WASHINGTON STATE ROAD USAGE CHARGE

Forward Drive Project Update
December 14, 2021

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Project Manager, CDM Smith
Agenda

Research update
  RUC financial analysis
  Equity analysis and outreach
  Cost reduction
  RUC innovation

2022 demonstration plans

Next steps

End of year report to legislature
RUC Financial Analysis
Overall Project Status

✓ Data collection and analysis
✓ Financial model development
✓ Scenario development
✓ Scenario analysis
✓ Revenue projections
✓ Analytical tool development
Analytical Approach

• Develop updated financial model
• Identify factors potentially affecting travel
• Develop an integrated framework to incorporate the factors
• Analyze illustrative scenarios
• Perform scenario planning using the framework
Adjustments to VMT

Baseline VMT

Adjust for Telecommute and E-commerce, Pandemic

Apply electrification forecast

Adjust for autonomy and/or shared ride

Per VMT growth scenario

IPUMS and NHTS data used in this step according to selected scenario

EIA and Bloomberg forecast applied according to selected scenario

L5 autonomy and shuttle service effects according to selected scenario
Identifying Workers/Occupations Expected to Continue Working from Home

- Washington’s 3,000,000 workers
- 800,000 identified in professions with WFH
- Drive to work in car, van or truck (when they do)
- Number of workers to Work From Home

As per IPUMS/ACS for 2019

Approximately 27% working in professions with high WFH potential

Approximately 66% drive to work when they go in-person

Scenario-specific factors to be applied to this baseline
Electrification Forecasts

Percent of VMT Traveled by Electric Vehicles

- High Economic Growth
- EIA High oil price
- EIA Reference case
- Bloomberg ENEP
- Medium
Vehicle Fleet Composition Using DOL Data

• Department of License (DOL) data containing Vehicles’ ID Numbers (VIN) (6.7 million)
• VIN decoding performed on the dataset (6.1 million)
• Algorithm developed to estimate fuel efficiency using VIN
• Data used to develop fleet composition by model year and fuel efficiency (miles per gallon)
• Analysis output used to forecast fleet composition and fuel efficiency
Vehicle Fleet Composition Using DOL Data

(Illustrative examples based on Over Drive scenario)
**Scenario Planning Vs. Traditional Planning**

**Planning Techniques**

- **Traditional planning techniques generally focus on point forecasts**
  - Risk Analysis generally looks at ranges of results
  - Scenario planning techniques shift from forecasting the future to preparing for potential depictions of future

**Planning Methods**

- **Point Forecast**
  - Today
  - Future 1
  - Future 2
  - Future 3

- **Risk Management**
  - Today
  - Risk Analysis
  - Planning Horizon

- **Scenario Planning**
  - Today
  - Planning Horizon
  - Multiple scenarios are developed and used as depictions of future
Approach to Scenario Development

- Scenarios cannot be defined in “isolation” using just a single factor, e.g., “Low Economic Growth”
- Analyzing ALL possible combinations of the factors is not practical
- Define a “Baseline Scenario” using appropriate factors’ ranges
- Identify 5 “plausible” combinations to develop a reasonable number of preliminary scenarios to analyze
- Select 3 scenarios to be analyzed in detail
Factors Defining RUC Scenarios

- VMT/ Economic growth
- Covid/ Pandemic outlook
- Telecommuting impacts
- E-Commerce impacts
- Technology adoption outlook (electrification)
- Autonomy and Shared Mobility impacts
Scenario Names and Descriptions

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

<table>
<thead>
<tr>
<th>Factors</th>
<th>Neutral</th>
<th>Cruise Control</th>
<th>Over Drive</th>
<th>Shared Drive</th>
<th>Low Gear</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMT Growth</td>
<td></td>
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<tr>
<td>Pandemic Risk</td>
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<tr>
<td>Telecommuting Increase</td>
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<td>E-Commerce</td>
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<td>Electrification</td>
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<tr>
<td>Autonomy</td>
<td>Traditional Vehicles</td>
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<td></td>
<td>Private L5 Vehicles</td>
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<td></td>
<td>Shared Mobility</td>
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<tr>
<td>Low</td>
<td>Medium</td>
<td>Moderate</td>
<td>High</td>
<td></td>
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<tr>
<td>Low</td>
<td>Medium</td>
<td>Moderate</td>
<td>High</td>
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</tbody>
</table>
Model User Interface
RUC Revenue (Neutral)
RUC Revenue (Cruise Control)
RUC Revenue (Over Drive)
RUC Revenue (Shared Drive)

RUC Revenue (Billions)
Urban and Rural

Billions
$0.00 $0.20 $0.40 $0.60 $0.80 $1.00 $1.20 $1.40

2020 2022 2024 2026 2028 2030 2032 2034 2036 2038 2040 2042 2044 2046 2048 2050

Urban RUC  Rural RUC
RUC Revenue (Low Gear)
Sample Output From Dashboard

Date: 12/7/2021
Scenario: Neutral
Description:

- **INPUTS**
  - **VMT Growth:** Low
  - **Fuel Type/Electrification:** Reference Case
  - **Commute Shifts:** 25% Increase
  - **Pandemic Scenario:** Return to Normal
  - **E-Commerce Impact:** 10%
  - **RUC Transition:** MPG and/or Year
  - **Gas Tax Scenario:** No Change
  - **MPG Transition:** 25
  - **Model Year:** 2025

- **RUC Rate ($/mile):** 0.024

**EIA Reference**
- **EIA High Gas Price**
  - $0.00
  - $0.20
  - $0.40
  - $0.60
  - $0.80
  - $1.00
  - $1.20
  - $1.40

**Total Revenue (Billions)**
- Urban and Rural
- Total Revenue

**Total Vehicles on RUC**
- Urban and Rural
- Total

**Total Vehicles on Fuel**
- Urban and Rural
- Total

**Fuel Tax Revenue (Billions)**
- Urban and Rural
  - Urban Gasoline
  - Rural Gasoline

**RUC Revenue (Billions)**
- Urban and Rural
  - Urban RUC
  - Rural RUC

**Electrification Scenarios**
- Percentage of VMT From Electric Cars

**Annual Vehicle Miles Travelled (Billions)**
- Passenger Vehicles and Light Trucks
- Urban and Rural
Next Steps

• Finalize the modeling tool
• Develop a final report and user guide for the model
• Transfer knowledge to WSTC staff
• Utilize the modeling tool to support Commission, Steering Committee, and legislative requests regarding future revenue scenarios
Equity Analysis & Outreach
Transportation Taxes are Small as a Proportion of Household Expenditures

Transportation as a percent of household expenditures, by income level

Today’s fuel tax represents only 4% of low-income household transportation expenditures but will increase as fuel taxes increase.
On Average, Lower Income Households Pay Higher Fuel Taxes Per Mile Driven

<table>
<thead>
<tr>
<th>Census tract average household income</th>
<th>Census tract average MPG</th>
<th>Fuel Tax per 10,000 miles driven</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $50k</td>
<td>20.0</td>
<td>$247</td>
</tr>
<tr>
<td>$50-75k</td>
<td>20.1</td>
<td>$246</td>
</tr>
<tr>
<td>$75-100k</td>
<td>20.5</td>
<td>$241</td>
</tr>
<tr>
<td>$100-150k</td>
<td>21.4</td>
<td>$231</td>
</tr>
<tr>
<td>Over $150k</td>
<td>22.6</td>
<td>$219</td>
</tr>
</tbody>
</table>
Under RUC, All Households Would Pay the Same Per Mile Driven

<table>
<thead>
<tr>
<th>Census tract average household income</th>
<th>Census tract average MP</th>
<th>RUC per 10,000 miles driven (2.4¢/mile)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $50k</td>
<td>20.0</td>
<td>$240</td>
</tr>
<tr>
<td>$50-75k</td>
<td>20.1</td>
<td>$240</td>
</tr>
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<td>22.6</td>
<td>$240</td>
</tr>
</tbody>
</table>
Under RUC, Higher Income Households Would Generally Pay More in Fuel Taxes Over the Course of a Year

This is because higher income households drive more miles, on average, over the course of a year.

Note: The lower number of miles driven in the highest income group is likely due to the small number of households in this group in the WA State sample. In the national data, the highest income group drives the most miles, on average.
## Focus Group Participants

<table>
<thead>
<tr>
<th>Organization/Group</th>
<th>Number of Participants</th>
<th>% of Total Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahora Construction</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td>Arab Festival</td>
<td>4</td>
<td>4%</td>
</tr>
<tr>
<td>Bremerton NAACP</td>
<td>7</td>
<td>7%</td>
</tr>
<tr>
<td>Coalition of Immigrants Refugees &amp; Communities of Color</td>
<td>4</td>
<td>4%</td>
</tr>
<tr>
<td>COVID-19 Community Response Fund Alliance</td>
<td>7</td>
<td>7%</td>
</tr>
<tr>
<td>Disability Rights Washington</td>
<td>9</td>
<td>9%</td>
</tr>
<tr>
<td>Filipino Chamber of Commerce of the Pacific Northwest</td>
<td>8</td>
<td>8%</td>
</tr>
<tr>
<td>India Association of Western Washington</td>
<td>8</td>
<td>8%</td>
</tr>
<tr>
<td>Kent/Renton African American Group</td>
<td>9</td>
<td>9%</td>
</tr>
<tr>
<td>Legacy of Equality Leadership &amp; Organizing</td>
<td>7</td>
<td>7%</td>
</tr>
<tr>
<td>Neighborhood House</td>
<td>7</td>
<td>7%</td>
</tr>
<tr>
<td>Refugee Women's Alliance</td>
<td>10</td>
<td>10%</td>
</tr>
<tr>
<td>Yakima County Development Association</td>
<td>19</td>
<td>18%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>104</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Note: The charts on the following slides summarize information that was self-reported by focus group participants. The “Not Reported” category indicates participants that did not submit this information.
Focus Group Participants: Income and Household Size

**Income**
- $50K or less: 39%
- $51K to $100K: 23%
- More than $100K: 16%
- Not Reported: 22%

**Household Size**
- 1 member: 32%
- 2 members: 32%
- 3 members: 15%
- 4 members: 14%
- More than 5 members: 8%
- Not Reported: 22%
Focus Group Participants: Vehicle Age and Weekly Mileage

Vehicle Age
- Not reported: 23%
- No vehicle: 5%
- Less than 5 years old: 22%
- 5-10 years old: 24%
- More than 10 years old: 26%

Miles Driven per Week
- Not Reported: 18%
- Less than 50 miles: 30%
- 50-100 miles: 22%
- More than 200 miles: 19%
- 101-200 miles: 11%
How Familiar are you with How Roads are Paid for in the State?

• 38% were unfamiliar or did not respond (15%)
  • Many who were unfamiliar offered taxes as their guess
  • Federal and state government were also listed
• For those who were familiar, taxes, car tabs, and tolls were most often cited
How Much do you Pay Yearly in Gas Tax?

The answers shown here reflect respondents’ estimates of how much they pay in gas tax over the course of the year. Some respondents answered in formats that could not be translated into a dollar amount per year (e.g., a percentage). These are included under the “Don’t know/Answer unclear” category, which also includes respondents who said they didn’t know how much they paid in gas tax.
Next Steps

• Interviews with community leaders
• Electronic survey to Groups for broader distribution
  • Questions would be same as those asked in Focus Groups
• Reach back out to participants about pilot participation
RUC Cost Reduction
Cost of Collection Reduction Workshop Approach

Background research and initialization
- Cost analysis framework
- Challenge statements for each workshop
- Invite partner agencies

Workshops
- Orientation: background briefing, challenge statement, and operating rules
- 1 week of dedicated work
- Presentation of findings

Report out
- Public policy elements
- System design concepts
- Concepts and recommendations for pilot testing
- Concepts and recommendations for other states and federal government in pilot testing or implementations
Schedule of Topics

• Week of September 13: Customer Service

• Week of September 27: Enforcement

• Week of October 11: Procurement & Certification
Participation

Washington State Transportation Commission

WASHINGTON STATE DEPARTMENT OF LICENSING

OREGO
Design a customer service center at low cost of operations.
Design a regional procurement and certification process for RUC vendors with a market contract accessible by multiple states through service level agreements.
Design a low-cost enforcement regime that captures a relatively high percentage of violation events.
Next Steps

- Report-out in Q1 2022
  - Public policy elements
  - System design concepts
  - Concepts and recommendations for pilot testing
  - Concepts and recommendations for other states and federal government in pilot testing or implementations
- Pilot concepts to carry forward
RUC Innovation
Incorporate new mileage reporting approaches into Washington’s RUC research, such as in-vehicle telematics, improved smartphone apps, use of private businesses to provide odometer verification and mileage reporting services, and more.

New mileage reporting methods → RUC Innovation
RUC Innovation Objectives

1. Improve the user experience
   • More choices for mileage reporting and payment
   • Better service design to address operational equity and promote compliance
   • User-friendly privacy policies

2. Optimize RUC Service
   • Build on existing state capabilities
   • Leverage private sector services
   • Define public/private sector roles

3. Open the market
   • Identify new business models
   • Define standards
RUC Innovation Guiding Principles

**User experience**
- A RUC system should be simple, convenient, transparent to the user
- Compliance should not create an undue burden and should be encouraged by design

**Cost-effectiveness**
- Administration of a RUC system should be cost efficient
- Define common terminology to make it easier to compare costs of RUC systems

**Equity through user choice**
- Consumer choices should be considered to address typical “user situations”
- A RUC system provides relevant choices to drivers for not only how they report their miles but also how and when they pay and to which entity

**Systems & operational Equity**
- Offer simple, accessible and convenient options
- Create user-friendly privacy policies
- Design systems to make it easy to comply
- Assist users with decision making
Research Approach in Three Steps

1. Break down RUC into core function
   - Identify subject vehicle & owner/lessee—connect with vehicle registry & set up account
   - Generate road usage data for subject vehicle over designated time—report data
   - Access road usage data—receive reporting of road usage data
   - Apply per-mile charging rates—process data to determine amount of charges
   - Provide invoice to owner/lessee—issue notice of the charge
   - Collect payment—provide one or more ways to pay
   - Issue acknowledgement of payment—create a receipt
   - Enforce payment—apply mechanisms for ensuring everyone pays
   - Remit revenue to appropriate fund—integrate revenue collection with financial systems

2. Identify new mileage reporting and payment choices
   - Feasibility Services
     - Assisted (in-person orientation)
     - Self-reporting ( altijd online)
     - Fully automated (automated receipt)
   - No connectivity
   - 3rd party connectivity
   - Native connectivity

3. Identify compatible business models
   - Already piloted
     - Usage-based insurance/Account Managers
     - Tolling account managers
     - Technology providers
     - Fleet telematics service provider
   - Additional candidates
     - Rate sheet providers
     - Dealers
     - Business mileage logging apps
     - Accident repair and service stations
     - Severe weather reporting providers
     - Vehicle history report providers
     - Vehicle licensing office
     - Auto dealers
Key Research Outcomes: More Reporting Choices

1. Break down RUC into core function

2. Identify new mileage reporting and payment choices

3. Identify compatible business models

Reporting choices supported by a range of business partners:
- MaaS technology platform providers
- Vehicle-registry system operators
- Data aggregators
- Retail partners
- Automakers

Feasibility Services

- Assisted (in-person assistance)
- Self-reporting (financial data reporting)
- Fully automated (no human interaction)

No connectivity | 3rd party connectivity | Native connectivity

Already piloted
- Usage-based Insurance/Auto Managers
- Tolling Account Managers
- Technology providers
- Fleet 行 service providers

Additional candidates
- Data aggregators
- Retail partners
- Automakers
- Business mileage logging apps
- Auto dealers
- Vehicle Licensing Offices
Key Research Outcomes: Service Improvement

1. Break down RUC into core function

2. Identify new mileage reporting and payment choices

3. Identify compatible business models

RUC service improvement opportunities

RUC Service Entry Point
2022 RUC Demonstration Plans
## Concepts for 2022 Mini-Pilot Tests

<table>
<thead>
<tr>
<th>#</th>
<th>Concept</th>
<th>Type</th>
<th>Equity</th>
<th>Cost effectiveness</th>
<th>User experience</th>
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<tbody>
<tr>
<td>1.</td>
<td>Self-reporting, tab renewal-based RUC</td>
<td>Prototype testing</td>
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<tr>
<td>2.</td>
<td>Flexible payment plans</td>
<td>Pilot</td>
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<td></td>
<td>X</td>
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<tr>
<td>3.</td>
<td>Enhanced RUC options</td>
<td>Pilot</td>
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<td>X</td>
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<tr>
<td>4.</td>
<td>Native automaker telematics-based RUC</td>
<td>Pilot</td>
<td>X</td>
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<td>5.</td>
<td>Manual mileage exemptions</td>
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<tr>
<td>6.</td>
<td>Targeted income-based discounts</td>
<td>Prototype testing</td>
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<td>7.</td>
<td>Alternative invoice designs</td>
<td>Prototype testing</td>
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<td>8.</td>
<td>Unregistered vehicle research</td>
<td>Field research/pilot</td>
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<td>9.</td>
<td>Vehicle transactions research</td>
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<td>10.</td>
<td>Mock standards committee</td>
<td>Simulation</td>
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Concepts for 2022 Mini-Pilot Tests

1. Self-reporting, tab renewal-based RUC
2. Flexible payment plans
3. Enhanced RUC options
4. Telematics-based RUC
5. Manual mileage exemptions
6. Targeted income-based discounts
7. Alternative invoice designs
8. Unregistered vehicle research
9. Vehicle transactions research
10. Mock standardization committee
Next Steps
Outline: End of Year Report to Legislature

1. **Background** on RUC research to date in Washington and Forward Drive project
   - Original motivation
   - Brief RUC Steering Committee history
   - 2018-2019 pilot summary
   - 2020 Commission recommendations
   - Forward Drive research proposal and scope

2. **Research task results summary**
   - Financial analysis methodology and results
   - Equity analysis and outreach methodology and results
   - Cost reduction methodology and results
   - RUC innovation methodology and results
   - Next steps for concluding research tasks
3. **2022 demonstration plan**
   - Summary of pilot concepts
   - High-level pilot plan
   - High-level evaluation plan
   - Next steps for final design, setup, and testing
## Upcoming Pilot-Related Activities

### Project Activities

| Q1-Q2 2022       | Pilot planning  
|                  | • Final designs  
|                  | • Evaluation planning  
|                  | • System development and testing  
|                  | • Participant recruitment  
| Summer 2022      | Staggered launch of mini-pilots  
| Q3-Q4 2022       | Operation of mini-pilots  
|                  | Ongoing evaluation of mini-pilots  

### Steering Committee Activities

- **April-May:** Spotlight sessions  
  - The mini-pilot user experience  
  - Evaluation plan  
  - Recruitment and participation  
- **July:** Meeting to review launch of mini-pilots  
  - Member enrollment/ participation  
- **December:** Meeting to report on pilot progress