outside of Washington and how to charge drivers from out-of-state who are using Washington roads.

To support this work plan, we are requesting \$1.6 million in the 2013-15 biennium to carry out the tasks of the first phase of work described in Sections 3 and 4 of the attached report. Please note the proposed work plan has two phases to allow for greater public outreach and input; to scale down the funding requirements; and to ensure that the Legislature and Governor retain full control over the pacing and scope of the work, including whether to proceed to the next phase of development. We are pleased that the Steering Committee has unanimously agreed to continue working on this important issue if the Legislature approves.

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

Very truly yours,



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

Index

Steering Committee Membersii

Section 1: Introduction and Executive Summary 1

Section 2: Feasibility Assessment 9

Section 3: Proposed Work Plan 29

Section 4: Proposed Budget for Phase 1 53

Appendix A: Steering Committee Member Biographies 59

Appendix B: Summary of Operational Concepts Used for Feasibility Assessment 65

Additional Documents

The following foundational material was used by the Steering Committee to reach the conclusions in this report:

- *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;
and
- Presentations at four Steering Committee meetings.

These are available on the Steering Committee’s web site: <http://waroadusagecharge.wordpress.com/>, as well as on the CD that accompanies the printed version of this report.



Steering Committee Members

Name and Affiliation	Representing	Name and Affiliation	Representing
Steering Committee Chair, Commissioner Tom Cowan (WSTC Commissioner)	WSTC	Pete Capell (Clark County Public Works)	Cities and Counties
Commissioner Anne Haley (WSTC Commissioner)	WSTC	Cynthia Chen (University of Washington)	Appointed by WSTC
Commissioner Charles Royer (WSTC Commissioner)	WSTC	Scott Creek (Crown Moving Company, Inc.)	Trucking industry
Sen. Tracey Eide (Federal Way (D) 30 th District)	Washington Senate	Don Gerend (City of Sammamish Councilmember)	Cities and counties
Sen. Ann Rivers (La Center (R) 18 th District)	Washington Senate	Paula Hammond (WSDOT Secretary)	Appointed by WSTC
Rep. Andy Billig (Spokane (D) 3 rd District)	Washington House of Representatives	Tom Hingson (Everett Transit)	Public transportation
Rep. Mark Hargrove (Covington (R) 47 th District)	Washington House of Representatives	Sharon Nelson	Appointed by WSTC
Curt Augustine (Alliance of Automobile Manufacturers)	Auto and light truck manufacturers	Kush Parikh (INRIX)	User fee technology
Kurt Beckett (Port of Seattle)	Appointed by WSTC	Janet Ray (AAA Washington)	Motoring public
Rod Brown Jr. (Cascadia Law Group PLLC)	Environmental	Neil Strege (Washington Roundtable)	Business

Committee member biographies are shown in Appendix A.

Section 1:

Introduction and Executive Summary

Legislative Directive for this Feasibility Assessment

The 2012 Regular Session of the 62nd Legislature passed a Supplemental Transportation Budget, providing funding to the Washington State Transportation Commission (WSTC) “solely to determine the feasibility of transitioning from the gas tax to a road user assessment system of paying for transportation.”¹ 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. Required activities included:

- Review relevant reports and data related to models of road usage assessments and methods of transitioning to a road usage assessment system, and analyze the research to identify issues for policy decisions in Washington;
- Make recommendations for the design of systemwide trials;
- Develop a plan to assess public perspectives and educate the public on the current transportation funding system and options for a new system; and
- Assess technology, agency administration, multistate and Federal standards, and other necessary elements.

Objective of this Feasibility Assessment

The purpose of this assessment was to determine whether road usage charging is feasible for Washington, and if so, make recommendations about what next steps should be taken or further studied.

¹ Engrossed Substitute House Bill 2190, 62nd Legislature, 2012 Regular Session.

Motivations for Examining a Road Usage Charge

This feasibility assessment builds on previous work to identify a sustainable, long-term funding source for transportation in Washington, including:

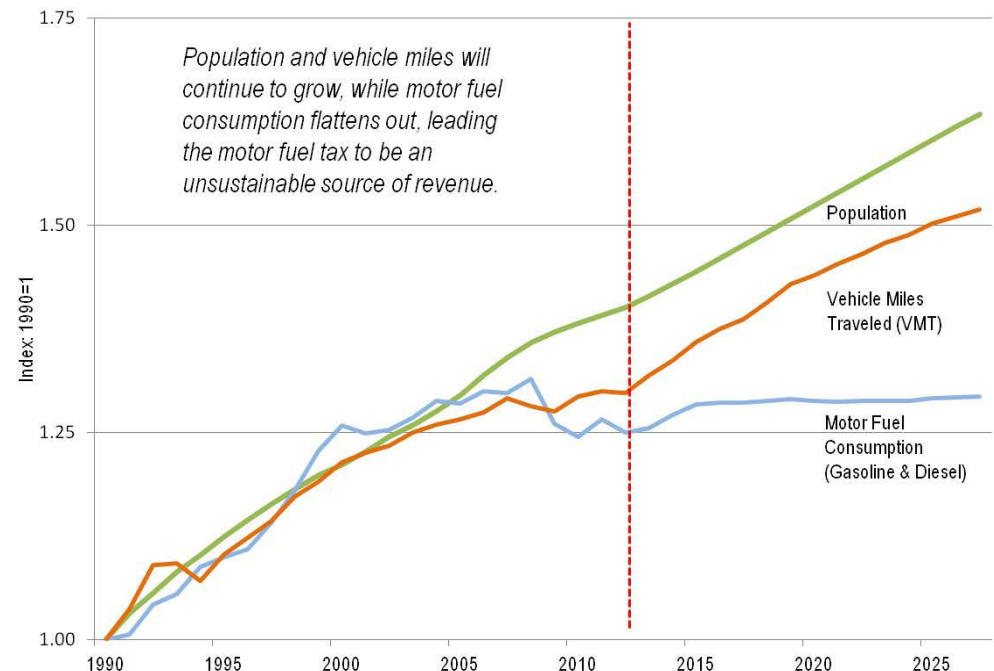
- 2007 – Long-Term Transportation Financing Study;
- 2009 – Implementing Alternative Transportation Funding Methods; and
- 2012 – Connecting Washington.

The motor fuel tax represents the largest share of State transportation funding, supporting 76 percent of all transportation investments.² Because the motor fuel tax is levied as a fixed amount per gallon, it:

- Does not rise and fall with the price of fuel;
- Does not keep pace with inflation; and
- Declines on a per-mile basis as vehicles become more fuel-efficient.

While some of the reduction in motor fuel consumption after 2008 is attributable to economic conditions, better fuel economy in light-duty vehicles will be the primary cause of lower fuel consumption over the next 15 years.³ Population and vehicle miles will continue to increase but will consume less fuel – this translates into less revenue for road improvements. The motor fuel tax is not sustainable over the long term, which prompted the Legislature to request this assessment of the feasibility of transitioning to road usage charging.

Population, Vehicle Miles Traveled, and Motor Fuel Consumption Trends and Forecast (1990-2027)



Sources: Population and fuel consumption forecasts based on Washington Office of Financial Management (OFM), November 2012 projections. VMT based on OFM, September 2012 projections.

² Connecting Washington, January 2012.

³ Chart does not reflect recently enacted Federal corporate average fuel-efficiency standards of 55 MPG by 2025 for light duty vehicles, so future per-capita fuel consumption should be even lower than shown.

Feasibility Assessment Process

The Steering Committee conducted its feasibility assessment in steps, establishing a common understanding of road usage charge policy and technical considerations (see timeline below). At its first meeting, the Steering Committee received a report on domestic and international experience with road usage charging and an overview of policy issues. Through facilitated discussion Steering Committee members expressed their preferences on policy objectives and feasibility criteria, which were confirmed through a follow-up member survey.

At its second meeting, the Steering Committee received a report on potential road usage charge concepts for Washington that would carry out the policy objectives identified in the first meeting, and be evaluated according to the feasibility criteria. Committee members unanimously agreed that road usage charging is feasible in Washington. The first two reports are available on the road usage charge web site.



Steering Committee Feasibility Recommendation

The Steering Committee unanimously concluded that a road usage charge is feasible in Washington and recommends further evaluation as outlined in the Work Plan and Budget Sections of this report (Sections 3 and 4).

The Steering Committee recognizes that the gas tax is not a sustainable revenue source for transportation in Washington, as demonstrated by prior studies. Successful international examples of road usage charge systems in practice and successful demonstrations in the U.S. show that there are numerous viable operational concepts and technologies for road usage charging in Washington. The Steering Committee has not agreed on whether it would be preferable to use road usage charging to supplement or replace the gas tax.

However implemented, road usage charging will not be perfect, but no tax mechanism is perfect, including the current gas tax. All taxing policies involve tradeoffs between ideal policy objectives and how these objectives can actually be implemented. This assessment demonstrates that offering choices may solve many of the issues related to road usage charging (e.g., privacy and acceptance).

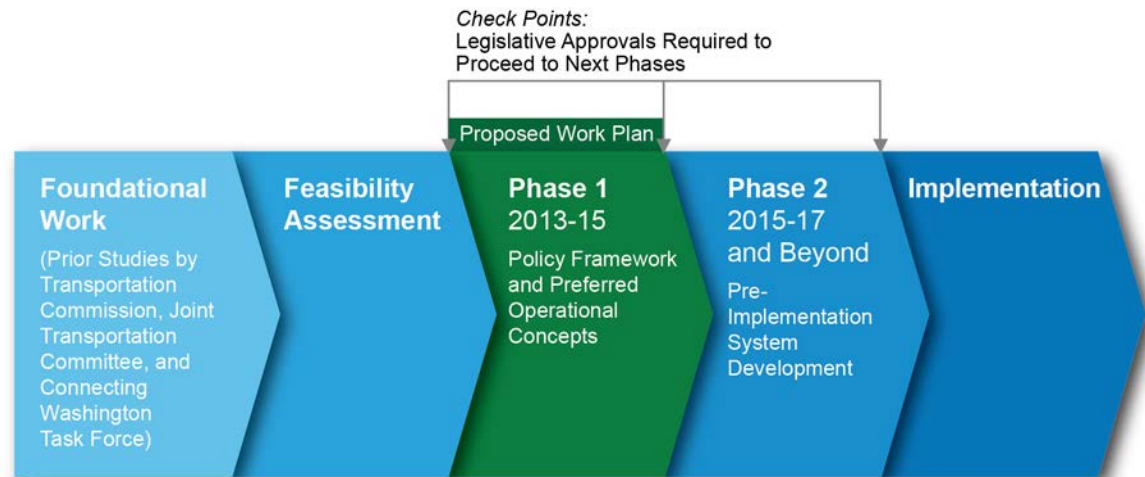
Proposed Work Plan Moving Forward

To get from where we are now—“feasible”—to a new system of road usage charging is a complex effort involving potentially contentious policy choices and operational and administrative design decisions. We developed a two-phase process to get to the point where Washington might implement a new road usage charge system.

2013-2015 Biennium: Policy Framework and Preferred Operational Concepts (Phase 1). If authorized by the Legislature, the next phase of work would focus on policy choices, implications, public outreach, and operational concept design to enable the Legislature to decide whether to begin full pre-implementation system development.

2015 and Beyond: Pre-Implementation System Development (Phase 2). If authorized by the Legislature, activity would shift to detailing system features and administrative needs and conducting pilot tests of preferred operational concepts. Phase 2 would be scoped at the end of Phase 1.

Implementation. At the end of Phase 2, if directed by the Legislature, full implementation and transition activities could commence.



Potential Role of Pilot Tests in the Work Plan. Pilot tests can demonstrate technology, administrative systems, or public acceptance before committing extensive resources to a road usage charge system. Pilot tests will be best carried out in Phase 2 once policy direction is established and a preferred operational concept is chosen. See page 50 for more details.

Section 2:

Feasibility Assessment

Background: Reasons and Ways to Charge for Road Use

Practitioners often use terms such as tolling, congestion pricing, and road usage charging interchangeably, but there are substantive differences among them. The list below provides brief descriptions of four forms of charging in order to clarify the differences.

- Fuel tax. Charges assessed on fuel consumed by road users.
- Toll. Charges assessed on users of a specific highway, bridge, or tunnel (such as on Tacoma Narrows Bridge and SR 520 in Washington), including express toll lanes (such as SR 167).
- Congestion charging. Charges assessed during specific times and at specific places to change travel behavior and manage congestion.
- General road usage charging. Charges assessed across the entire network of roads based on measured usage.

The sole focus of this assessment is on “general road usage charging,” which we define as an alternative means of paying for the road system in general, and has these characteristics:

- Network-wide. Charged across an entire network of facilities for a specified geography rather than for a single facility, corridor, or “trunk line” as is often the case in tolling.
- Charged 24/7. Charged regardless of the time of use. In this respect, road usage charges are like other utilities or consumer products. Time-of-day charging can manage demand, but is not a necessary component.
- For General Roadway Usage. Would fund transportation expenditures across a broad region or state, rather than a single facility or limited jurisdiction.

Background:

Typical Policy Objectives of General Road Usage Charging

There are many reasons to assess charges on road usage. The primary purpose is typically revenue generation, but there are often secondary motivations.

Typical Primary Objective: Revenue Generation

The primary purpose of general road usage charging, as we define it, is to raise revenue. The use of that revenue may vary. In practice, examples of the allocation of these revenues include:

- Revenues dedicated to highways. New Zealand's road usage charge is dedicated to the highway system, transport studies, and environmental projects.
- Revenues dedicated to transportation. Examples include U.S. Federal fuel taxes that are devoted to the Highway and Transit Trust Funds. Most state gas taxes are similarly devoted to transportation uses, if not dedicated explicitly to highways.
- Revenues partially dedicated to highways or transportation. Outside the U.S., particularly in Europe, revenues deriving from road usage, such as fuel taxes and tolls, are often diverted to non-transportation uses. In the UK, less than half of road revenues were devoted to transport and only 20 percent out of £50 billion to highways in 2010.
- Revenues devoted to a general fund. In many places around the world (but not in the U.S.), road usage-derived charges, including fuel taxes, are deposited into a general fund together with other tax revenues. Because funds are fungible, there is no meaningful link between revenues and spending.

Background:

Typical Policy Objectives of General Road Usage Charging (continued)

Typical Secondary Objective: Other Social Purposes

Secondary purpose(s) of general road usage charging may be to address various social objectives, such as:

- Manage demand/congestion. Prices can influence the demand for transportation. Therefore, it is possible to use price to manage demand in addition to raising revenue.
- Protect the environment by reducing fuel use. Fuel taxes directly discourage fuel consumption. France’s “eco-tax” on heavy vehicles and Switzerland’s heavy vehicle tax have explicit tax components based on environmental impact. Austria utilizes road usage charging to help shift freight from roads to rails. In all of these cases, however, revenue is still a primary objective.
- Influence travel behavior and other decisions such as land use. All charges or taxes affect user behavior. Some are explicitly designed to influence choices, such as the very high fuel taxes found in Europe, congestion charges, and environmental taxes. Charges that seek only to recover costs of road use, such as New Zealand’s road usage charge and U.S. fuel taxes, have less impact on personal decisions.

Actual Experience With Road Usage Charges is Limited

Though studied extensively both by academics and by practitioners, implementation of road usage charging has been limited:

- New Zealand. All heavy and alternative fuel vehicles have been subject to road usage charges since 1978 using a low-tech system where motorists buy blocks of kilometers. Newer systems that use advanced technologies to measure and pay charges are being phased in.
- European Vignette Systems. Several European nations use vignettes (stickers) that allow motorists to use certain roads for a designated time (from a few days to a year).
- U.S. – Weight-Distance Taxes. Over 20 states implemented weight-distance charging for commercial vehicles in the mid-20th century, but only four programs remain (Kentucky, New Mexico, New York, and Oregon), the rest having been replaced by diesel taxes. The reasons for switching from weight-distance charges to diesel taxes included high cost of collection for government agencies, high cost of compliance for operators, and evasion. These shortcomings were due to manual reporting before computer automation and modern communications became available for tax reporting and collection.
- U.S. – IFTA and IRP. Interstate truck operators report miles state-by-state in order to convert diesel taxes and registration fees into mileage-based fees through the International Fuel Tax Agreement (IFTA) and International Registration Plan (IRP), respectively.

Sections 4-7 of Report 1 provide more details on many of the systems mentioned here and on the next page.

Studies and Proposals of Road Usage Charge Systems Are Numerous

International

Four countries outside the U.S. have studied and conducted pilot tests of road usage charging: United Kingdom, 1964 – Present; Singapore, 1978 – Present; The Netherlands, 1988-2010; and Hong Kong, 1983-2009. While there are many differences, they share the following characteristics:

- Studies have been underway for several decades or more and have rarely led to the implementation of new operational systems;
- Road usage charging was coupled with one or several companion policies such as congestion charging, tolling, and environmental impact charging; and
- Policy-makers often undergo several “rounds” of study, outreach, and analysis before a system is implemented.

Domestic

General road usage charging has been discussed, proposed, studied, and subject to pilot tests in almost 20 states, including:

- Studies with completed trials – University of Iowa (not fully reported); Oregon DOT (2007), Puget Sound Regional Council (2008);
- Studies with trials in progress – Minnesota DOT (2011), Oregon DOT (2012); and
- Studies without trial (so far) – I-95 Corridor Coalition, Nevada DOT, Colorado DOT, San Francisco Bay Area.

Motivations for these efforts were similar to those in Washington: falling gas tax revenues caused by increasing vehicle fuel efficiency and the emergence of vehicles that do not use motor fuel. While these studies generally focus on generating revenues to cover road usage costs as their primary policy goal, several of these studies also considered other goals such as reducing peak-hour urban congestion and reducing emissions.

Lessons Learned from Prior Road Usage Charging Efforts

Prior efforts provide valuable lessons for Washington’s feasibility assessment, including:

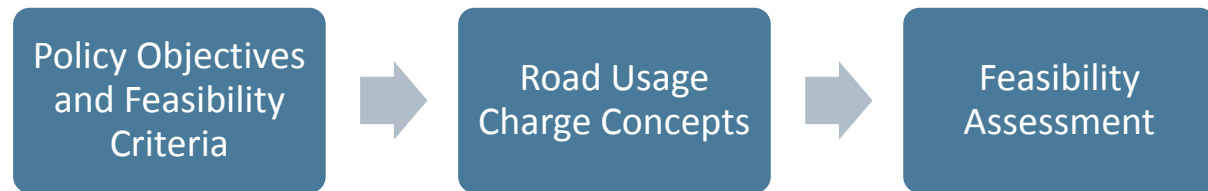
- Policy framework:
 - > Establish policy and legislative framework first – then select a solution to fit policy objectives.
 - > Policy objectives drive the technology selection, not the other way around.
 - > Understand, refine, and test policy objectives – be open and communicate clearly with the public and stakeholders.
 - > Passenger cars are different than trucks.
- User experience:
 - > Choices in technology and payment streams are key.
 - > Ensure simplicity and efficiency.
- Public acceptance:
 - > Minimize exemptions and consider phase-in discounts.
 - > Clearly define what will be done with the revenues.
- Implementation:
 - > “Open market” approach and use of certified service providers reduces overall costs and ensures system sustainability.
 - > Enforcement and legal appeals process are critical – taxes have more “bite” than fees, tolls, or charges.
 - > Political will is essential.

Steering Committee Policy Objectives⁴

Working with the consultants, Steering Committee members expressed their policy objectives for road usage charging in Washington, recognizing that there may be some tradeoffs in how well different objectives are met:

- Create a sustainable transportation revenue source to address erosion in revenue due to vehicle fuel efficiency gains;
- Demonstrate equity in who uses and who pays for transportation;
- Increase the transparency of what road use costs and how funds are spent; and
- Accomplish other social objectives, such as:
 - > Reduce the amount of driving;
 - > Reduce energy usage;
 - > Reduce greenhouse gas emissions; and
 - > Reduce congestion through pricing.

There was a range of opinion as to which objectives should be considered in the feasibility assessment. For the most part, creating a sustainable transportation revenue source was the highest priority for most of the Steering Committee members. The policy objectives formed the basis for a set of illustrative road usage charge concepts developed by the consultant team for use in the feasibility assessment, but considerably more work on refining policy objectives would be needed in Phase 1 of the proposed work plan (see Section 3).



⁴ Please reference Report 2, *Potential Road Usage Charge Concepts for Washington*, for more detail about the policy objectives and feasibility criteria.

Feasibility Criteria

The Steering Committee developed 10 feasibility criteria to evaluate the illustrative operational concepts developed by the consultant team:

- **Convenience:** The system is convenient to the users; it does not impose a significant burden for compliance and offers choices to meet the needs of diverse users.
- **Implementability:** The system can overcome implementation barriers and challenges – reasonable solutions exist.
- **Transparency:** The system can achieve transparency in the rate-setting, customer billing, and accounting.
- **Stability and Sustainability:** There is a high degree of confidence in revenue expected from the system, measured by revenue stability and sustainability relative to the gas tax.
- **Privacy:** Actual and perceived issues of privacy are considered.
- **Fairness (Equity):** The system can collect revenues from users in a way that is fair across classes of users such as cars and trucks; urban and rural residents; and motorists of all income levels.
- **Flexibility:** The system can accommodate evolving revenue collection technologies, revenue needs, user needs, and policy changes such as rate-setting.
- **Choice:** Users can choose from a menu of options to meet their individual preferences.
- **Out-of-State Travel:** The system can distinguish between in-state and out-of-state travel.
- **Collect Revenue from Out-of-State Travelers:** The system has an appropriate way to collect revenue from out-of-state travelers.

While there was a general consensus that all of the feasibility criteria were appropriate, the Steering Committee found the criteria related to out-of-state travel to be of lesser importance in making a feasibility determination.

Core Elements of Potential Operational Concepts

Road usage charge concepts are composed of the following core elements:

- **Principal.** The responsible party – individual or entity such as a corporation or other organization – that is legally responsible to pay charges and fines. This party should be defined in law.
- **Vehicle.** Vehicles for which a road usage charge is levied should be identified in legislation, as should vehicles that might be exempted.
- **Road Network.** The road network defines the roads that are subject to the road usage charge. It is possible that some roads might be excluded from charges, such as roads on private land and toll facilities.
- **Usage.** A measure of usage of the road system that can be based on distance or time (or both).
- **Charge Rates.** How much is charged per unit of usage.
- **Charging Policy.** The set of laws, regulations, and rules that defines the road network, usage, rates, and approved methods of measurement.
- **Road Usage Charge Administration.** Includes account management, charge management, compliance and enforcement, and policy/administrative functions. A combination of governmental and private entities can carry out these functions.

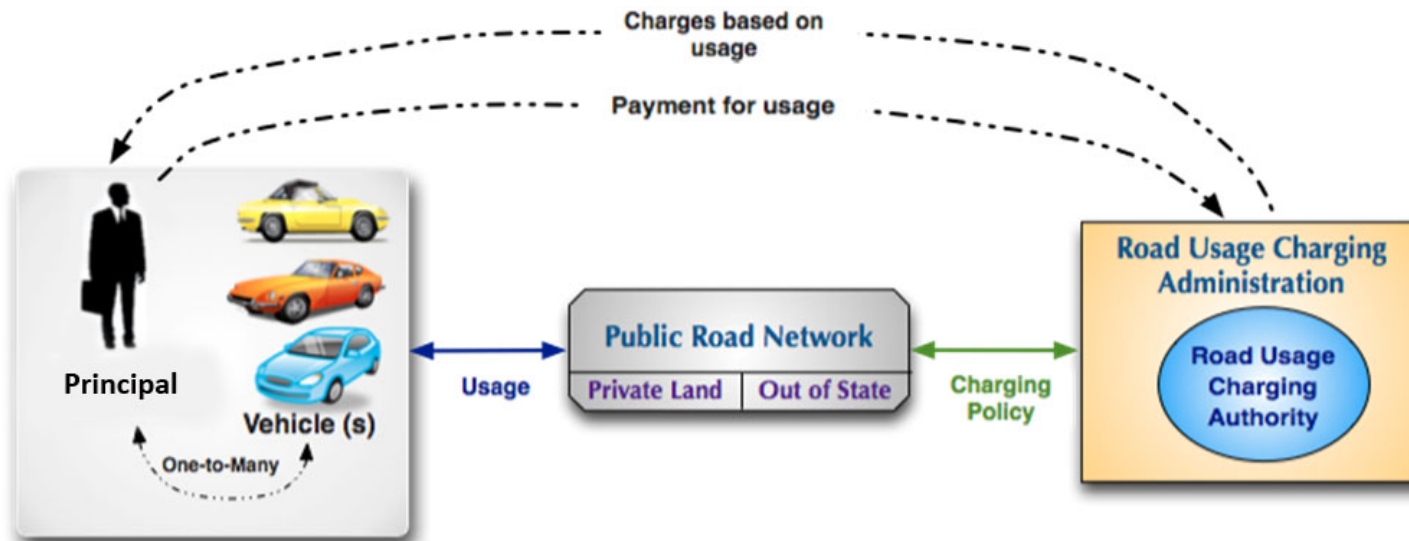
Core Elements of Potential Operational Concepts (continued)

The core elements combine to form operational concepts that include these characteristics:

- Every vehicle will have a single principal, but a principal may be responsible for more than one vehicle.
- Usage of the vehicle on the road network will generate charges based on the charging policy.
- A road usage charging administration will manage accounts, charge the principal, and collect and manage payments.
- The road usage charging administration might be part of an existing organization or organizations, a new entity, or some combination of these. It may also encompass both governmental and private sector elements.

Figure 2-1 provides an overview of how the core elements fit together into the **generic operational concept**.

Figure 2-1: Generic Road Usage Charge Operational Concept



Core Elements of Potential Operational Concepts (continued)

A Simple Charging Policy

At its simplest, the road usage charge consists of a rate that applies to road usage on all roads at all times (Figure 2-2):

- Rate: Could be the same for all vehicles or differ based on:
 - > Number of axles;
 - > Physical size of vehicle (length, width, and height);
 - > Type of vehicle drive train (e.g., internal combustion engine, gas hybrid, diesel hybrid, electric.);
 - > Vehicle class; or
 - > Combination of any of the above.
- Usage: The amount of usage based on some combination of these factors:
 - > Time:
 - Calendar (e.g., week, month, year); or
 - Engine run time.
 - > Distance:
 - Odometer reading;
 - Computations from an inertial navigation system (INS); or
 - Computations from a global positioning system (GPS).

Figure 2-2: A Simple Road Usage Charge



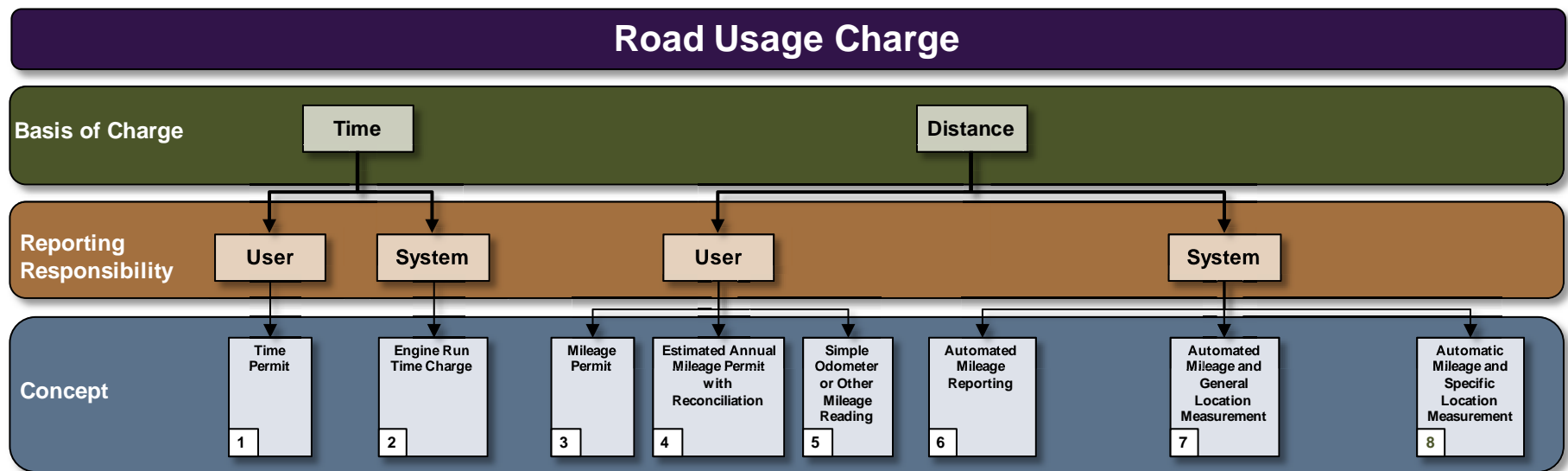
In addition to simple road usage, charging policies can assess charges for congestion and environmental impacts of driving, either separately or in combination.

Framework for Operational Concepts

Figure 2-3 outlines a framework for eight operational concepts, each reflecting how Washington State might implement a road usage charge, consisting of the following dimensions:

- Basis of the charge – Either time or distance (potentially including congestion or environmental factors).
- Reporting responsibility – Either declared by the user or detected by the road usage charge “system,” including any component technologies.

Figure 2-3: Road Usage Charge: Framework for Operational Concepts



These eight operational concepts capture a broad range of policies – from “simple” usage charging to “more complex” congestion and environmental charging, and technologies – from no technology to non-location-based technology to location-based technology. It is possible – and probably preferable – to implement several operational concepts in parallel rather than relying on one single concept in order to achieve a range of choices for principals.

We elaborate on the technology alternatives associated with the eight operational concepts on the next page.

Enabling Technologies

We further considered technology options to implement each of the eight concepts, as illustrated in the bottom row of Figure 2-4 (next page). There is no technology required for the concepts in which the principal reports usage, while there are several technology alternatives for concepts in which the system detects usage. Please reference Report 1, *Domestic and International Review and Policy Context*, for a more detailed treatment of the technology options and how each works.

Time-Based System Technology Options

The technology for reporting engine run time is relatively simple. Vehicles emit unique vibrations that only occur when the engine is running, and there are sensors that can detect these vibrations. It would be a simple matter to keep track of how long the engine is running, and then communicate the information to the road usage charge authority via in-vehicle telematics, Bluetooth device to a smartphone, or built-in single-purpose communications device. Even electric vehicles will have vibrations that can be detected.

Distance-Based System Technology Options

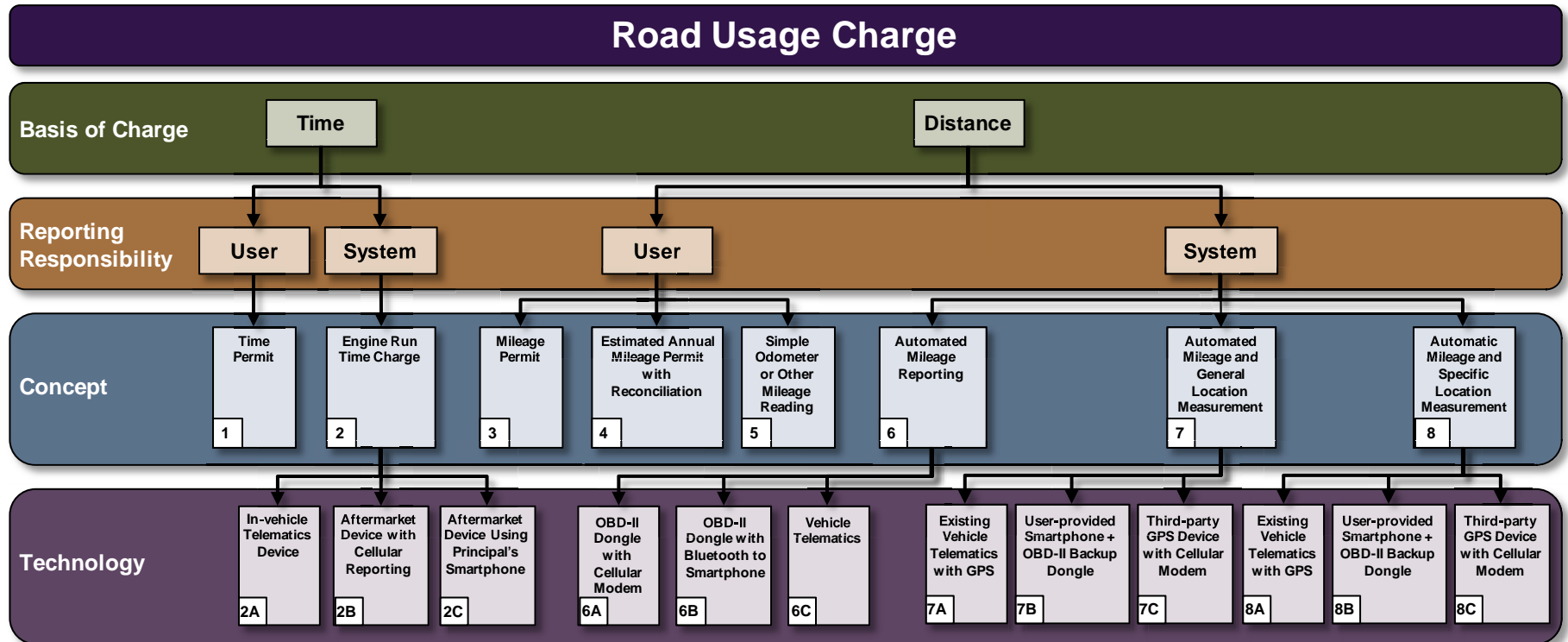
Automatic system reporting requires some technology (see Figure 2-4, next page).

- OBD-II⁵ devices such as the Progressive insurance “Snapshot” dongle are currently used for reporting miles for pay-as-you-drive (PAYD) insurance. The dongles have built-in cellular modems that transmit data over the Internet to a central server.
- Experiments in Ohio and Oregon are testing the OBD-II dongle with a Bluetooth interface to a cellular telephone that runs an application to collect and report data from the vehicle.
- Vehicle telematics such as GM’s “OnStar” or Ford’s “SYNC” can collect the data and transmit them over the cellular network to a cloud-based application for automated reporting.
- A number of stand-alone, third-party GPS units exist and are field-tested. Most of these are from truck mileage systems, but can be adapted to a car.



⁵ OBD-II devices connect to a vehicles on-board diagnostics port on vehicles manufactured after 1995 via a “dongle.”

Figure 2-4: Road Usage Charge Operational Concepts with Enabling Technology Options



Potential Operational Concepts – Overview

Descriptions of the road usage charging operational concepts, associated technology options and their relative advantages and disadvantages are provided on the next few pages. Please reference Report 2, *Potential Road Usage Charge Concepts for Washington*, for additional detail about each operational concept.

In considering the eight operational concepts, note that:

- Operational concepts are illustrative, designed to provide a better understanding of the range of alternatives and the high-level requirements to implement them.
- Some concepts do not require technology, while others need one or more technologies.
- Operational concepts are not mutually exclusive. In fact, if road usage charging advances in Washington State, it is likely that a combination of several concepts would be pursued, especially if some of the more technologically advanced concepts were included.
- Switching to a road usage charge all at once, in a “big bang,” increases the consequences of any failure in the system. A more gradual approach to introducing the road usage charge will have smaller downside risks.
- Policy choices, such as rate structure, determine whether some of these concepts can work.
- All of the eight operational concepts can be accommodated by a variety of administrative concepts.

Potential Operational Concepts – Specifics

The eight operational concepts, including technology alternatives associated with each, are briefly described below, grouped according to the basis of the charge: time or distance. A summary assessment of the potential operational concepts is included in Appendix B.

Time-Based Concepts

1. Time Permit. Purchase unlimited road network access for a set period of time (e.g., week, month, year).
2. Engine Run Time Charge. System detects engine run time over a set period (e.g., monthly) and reports charges automatically. There are three technology alternatives: a) In-vehicle telematics device, b) Aftermarket device with cellular reporting, c) Aftermarket device using principal's smartphone.

Distance-Based Concepts

3. Mileage Permit. Purchase a license to drive a certain number of miles.
4. Estimated Annual Mileage Permit with Reconciliation. Pay for estimated mileage for a set period, then reconcile the account based on actual distance driven periodically (monthly, quarterly).
5. Simple Odometer or Other Mileage Reading. Report mileage at the end of a period (e.g., quarterly) and pay the corresponding amount owed.
6. Automated Mileage Reporting. System detects mileage traveled and reports charges automatically at the end of a period (monthly, quarterly). There are three technology alternatives: a) OBD-II dongle with cellular modem, b) OBD-II dongle with Bluetooth to smartphone, c) Vehicle telematics.
7. Automated Mileage and General Location Measurement. System detects mileage traveled by geographic zone over a set period of time (e.g., monthly) and reports charges, with rates set by zone. There are three technology alternatives: a) Existing vehicle telematics with GPS, b) User-provided smartphone + OBD-II backup dongle, c) Third-party GPS device with cellular modem.
8. Automatic Mileage and Specific Location Measurement. System detects mileage traveled by geographic zone over a set period of time (e.g., monthly) and reports charges, with rates set by road segment or type of road. There are three technology alternatives: a) Existing vehicle telematics with GPS, b) User-provided smartphone + OBD-II backup dongle, c) Third-party GPS device with cellular modem.

Feasibility Assessment

The feasibility assessment considered each of the potential road usage charge concepts through the lens of the feasibility criteria. The consultant team conducted a preliminary feasibility assessment, rating each concept across the criteria using a five-point scale. In the end, all Steering Committee members agreed that road usage charging was feasible in Washington.

In conducting the preliminary assessment, a number of common themes and issues emerged across all concepts:

- Evasion likely to increase. Not all principals subject to the road usage charge will have a valid vehicle registration and might be able to avoid paying their road usage charges. With the gas tax, even unregistered motorists pay their road usage charge.
- Infrequent users are problematic. The high cost and complexity of implementing a road usage charge system that applies to infrequent users is problematic, especially given that one of the benefits of the road usage charge is making clear to users the relationship between usage costs and actual road usage.
- Administrative costs will be higher than with a gas tax. An entirely new administrative system will be needed. Costs may change over time as well, especially if other states are involved.
- Perception of double taxation. To avoid a perception of double-taxation, methods for processing gas tax refunds for motorists subject to road usage charges during a potential transition phase will be necessary.
- All solve the problem of revenue erosion equally. Relative to the gas tax, revenue erosion is no longer an issue. However, unless road usage charge rates are indexed to some inflation index, revenue will not keep pace with inflation.
- All will need a rate-setting rationale. Rate structure will need to be addressed so that if a flat tax is imposed, it captures external costs and can accommodate changes to those costs over time.
- Virtually all are more inconvenient than the gas tax. All systems will be more inconvenient than the gas tax because they will require users to pay a new bill or find a way to purchase licenses of some sort. The exception would be a system that does not count miles and is paid at the same time as vehicle registration.

Section 3:

Proposed Work Plan

Proposed Work Plan in Context

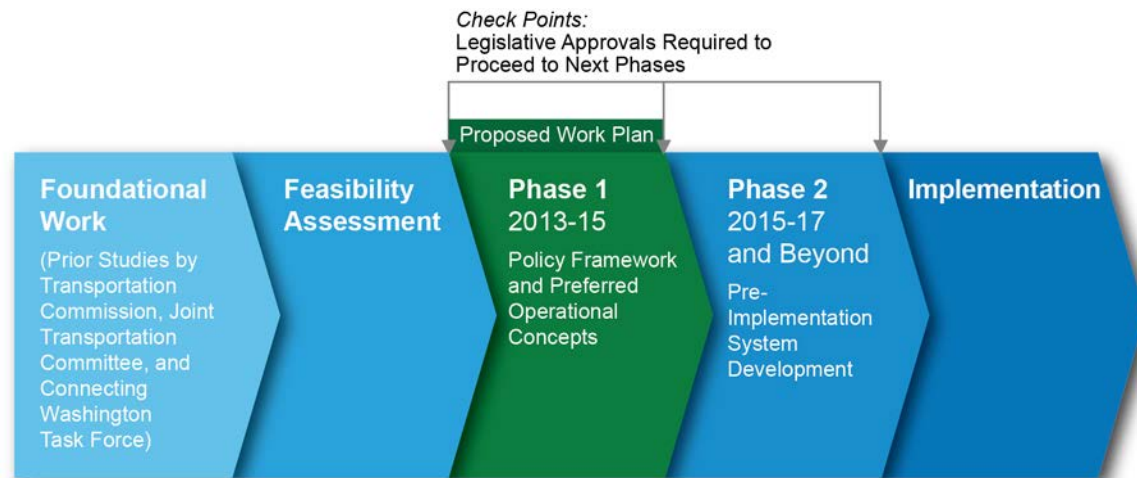
To get from where we are now—“feasible”—to a new system of road usage charging is a complex effort involving potentially contentious policy choices and operational and administrative design decisions. We developed a two-phase process to get to the point where Washington might implement a new road usage charge system.

2013-2015 Biennium: Policy Framework and Preferred Operational Concepts (Phase 1). If authorized by the Legislature, the next phase of work would focus on policy choices, implications, public outreach, and operational concept design to enable the Legislature to decide whether to begin full pre-implementation system development.

2015 and Beyond: Pre-Implementation System Development (Phase 2). If authorized by the Legislature, activity would shift to detailing system features and administrative needs and conducting pilot tests of preferred operational concepts. Phase 2 would be scoped at the end of Phase 1.

Implementation. At the end of Phase 2, if directed by the Legislature, full implementation and transition activities could commence.

Potential Role of Pilot Tests in the Work Plan. Pilot tests can demonstrate technology, administrative systems, or public acceptance before committing extensive resources to a road usage charge system. Pilot tests will be best carried out in Phase 2 once policy direction is established and a preferred operational concept is chosen. See page 50 for more details.



Phase 1: Policy Choices and Operational Concepts Work Plan Overview

Phase 1 will investigate policy issues and operational concepts in enough detail so that decision-makers can understand how a potential system would work, how much it would cost, and what the business implications would be. It will include public outreach and education to ascertain public views and provide information about road usage charging and the reasons why Washington is considering transitioning to it from the gas tax. With this information, the Legislature and Governor can decide whether to move into more detailed pre-implementation system development (Phase 2) of the preferred alternative(s).

The specific tasks for Phase 1 are summarized below, with further details on the pages that follow.

- Conduct public outreach, engagement and education that measures public perspectives, gathers input, and provides information.
 - > Task 1: Measure Public Attitudes and Acceptance
 - > Task 2: Communications and Public Engagement
- Define the policy frameworks and narrow the objectives of a potential road usage charge system.
 - > Task 3: Define Policy Objectives
 - > Task 4: Policy Research
- Establish operational concepts that achieve the policy objectives.
 - > Task 5: Define Operational Concepts
- Conduct initial investigations into system design alternatives to carry out the operational concepts, leaving details for Phase 2.
 - > Task 6: Administrative Design
 - > Task 7: System Architecture and Technical Requirements
- Develop initial business analyses that evaluate costs, risks, transition issues, and interoperability of road usage charging, with detailed development in Phase 2.
 - > Task 8: Business Case
 - > Task 9: Evaluation Framework
 - > Task 10: Interoperability with Other Systems
 - > Task 11: Transition Strategy
 - Task 12: Risk Analysis

Engaging the Public

Task 1: Measure Public Attitudes and Acceptance

Objective. Measure and evaluate public perceptions of road usage charging.

Approach. We will use a combination of surveys starting with the Voice of Washington⁶ survey panel, and supplemented later with focus groups, which will explore concepts in more detail and test messaging strategies.

1A: Baseline evaluation of public perception and understanding related to transportation funding needs, existing revenue sources, and potential road usage charge approaches using the existing Voice of Washington survey panel and supplemented with additional market research to capture a broader population. This would occur towards the beginning of Phase 1.

1B: Interim evaluation, where we explore more specific road usage charge proposals, involving:

- Focus groups to test public reaction to various policy and operational concepts and communication approaches, to understand how people react to alternative ways of describing problems and proposed road usage charging solutions.
- Voice of Washington survey panel, market research, and targeted polling of specific populations and stakeholder groups.

⁶ The Voice of Washington is an Internet survey panel of over 15,000 participants used by the WSTC to test public responses to transportation issues.

Engaging the Public

Task 2: Communications and Public Engagement

Objective. Provide information to the public and engage them in discussions about policy and operational issues.

Approach. Communications and public engagement activities related to road usage charging should consider and be coordinated with communications related to other shorter term transportation funding issues and potential transportation revenue packages. Specific elements include:

2A: Develop a communications plan and update periodically to respond to needs as they arise.

2B: Develop collateral material, such as:

- A more advanced public web site for two-way communication (i.e., provide project information and updates and accept public comment);
- Fact sheet(s) that provides a short, easy-to-understand overview of road usage charging objectives and methods;
- Reference information, including project reports, news stories, reports from around the world, white papers, and other project web sites;
- Informational video(s) on the project;
- Presentations for use with stakeholders and key audiences; and
- Frequently asked questions for external audiences.

Engaging the Public

Task 2: Communications and Public Engagement (continued)

2C: Communications activities, such as:

- Press releases, media briefings, newsletter blasts and interviews with media outlets, timed to coincide with important project milestones;
- Use of social media;
- Media roundtable in advance of party caucuses;
- Web conference for global and national stakeholders;
- Meetings with local stakeholders, including Regional Transportation Planning Organizations, Transportation Choices Coalition, and other transportation stakeholder groups;
- Webinars and on-line forums;
- Op-eds in key media markets;
- Workshops, summits, and open houses with the public;
- Open meetings of the Steering Committee, with opportunities for public comment; and
- Individual briefings of key Legislators and their staff or other stakeholders.

Policy Framework

Task 3: Define Policy Objectives

Objective. Establish a road usage charging policy for Washington State.

Approach. Basic, high-level policy objectives need to be resolved in Phase 1 to provide a framework for the system and operational designs that must follow. These policy objectives will be refined in Phase 2, but the majority of the questions should be addressed in Phase 1. At a minimum, the following policy issues identified in this feasibility assessment should be addressed:

- Relationship to the gas tax. Should a road usage charge replace, supplement, or transition from the gas tax? How do these choices affect the definition of a road usage charge and how it might be implemented?
- Social objectives. Should the road usage charge be used to influence motorist behavior in ways that have different social objectives, such as reducing energy use, greenhouse gas emissions, and congestion, or encouraging transit use?
- Use of revenues. Should revenues raised by a road usage charge be strictly for roadway use (similar to the gas tax) or should there be a broader transportation use of such revenues? How does the 18th Amendment to the Washington Constitution influence this decision?⁷
- Equity among user groups. Should charges account for special situations, such as the amounts that urban or rural motorists might pay, or the ability of poor people to afford the charge? What factors should be considered when considering equity?
- Privacy. How to protect the legitimate expectations for privacy and data security while ensuring accurate charges?
- Rate-setting. How should cost responsibility be measured? How important is it for a road usage charge to reflect actual miles traveled? To what extent are compromises in this desire appropriate to satisfy issues related to technology and/or privacy?
- Out-of-state issues. How important is it for a road usage charge to capture revenue from all out-of-state motorists? How important is it to distinguish Washington residents' in-state versus out-of-state travel?

⁷ The 18th Amendment to the Washington State Constitution dedicates motor fuel tax collections to “highway purposes”.

Policy Framework

Task 3: Define Policy Objectives (continued)

Specific steps in Phase 1 would include:

- A series of workshops with the Steering Committee and potentially a larger group that focus on several policy issues. The workshops would be similar to the Steering Committee meetings conducted for this feasibility assessment, involving presentations of research materials by staff or consultants, plus facilitated discussions aimed at garnering the consensus of workshop participants.
- Legislative briefings for Legislators and their staff as well as the Governor and his staff to ensure that the Steering Committee is heading in a direction that can result in acceptable legislation.
- Draft recommendations, including a determination of whether to move into pre-implementation system development (Phase 2), if supported by the Phase 1 findings.

Policy Framework

Task 4: Policy Research

Objective. Provide the analytical information needed to make informed policy decisions.

Approach. The Steering Committee will identify the research parameters that will enable it to arrive at sound recommendations that can be substantiated and supported by facts and data. Some of the initial policy research needs identified in this feasibility assessment include:

- Forecasts of the size and fuel efficiency of the vehicle fleet, and the amount of vehicle miles driven;
- Quantification of out-of-state travel by Washington residents;
- Quantification of travel in Washington by out-of-state travelers;
- Rate-setting options: Initial research and analysis of rate-setting options based on experiences in other contexts and the Washington State context;
- Preliminary transportation cost allocation evaluation to address road costs allocated to various classes of users, including by geography (counties or regions) and vehicle type (light vehicles, buses, trucks); and
- Preliminary evaluation of how road usage charge revenue should be allocated. Potential dimensions of this question include different highway functional classifications (e.g., freeways, arterials), different modes, different geographies (e.g., counties or regions), and projects that benefit different vehicle types (e.g., cars or trucks).

Operational Concepts

Task 5: Define Operational Concepts

Objective. Define how system users will experience the system when driving and paying charges.

Approach. Take the highest-level policy goals, and transform them into a description of the user's experience. This must occur before any work on designing system architecture or establishing technical requirements (Task 7). In Phase 1, we will:

- Develop a short list of potential operational scenarios, based on the policy direction from Task 4, considering:
 - > Preliminary operational concepts – Construct operational concepts, which involves thinking through the standard driving and payment situations, and developing preliminary approaches to handling them. These include: driving in Washington State; driving out of Washington State; paying an invoice; buying a vehicle; selling a vehicle; setting up an account or purchasing a mileage block; and other similar situations.
 - > Enforcement/Compliance Approach – How to maximize compliance with the system and address nonpayment?
 - > Security – Encryption and authentication measures for data; physical security for system.
 - > Data Privacy and Usage – What measures will be instituted to protect privacy? Also address who reviews possible privacy complaints.
- Work with the Steering Committee to define up to two operational concepts in sufficient detail to prepare preliminary administrative designs and evaluate the business case (Tasks 6, 7, 8).

System Design

Task 6: Administrative Design

Objective. Provide recommendations relating to the administrative functions of a road usage charge.

Approach. Building upon the operational concepts (Task 5), address implementation options by existing or new government agencies and private partners. In Phase 1, we will:

- Identify administrative functions necessary to support road usage charge concepts.
- Evaluate current administrative functions of state agencies, including Departments of Transportation, Licensing, and Revenue, as well as the Transportation Commission and opportunities to cost-effectively integrate new functions into these agencies.
- Evaluate opportunities for outsourcing or other ways of partnering with the private sector, such as through certified service providers and auditors.⁸
- Develop initial recommendations for several potential approaches to administrative systems.

Phase 2 efforts will address administrative design in considerably more detail, working with policy-makers, the Legislature, and Governor, to down-select to a preferred administrative alternative. The work will include designing an organizational transition and implementation plan for implementing the preferred alternative and developing a procurement approach and documentation (including certification) to support any outsourcing or private sector involvement envisioned.

⁸ Please reference Report 2, *Potential Road Usage Charge Concepts for Washington*, pages 40-42 for more detail on these concepts.

System Design

Task 7: System Architecture and Technical Requirements

Objective. Based on the operational concepts defined in Task 5, develop the system architecture – the basic framework for how the system will operate – and detailed technical requirements of the technology.

Approach. Develop preliminary system architecture and technical requirements, adequate for a preliminary assessment of the business case (Task 8). In Phase 1, this will involve:

- Develop system architectures that would accomplish the goals of the operational concepts defined in Task 5.
- Develop draft technical requirements. Requirements are not technical specifications; rather, they explain what the system components and the system as a whole must do, but do not precisely establish how the system must accomplish those tasks. However, all system interfaces – interfaces to existing Washington State systems and interfaces between various parts of the system that need to be procured separately – must be specified precisely.
- Identify information to be exchanged between systems, such as the exchange of lists of registered vehicles subject to the road usage charge.
- Identify communications exchange parameters such as what a transaction entails and how often each transaction is made, or when periodic statements are sent or invoiced in the system design.
- Draft data standards and communications specifications such as the communications protocols and frequencies or the message formats for reporting the mileage data.

Business Analysis

Task 8: Business Case

Objective. Develop a business case based on the preliminary concepts developed in Tasks 5 through 7.

Approach. Evaluate the value proposition of road usage charging for Washington State, considering the cost to implement, operate, and enforce a road usage charge and the resulting revenue streams. It will be used to compare road usage charge alternatives, as well as to compare to other types of State revenues, including the gas tax. In Phase 1, this will involve the following tasks:

- Develop Evaluation Models. Some policy objectives may cost more than they are worth to implement, and there could be variations based on future levels of vehicle miles of travel and fuel consumption. We would build models to evaluate concepts such as:
 - > Involvement of the private sector versus State control over system operations;
 - > Charging out-of-state users versus incurring additional operational and enforcement costs;
 - > Utilizing existing State agencies and resources versus establishing a new agency to administer road usage charges;
 - > Operating advanced technology approaches to road usage charging versus offering simple, low-tech approaches; and
 - > Effects of different levels of vehicle miles of travel and fuel consumption (from Task 4).
- Benefit/cost analysis to allow decision-makers to compare alternative strategies and recommendations regarding a transition toward road usage charging.

Business Analysis

Task 8: Business Case (continued)

- Formal Business Case For Recommended Option(s) to address:
 - > Business case for government, including benefits versus costs, potential risks and mitigations, and comparisons to other approaches, including a “do-nothing” approach.
 - > Business case for Washington State motorists that considers differences in the user experience relating to collection of the road usage charge as well as differences in the quality of the roadway system made possible from a sustainable revenue source.
 - > Business case for the private sector in the event that administrative concepts involve the private sector such as contracted providers of specific services to certified agents operating in an open market. The business case for the private sector entities with experience in providing hardware, software, and services (including customer account management, transaction processing, and revenue collection) depends on the operational concepts pursued and the degree of openness envisioned. This aspect of the business case is often overlooked, but it could be the key to overcoming risks and challenges facing road usage charging.

Business Analysis

Task 9: Evaluation Framework

Objective. Define at the outset the objective criteria by which to evaluate a road usage charge system once it is operational.

Approach. Planning for evaluation of a road usage charge system in the early planning stages ensures that the goals of the project are not lost in the details of system implementation later on. Evaluation can be used both for pilot studies as well as full-scale implementation. In Phase 1, the focus will be on the criteria, with far more detail in Phase 2 related to evaluation procedures.

In Phase 1, we will develop evaluation criteria that might include:

- Policy conformity;
- Public acceptance;
- Technology performance;
- Operational performance;
- Cost;
- Administrative performance;
- Revenue yield; and
- Compliance and enforcement.

Business Analysis

Task 10: Interoperability with Other Systems

Objective. Reduce redundancy with similar systems. Interoperability of systems creates convenience for system users and has the potential to leverage existing systems resulting in lower costs.

Approach. This task will evaluate alternative approaches to interoperability and provide recommendations. The Phase 1 efforts will address the intra-state or inter-state agencies that might be combined, conjoined, or interfaced to make for a more cost-effective and simplified system for motorists or users. These evaluations will, at a minimum address:

- Potential interoperability with existing Washington State revenue systems such as tolling, vehicle registration fees, and gas taxes.
- Potential interoperability with other states and countries. This would include individual states such as Oregon, entities such as the Alliance for Tolling Interoperability and the Western State Alliance – a nascent entity of Western states interested in road usage charging. Additionally, it will address interoperability with British Columbia, Canada as they explore distance based road usage charging for the Province. This investigation would also consider how enforcement can legally work across borders in both the U.S. and Canada and how money transfers can work across the border.
- Possibilities for common certification entities in a multistate context where on-board distance recording devices that are certified in Washington or other states can be used in all jurisdictions without costly re-certification or procuring multiple devices.

Business Analysis

Task 11: Transition Strategy

Objective. Develop a strategy to transition from the gas tax to a road usage charge in phases, recognizing that an all-at-once conversion is likely to be difficult or impossible.

Approach. This task will explore options and approaches for a transition. In Phase 1, we will develop the rudiments and framework for a transition plan:

- Evaluate fleet phase-in options and impacts – Potential options include basing road usage charging liability on miles per gallon rating, on vehicle class, or on vehicle engine technology.
- Assess technology phase-in approaches – Consider issues such as the likely supply of on-board equipment at different time horizons, how to avoid single suppliers, how to support future technology change, integration with current and emerging technology trends such as smartphones, in-vehicle telematics, and connected vehicle systems.
- Assess administrative phase-in approaches – As the system grows, staffing needs and the need for interaction with a greater population of users will grow. This task will evaluate organizational change as the system grows.
- Assess state/interstate/international phase-in approaches – Explore how system expansion would synchronize and be compatible with system rollouts and expansions of other organizations, including other states, such as those in the Western States Alliance and British Columbia.

In Phase 2, with more details in hand from the evaluation of the preferred option(s) and operational concept(s), the transition strategy would be refined to a system design that would be carried forward into implementation.

Business Analysis

Task 12: Risk Analysis

Objective. Identify, quantify, and develop mitigation measures for risks when transitioning to a road usage charge.

Approach. Risk analysis addresses not only the quantitative modeling, but also the communications, legal, administrative design, and other tasks. A log of risks and threats to road usage charge development and implementation will be maintained. Solutions or methods to mitigate these risks will be proposed by the project team and discussed in periodic workshops as well as being integrated into the overall logic process and project processes.

Because the risk analysis is an ongoing task with implications for the overall program development, it should be initiated at the outset of Phase 1. An initial workshop should be conducted with the project team to classify the risks, assign responsibility for researching, analyzing, and developing mitigation approaches, along with a process for logging other risks and conducting follow-up workshops.

As other tasks progress throughout the course of Phase 1, the risk log will be periodically revisited as risks identified from across all tasks feed into it. According to the risk mitigation strategy determined at the first workshop, follow-up workshops will be periodically conducted with the project team to update the inventory, note progress in mitigating risks, and note new risks that have been identified.

Throughout the transition from Phase 1 to Phase 2, should the effort move forward, the risk log will be periodically updated. Workshops with the project team would be convened to develop approaches for addressing risks to program success as defined in the policy objectives.

Potential Phase 2 Activities: Pre-Implementation System Development

Objective. Starting with the preferred operational concepts from Phase 1, develop a road usage charge system that is ready to implement if the Legislature provides authorization.

Approach. Phase 2 will address the system details to develop a road usage charge system that is ready to implement. This will entail activities to refine operational concepts, technology options, agency functions, and services to be procured. There will also be continuing public outreach and communications to explain how the system will operate and how users will interface with the system, as well as continued focus on the business analysis. It is likely that pilot tests will also be part of Phase 2.

The cost and duration of Phase 2 could vary considerably depending on the type of system that emerges from Phase 1. We expect it would take at least two years, and involve the following tasks:

- Public attitudes and acceptance. Advanced evaluation of public attitudes, recognizing that discussion of road usage charging will have been underway for more than two years. Phase 2 will build on Phase 1 efforts and provide greater details and interface information. This will likely involve additional focus groups and surveys.
- Communications and public engagement. Continued attention to communicating with the public about policy direction and decisions, maintaining the project web site, developing materials for speakers to use when talking to community organizations, and preparing op-ed pieces in key media markets.
- Refine policy objectives. Some policy decisions may not be finalized at the end of Phase 1. Continued discussion about the following topics would be appropriate:
 - > Define legal terms. How should legislation define "principal," "measuring instrument," "road usage charge," "public road," and other terms critical to successful implementation of road usage charging policy?
 - > Penalties and enforcement. How will the policy specify penalties and other enforcement regimes?
 - > Government agency and private sector involvement. Which agencies should be responsible for which activities, and what elements could be done by the private sector?

Potential Phase 2 Activities: Pre-Implementation System Development (continued)

- Refine operational concepts. As system details are explored, it may be necessary to make adjustments to operational concepts.
- Detailed administrative design. Working with policy-makers, the Legislature, and Governor, choose a preferred administrative alternative. Design an organizational transition and implementation plan for implementing the preferred alternative. Develop a procurement approach and documentation (including certification) to support any outsourcing or private sector involvement envisioned.
- Detailed system architecture and technical requirements. Starting with high-level material developed in Phase 1, develop detailed system architecture and technical requirements sufficient for procurement. Consult with industry to identify what can be accomplished given the state-of-the-practice, and develop draft technical requirements and specifications, and refine.
- Update business case. Update business case analysis from Phase 1 as details are refined.
- Develop evaluation procedures. Evaluation will involve data collection and methods to evaluate the data, including a timeline. Some procedures may be appropriate on a monthly or annual basis, while others might occur less frequently.
- Interoperability with other systems. Refine interoperability decisions as more information is available from refined operational concepts.
- Transition strategy. Refine the transition strategy addressing the specifics of the selected operational concepts.
- Risk analysis. Throughout the transition from Phase 1 to Phase 2 the risk log will be periodically updated. Workshops would be convened to develop approaches for addressing risks to program success as defined in the policy objectives.
- Pilot tests. Carrying out pilot tests will involve considerable planning, including procuring vendors, testing individual system components, recruiting participants, carrying out the pilot itself, evaluation, and other elements.

The Potential Role of Pilot Tests in the Work Plan

Pilot tests can assess technology, administrative systems, or public acceptance before committing extensive resources to a road usage charge system. With pilot tests, we can:

- Evaluate whether the technology functions as intended, and whether there are any unexpected problems;
- Evaluate how well the system works from the users' perspective; and
- Build confidence with the public and decision-makers for new and unfamiliar systems.

Tests could be of individual components of a system or of an entire system. Pilot tests will be best carried out in Phase 2 once policy direction is established and a preferred operational concept is chosen.

Preparing for, carrying out, and evaluating pilot tests could take anywhere from 18 months to several years, and the cost could vary considerably. Pilot tests and their evaluation in other places have ranged from \$1 million to \$5 million or more depending on their scope and objectives. If Washington State can collaborate with other states or use their information and evaluations, the cost of pilot tests might be minimized. But if the State decides to explore new methods or technologies, more extensive pilot testing could be required and thus cost more.

Pilot tests of road usage charge systems in other places have demonstrated the viability of some technology solutions. Should opportunities to partner with other states emerge before the end of the Phase 1 work plan, there may be benefits to Washington's participation in such demonstrations, within the context of its own emerging policy framework.

A Short History of Road Usage Charge Pilot Studies

Oregon's Pay-at-Pump Approach (2006-2007). Oregon DOT piloted a system whereby cars outfitted with GPS devices could distinguish driving within designated boundaries such as congested urban areas. Mileage data were transferred at the gas station and drivers paid for the total of fuel and miles driven. Reaction against the mandatory GPS component led Oregon to rethink its approach.

Oregon's Open Platform Approach (2012). Oregon developed a second pilot study that tested how motorists might opt in to different mileage recording technologies provided by trusted third-party sources. Participants were legislators and other stakeholders and included users from Washington State. Phase 1 of the pilot is complete and being analyzed and Phase 2 is underway.

University of Iowa Multistate Pilot (2009-2011). The University tested a GPS-based approach to road usage charging. Official results have not yet been published.

Minnesota Mileage Based User Fee Demonstration (2010 – present). Minnesota DOT tested a system that used participants' mobile phones to identify mileage driven in- and out-of-state.

Potential Implementation Tasks After Phase 2

Once road usage charging is ready to implement, there will be a significant effort to actually implement the system. The following is a partial list of tasks that would be needed to move from the end of the work plan described in Section 3 to an operational system.

Pre-operational Phase

- Policy and Communications
 - > Translate legal provisions into processes and rules
 - > Ongoing public communications and education
- Administrative
 - > Create taxing entity and enforcement unit
 - > Contract certification agent
 - > Develop interface with Departments of Licensing and Revenue
- Operational
 - > Refine and finalize operational concepts
 - > Finalize system requirements specifications and interface control documents
 - > Procure technology
 - > Develop communications network
- Business
 - > Cultivate network of certified service providers
 - > Develop evaluation procedures and procure evaluator

Transition Phase

- Policy and Communications
 - > Ongoing communications and education
- Administrative
 - > Implement new organizational structures and processes
 - > Plan for program expansion and interoperability
- Operational
 - > Collect, audit, account for road usage charge
 - > Fine enforcement and collection
- Business
 - > Monitor certified service providers
 - > Evaluate program performance, identify and plan for efficiency improvements, and report periodically to policy-makers

Section 4:

Proposed Budget for Phase 1

Proposed Budget for Phase 1

The proposed budget to carry out Phase 1 of the work plan is \$1.6 million⁹ (see Table 4-1 on the next page). The budget amount could vary according to circumstances that might change from those assumed when preparing this estimate. Some examples of changes that could affect the budget (up or down) include:

- Time lines that are faster or slower than assumed;
- More or fewer road usage charge options to be investigated; and
- Desire for more or less public involvement and communication.

⁹ Note that the Steering Committee did not feel it had the time or expertise to review the details of the budget, and relied on staff from WSDOT and WSTC for this effort.

Table 4-1: Indicative Budget for Phase 1

Task	Purpose	Description	Cost
Engaging the Public			\$390,000
Task 1	Measure Public Attitudes and Acceptance. Understand public perceptions of road usage charging and transportation funding issues.	Use surveys and focus groups to explore public attitudes towards operational concepts and test messaging strategies. Use the Voice of Washington Survey Panel already developed by the Transportation Commission.	\$160,000
Task 2	Communications and Public Engagement. Provide information to the public and engage them in discussions about policy and operational issues.	Execute a communications plan that includes public relations (e.g., media outreach), information dissemination (e.g., reference material), and public involvement (e.g., opportunities for two-way communication).	\$230,000
Policy Framework			\$430,000
Task 3	Define Policy Objectives. Support the Legislature, Commission, and Steering Committee in establishing a road usage charge policy for Washington State.	Explore policy objectives through workshops, facilitated discussions, and legislative briefings resulting in a clear statement of policy objectives on topics such as: relationship to the gas tax, social objectives, use of revenues, equity among user groups, rate setting, and out-of-state issues.	\$170,000
Task 4	Policy Research. Provide the analysis and information to support informed policy decisions.	Conduct policy research into topics such as: fleet and vehicle miles of travel composition trends, forecasts and scenarios; in-state and out-of-state travel; rate-setting options; and preliminary transportation cost and revenue allocation.	\$260,000
Operational Concepts			\$130,000
Task 5	Define Operational Concepts. Define how system users will experience the system when driving and paying charges.	Devise potential operational scenarios and advance up to two operational concepts that address the components of driving and payment situations (e.g., setting up accounts, making payments, and data privacy requirements).	\$130,000
System Design			\$320,000
Task 6	Administrative Design. Provide recommendations relating to the administrative functions of a road usage charge system.	Identify and evaluate the administrative functions of the operational concepts devised in Task 5 with an efficient and effective organizational design for the delivery and operations of the proposed system. Consider both existing and new public and private entities.	\$120,000
Task 7	System Architecture and Technical Requirements. Begin to develop the system architecture and detailed technical requirements of the technology so that the technology can be tested and procured.	For the operational concepts devised in Task 5, develop 1) preliminary system architecture, which is the basic framework for how the system will operate and then 2) determine technical requirements, which includes technology and data flows. These will be adequate for a preliminary assessment of the business case in Task 8.	\$200,000

Task	Purpose	Description	Cost
Business Analysis			\$370,000
Task 8	Business Case. Develop a business case based on the preliminary operational concepts developed in Tasks 5 - 7.	Evaluate the value of road usage charging for Washington State, considering the cost to implement, operate, and enforce a road usage charge system and the resulting revenue streams. Compare road usage charge system alternatives, as well as to other types of state revenues (e.g., gas tax), resulting in an analysis of whether road usage charging makes business sense for the State, motorists, and potential private partners.	\$240,000
Task 9	Evaluation Framework. Provide objective criteria and an approach to evaluate whether the road usage charge achieves its desired results and policy objectives from Task 3.	Define evaluation criteria such as policy conformity, public acceptance, technology performance, operations performance, cost, administrative performance, revenue yield, and compliance and enforcement. It is valuable to consider this well before project implementation.	\$30,000
Task 10	Interoperability with Other Systems. Provide guidelines for road usage charging interoperability with other similar systems such as tolling, fuel taxes, and road usage charges in other jurisdictions.	Assess interoperability with State revenue systems, other states, and countries to reduce redundancy and/or leverage existing systems. This ensures that a road usage charge system does not unduly add to the compliance burden of users and adds value to existing back-office operations.	\$30,000
Task 11	Transition Strategy. Develop a manageable strategy to transition from the gas tax to a road usage charge, potentially in phases.	Develop preliminary approaches to transition from the gas tax to a road usage charge, including fleet phase-in options and impacts; technology phase-in; administrative phase-in; and state/interstate/international phase-in.	\$20,000
Task 12	Risk Analysis. Identify risks and potential mitigation measures to minimize adverse impacts and the cost of such impacts.	Develop an inventory of technical, operational, cost, communications, and policy risks and threats to the development and implementation of a road usage charge, and identify mitigation measures to alleviate uncertainty in the execution of the project.	\$50,000
Total			\$1,640,000

Appendix A:

Steering Committee Member Biographies

Washington State Commissioners

Tom Cowan – San Juan County – Steering Committee, Chair

Tom is a public policy consultant and also manages marine resources restoration projects. Tom was formerly the Director of the congressionally authorized Northwest Straits Commission and was a former Assistant Director for the Puget Sound Action Team. Prior to that, Tom was a San Juan County Commissioner for 12 years and served as President of the Washington State Association of Counties. Tom and his wife owned and operated an electrical contracting firm and the only hardware and building supply store on Lopez Island. Tom is currently the Chair of the San Juan County Land Bank and a Board member of the SeaDoc Society. Tom has lived on Lopez Island for the past 36 years and is a frequent ferry rider. He was appointed to the Commission by Governor Gregoire in 2011.

Anne Haley – Walla Walla County

Anne comes to the Transportation Commission with a breadth of experience on private, public, and nonprofit boards and commissions, and 30 years experience of managing public libraries in Washington. She currently is Chairman of the Board of Directors of Brown & Haley, Tacoma. As Chairman of the Washington State Library Commission, she guided the Washington State Library's merger into the Office of Secretary of State in 2002. She was President of the Washington Library Association and Pacific Northwest Library Association, and Counselor-at-Large of the American Library Association. In Walla Walla, she founded Project Read, sat on the Sherwood Trust Advisory Committee, served as Chairman of the Budget and Allocation Committee of United Way, and served on various community organization Boards. After retiring from the Yakima Valley Library in 2002, she returned to school and earned a BFA degree. Anne was appointed by Governor Gregoire in 2011.

Charles Royer – King County

Charles served three terms as Mayor of Seattle from 1978 to 1989, during which time he also served as President of the National League of Cities. Charles served for five years as Director of the Institute of Politics at Harvard University and Lecturer at the John F. Kennedy School of Government, and later directed the University of Washington's Urban Health Initiative. Charles serves as co-chair of the Seattle Central Waterfront Committee and as co-chairman of the Advisory Committee on Tolling and Traffic Management that is recommending strategies and policies to minimize downtown traffic impacts from the tunnel replacing the Alaskan Way Viaduct. Charles also serves as Chairman of the Major League Baseball Stadium Public Facilities District. Charles was appointed to the Commission by Governor Gregoire in 2012.

Members Required by Legislation

Auto and Light Truck Manufacturers

Curt Augustine is Director of Policy and Government Affairs for the Alliance of Automobile Manufacturers, a national trade association representing domestic and foreign car and light truck manufacturers. He served as chief transportation advisor to California Governor Arnold Schwarzenegger and currently is a contributor and industry representative to the Oregon's Road User Fee Task Force.

Business

Neil Strege is Vice President of the Washington Roundtable, a public policy research and advocacy group comprised of chief executive officers of major Washington state companies. Before joining the Roundtable in February 2012, Neil worked at the King County Council and for a Member of Congress. He is a graduate of Washington State University and life-long resident of Washington State.

Cities

Don Gerend, Councilman, City of Sammamish, is the 2012-2013 President of the Association of Washington Cities. Currently working in real estate, he has a Ph.D. in astronomy from the University of Washington. He formerly worked as a rocket scientist with Boeing and as a Professor of Astronomy and Physics at Seattle University.

Counties

Pete Capell, PE, is County Engineer and Director of Clark County Public Works. He is a member of the Washington State Public Works Board and is Board Chair of the Southwest Washington Chapter of the American Red Cross.

Environmental

Rod Brown, Jr., President, Washington Environmental Council, is a founder and partner of Cascadia Law Group. A graduate of the University of Texas School of Law, he is a Member, Board of Directors, Portland General Electric and served as a Member of the Connecting Washington Task Force.

Motoring Public

Janet Ray is Assistant Vice President of Corporate Affairs and Publishing, AAA Washington. A University of Washington graduate, Janet has been with AAA Washington for 38 years and is the Chairman of the Board of the Bellevue Chamber of Commerce.

Public Transportation

Tom Hingson is the Director of Everett Transit. Tom has led the agency in several projects of regional significance, including the ORCA regional fare card system and the Swift Bus Rapid Transit Agreement with Community Transit. A graduate of Seattle Pacific University with an MPA from the University of Washington, he also performs with the Seattle Opera.

Trucking

Scott Creek is Chairman and CEO of Crown Moving Company, Inc. A graduate of Western Washington University, Scott has been with Crown Moving Company for 34 years. He is a member of the Board of Directors for the Washington Trucking Association and Chairman of its Legislative Committee.

User Fee Technology

Kush Parikh is Senior Vice President of Business Development at INRIX, a worldwide leader in traffic information, driver services and applications. Earlier in his career, he was a product marketing and applications engineer at IBM Microelectronics. Kush holds a MBA from Duke University's Fuqua School of Business and a B.S. in electrical engineering from Pennsylvania State University. He was also recently granted INRIX's first business methodology patent related to data and traffic information.

Legislators

Senator Tracey Eide – Federal Way (D – 30th District).

Senator Ann Rivers – La Center (R – 18th District).

Representative Andy Billig – Spokane (D – 3rd District).

Representative Mark Hargrove – Covington (R – 47th District).

Additional Members Appointed by the WSTC

Kurt Beckett is Chief of Staff for the Port of Seattle. Previously, he served as chief of staff for U.S. Senator Maria Cantwell and worked for Congressman Norm Dicks for nearly 10 years, most recently as district director. He is a graduate of the University of Washington.

Paula Hammond, PE, is Transportation Secretary. A graduate of Oregon State University in civil engineering, she currently chairs three AASHTO Committees: AASHTO Standing Committee on Highways; AASHTO Leadership on High-Speed and Intercity Passenger Rail; and AASHTO Sustainable Transportation Steering Committee.

Cynthia Chen is Associate Professor of Civil Engineering, University of Washington. Her current research interests include land use and travel behavior, the use of GPS in travel surveys, and residential search and location decisions. She chairs the subcommittee on Time Use and Activity and Travel Patterns at the Transportation Research Board (TRB), a division of the National Research Council. She also is a member of the TRB Committees on Travel Behavior and Values and Telecommunications and Travel Behavior.

Sharon Nelson served two terms as Chairman of the Washington Utilities and Transportation Commission (WUTC), from 1985 to 1997 and was Chief of the Consumer Protection Division, in the Washington State Attorney General's office from 2003-2006. She sits on the Board of Directors of Itron, Inc., was a commissioner on the National Energy Policy Commission, and is a former Chair of the Board of Consumers Union, the publisher of Consumer Reports.

Appendix B:

Summary of Operational Concepts Used for Feasibility Assessment

Concept	Advantages	Disadvantages
Time-Based Concepts		
<p>1. Time Permit Purchase unlimited road network access for a set period of time (e.g., week, month, year).</p>	<ul style="list-style-type: none"> • Proven implementation in Europe (vignette system). • Simple system that can be implemented with no advanced technology, if there is no enforcement for out-of-state vehicles. • Potential stepping stone to more advanced approaches. • Privacy, both actual and perceived, is completely mitigated. • Cross border issues can be solved. • Enforcement is relatively simple for in-state vehicles, requiring only seeing a valid sticker (no odometer match needed). • Out-of-state travel not an issue, since miles are not charged. 	<ul style="list-style-type: none"> • Upfront payment inconvenient and needs to be repeated. With an electronic system, however, automatic replenishment is possible. • Cross-border issues, though solvable, create a significant departure from current practice.
<p>2. Engine Run Time Charge System detects engine run time over a set period (e.g., monthly) and reports charges automatically.</p> <p><i>Three technology alternatives: a) In-vehicle telematics device, b) Aftermarket device with cellular reporting, c) Aftermarket device using principal's smartphone</i></p>	<ul style="list-style-type: none"> • Automates collection of road use data, with a simpler system than collecting mileage data. • More convenient for road users. • Provides more immediate feedback to motorists on amount of driving they do (amount of time their engine is running). • Offers customer choices in technology. • Opportunity to piggyback on existing service providers. • Reflects not only cost of miles, but also environmental costs and costs of congestion (since time spent idling is charged the same as time spent moving) – similar to the gas tax. 	<ul style="list-style-type: none"> • Relationship between payment and benefit received not as close as with mileage. • Upfront equipment and costs for users. • Some vehicles may not have technology capabilities – creates a two-tiered system – those that can afford (or are willing to use) an automated system, and those that cannot. • Automated equipment in cars may lead to perception of loss of privacy (though there are ways to handle this). • Will not work the same on hybrid-electric and electric vehicles.

Concept	Advantages	Disadvantages
Distance-Based Concepts		
<p>3. Mileage Permit Purchase a license to drive a certain number of miles.</p>	<ul style="list-style-type: none"> • Proven implementation in New Zealand. • Simple system that can be implemented with no advanced technology. • Potential stepping stone to more advanced approaches. • Privacy, both actual and perceived, is completely mitigated. • Cross border issues can be mitigated. 	<ul style="list-style-type: none"> • Upfront payment inconvenient and needs to be repeated. • Enforcement is burdensome, requires seeing both the distance license and the odometer. • Cross-border issues though solvable, create a significant departure from current practice. • Out-of-state travel not easily refunded.
<p>4. Estimated Annual Mileage Permit with Reconciliation Pay for estimated mileage for a set period, then reconcile the account based on actual distance driven periodically (monthly, quarterly).</p>	<ul style="list-style-type: none"> • Simple system that can be implemented with no advanced technology. • Privacy, both actual and perceived, are completely mitigated. • Potential stepping stone to more advanced approaches. • Cross border issues can be solved. 	<ul style="list-style-type: none"> • Upfront payment inconvenient, needs to be repeated, and introduces reconciliation process, another step. • Cross-border issues though solvable, create a significant departure from current practice. • Out-of-state travel not easily refunded.
<p>5. Simple Odometer or Other Mileage Reading Principal reports mileage at the end of a period (e.g., quarterly) and pays the corresponding amount owed.</p>	<ul style="list-style-type: none"> • Simple system that can be implemented with no advanced technology. • Potential stepping stone to more advanced approaches. • Privacy, both actual and perceived, is completely mitigated. • Cross border issues can be solved. • No need for reconciliation saves a step. 	<ul style="list-style-type: none"> • Government cash flow – revenue not received until after travel is completed. • Cross-border issues though solvable, create a significant departure from current practice. • Out-of-state travel not easily refunded.
<p>6. Automated Mileage Reporting System detects mileage traveled and reports charges automatically at the end of a period (monthly, quarterly).</p> <p><i>Three technology alternatives: a) OBD-II dongle with cellular modem, b) OBD-II dongle with Bluetooth to smartphone, c) Vehicle telematics</i></p>	<ul style="list-style-type: none"> • Automates collection of road use data. • More convenient for road users. • Provides more immediate feedback to motorists on amount of driving they do and related costs. • Offers customer choices in technology. • Opportunity to piggyback on existing service providers. 	<ul style="list-style-type: none"> • Upfront equipment and costs for some users. • Some vehicles may not have technology capabilities – creates a two-tiered system – those that can afford (or are willing to use) an automated system, and those that cannot. • Automated equipment in cars may lead to perception of loss of privacy (though there are ways to handle this).

Concept	Advantages	Disadvantages
<p>7. Automated Mileage and General Location Measurement System detects mileage traveled by geographic zone over a set period of time (e.g., monthly) and reports charges, with rates set by zone.</p> <p><i>Three technology alternatives: a) Existing vehicle telematics with GPS, b) User-provided smartphone + OBD-II backup dongle, c) Third-party GPS device with cellular modem</i></p>	<ul style="list-style-type: none"> • Adds ability to differentiate miles driven in different locations to address in-state/out-of-state concerns and rudimentary congestion pricing. • Automates collection of road use data. • More convenient for road users. • Provides more immediate feedback to motorists on amount of driving they do and costs. • Offers customer choices in technology. • Opportunity to piggyback on existing service providers. 	<ul style="list-style-type: none"> • Upfront equipment and costs for users. • Some vehicles may not have technology capabilities – creates a two-tiered system – those that can afford (or are willing to use) an automated system, and those that cannot. • Automated equipment in cars may lead to perception of loss of privacy, especially with general location component (though there are ways to handle this). • General location component allows for differential pricing by region – something that some populations may not appreciate.
<p>8. Automatic Mileage and Specific Location Measurement System detects mileage traveled by geographic zone over a set period of time (e.g., monthly) and reports charges, with rates set by road segment or type of road.</p> <p><i>Three technology alternatives: a) Existing vehicle telematics with GPS, b) User-provided smartphone + OBD-II backup dongle, c) Third-party GPS device with cellular modem</i></p>	<ul style="list-style-type: none"> • Adds ability to differentiate miles driven on specific roads to allow for differential pricing by road or congestion pricing. Also handles in-state/out-of-state concerns and rudimentary congestion pricing. • Automates collection of road use data. • More convenient for road users. • Provides more immediate feedback to motorists on amount of driving they do. • Offers customer choices in technology. • Opportunity to piggyback on existing service providers. 	<ul style="list-style-type: none"> • Upfront equipment and costs for users. • Some vehicles may not have technology capabilities – creates a two-tiered system – those that can afford (or are willing to use) an automated system, and those that cannot. • Automated equipment in cars may lead to perception of loss of privacy, especially with general location component (though there are ways to handle this). • Specific location component allows for differential pricing by specific road – something that some populations may not appreciate – potentially even more than general location.



Washington State Transportation
Commission



Washington State
Department of Transportation

CAMBRIDGE
SYSTEMATICS

BERK

NATALIE
QUICK
CONSULTING

D'ARTAGNAN
CONSULTING