Washington State Transportation Commission

Eastside Corridor Independent Traffic and Revenue Study

Briefing on Findings

presented to

Washington State Transportation Commission

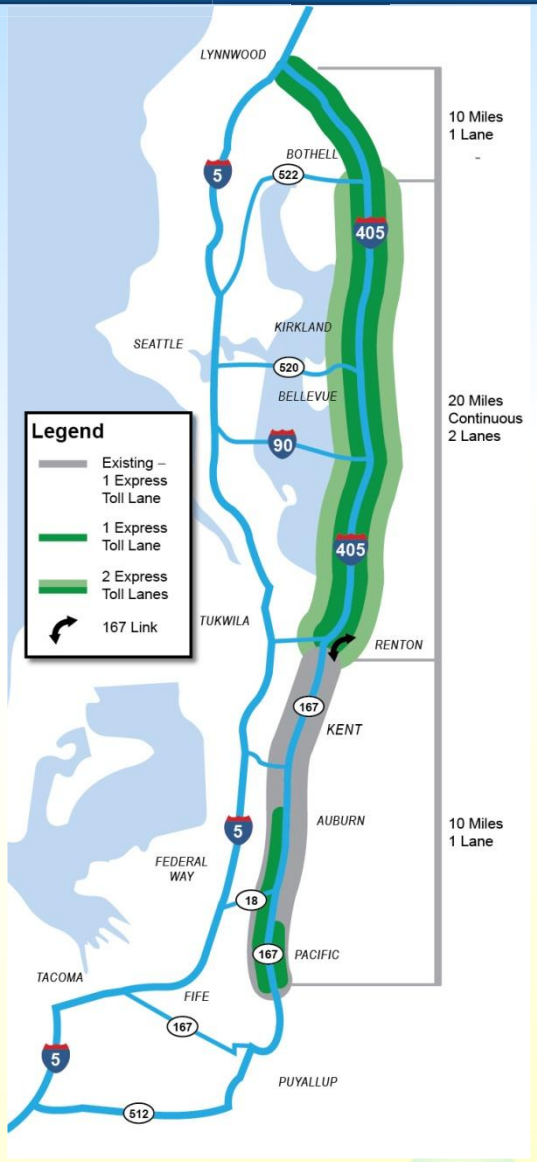
presented by

Cambridge Systematics, Inc.

Jeff Buxbaum

Jaimie Sloboden

November 13, 2012



CAMBRIDGE SYSTEMATICS

Transportation leadership you can trust.

Agenda

- Study Objectives and Project Description
- Concept of Operations
- Study Approach and Assumptions
  - » Traffic and Revenue Scenarios
  - » Risk analysis
- Study Results

Study Objectives & Project Description

Legislative Directive

The transportation commission shall retain appropriate independent experts and conduct a traffic and revenue analysis for the development of a 40-mile continuous express toll lane system that includes State Route number 167 and Interstate 405. The analysis must include a review of the following variables within the express toll lane system

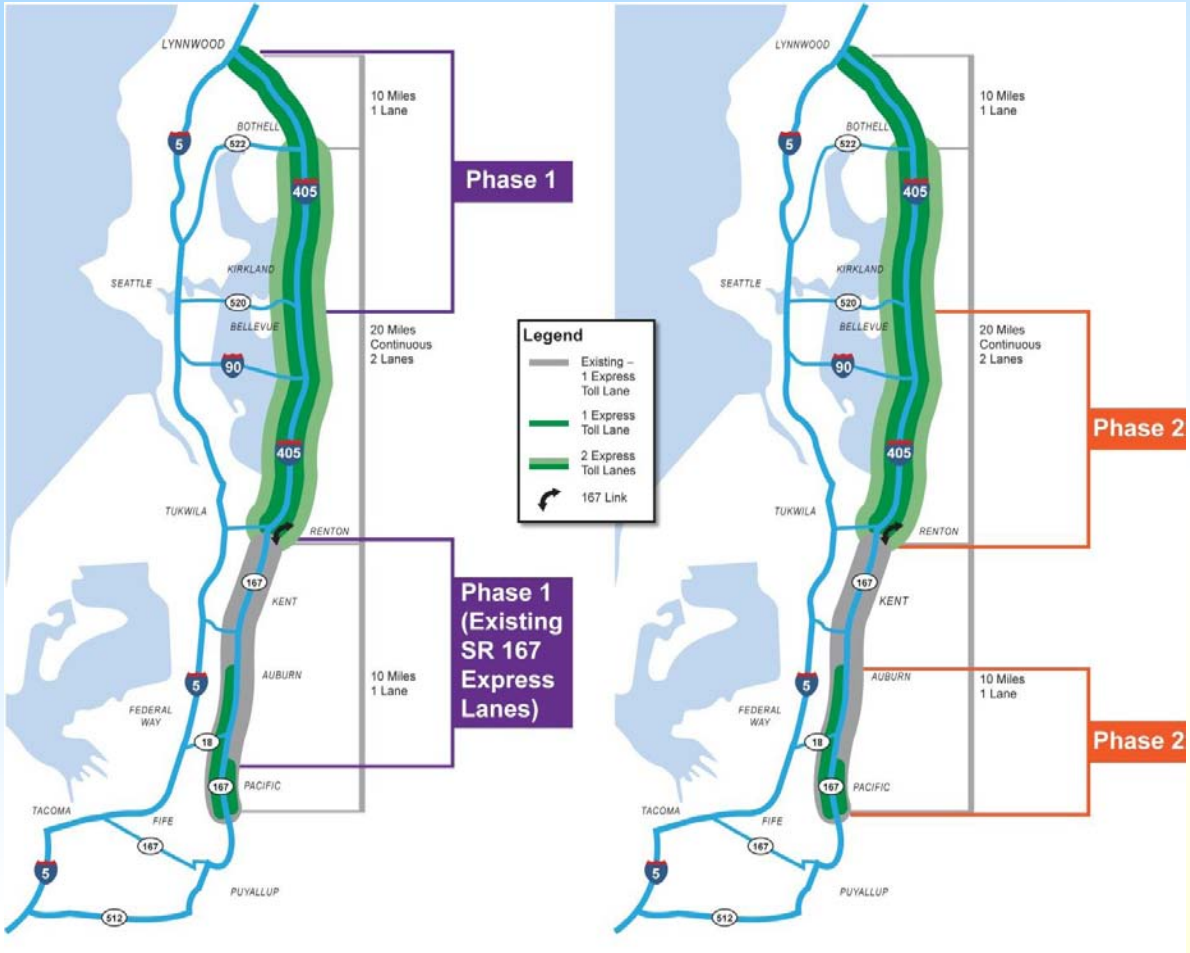
- **Vehicles with two or more occupants are exempt from payment**
- **Vehicles with three or more occupants are exempt from payment**
- **A variable fee**
- **A flat rate fee**

CAMBRIDGE SYSTEMATICS

The Eastside Corridor Express Toll Lane Project

- **WSDOT's Option 4: 40+ mile system**
  - **Express toll lanes per direction: 1-2**
  - **General purpose lanes per direction: 2-4**
  - **Four variations of discounts/exemptions:**
    - **HOV2+ travels free**
    - **HOV3+ travels free**
    - **HOV3+/2+ travels free peak/off-peak**
    - **All HOV discount of $1.00 in 2030**

The Eastside Corridor Express Toll Lane Project Boundaries and Phases



CAMBRIDGE SYSTEMATICS

Concept of Operations

Concept of Operations: Toll Setting Criteria

WSDOT has made several key operational assumptions for the I-405 corridor. These assumptions were used in both the 2009 WSDOT study and in the 2012 CS study for consistency purposes and are as follows:

- **Tolls collected seven days a week, 5am to 8pm**
- **Dynamic toll setting:**
  - **Maintain speeds > 45 mph in the express toll lane**
  - **Toll rate can be adjusted as often as every five minutes**

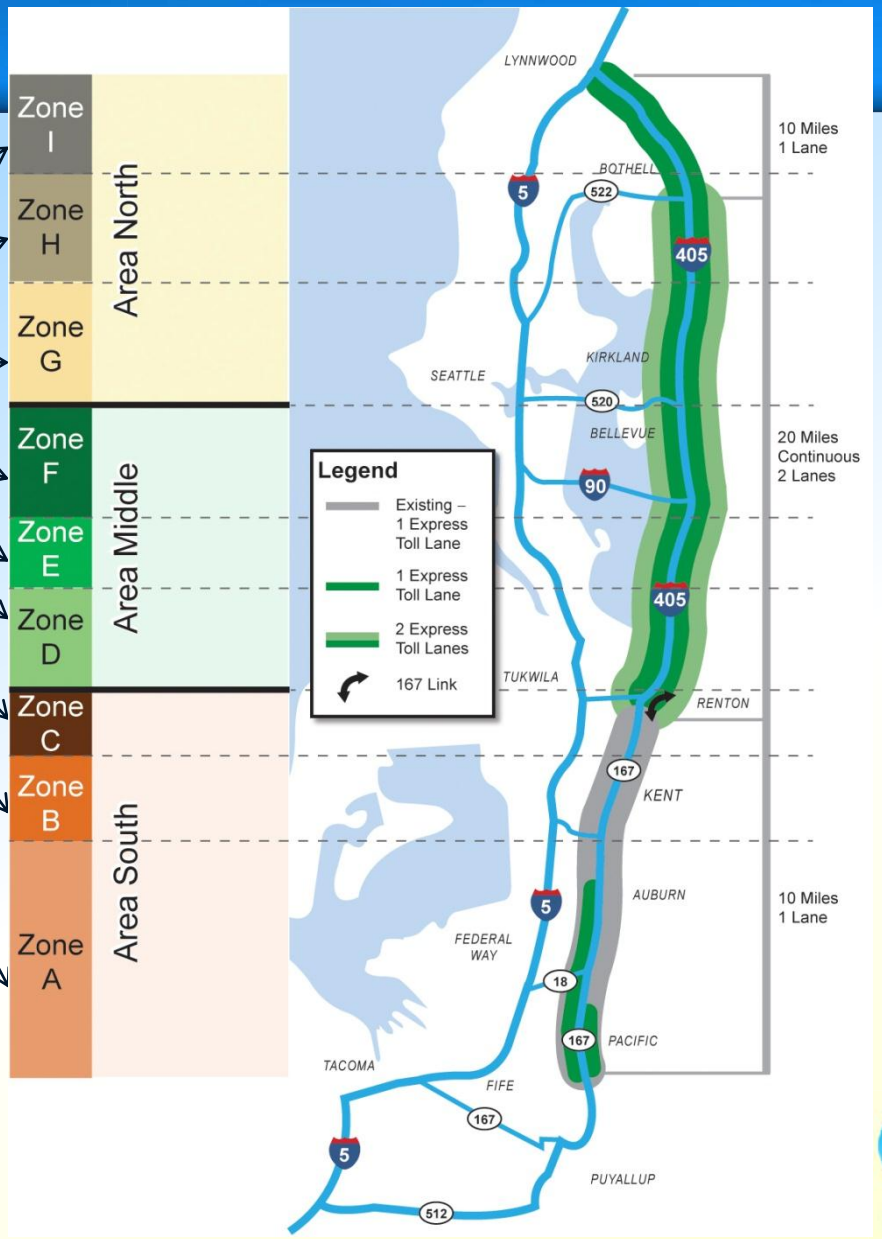
Proposed Toll Policies by Type of Highway User

Transit and public vanpools	Free
HOVs	Free, toll, or discount
Other vehicles	Toll (Good to Go! Required)
Other vehicles over 10,000 pounds gross	Not allowed

CAMBRIDGE SYSTEMATICS

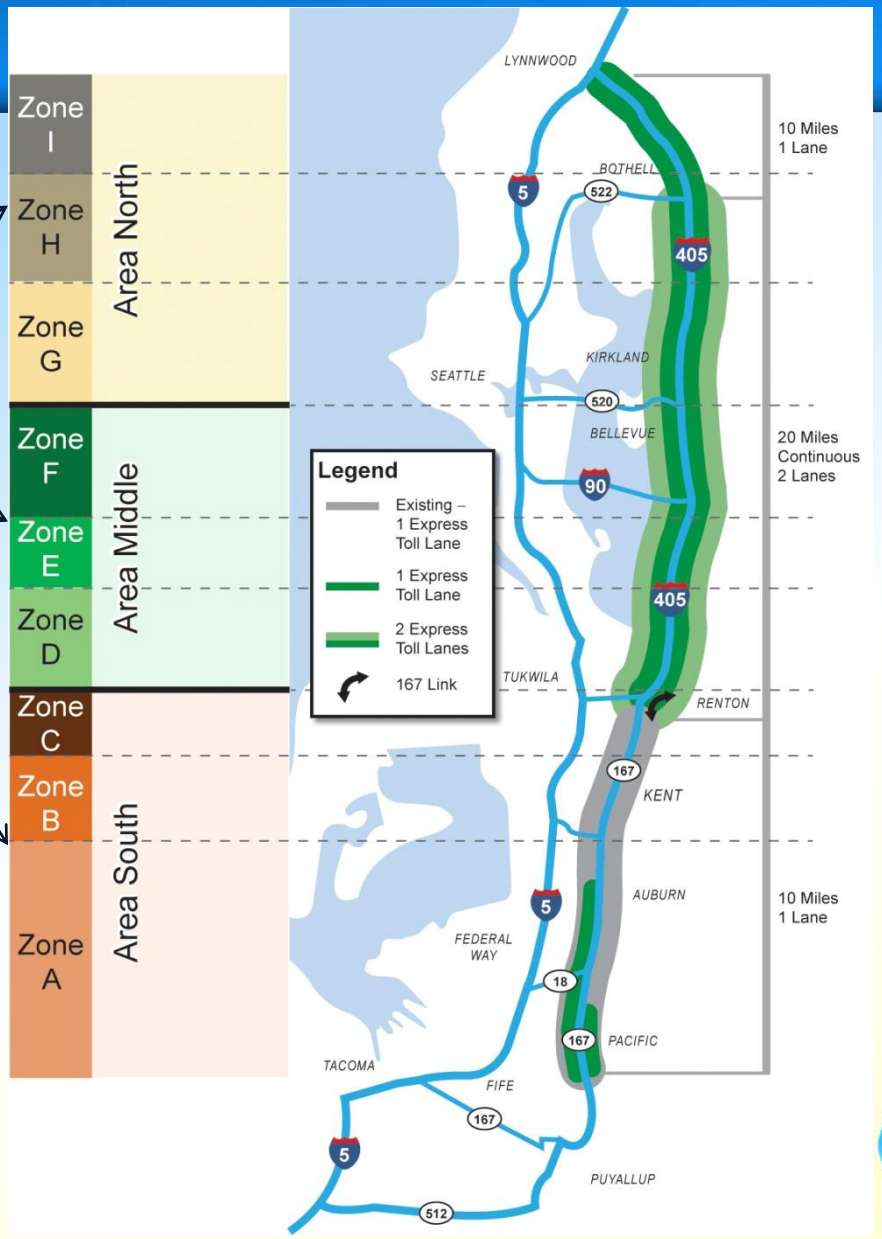
Concept of Operations: Dynamic Pricing

- **Pricing by**
  - » **9 Zones**



Concept of Operations: Dynamic Pricing

- 9 Zones
  - » Grouped in 3 Areas
- Minimum Toll Per Area
- New pricing at the end of each area



Concept of Operations: Dynamic Pricing

- Rates shown for up to 3 destinations within a tolling area
  - » Upon entering a new area a new rate is charged
- Toll rates
  - » Increments of $0.25
  - » Minimum toll per toll area
    - Phase 1 (2014) = $0.50 (2012$)
    - Phase 2 (2018) = $0.75 (2012$)
  - » No maximum

Illustrative Toll Rate Display

CAMBRIDGE SYSTEMATICS

Study Approach
Assumptions, & Scenarios

Study Approach

Used and supplemented WSDOT's data

- New stated-preference/attitude survey
- Current and historical traffic data
- National review of similar projects, including willingness to pay tolls

Improved upon WSDOT's models

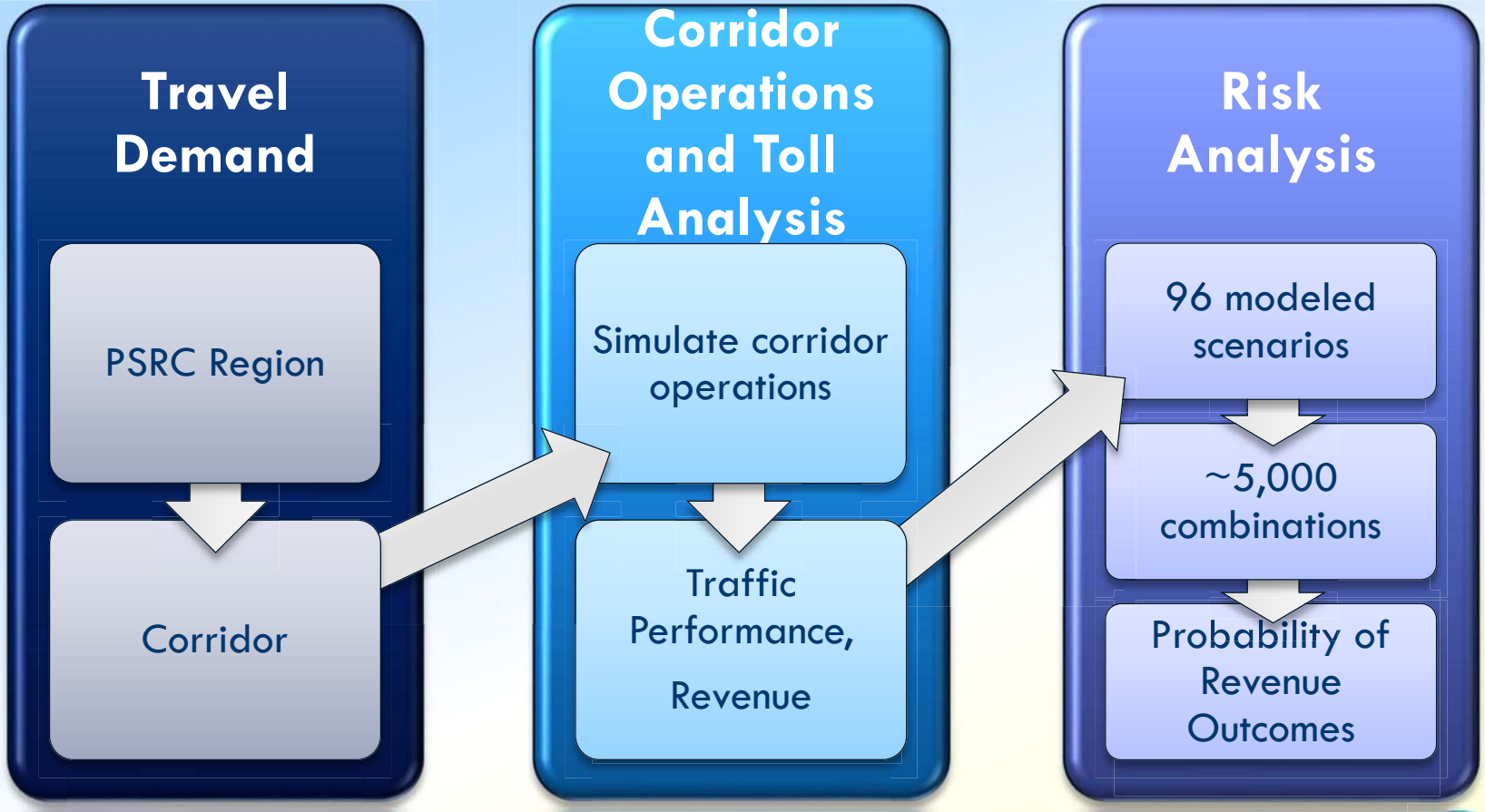
- Extensive independent review
- Modifications made to models as needed
- Incorporated independent model of choice to pay toll
- Available to WSDOT for use after this study is over

Conducted Robust risk analysis

- Identified most important risks
- Developed probabilities of achieving different levels of revenue

CAMBRIDGE SYSTEMATICS

Traffic and Revenue Forecast Process



Scenarios Evaluated

Primary Scenarios

- Free Passage and Dynamic Tolling for:
  - HOV 2+
  - HOV 3+
  - HOV 3+/2+ peak/off-peak (Mixed Scenario)

Sensitivity Scenarios*

- $1 HOV Discount and Dynamic Tolling
- HOV 3+ Free Passage
  - Flat Toll Rate (same price all day)
  - Variable Toll Rate (time of day)

* Evaluated with sensitivity tests rather than extensive risk modeling.

CAMBRIDGE SYSTEMATICS

Risk Factors and Range of Assumed Values

Year	Risk Factors		
	Percent of corridor vehicles with transponders	Corridor Traffic Growth: *Difference from PSRC Forecast*	Value of Time: *Difference from 2011 Survey*
2014 Phase 1	20% 45%	Not tested	-25% 0% +25%
2018 Phase 2	20% 45% 100%	Not tested	-25% 0% +25%
2030	100%	-10% 0% +10%	-25% 0% +25%
2040	100%	0%	0%

Revenue will take a few years to "ramp up" to expected levels

- It takes time for drivers to find new toll projects and get comfortable using them
- Traffic and revenue in early years will be lower than expected, and lower than the WSDOT 2009 forecast
- CS assumed revenue in early years would be these percentages of the values that we modeled:

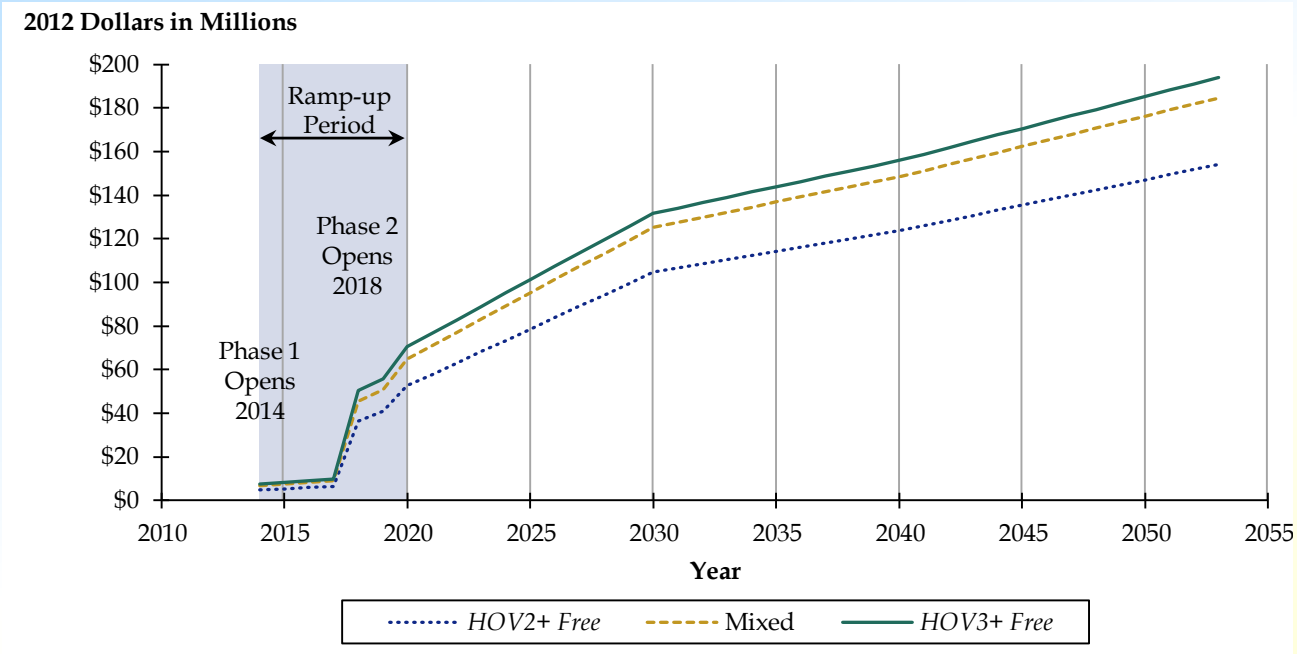
Year	South	Middle	North
2014	75%	--	50%
2015	85%	--	60%
2016	95%	--	75%
2017	100%	--	85%
2018	100%	75%	100%
2019	100%	85%	100%
2020	100%	100%	100%

Study Results

Annual Gross Revenue Forecasts: Primary Scenarios

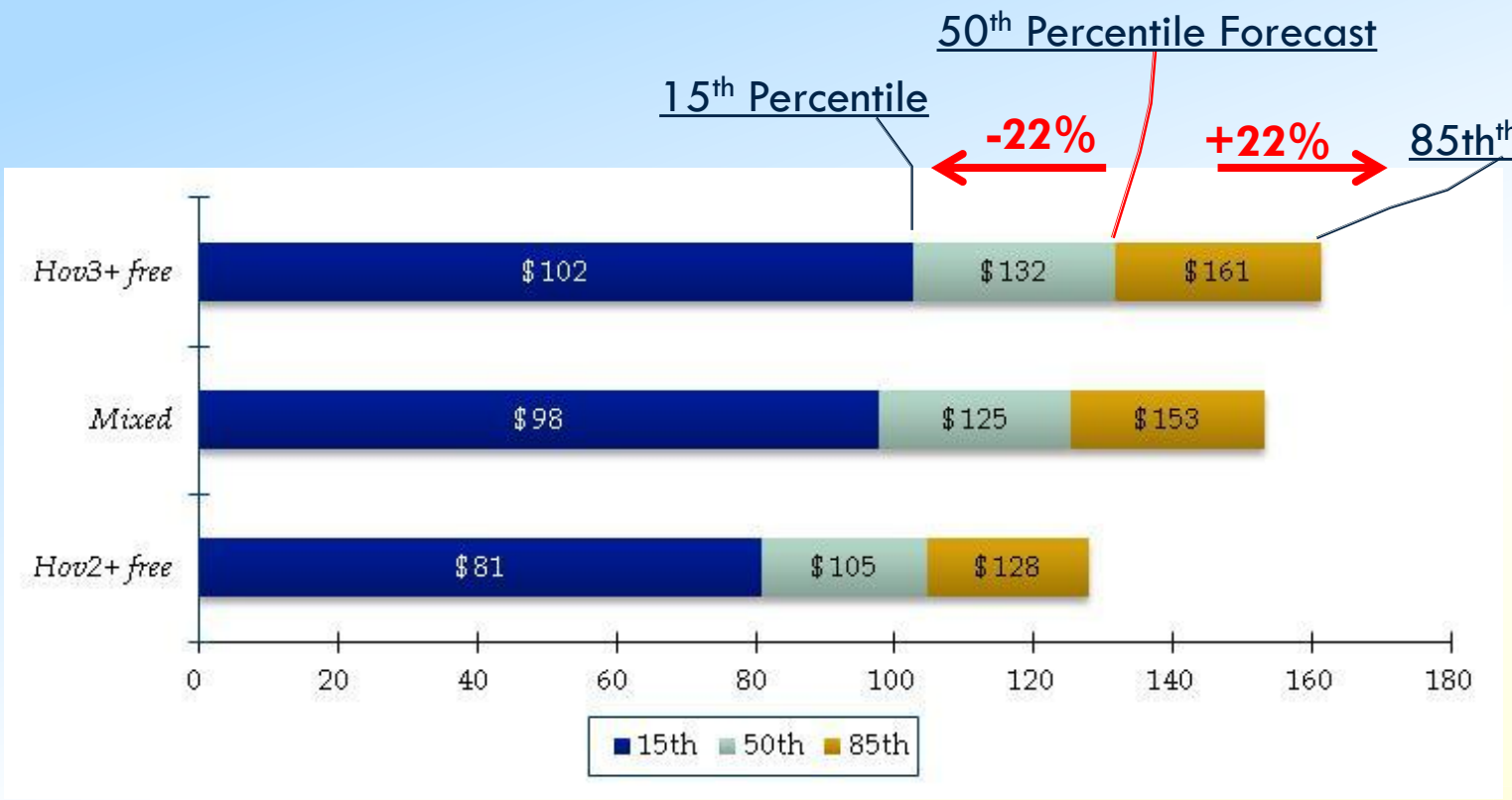
- Large increase in revenue when Phase 2 opens in 2018
- "HOV 3+ Free" revenue forecast about 22% higher than "HOV 2+ free" revenue in 2030
- "HOV 3+ Peak/2+ Off Peak Free" (Mixed) scenario is in between, and closer to "HOV 3+ free" scenario

50th Percentile Revenue



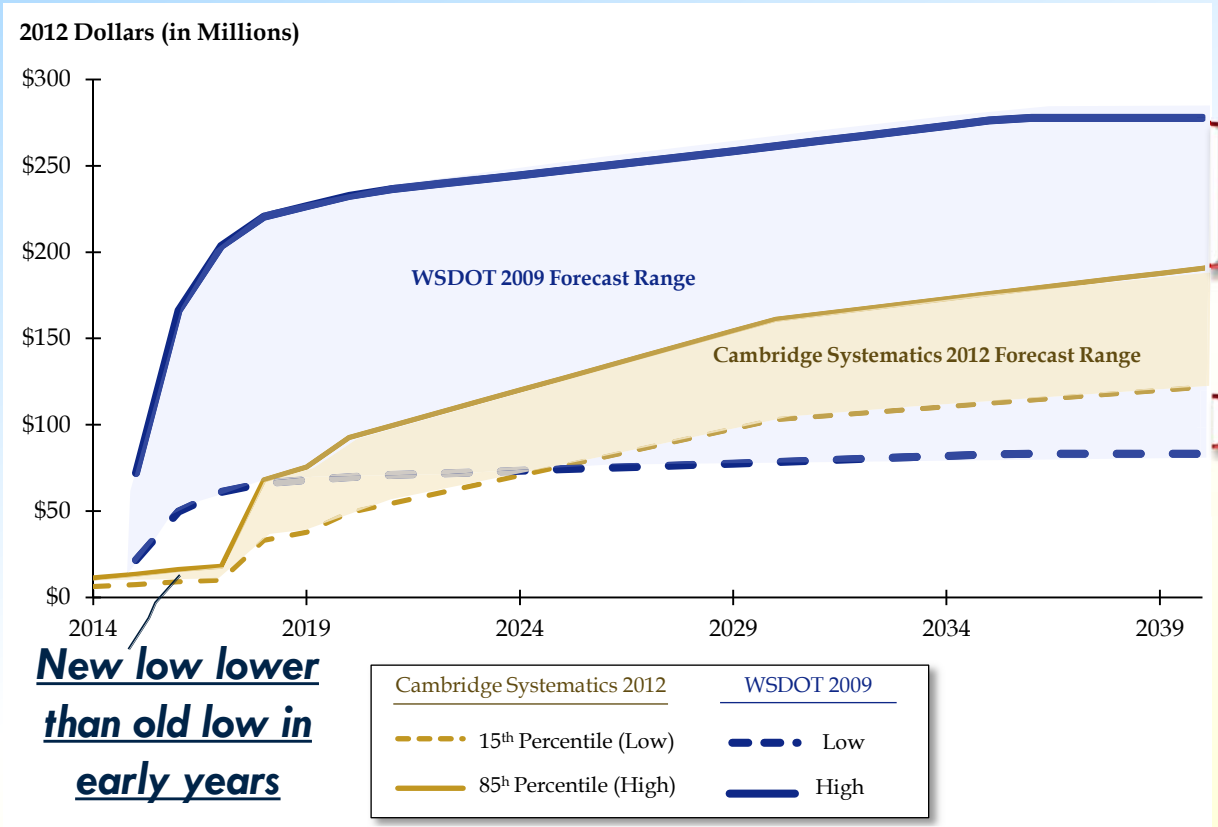
2030 Gross Revenue Forecast Ranges
Primary Scenarios

- **Revenue varies by ±22% around the 50th percentile forecast**



Comparison of Gross Revenue Forecasts WSDOT 2009 and CS 2012 (HOV 3+ Free)

- New forecast has a narrower range than prior forecast
- Similar pattern for other scenarios



Important Takeaways: Revenue

- **Revenue:**
  - Independent revenue forecast narrowed the gross revenue range used by WSDOT for prior financial planning
  - Within, and on the low side of the WSDOT range except from 2014 to 2018 where the revenue is much lower than WSDOT, due to different "ramp up" assumptions
- **Toll revenue is highly sensitive to transponder ownership**
- **Revenue growth is driven by**
  - Toll rate growth
  - Which is driven by increasing congestion

Important Takeaways: Operations

- Corridor demand will exceed available capacity
  - » Implications are uncertain
- Little difference in system performance between HOV 2+ free and HOV 3+ free scenarios
  - » But – HOV 3+ allows greater flexibility in managing demand
- Frequent access points (1.5 miles between access) adversely impacts system performance due to weaving
  - » Further evaluation of design in the middle section warranted (and planned by WSDOT)
- Express-lane performance affects general-purpose lane performance – and vice versa

Thank you

Contact:
Jeff Buxbaum
Cambridge Systematics
617-234-0534
jbuxbaum@camsys.com

CAMBRIDGE SYSTEMATICS