Agenda

Metro
600 NE Grand Ave.
Portland, OR 97232-2736

Meeting: Transportation Policy Alternatives Committee (TPAC)
Date: Wednesday, October 7, 2020
Time: 9:00 a.m. – 11:30 am
Place: Virtual meeting – Please click the link below to join the webinar:
             https://us02web.zoom.us/j/86273214987?pwd=NFZqd0FwaDY1c0lRZ09IQWNPWi8rUT09
             Password: 218370
             Phone: 877-853-5257 (Toll Free)

9:00 am	**1.**		**Introductions and Workshop Purpose**	**Tom Kloster, Chair**
9:10 am	**2.**		**Metro Regional Congestion Pricing Study Update** • Goals and updates	**Elizabeth Mros-O'Hara, Metro**
9:20 am	**3.**		**Setting the Stage: Analytical Tools and Equity Measures** • Tools for analysis • Strengths and weaknesses of the regional model • Measuring equity (baseline analysis and questions to answer) • Ways of displaying data ***Discussion: What questions do you have about the analysis tools? Are these tools helpful?***	**Peter Bosa, Metro** **Jennifer Wieland, Nelson\Nygaard** **Alex Oreschak, Metro**
10:15 am	**4**		**5 minute break**	
10:20 am	**5.**		**Pricing Scenarios: Round 1 Results and Proposed Next Round** • What we modeled • Summary of scenario results • Proposed Round 2 scenarios ***Discussion: Are the findings intuitive to you?*** ***What questions do you want the team to explore in the Round 2 scenarios?*** ***Are there specific areas where you want more information?***	**Alex Oreschak, Metro** **Theresa Carr, Nelson\Nygaard**
11:20 am	**6.**		**Schedule and Next Steps** • Overall project schedule • Outreach to stakeholder groups	**Elizabeth Mros-O'Hara, Metro**
11:30 am	**7.**		**Adjourn**	**Tom Kloster, Chair**

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Memo

Date: October 7, 2020

To: Transportation Policy Alternatives Committee and Interested Parties

From: Elizabeth Mros-O'Hara, RCPS Project Manager

Subject: Regional Congestion Pricing Study – Workshop #2

Purpose
This workshop is a follow up to the TPAC Workshop on July 22, 2020. Staff will provide TPAC an update on the Regional Congestion Pricing Study, discuss the tools that that are being used to evaluate the different types of congestion pricing, review the scenarios tested, and discuss Round 1 modeling results and next steps.

Request to TPAC
Provide input and comment on the congestion pricing analysis, Round 1 modeled findings, and the approach to the next round of modeling.

Information and findings
Much of the background information needed for the workshop discussion was provided as part of the July 22nd workshop and is attached for your reference. Attachment 2 includes new information summarizing Round 1 modeling results key takeaways.

- Attachment 1 - July 22, 2020 TPAC Memorandum containing a detailed description of the Round 1 modeling scenarios.
- Attachment 2 - Round 1 Modeling Results Key Takeaways – NEW INFORMATION
- Attachment 3 - Regional Congestion Pricing Study Summary 083120

Questions for TPAC
- What questions or comments do TPAC members have regarding the analysis/methods?
- Are the Round 1 modeling outputs and findings intuitive?
- What questions do you want the team to explore in the Round 2 scenarios? Are there specific areas where you want more information?

Next Steps
Metro and the consultant team will continue to analyze the preliminary scenarios' modeling outputs to understand their performance. Based on findings and feedback from TPAC and project partners, Metro staff will adjust the scenarios and model and test revised scenarios.

In addition, the RCPS staff will continue to reach out to equity groups for feedback on the equity portion of the analysis. These groups include the region's Committee on Racial Equity (CORE), the ODOT Equitable Mobility Advisory Committee (EMAC), and a subcommittee of the Portland Equitable Mobility Task Force and potentially others.

Staff will return to TPAC in the winter (likely November or December) to share the outputs and findings from the adjusted scenario analyses and gather further input. The TPAC discussion will include an assessment of the performance of the different pricing concepts based on the modeled and any off-model analyses. In addition, any updates related to the tools, performance measures, and any possible modifications to the analysis approach will be discussed. After gathering input from TPAC, the findings will be refined. The findings will be summarized and shared with JPACT and Metro Council. In addition, an expert panel will assembled to review the finding and provide feedback in early 2020.

Memo

Date: July 22, 2020

To: Transportation Policy Alternatives Committee and Interested Parties

From: Elizabeth Mros-O'Hara, RCPS Project Manager

Subject: Regional Congestion Pricing Study – Workshop Summary

Purpose

The workshop is intended to provide TPAC an opportunity for a detailed discussion of the Regional Congestion Pricing Study (RCPS) including: best practices and equity considerations, evaluation tools and performance measures, and initial pricing scenarios being analyzed.

Request to TPAC

Provide input and comment on the congestion pricing analysis and scenarios being tested.

Scope of Work

The RCPS is evaluating the efficacy and performance of different pricing concepts through testing a series of modeling scenarios, research, technical papers, and feedback from experts in the field. The study is evaluating congestion pricing as a tool to accomplish the four primary transportation regional priorities identified in the 2018 Regional Transportation Plan (RTP): addressing climate, managing congestion, getting to Vision Zero (safety), and reducing disparities (equity).

This analysis will provide a foundational understanding of how congestion pricing tools could perform with our region's land use and transportation system. The intent is to inform policy makers and existing and future projects in our region.

Project Goal: *To understand how our region could use congestion pricing to manage traffic demand to meet climate goals without adversely impacting safety or equity.*

Performance Measures

Metro staff is using performance measures from the system evaluation of the 2018 RTP and those measures associated with the 2018 RTP priorities. Table 1 illustrates the crosswalk between the 2018 RTP priorities, outcomes being measured, and performance measures. The 2018 RTP performance measures serve as a starting point for potential performance measures for this study, and others may be considered and added based on advice and suggestion from outside expertise and if other tools and resources are available.

The performance measures in Table 1 below include outputs that can be derived from the regional transportation model, the Motor Vehicle Emissions Simulator (*MOVES)* model, and geographic information systems (GIS) analysis to demonstrate how well the different congestion pricing scenarios perform with regard to the four 2018 RTP priorities.

Table 1. Crosswalk between 2018 RTP Priorities and Regional Congestion Pricing Study
Performance Measures

2018 RTP Priority	Outcome Being Measured	Performance Measure Proposed for Congestion Pricing Tools
Equity	Accessibility	• Access to jobs (emphasis on middle-wage) • Access to community places • System completeness of active transportation network
Safety[1]	Eliminate fatal and severe injury crashes for all modes of travel.	• Level of investment in improvements that address fatalities and serious injuries on high injury corridors
Climate Change	Reduce emissions from vehicle	• Percent reduction of greenhouse gases per capita • Percent reduction of criteria pollutants and transportation air toxics • Percent reduction of vehicle miles traveled per capita • Shift in travel behavior
Traffic Congestion	Multimodal travel times Mode split/shift Mode miles traveled (e.g. person miles traveled, vehicle miles traveled)	• Travel time between regional origin-destination pairs during mid-day and evening commute hour peak by mode of travel (e.g. transit, bicycle) • System-wide number of miles traveled (total and share of overall travel) by different modes of travel • Average weekday transit boardings for all transit service providers (e.g. TriMet, SMART, C-TRAN and Portland Streetcar, Inc.)

Evaluation of Different Pricing Concepts

The study is evaluating five different pricing concepts to understand how they would perform in
our region with our land use and transportation system. Pricing concepts being assessed are:
- Cordon: vehicles pay to enter a defined boundary (usually a highly congested area)
- Area: vehicles pay to travel within a defined boundary
- Vehicle Miles Traveled/Road User Charge: a charge based on how many miles are traveled
- Roadway: a direct charge to use a specific roadway or specific roadways
- Parking: charges to park in specific areas

To understand how these different concepts could perform, staff is developing modeling scenarios
for each concept to run through the regional travel demand model. Some of the pricing concepts
will be evaluated multiple times by adjusting the scenarios tested for a single factor and/or for
testing performance of certain mitigation strategies. These scenarios will be compared to each
other and a Baseline Scenario based on the RTP 2027 Financially-Constrained network.

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[1] Because crashes cannot be projected, this performance measure will take an observed approach looking at
the level of safety investment and location of safety investment.

Preliminary Congestion Pricing Modeling Scenarios

Table 2 describes the preliminary pricing scenarios developed to test different pricing concepts. The scenario assumptions/components (such as geographies, time of day charged, and prices) will be adjusted to demonstrate how these different pricing concepts could perform. For example, staff may adjust the boundaries for a cordon or area scenario, the geographic areas subject to parking charges, or time of day for charges. Also, the roadways tolled could be adjusted to include key arterials or to remove some freeway segments. Amounts charged to drivers/parkers could also be adjusted to reveal impacts on performance.

Table 2: Preliminary Pricing Scenarios

	VMT (2 runs)	*Cordon*	*Area*	*Parking*	*Roadway (3 runs)*
Description	Toll applied to miles driven regardless of location Two runs: • Representing OReGO gas tax replacement • Higher charge	Toll charged to enter a specific area; no tolls for driving within or exiting the area	Toll charged to operate within an area; charge increases with mileage driven within the area	Parking pricing increased throughout region based on assumptions in the 2018 RTP 2040 FC	Toll charged on freeway links throughout region Three runs (see below)

Assumptions	Applied as higher per mile operating costs (2010$):
	• Run 1: $0.216
	• Run 2: $0.343
	• Base: $0.211
	   • 2010/2011 OR state fuel tax: $0.30 /gallon
	   • Ave 2010 region pass veh fuel economy: 20.4 mpg
	   • Ave 2010 OR state fuel tax: $0.0147/mi
		• Cordon area is downtown Portland and parts of NW Portland (see map below)
		• $7 (2020$) toll to enter the area the cordon area, reflected as $5.63 in the model (2010$). This is the high end of reasonable range of prices based on tolls in other cities
			• Toll area is similar to cordon area
			• E-W distance along Burnside = 1.6 miles
			• Cordon cost / 1.6 = $5/mile.
				• Double all 2040 FC short-term and long-term parking costs (see parking costs section below)
				• Second run may use different costs
					• Run 1: equivalent to VMT2 run on a per mile basis
					• Run 2: double Run 1 cost
					• Run 3: triple Run 1 cost

Geography	**Region (MPA)** See Figure 1	See Figure 2	See Figure 3	See Figure 4	**Region (MPA)**

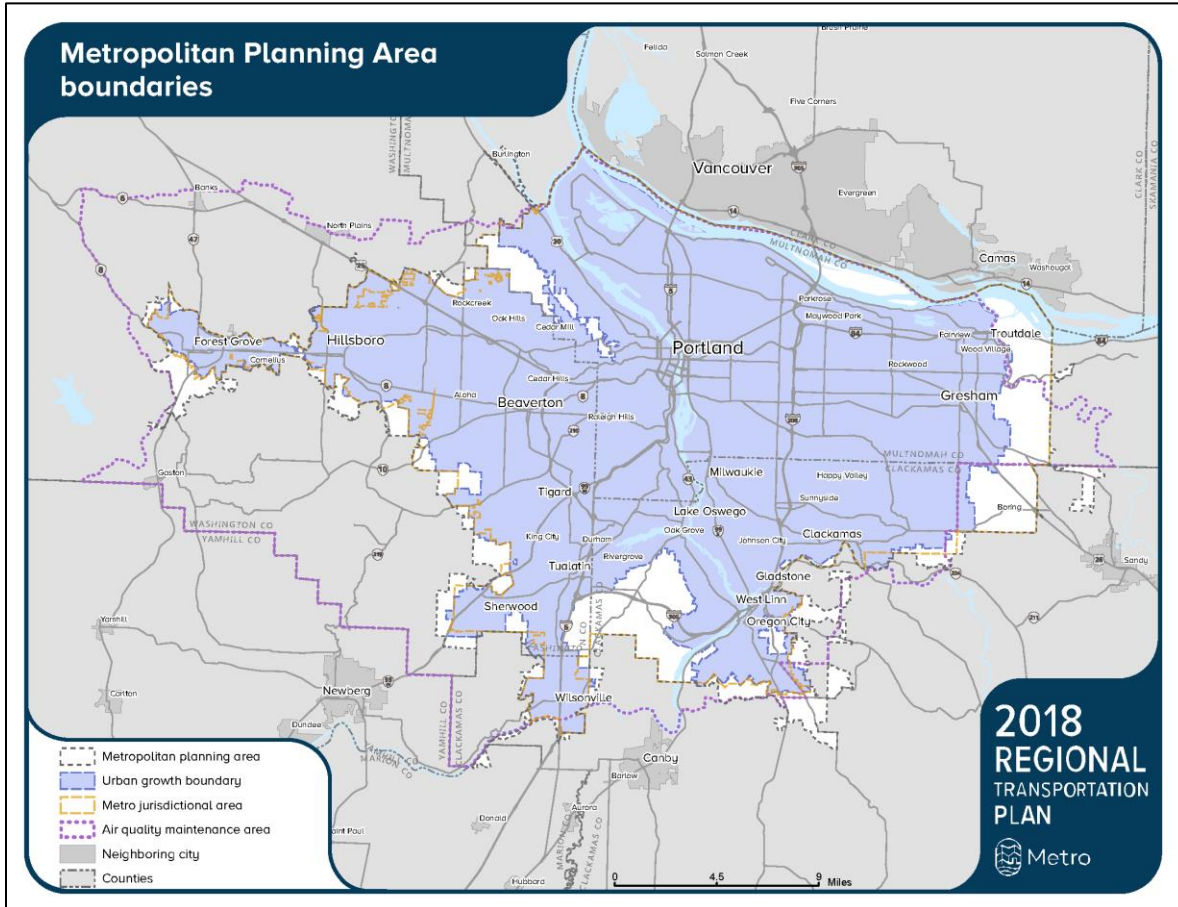Figure 1. Metropolitan Planning Area Boundaries

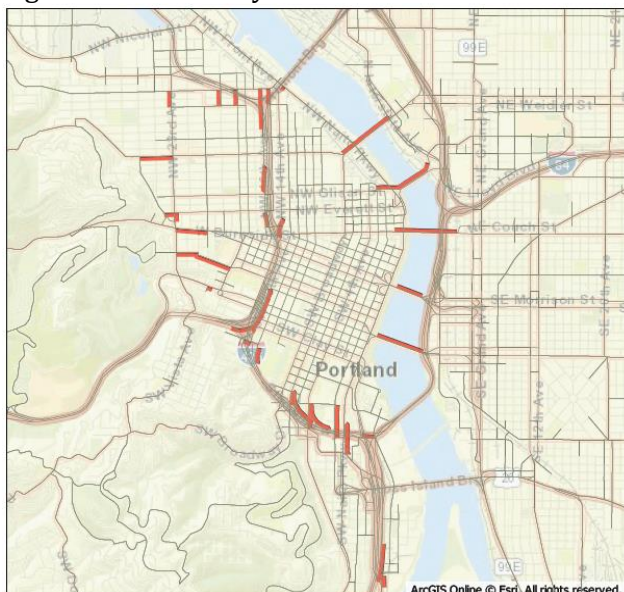Figure 2. Preliminary Cordon Scenarios tolled links

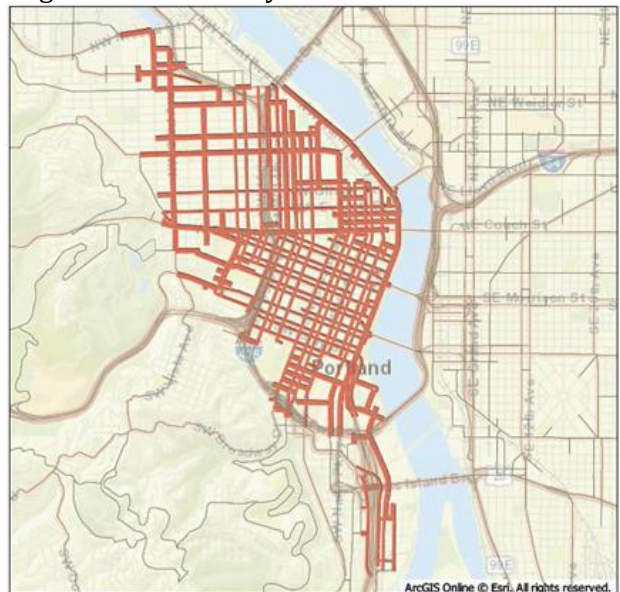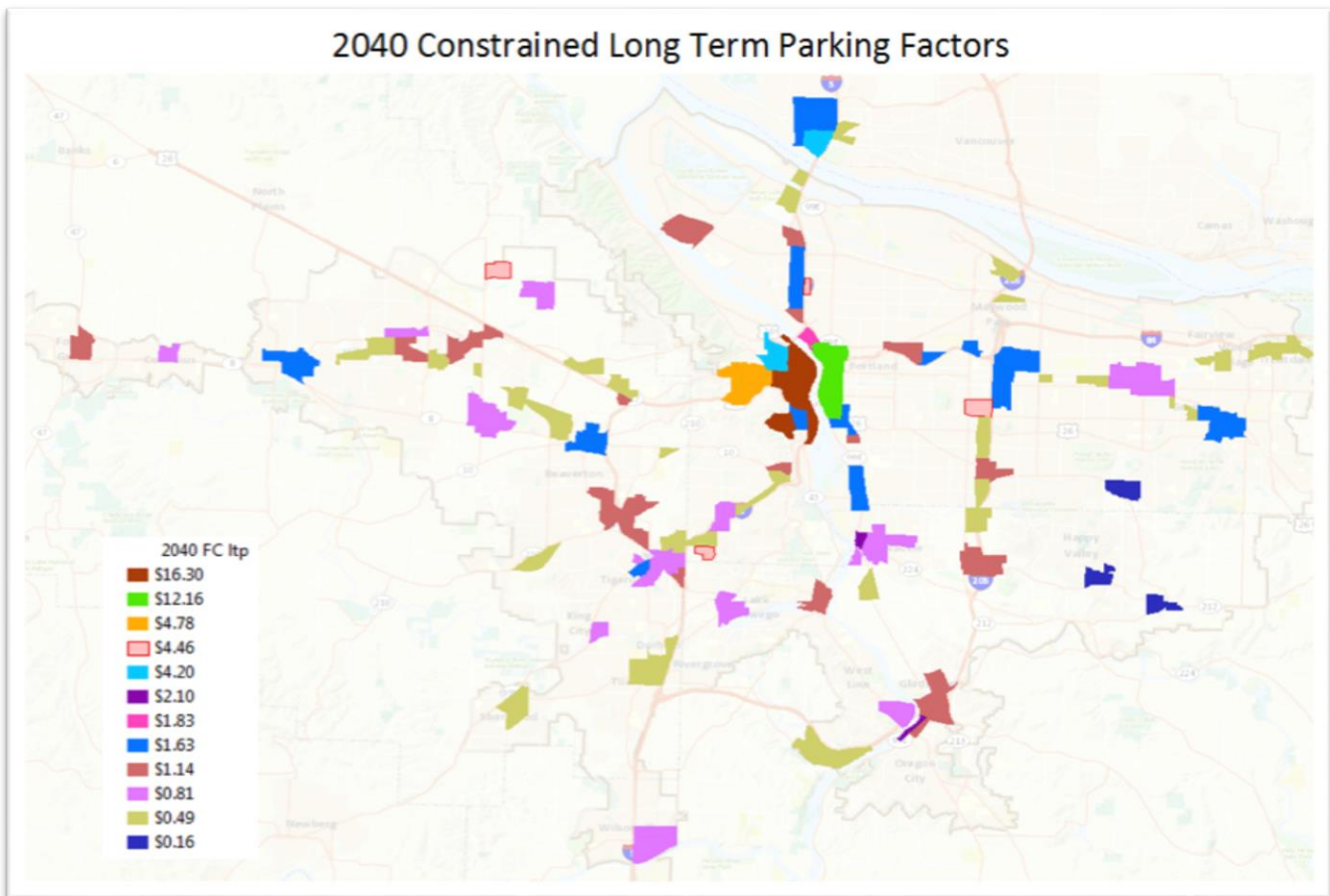Figure 3. Preliminary Area Scenarios tolled links

Figure 4: Preliminary Parking Scenarios Parking Charge Locations

TPAC Discussion Questions
- What questions or comments do TPAC members have on the approach, performance measures, tools, or geographies for the Regional Congestion Pricing Study?
- Are there other geographies we should consider for the cordon, area, or parking concepts?
- Are there other roadways we should consider tolling for the roadway concept?

Next Steps
Metro and the consultant team will continue to analyze the preliminary scenarios' modeling outputs to understand their performance. Based on their findings and feedback from TPAC and project partners, Metro staff will adjust the scenarios and model and test revised scenarios.

RCPS staff will return to TPAC in the fall to share the findings from the adjusted scenario analyses and gather further input. The TPAC discussion will include an assessment of the performance of the different pricing concepts based on the model and any off-model analysis. In addition, any updates related to the tools, performance measures, and any possible modifications to the analysis approach will be discussed. After gathering input from TPAC, the findings will be refined and shared with a panel of pricing experts that will provide feedback in winter 2020.

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Metro Regional Congestion Pricing Study

ROUND 1 OF MODELING RESULTS – 10/7/20 EARLY FINDINGS

Key Takeaways

VMT1

1. The cost structure of VMT1 is such that out-of-pocket costs for driving are similar to what they are today.
2. Drivers are not discernibly paying more in this scenario, but pay by mile driven.
3. The scenario does not move the needle in relation to performance metrics.
   a. No change in VMT
   b. No change in mode split
   c. No reduction in delay
   d. No change in access to jobs by transit or auto

VMT2

1. VMT2 is approximately 1.5 times the cost of driving today (based on operating costs and gas tax).
2. It shows a very substantial impact to driver behavior at a region-wide scale.
   a. Largest reduction in VMT
   b. Largest shift in mode split for the region as a whole
3. All geographies show some benefit in terms of travel time reductions, however benefits are highest to the outer parts of the region.
4. There are disproportionate impacts by geography.
5. Total traveler costs at a system-wide scale (for the region) are higher for this scenario than for any other Round 1 scenario.

Cordon1

1. Charges drivers to enter downtown Portland core from any direction.
2. No charge for using throughways (US-26, I-405, I-5)
3. Benefits and impacts are diluted when observed at a regional scale. Benefits are localized.
4. Cost to the region as a whole is low. The cost will only accrue to those entering the cordon.
5. Overall, increases delay (especially on throughways near downtown Portland) as drivers seek to avoid paying toll.
6. Jobs access via auto decreases though there is a slight improvement in job access via transit.
7. Greatest mode shift in Portland alone (both work and non-work trips).

Area1

1. Results similar to Cordon1.
2. Area scenario charges drivers on a link basis within the same downtown Portland core boundary as cordon, but based on distance traveled within the boundary.
3. Similar to Cordon scenario, benefits and impacts are diluted when observed at a regional scale. Benefits are localized.
4. Overall, delay increases (especially on throughways near downtown Portland) as drivers seek to avoid paying toll.
5. Jobs access via auto is reduced though there is a slight improvement in job access via transit.
6. When looking at downtown core, volumes on local streets decrease while highway volumes increase.
7. Similar scale of mode shift in Portland to Cordon1 scenario.

Parking1

1. Parking scenario charges for parking locations identified in the 2040 FC RTP. Costs are doubled over 2040 FC RTP assumed costs for short-and long-term parking.

2. Benefits and impacts are diluted when observed at a regional scale. Benefits are localized.

3. VMT increases (presumably as people drive farther to reach lower cost parking). There is no discernable change to accessibility.

4. Has strong mode shift, especially for work trips, both for Portland and the region as a whole, especially for a shift to transit.

Roadway1

1. Charges for use of "throughways" at a similar rate to VMT2 per mile. Other roadways are not charged. (Throughways are limited access roadways.)

2. VMT does not decrease nearly as much as it does under VMT2 as the charges are limited to the throughways.

3. Lower system-wide traveler costs than the VMT2 scenario.

4. Less effect on mode shift than other scenarios.

5. Access to jobs increases slightly by auto but decreases slightly by transit.

6. Substantially reduces delay on throughways; minimal increase to delay on arterials.

7. Benefits are not uniformly distributed across the region (due to scenario having a non-uniform application).

Roadway2

1. Roadway2 doubles the cost from Roadway1 on throughways.

2. No significant change on system-wide traveler cost across the region.

3. This has an effect on
   a. Reducing VMT.
   b. Reducing person vehicle trips.

4. Still no dramatic change in mode shift.

5. Diversion onto parallel arterials to avoid toll causes a decrease in delay on throughways and an increase in delay on arterials.

6. Diversion onto arterials reduces access to jobs via transit, impacting lower wage workers and people in equity focus areas more than the region as a whole.

Roadway3

1. Roadway3 triples the cost from Roadway1 on throughways.

2. No significant change on system-wide traveler cost across the region.

3. Continued and linear effect on reducing VMT and reducing person vehicle trips.

4. Still no dramatic change in mode shift.

5. Diversion onto parallel arterials increases over Roadway2. This causes a decrease in delay on throughways and an increase in delay on arterials. Diminishing returns.

6. Diversion onto arterials has even more negative impact on access to jobs, especially for lower wage workers and people in equity focus areas (effect seen on both auto and transit access).

METRO REGIONAL CONGESTION PRICING STUDY

EXPLORING CONGESTION PRICING FOR THE REGION

AUGUST 2020

Metro

NELSON NYGAARD

WHAT IS THIS STUDY?

The Metro Regional Congestion Pricing Study is exploring whether congestion pricing can benefit the Portland metro region. Metro is looking at many different pricing tools to understand how pricing could support an equitable, safe and sustainable transportation system.

Congestion pricing was documented as a high priority, high impact strategy in the 2018 Regional Transportation Plan (RTP). A range of scenarios testing different congestion pricing tools will help Metro understand if pricing can help the region meet four of the goals set out in the RTP.

Congestion pricing was identified in the RTP as a high impact strategy

Four RTP goals will be used to evaluate the pricing scenarios:

|	
EQUITY *Reduce disparity*	**SAFETY** *Getting to Vision Zero*
CLIMATE SMART *Reduce emissions*	**CONGESTION** *Reduce traffic*

What is Metro's timeline?

The study is planned to take about 18 months with findings released in early 2021. Leaders around the region may use these findings to inform policies and other transportation projects such as Oregon Department of Transportation's (ODOT) I-5 and I-205 Tolling Project and Portland's Pricing Options for Equitable Mobility (POEM). The findings may also provide information for policymakers who want to propose new congestion pricing projects at the local level.

2019 — 2020 ———————————————————————————————— **2021**

PROJECT START-UP
SUMMER 2019 - WINTER 2020

EXISTING CONDITIONS
WINTER 2020 - SPRING 2020

SCENARIO DEFINITION
SPRING 2020 - SUMMER 2020

SCENARIO ANALYSIS
SUMMER 2020 - LATE 2020

NEXT STEPS
EARLY 2021

Why this study?

Congestion is a problem in the Portland metro region. Changing travel patterns and a growing population mean more traffic and less freedom to travel reliably around the region. Congestion also has devastating economic, social and environmental impacts.
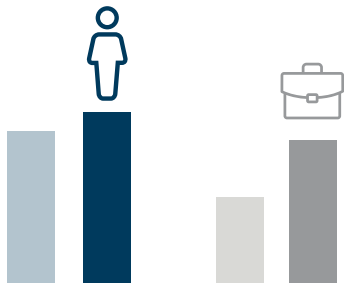
The region expects 600,000 new residents and 350,000 new jobs by 2040.
Source: 2018 RTP

Portland metro is the 8th most congested region in the country.
Source: 2019 Inrix Global Scorecard

1 BOSTON
2 CHICAGO
3 PHILADELPHIA
4 NEW YORK CITY
5 WASHINGTON, DC
6 LOS ANGELES
7 SAN FRANCISCO
8 PORTLAND
9 BALTIMORE
10 ATLANTA

In 2019, people in the Portland metro region spent 89 hours stuck in traffic.
Source: 2019 Inrix Global Scorecard

89HRS =
$1,300
PER PERSON

Due to increasing congestion, TriMet must add service each year to get residents and employees to their destinations on time.
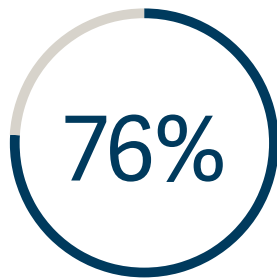*Source: 2018 City of Portland Enhanced Transit Corridors Plan*

+$1-2 MILLION

Congestion got 10% worse between 2018 and 2019.
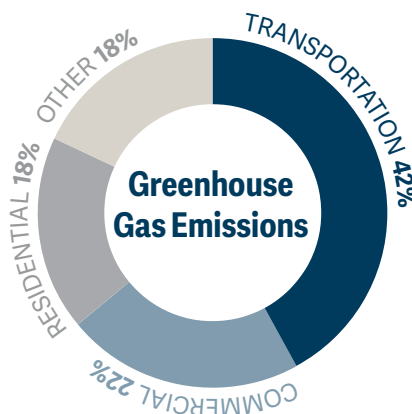*Source: 2019 Inrix Global Scorecard*

2018
2019

76% *of the region's residents think congestion is a serious problem.*
Source: 2019 Oregon Transportation Survey

Greenhouse Gas Emissions

TRANSPORTATION 42%
OTHER 18%
RESIDENTIAL 18%
COMMERCIAL 22%

Transportation accounts for over 40% of Multnomah County's greenhouse gas emissions.
Source: Multnomah County 2017 Carbon Emissions and Trends, Portland Bureau of Planning and Sustainability

CONGESTION & COVID-19

With stay-at-home orders related to COVID-19, congestion in the Portland metro region has declined significantly. But as businesses reopen and the region goes back to work, congestion will return and may be worse if more people choose to drive. As income disparities and unemployment worsen, inequities in the transportation system will be more important than ever to address.
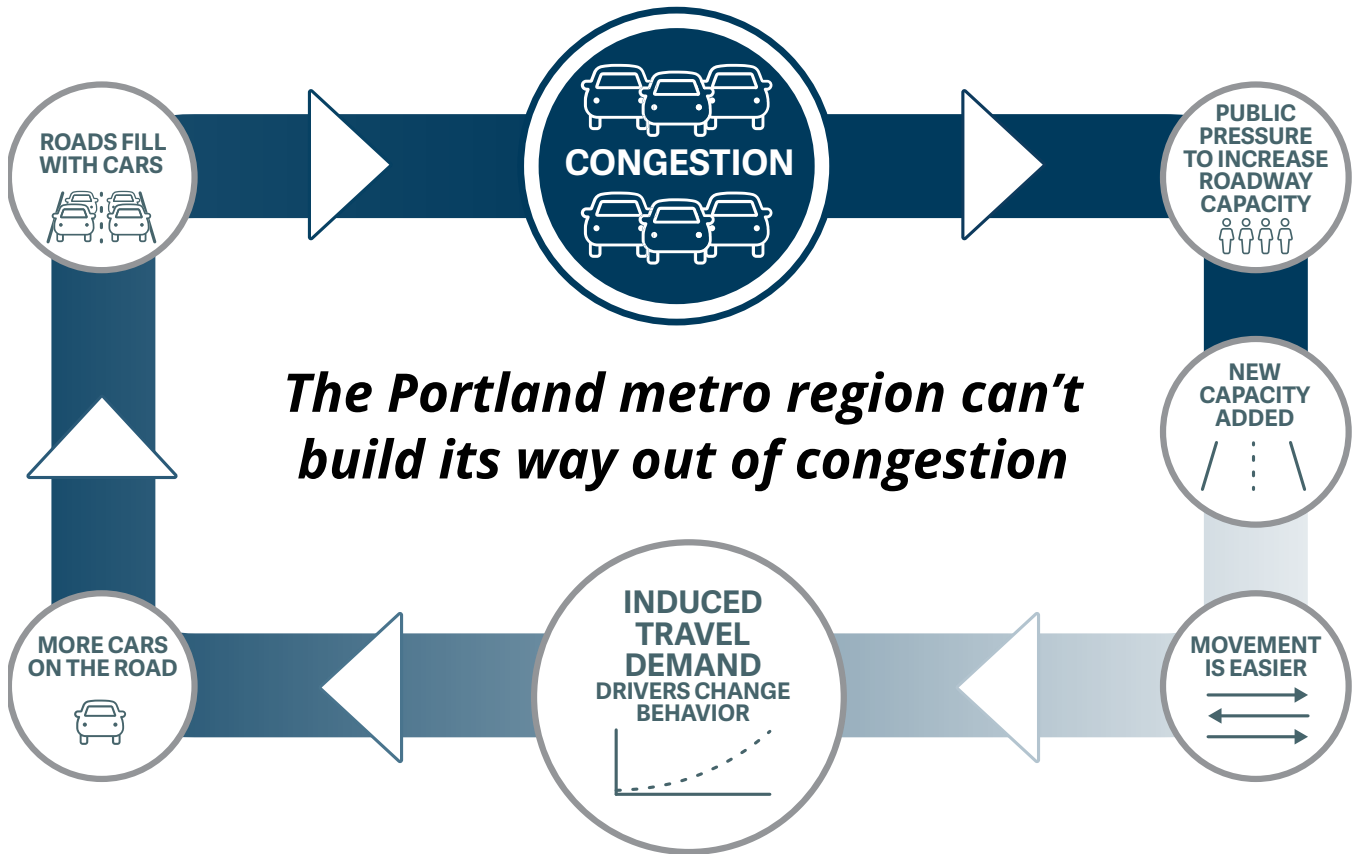
In the Portland region, the 10 lowest income and 10 highest minority neighborhoods experience more exposure to toxic air than the average neighborhood.
Source: 2012 Portland Air Toxics Solutions Committee Report and Recommendations, Oregon Department of Environmental Quality

The Cycle of Congestion

ROADS FILL WITH CARS

CONGESTION

PUBLIC PRESSURE TO INCREASE ROADWAY CAPACITY

The Portland metro region can't build its way out of congestion

NEW CAPACITY ADDED

MORE CARS ON THE ROAD

INDUCED TRAVEL DEMAND DRIVERS CHANGE BEHAVIOR

MOVEMENT IS EASIER

What pricing strategies is Metro exploring?

Metro is exploring if and how four congestion pricing strategies can support the region's priorities to **provide an equitable transportation system.** Each of the pricing strategies could vary by time of day, by area, by types of drivers on the road and by income levels.

VEHICLE MILES TRAVELED FEE
Drivers pay a fee for every mile they travel

CORDON PRICING
Drivers pay to enter an area, like downtown Portland (and sometimes pay to drive within that area)

CORRIDOR PRICING
Drivers pay a fee to drive on a particular road, bridge or highway

PARKING PRICING
*Drivers pay to park in certain areas*

WHY IS THE CURRENT TRANSPORTATION SYSTEM INEQUITABLE?

Transportation investments in the Portland metro region have a long history of contributing to racial inequity and neighborhood displacement. Decades ago, public agencies planned and built new highways that cut through Black communities, splitting neighborhoods and contributing to poor air quality, noise pollution and safety issues. Recently, transit investments have been made without complementary affordable housing strategies, leading to gentrification and further displacement.

Today, while the region's residents all feel the impacts of congestion, historic inequities in the transportation system amplify impacts on people of color and low-income people:

- Housing costs are increasing faster than incomes, making travel distances longer for people of color and low-income people.

- Communities of color and low-income communities have longer commutes, made slower and more unreliable when roadways are congested.

- Major roads and freeways often run through communities of color and low-income communities, resulting in disproportionately high rates of air pollution and chronic illnesses.

In the Portland region, average commute times for Black commuters are 13% longer than white commuters.

+13%

VS.
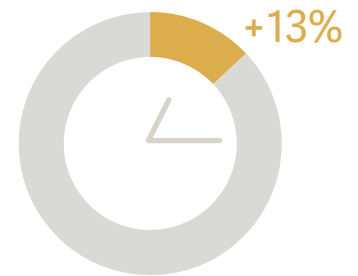
The lowest income households spend 35% of their income on transportation. Those with the highest income spend 13% or less.

Source: U.S. Bureau of Transportation Statistics

Funding is limited for travel options that communities of color and low-income communities depend on:

FEDERAL, STATE AND LOCAL GAS TAXES AND FEES PROVIDE REVENUE

INFLATION AND HIGH-EFFICIENCY VEHICLES SHRINK POTENTIAL REVENUES

MOST REVENUES ARE SPENT ON **PRESERVING AND BUILDING STREETS**

REMAINDER CAN BE SPENT ON **TRANSIT, BICYCLE AND PEDESTRIAN PROJECTS**

How can congestion pricing advance equity?

Congestion pricing strategies have the potential to enhance racial equity and benefit historically marginalized communities (people of color, people with limited English proficiency and people in poverty), as well as all residents of the region. This largely depends on how people are charged and how revenue from congestion pricing strategies is spent.

AFFORDABILITY

Unlike sales taxes, fuel taxes and many other transportation funding sources, congestion pricing programs can offer discounts, set caps (the maximum amount that someone might need to pay), provide rebates or fully exempt certain drivers based on income level or other characteristics.

SAFER STREETS

Pricing revenues can be invested in enhanced bicycle and pedestrian networks to improve street safety and provide benefits to historically disadvantaged communities. Pricing can also decrease the number of cars on the road, increasing safety for people walking and biking.

HEALTHIER COMMUNITIES

Pollution from cars and trucks is tied to increased rates of asthma, heart disease and impaired lung function. In the Portland region, urban low-income neighborhoods and communities of color are disproportionately exposed to air pollution. Congestion pricing can help reduce traffic and the associated health risks to these groups.

BETTER MOBILITY OPTIONS

Revenue from congestion pricing strategies can help to fund a variety of mobility options, such as more transit service, roadway improvements to make transit travel times more predictable, carpool and vanpool programs and new mobility programs to increase choices for people who spend more time in traffic.

PROGRAMS FOR SENIORS AND PEOPLE WITH DISABILITIES

Special programs for those with limited mobility can ensure that seniors and people with disabilities can travel around the region. These programs can be funded by revenues from congestion pricing.

WHO ELSE PRICES?

This study will build on lessons learned from other cities to explore whether pricing makes sense for the region. Many European cities have had congestion pricing programs in place for decades, and major North American cities are now studying whether pricing could help to ease their congested streets.

For cities that have implemented congestion pricing programs:

- Their programs have built on aggressive transportation demand management programs, much like Metro's Regional Travel Options program, which provides grants and supports efforts that increase walking, biking, ridesharing, telecommuting and public transit use.

- The goals of congestion pricing programs are wide ranging—they are not just about reducing the number of vehicles on the road. They're also focused on improving air quality and equity.

- Most programs provide a revenue stream that funds transportation options and services. In many cases, this means significant increases in public transit investments that serve people of color and low-income people.

- Public and business acceptance typically increases dramatically after implementation.

Congestion pricing programs in place or under study

VANCOUVER, BC
SEATTLE
PORTLAND
SAN FRANCISCO
LA
CHICAGO
DC
NYC
ATLANTA

GOTHENBURG
STOCKHOLM
LONDON
MILAN
MADRID

SINGAPORE

BUENOS AIRES

IN PLACE
IN PLACE, BUT DELAYED
UNDER STUDY

What benefits have international cities seen?

STOCKHOLM

- The congestion pricing program has reduced traffic by 22% and reduced greenhouse gas emissions by 14%. *Source: SFCTA, Mobility, Access, and Pricing Study: Case Studies: Stockholm and London, 2010*
- Program revenues have funded 18 new regional bus lines and 2,800 new regional park-and-ride spaces. *Source: SFCTA, Mobility, Access, and Pricing Study: Case Studies: Stockholm and London, 2010*
- After congestion pricing was implemented, the number of acute asthma cases in young children dropped by about 50%. *Source: Simeonova, E, et al., Congestion Pricing, Air Pollution and Children's Health, 2018*

LONDON

- Prior to congestion pricing, traffic in central London averaged 2-5 mph. Since implementation, the average traffic speed has increased to 10 mph. *Source: SFCTA, Mobility, Access, and Pricing Study: Case Studies: Stockholm and London, 2010*
- London increased bus service in the pricing zone by 27%, adding more predictability and faster trips. As a result, bus ridership increased 38% in two years. *Source: Congestion Charging Central London, Impacts Monitoring Second Annual Report, 2004*

What can Metro learn from North American studies?

NEW YORK CITY

In 2019, New York City implemented a congestion zone surcharge on for-hire vehicles (like taxis, Uber and Lyft) in Manhattan as part of its phased approach to pricing. Future phases, planned for implementation in 2021, include a vehicle fee for crossing into a specified zone. A portion of the revenue will be reinvested in the city's subway system.

SAN FRANCISCO

In 2019, the San Francisco County Transportation Authority (SFCTA) began to explore how a fee to drive downtown could achieve congestion, climate, equity and safety goals. The study builds on a 2010 Study, which evaluated the applicability of congestion pricing to San Francisco.

VANCOUVER B.C.

A 2018 study considered how congestion pricing could reduce traffic congestion, promote fairness and support transportation investment. A second phase of study is developing a more detailed approach to a pricing program.
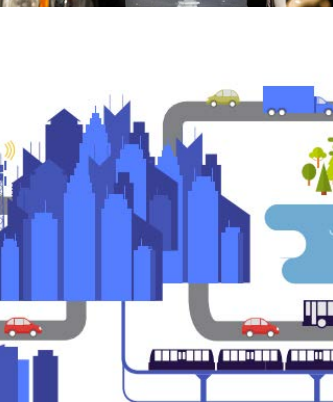
HOW DOES THIS RELATE TO METRO'S PARTNERS' WORK?

Metro, the ODOT, and the City of Portland are all working on projects that consider ways to price transportation to address challenges related to equity, climate change, congestion, and safety. Each agency makes decisions for different parts of our region's transportation system. Each has separate projects underway to help address issues specific to those geographies. The three agencies are coordinating their efforts to leverage each other's work, learn from one another and share findings.

METRO'S REGIONAL CONGESTION PRICING STUDY
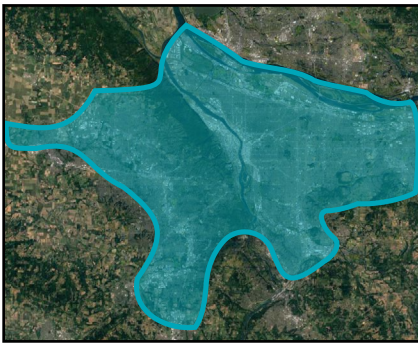
Metro is studying potential effects of congestion pricing for the entire Portland metro region.

CITY OF PORTLAND'S PRICING OPTIONS FOR EQUITABLE MOBILITY PROJECT

Portland is studying how pricing might produce a more equitable transportation system within the City.

ODOT'S I-5 AND I-205 TOLL PROJECTS
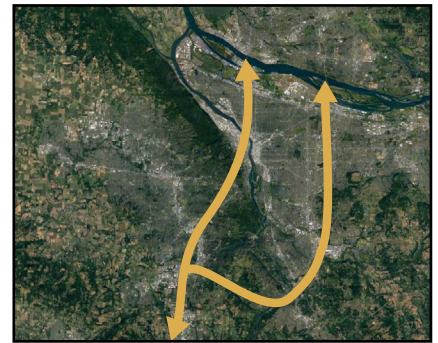
ODOT has identified segments of I-5 and I-205 for future tolling.

Metro's Regional Congestion Pricing Study

PROJECT ELEMENTS

- Conduct technical study of different pricing tools
- Coordinate with existing committees (Transportation Policy Alternatives Committee, Joint Policy Advisory Committee on Transportation, and Metro Council) for guidance
- Conduct transportation modeling and other analyses
- Convene Expert Panel to review results

PROJECT OUTCOMES

- Technical papers on best practices, equity in pricing, current transportation funding, and barriers to implementation
- Report on performance of pricing tools
- Foundational understanding of whether pricing can work for the region to inform policy makers
- Identification of needs for further study

PBOT
PORTLAND BUREAU OF TRANSPORTATION

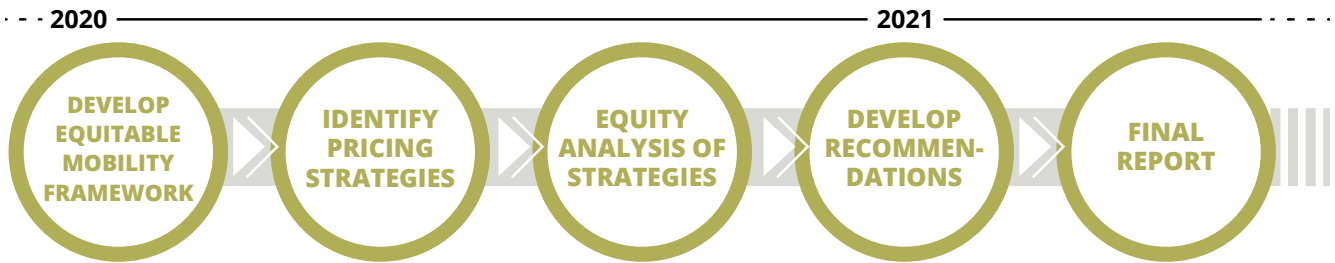# City of Portland's Pricing Options for Equitable Mobility (POEM) Project

POEM is exploring if and how new pricing strategies could be used in the City of Portland to improve mobility, address the climate crisis, and advance equity for people historically underserved by the transportation system. The project will consider pricing strategies that the City can implement itself and inform the City's participation in interjurisdictional conversations about pricing. Topics to explore include prices on parking, commercial fleets and right-of-way access, tolling, cordons and congestion zones and vehicle miles traveled.

PROJECT ELEMENTS

- Convene a community Task Force
- Develop an Equitable Mobility Framework for analyzing pricing strategies
- Explore conditions and complementary strategies needed for making pricing equitable

PROJECT OUTCOMES

- Inform the City's transportation pricing policies and role in interjurisdictional pricing conversations
- Final report summarizing technical analysis, Task Force recommendations, and City next steps

2020 ———————————————————————————————— **2021**

(DEVELOP EQUITABLE MOBILITY FRAMEWORK) › (IDENTIFY PRICING STRATEGIES) › (EQUITY ANALYSIS OF STRATEGIES) › (DEVELOP RECOMMEN-DATIONS) › (FINAL REPORT)

Oregon Department of Transportation
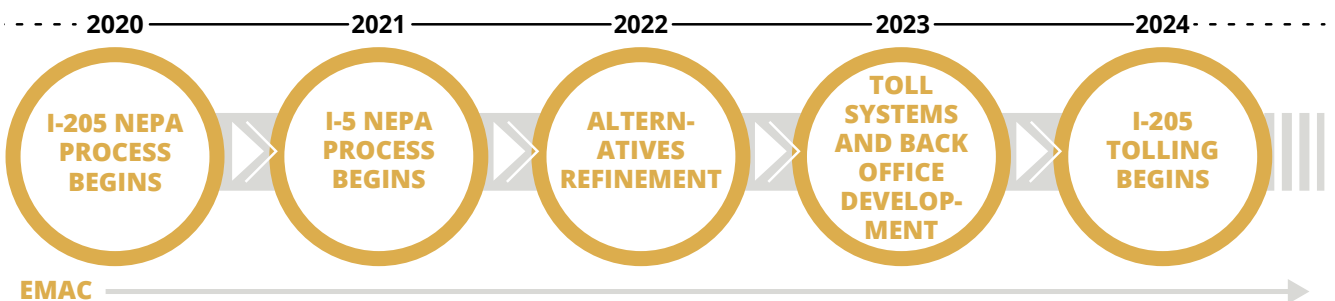
ODOT's I-5 and I-205 Toll Projects

ODOT is implementing tolls to both manage congestion and raise revenue on segments of I-205 and I-5, as identified during the 2017-2018 Value Pricing Feasibility Analysis. ODOT is committed to using an equity focus and has convened an Equity and Mobility Advisory Committee (EMAC) to provide recommendations to the project team and the Oregon Transportation Commission (OTC). The Committee will adopt an equity framework to make recommendations on I-205 and I-5 toll strategies to benefit communities that are currently and historically underrepresented and underserved. The Region 1 Area Commission is also providing recommendations to the OTC and toll team on the tolling program.

PROJECT ELEMENTS

- I-5 and I-205 toll project environmental review
- Equity and Mobility Advisory Committee

PROJECT OUTCOMES

- Toll equity framework
- Selection of preferred alternatives for I-205 and I-5
- Toll implementation

2020 —————— **2021** —————— **2022** —————— **2023** —————— **2024**

(I-205 NEPA PROCESS BEGINS) › (I-5 NEPA PROCESS BEGINS) › (ALTERN-ATIVES REFINEMENT) › (TOLL SYSTEMS AND BACK OFFICE DEVELOP-MENT) › (I-205 TOLLING BEGINS)

EMAC →

Metro

Materials following this page were distributed at the meeting.

Regional Congestion Pricing Study
TPAC Workshop – October 7, 2020

Agenda

- Study Update
- Setting the Stage: Analytical Tools and Equity Measures
- Pricing Scenarios: Round 1 Results
  - What we modeled
  - What we found
- Pricing Scenarios: Round 2 Approach
- Schedule and Next Steps

Workshop Purpose

1. *To review key findings from the first round of pricing scenarios modeling.*

2. *To discuss what aspects the next round of modeling should explore in detail.*

Study Update

Study Goal

To understand how our region could use congestion pricing to manage traffic demand to meet climate goals without adversely impacting safety or equity.

We are Exploring Four Families of Tools

- Focus on 4 tools with multiple possible program designs

- Explore combinations of strategies to maximize goals

- Provide assessment of overall value, not a recommendation

- Recognize that outcomes will be different than other regions

VEHICLE MILES TRAVELED FEE
Drivers pay a fee for every mile they travel

CORDON PRICING
Drivers pay to enter an area, like downtown Portland (and sometimes pay to drive within that area)

CORRIDOR PRICING
Drivers pay a fee to drive on a particular road, bridge or highway

PARKING PRICING
Drivers pay to park in certain areas

6

Project Discussions with Regional Partners

- WCCC TAC and CTAC

- City of Portland and City of Beaverton

- Equity groups - Committee on Racial Equity (CORE)--upcoming ODOT's EMAC and Portland's POEM Equitable Mobility Task Force

Setting the Stage:
Analytical Tools and Equity Measures

Performance Measures…Where we Started

2018 RTP Priority	Outcome Being Measured	Performance Measures Proposed for RCPS
Equity	• Accessibility	⭐Access to jobs (emphasis on middle-wage) • Access to community places • System completeness of active transportation network
Safety	• Eliminate fatal and severe injury crashes for all modes of travel	• Level of investment in improvements that address fatalities and serious injuries on high injury corridors
Climate Change	• Reduce emissions from vehicles	• Percent reduction of greenhouse gases per capita • Percent reduction of criteria pollutants and transportation air toxics ⭐Percent reduction of vehicle miles traveled per capita ⭐Shift in travel behavior
Traffic Congestion	• Multimodal travel times • Mode split/shift • Mode miles traveled (e.g. person miles traveled, vehicle miles traveled)	⭐Travel time between regional origin-destination pairs during mid-day and evening commute hour peak by mode of travel (e.g. transit, bicycle) ⭐System-wide number of miles traveled (total and share of overall travel) by different modes of travel • Average weekday transit boardings for all transit service providers (e.g. TriMet, SMART, C-TRAN and Portland Streetcar, Inc.)

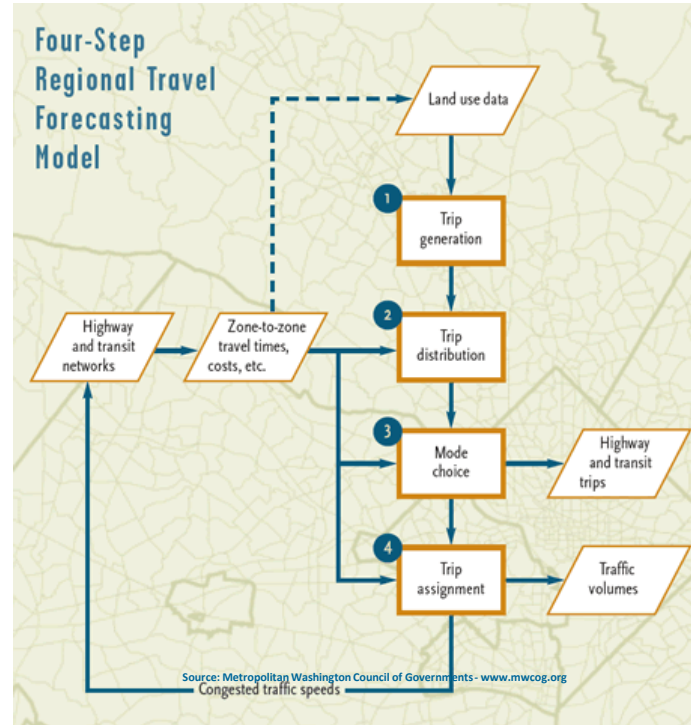⭐ = Measures used in current analysis

Key Performance Measures

- Cost
- Vehicle Miles Traveled (VMT)
- Mode Shift
- Accessibility to Jobs – Transit
- Accessibility to Jobs – Auto
- Delay

Metro Trip-based Travel Demand Model

Four-step modeling process

- Generation
  - *Do I want or need to take a trip?*

- Destination Choice
  - *Where do I want to go?*

- Mode Choice
  - *How will I get there?*

- Route Choice (Assignment)
  - *What route should I take?*

Four-Step Regional Travel Forecasting Model

Source: Metropolitan Washington Council of Governments - www.mwcog.org

Metro Trip-Based Travel Demand Model

Same model form and inputs as applied in latest 2018 RTP and 2020 MTIP updates

- **Kate** version of TDM (estimated from 2011 OHAS data), 2015 base year validation
- Baseline RTP18 2027 and 2040 Financially Constrained networks and assumptions
- A full list of included projects located here:

  https://www.oregonmetro.gov/sites/default/files/2019/04/02/2018-RTP-Appendices-A-and-B-Constrained-Project-List.pdf

	2027 Constrained	2040 Constrained
Throughways	▪ I-5 Rose Quarter ▪ I-5 south and I-205 operational improvements ▪ OR 217 NB and SB auxiliary lanes ▪ I-205 auxiliary lane (in Portland) ▪ I-205 SB widening to three lanes in each direction ▪ I-205/Abernethy Bridge widening ▪ OR 224 widening (third WB lane)	2027 Constrained, plus ▪ I-5/Columbia River Crossing (with tolling as defined in adopted LPA) ▪ US 26 widening to Brookwood Road ▪ OR 217 braided ramps ▪ More I-205 auxilliary lanes ▪ Sunrise Project, Phase 2 ▪ I-5/Boone Bridge SB auxiliary lane ▪ I-5 NB braided ramps from I-205 to Nyberg Road
Transit	**High Capacity Transit** ▪ Southwest Corridor Project ▪ Division Transit Project ▪ Red Line Improvements Project ▪ Central City Transit Capacity Analysis **Enhanced transit concept - hotspots** ▪ Streetcar upgrades on Grand Avenue in Portland ▪ Central City Portals (downtown Portland bridges) ▪ 82nd Avenue ETC (NE Killingsworth Street to SE Clatsop Street) ▪ Powell Boulevard ETC (SE Portland to I-205) **Enhanced transit concept - corridors** ▪ 122nd Avenue ETC (Lents to Parkrose transit center) ▪ Martin Luther King Jr. Boulevard ETC (Portland Central City to N Vancouver Boulevard) ▪ Sandy Boulevard ETC (Portland Central City to Parkrose TC) ▪ 82nd Avenue ETC (Swan Island to Clackamas town center) ▪ Hawthorne Boulevard/Foster Road ETC (downtown Portland to Lents town center) ▪ Streetcar to Montgomery Park in NW Portland	2027 Constrained, plus **High Capacity Transit** ▪ Portland to Vancouver ▪ Steel Bridge Transit Bottleneck **Enhanced transit concept - hotspots** ▪ Inner North Portland ETC (Portland Central City to N Lombard Street) ▪ Caesar Chavez ETC (Sandy to Powell) ▪ Lombard Street ETC (St. Johns to MLK Jr. Boulevard) ▪ SE Hawthorne/50th Avenue ETC (Willamette River to SE Powell) **Enhanced transit concept - corridors** ▪ Tualatin Valley Highway multimodal project (Maple Street to 160th Avenue) ▪ E. Burnside/SE Stark Street ETC (Portland to Gresham) ▪ Tualatin Valley Highway ETC from Beaverton to Forest Grove ▪ Beaverton-Hillsdale Highway ETC from Portland to Washington Square ▪ Cornell/Barnes ETC (Sunset transit center to Hillsboro TC) ▪ 185th/Farmington Road ETC (PCC Rock Creek to Beaverton transit center) ▪ Streetcar on NE Broadway to Hollywood town center

Metro Trip-Based Travel Demand Model
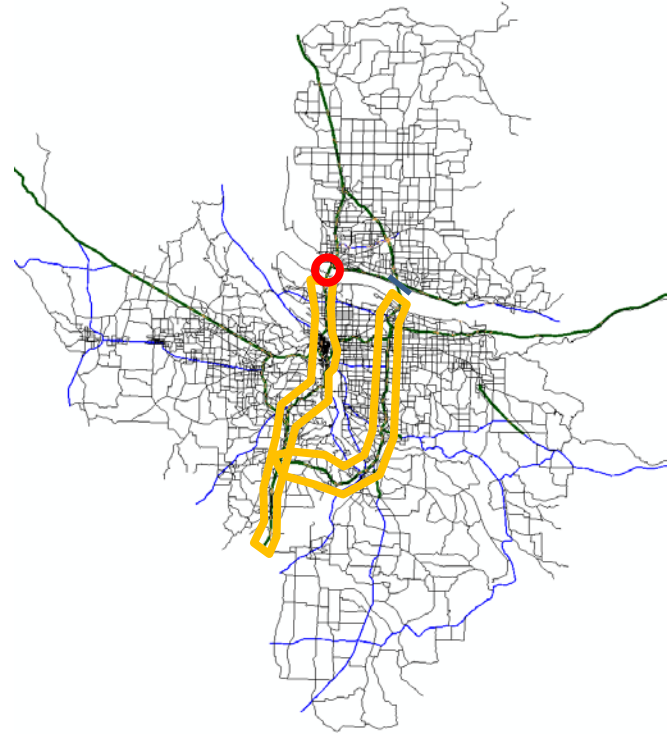## Regional Pricing Application Using Metro Model

Columbia River Crossing
- single-point toll
- revenue maximization

ODOT Value Pricing / Congestion Pricing
- per-link tolls
- all lanes / managed lanes
- congestion management / revenue generation

Other applications of pricing
- VMT toll
- OR-217 on-ramp tolls
- Willamette River bridge tolls
- parking cost increases

Metro Trip-Based Travel Demand Model
Limitations of Model

No current roadway pricing in region
- Impacts of pricing are stated, not revealed

Values of Time established > 10 years ago
- Values of Time may have changed
- Will be addressed in ODOT CP study
- Income-stratified Values of Time

Static assignments in regional model
- Do not react well to high congestion at facility level
- Model best analyzed at regional / sub-regional levels

Temporal granularity is limited to 1-hour increments

Model not sensitive to *trips not taken* as a result of a policy change

14
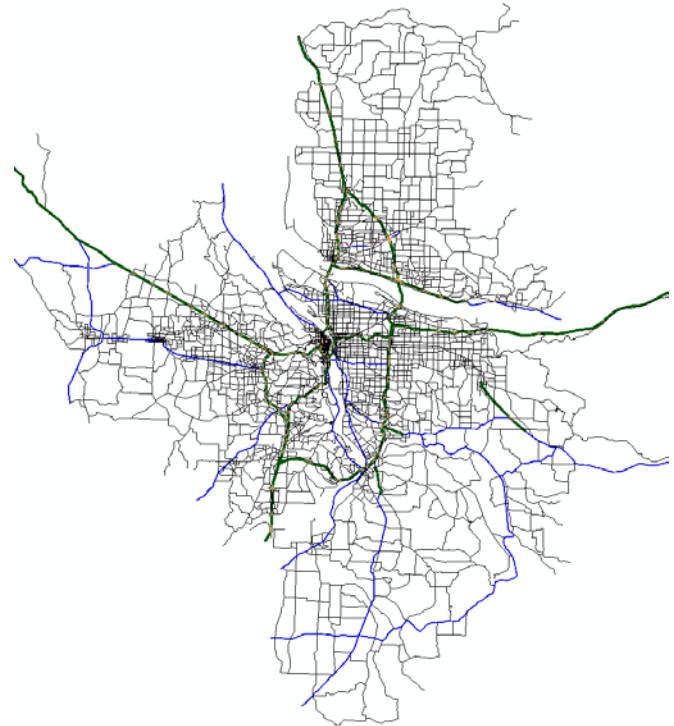
Other Metro Tools

Multiple Criterion Evaluation (MCE) Toolkit

Benefit-cost analysis findings

- Summarizes region-wide outcomes
- Simultaneous cost and benefit accounting
- Enables geographic and market segment benefit reporting (e.g. by Council District)
- Robust evaluations of *Equity, Health & Safety, Travel Options*

MOtor Vehicle Emission Simulator (MOVES)

- Accounts for on-road travel associated with passenger and freight vehicles
- Configured with localized inputs in accordance with EPA conformity guidance
- Emissions estimates for *Greenhouse Gases* and other pollutants

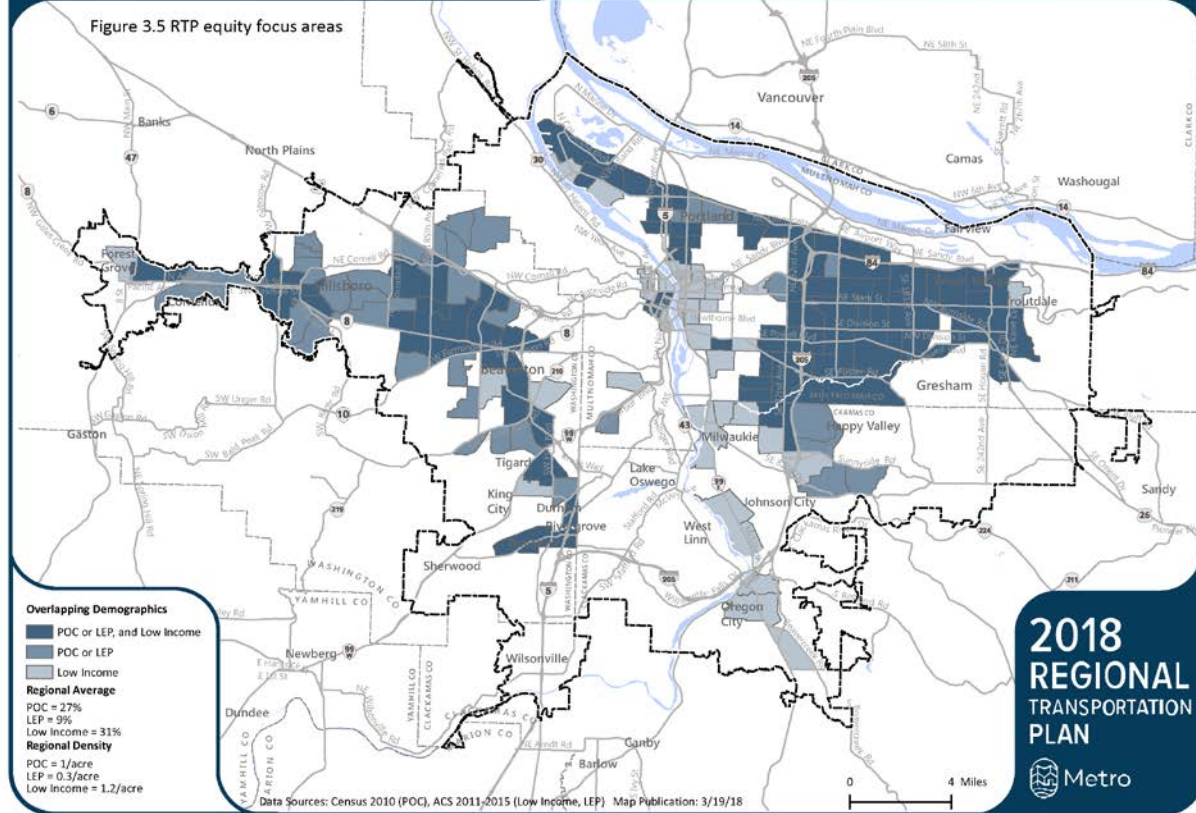| Criterion	Measure	ALT-A	ALT-B
Economic Vitality	Travel Time Savings	694	500
	Travel Time Reliability	25	40
	Vehicle Operating Costs	35	2
	Vehicle Ownership Costs	-	-
Environmental Stewardship	Mobile Source Emissions	(10)	20
	Surface Water	(20)	50
	Highway Noise	(1)	20
Social Goods	Highway Safety	(13)	186
	Physical Activity	(557)	(100)
	Travel Options / Choices	651	1,569
	TOTAL BENEFITS	**804**	**2,287**

MOVES

Motor Vehicle Emission Simulator

Core Tenets of Equitable Pricing

- The current transportation system is inequitable, both in how we pay and the outcomes people experience

- Pricing outcomes must improve conditions rather that simply mitigate impacts

Communities of Color, English Language Learners, and Lower-Income Communities

This map shows census tracts with higher than regional average concentrations and double the density of one or more of the following: people of color, people with low income, and English language learners. Census tracts where multiple demographic groups overlap are identified.

Figure 3.5 RTP equity focus areas

Overlapping Demographics
- POC or LEP, and Low Income
- POC or LEP
- Low Income

Regional Average
POC = 27%
LEP = 9%
Low Income = 31%

Regional Density
POC = 1/acre
LEP = 0.3/acre
Low Income = 1.2/acre

Data Sources: Census 2010 (POC), ACS 2011-2015 (Low Income, LEP) Map Publication: 3/19/18

2018 REGIONAL TRANSPORTATION PLAN

Metro

Equity in the 2018 Regional Transportation Plan

Transportation equity

*The removal of barriers to **eliminate transportation-related disparities** faced by and improve equitable outcomes for historically marginalized communities, especially communities of color*

Racial equity

*The removal of barriers with a **specific focus on eliminating disparities faced by and improving equitable outcomes for communities of color**—the foundation of Metro's adopted equity strategy with the intent of also effectively identifying solutions and removing barriers for other disadvantaged groups*

Baseline Measures: Regional Affordability

Where can a household making less than half of median income afford to rent?

Average salary of a pre-school teacher: $32,090

Combined income of two full-time minimum wage workers: $38,000

Source: Axiometrics, Multifamily NW, Johnson Economics

Percent of 2-bedroom rental units that cost less than $800/month (2011-2015)

- Less than 4%
- 4% - 8%
- 8% - 12%

Three-person household making 49% of median income: **$32,000**

Affordable monthly rent: **$800**

North Clark
5.4%
(98 of 1,825)

Vancouver
8.7%
(1,735 of 19,865)

Camas-Washougal
9.1%
(210 of 2,309)

North Portland
4.7%
(320 of 6,780)

Hillsboro Forest Grove
4.8%
(520 of 10,779)

Downtown
1.3%
(66 of 5,000)

East Portland
3.8%
(491 of 12,957)

Mid County
10.1%
(2,140 of 21,239)

East County
5.4%
(446 of 8,334)

Beaverton-Tigard
4%
(937 of 23,350)

Southwest
2.9%
(157 of 5,324)

Happy Valley
2.6%
(55 of 2,098)

Lake Oswego West Linn
1.5%
(36 of 2,464)

Milwaukie Gladstone Oregon City
5.6%
(520 of 9,344)

Tualatin Sherwood-Wilsonville
2%
(108 of 5,340)

Source: Johnson Economics

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Baseline Measures: Displacement

Displacement of people of color in the Portland Metro Region (1990-2010)

In the Portland region, average commute times for Black commuters are 13% longer than white commuters.

+13%

People of Color

Percent change from 1990 to 2010

46

0

-38

19
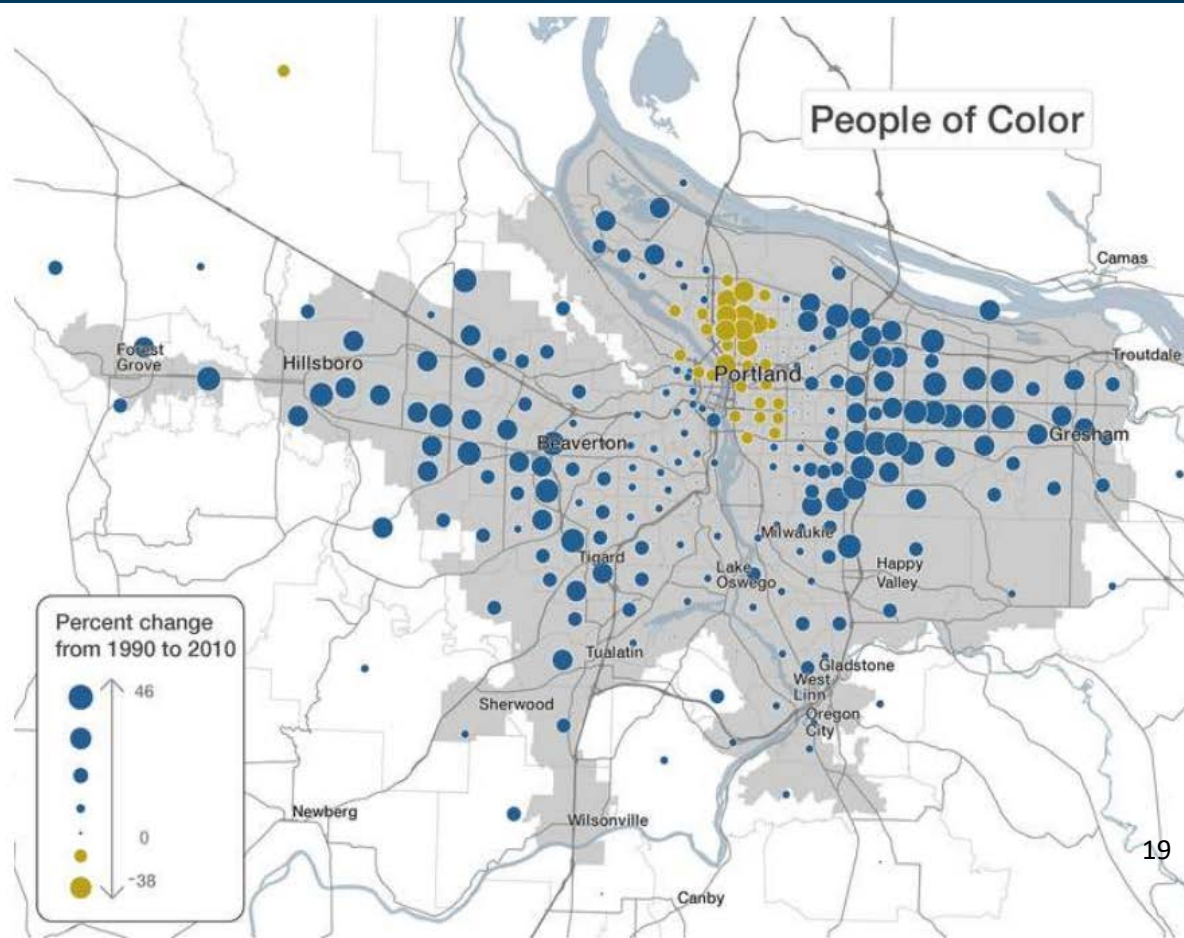
Building An Equitable Program
A Full Equity Strategy

- Go beyond a toolkit

- Connect analysis to further study

- Design scenarios to address barriers

- Inform expenditure framework

- Develop supportive programs

- Establish pre- and post-deployment monitoring

A Framework for Equity Outcomes in New Mobility

With new technologies and services emerging by the month, cities and governing bodies will need a framework for evaluating equity impacts. The framework below is a starting place that can be tailored to meet the needs of communities.

INCREASED ACCESS TO OPPORTUNITY

⇨ Does it overcome barriers (financial, cultural, technological, geographic) to accessing new mobility, so vulnerable populations actually benefit?
⇨ Does it improve, not impede, the movement of public transit?
⇨ Does it increase access to jobs, education, health care, and other destinations?
⇨ Does it reduce travel times for low-income households?
⇨ Does it prioritize the needs and trip patterns of vulnerable populations?

AFFORDABLE OPTIONS

⇨ Is the price low enough for low-income individuals to regularly use the service?
⇨ In instances where existing services such as bus lines are being cut, are there mechanisms to ensure that transportation costs don't increase for low-income households?
⇨ Is it likely to reduce transportation costs in the long run (e.g. by reducing the need for vehicle ownership or for parking in new developments)?

MORE HEALTHY & SAFE COMMUNITIES

⇨ Does it reduce air pollution and greenhouse gas emissions, both of which disproportionately burden low-income communities and people of color?
⇨ Does it serve people with disabilities, or people who walk or bike?
⇨ Are there policies in place to prevent discrimination or racially-biased policing?
⇨ Is it likely to improve health and reduce health disparities for vulnerable populations (e.g. by reducing crashes and fatalities or focusing vehicle electrification in impacted communities)?

REDUCED INCOME INEQUALITY & UNDEREMPLOYMENT

⇨ Does it increase employment with stable, well-paying jobs?
⇨ Does it create pathways for low-income individuals to enter the new mobility work force?
⇨ Are there policies in place to ensure fair treatment of the labor force (e.g. providing a living wage, ability to unionize, benefits, etc.)?[9]
⇨ Are we creating programs to train workers and replace jobs that will be lost with vehicle automation?

Equity in Pricing Program Design

- Program design has the greatest potential to improve outcomes

- Discounts and exemptions can help to reduce potential impacts, but they carry their own challenges for communities

PRICING AND INVESTMENT STRATEGY COMBINATIONS

EQUITY IMPACTS

Strategy Combination	Equity Impact
Variable pricing + targeted exemption + transit and vulnerable communities focus	
Variable pricing + targeted exemption + transit focus	
Variable pricing + targeted exemptions + limited transit investment	
Variable pricing + targeted exemptions + no supportive investments	
24-hr flat rate + transit and vulnerable communities focus	
24-hr flat rate + transit focus	
24-hr flat rate + limited transit investment	
24-hr flat rate + no supportive investments	

MORE EQUITABLE

LESS EQUITABLE

Developing a Reinvestment Plan

- Reinvesting revenue with an equity focus is also critical

- Increasing travel options, creating new connections, and prioritizing affordable modes can support equity

- Strategies must be informed by community members

Sample Strategies to Advance an Equity Agenda

Strategy	Examples
Affordability and Driver Assistance	**Driver Discounts, Caps, and Exemptions**, such as: • Free or discounted transponders • Toll discounts or credits for low-income households • Exemptions for people with disabilities • No tolls during off-peak hours **Cash Payments** for those without credit cards or bank accounts **Transit Discounts**, such as: • ORCA LIFT transit discounts • Subsidized bike and car share memberships or rides
Greater Mobility Options and Safer Active Transportation Networks	**Improved Transit Service**, including: • New routes to more destinations • Faster, more reliable service • Improved stations/stops **Carpool and Vanpool Programs**, such as: • Carpool matching services • New vanpool routes **Pedestrian/Bike Improvements**, including: • Improved pedestrian network • Improved bicycle network • Pedestrian-scale lighting **Emerging Mobility Options**, such as: • Bike share • Car share • Creative use of rideshare services to connect to transit • Shuttles • Carpool apps and programs
Programs for Seniors and People with Disabilities	**Accessible Information**, such as senior help lines and materials **Targeted Transit/Shuttle Routes**
Healthier Communities	**Encourage Clean Air Vehicles**, through strategies such as: • Credits for drivers • Purchase clean transit vehicles

Measuring What Matters
Expanding Equity Analysis

- Work with TPAC and community members to understand what is most important to measure

- Create "equity dimensions" of all performance measures to understand effects on specific communities

- Review and iterate throughout the planning and analysis process

Framing the Equity Analysis

- Where in the region are communities of color and/or low-income communities? What is unique about each of these districts?

- How are these equity focus areas directly or indirectly impacted by the pricing scenarios?

- What are ways to minimize impacts to equity populations? Are there opportunities to reinvest revenues so that they benefit equity focus area? Discounts for key groups?

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Pricing Scenarios:
Tools to Display Results

Our Approach

- We looked at the scenarios from several different angles and performance measures
  - Geographic
  - By equity focus areas
  - Area-wide

- What works? What doesn't?

Critical Round 1 Questions

- Were there any scenarios that just…don't make a difference?

- Are there some scenarios which cause major equity concerns?

- Are there scenarios that might work a lot better if…xyz…were adjusted in Round 2?

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Round 1 Scenarios

	VMT (2 runs)	Cordon	Area	Parking	Roadway (3 runs)
Description	Toll applied to miles driven regardless of location Two runs: • Representing OReGO gas tax replacement • Higher charge	Toll charged to enter a specific area; no tolls for driving within or exiting the area	Toll charged to operate within an area; charge increases with mileage driven within the area	Parking pricing increased throughout region based on assumptions in the 2018 RTP 2040 FC	Toll charged on freeway links throughout region Three runs (see below)

Assumptions	Applied as higher per mile operating costs (2010$):
	• Run 1: $0.216
	• Run 2: $0.343
	• Base: $0.211
	  • 2010/2011 OR state fuel tax: $0.30 /gallon
	  • Ave 2010 region pass veh fuel economy: 20.4 mpg
	  • Ave 2010 OR state fuel tax: $0.0147/mi
		• Cordon area is downtown Portland and parts of NW Portland (see map below)
		• $7 (2020$) toll to enter the area the cordon area, reflected as $5.63 in the model (2010$). This is the high end of reasonable range of prices based on tolls in other cities
			• Toll area is similar to cordon area
			• E-W distance along Burnside = 1.6 miles
			• Cordon cost / 1.6 = $5/mile.
				• Double all 2040 FC short-term and long-term parking costs (see parking costs section below)
				• Second run may use different costs
					• Run 1: equivalent to VMT2 run on a per mile basis
					• Run 2: double Run 1 cost
					• Run 3: triple Run 1 cost

Geography	**Region (MPA)** See Figure 1	See Figure 2	See Figure 3	See Figure 4	**Region (MPA)**

Metropolitan Planning Area boundaries

Legend:
- Metropolitan planning area
- Urban growth boundary
- Metro jurisdictional area
- Air quality maintenance area
- Neighboring city
- Counties

2018 REGIONAL TRANSPORTATION PLAN

Metro

Core Geography
Regional
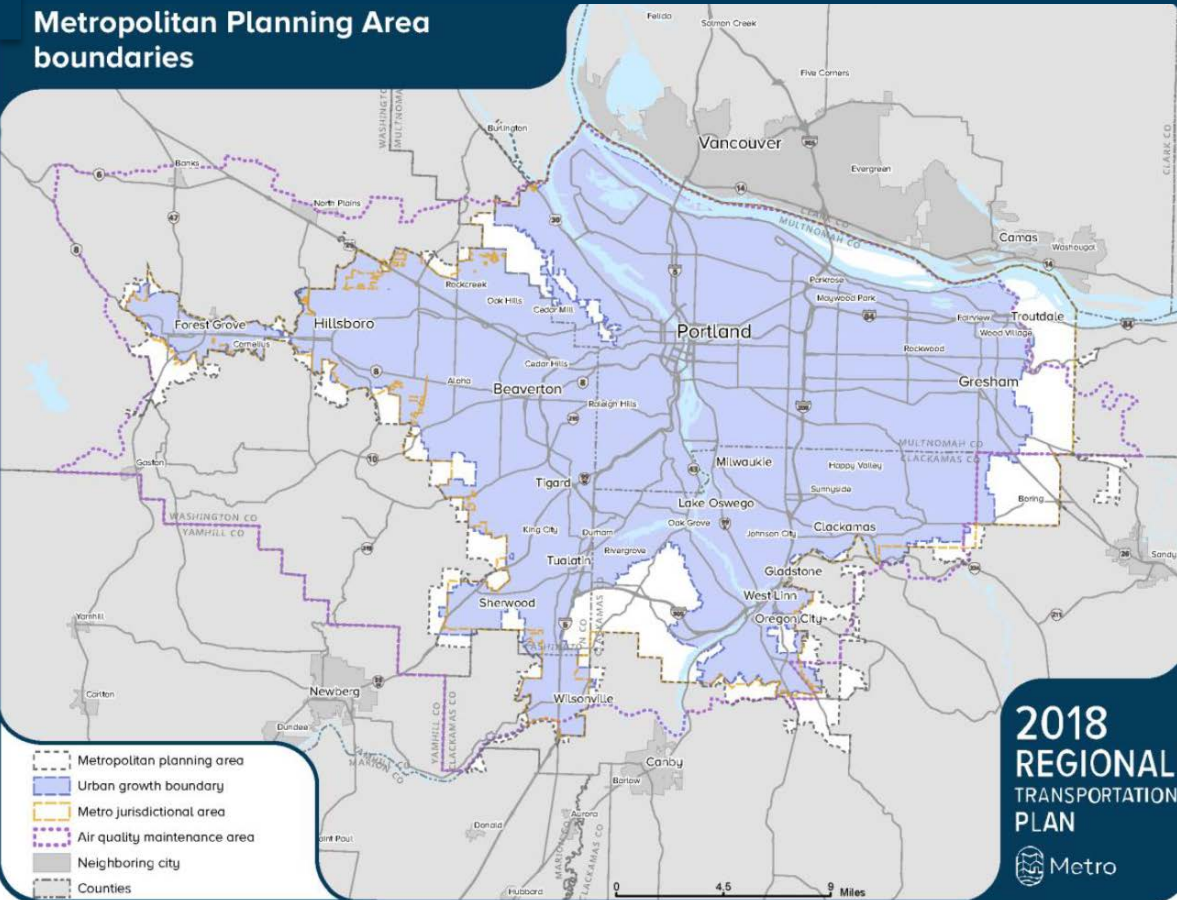
- Used for VMT and Roadway scenarios
- Coincides with MPA boundaries
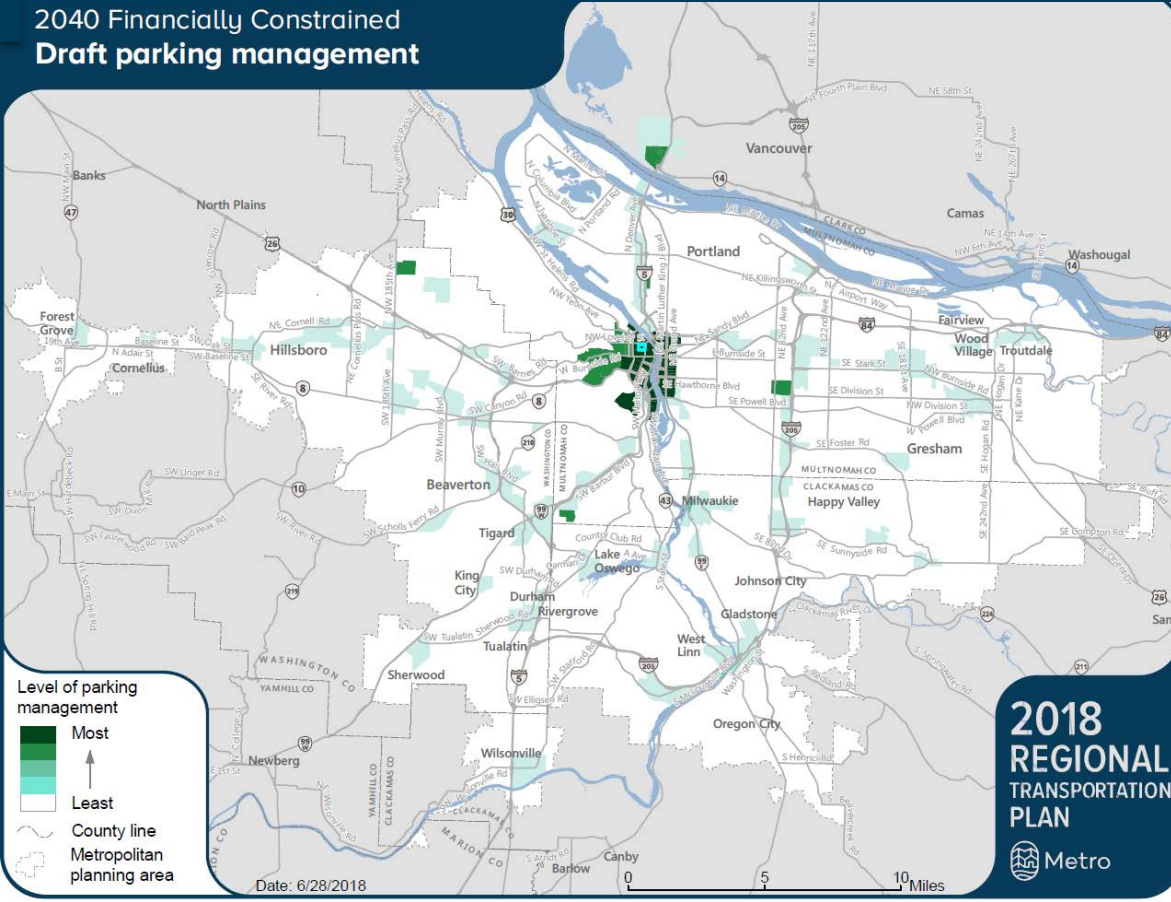- Also includes Clark County (not shown on map)

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Core Geography – Downtown Portland
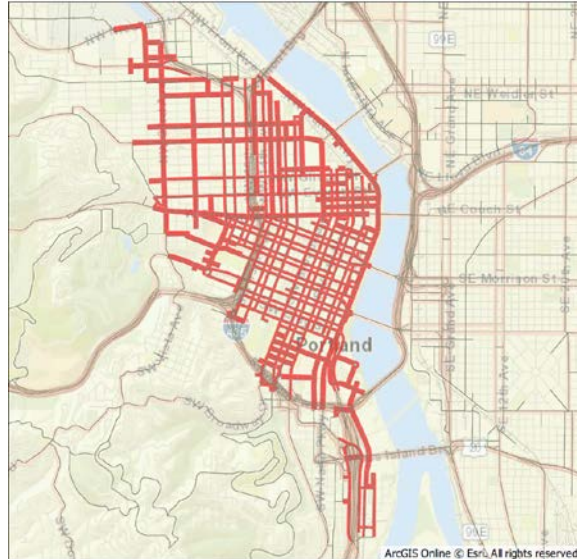
- Used for Cordon and Area Charging scenarios
- Downtown core
  - West of Willamette
  - Also portion of NW 23rd and Goose Hollow

Core Geography
Select

- Used for Parking scenario

- Geography is regional, but focuses on where parking is <u>priced</u>

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Regional Motor Vehicle Network

The three roadway scenarios only price the Throughways shown on this map

Legend:
- Throughway
- Major arterial
- Minor arterial
- Arterial outside UGB
- Urban center
- Employment/Industrial area
- Urban growth boundary
- Metropolitan planning area
- County boundary

(dotted lines are proposed projects and do not identify specific alignments)

See inset map

Inset map

See Section 8.3.1.2 for a description of future planning in the Sunrise Corridor

2018 REGIONAL TRANSPORTATION PLAN

Metro

December 6th, 2018

Geographic Findings

- GIS/map-based

- Focus on travel times and out-of-pocket costs

- Cost is converted to time for mapping

- Great way to see benefits and impacts to geographic groups across the region

Geographic Scenarios Tested

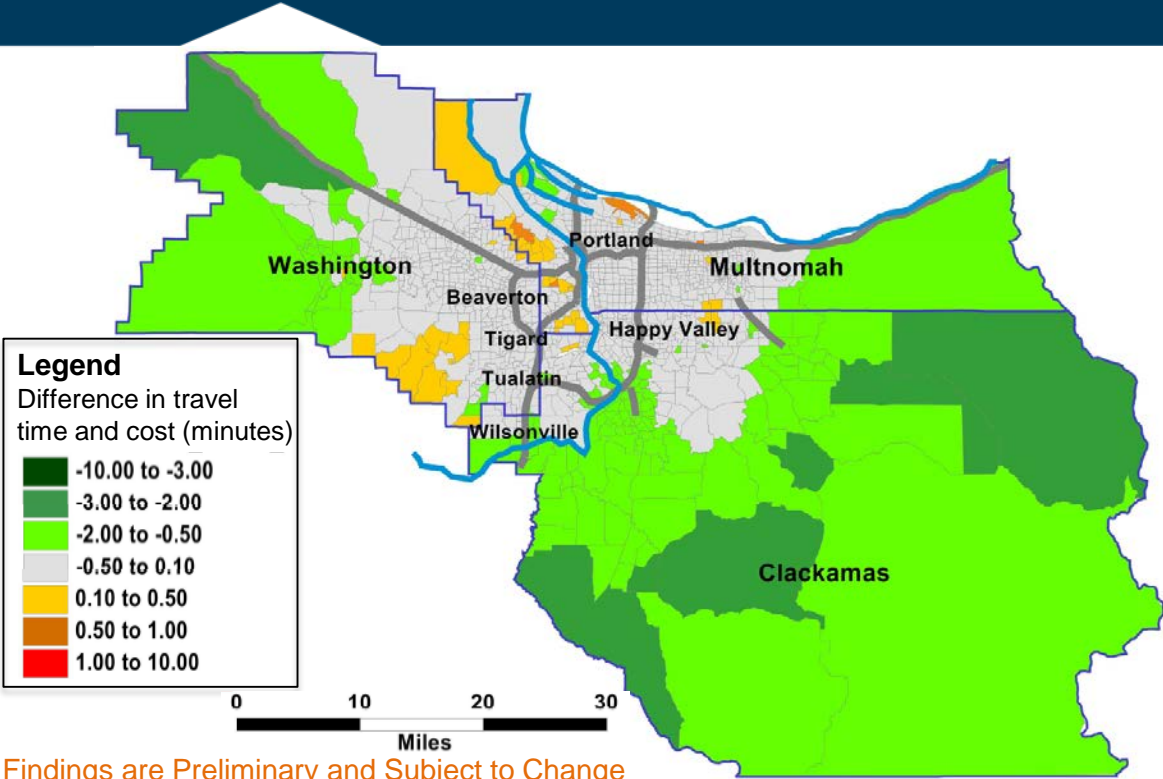|	VMT (2 runs)	Cordon	Area	Parking	Roadway
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Geography	**Region (MPA)** See Figure 1	See Figure 2	See Figure 3	See Figure 4	**Region (MPA)**

Geographic Results
VMT2 Scenario – Travel Time Only
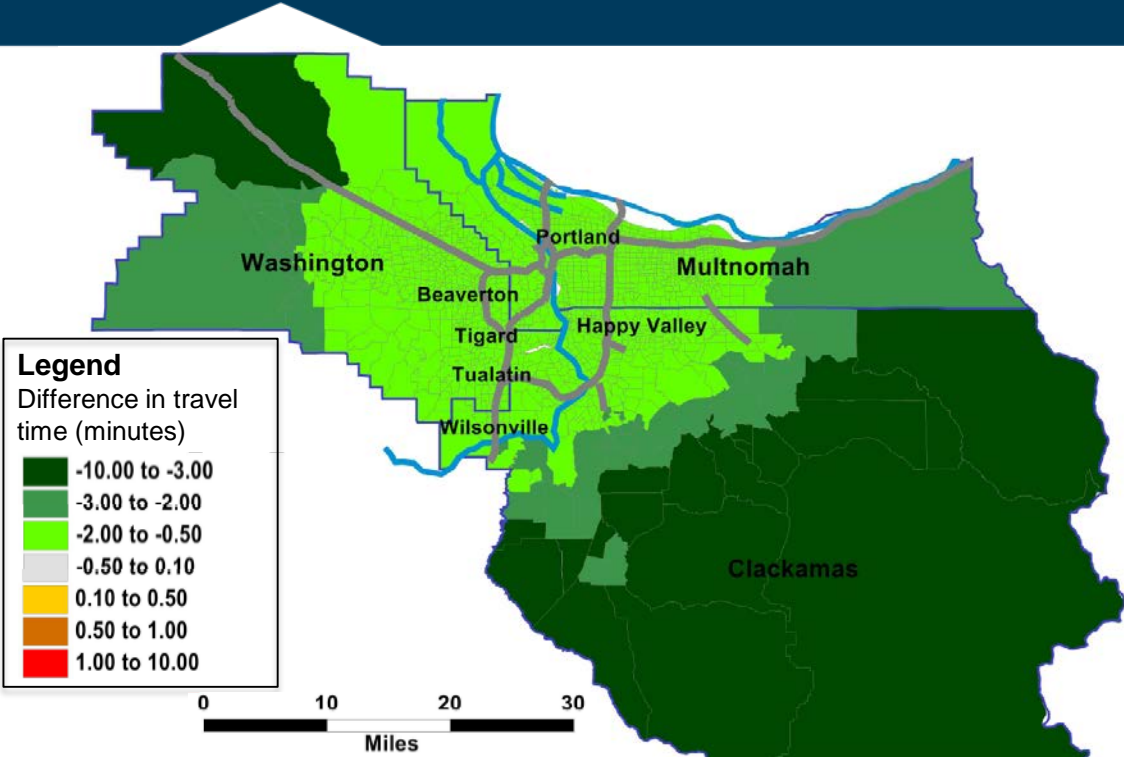
- When travel time alone is considered
  - Everyone benefits
  - Those who drive the farthest appear to benefit the most

Legend
Difference in travel time (minutes)

- -10.00 to -3.00
- -3.00 to -2.00
- -2.00 to -0.50
- -0.50 to 0.10
- 0.10 to 0.50
- 0.50 to 1.00
- 1.00 to 10.00

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Geographic Results
VMT2 Scenario – Travel Time **+ Cost**

Legend
Difference in travel time and cost (minutes)

Color	Range
	-10.00 to -3.00
	-3.00 to -2.00
	-2.00 to -0.50
	-0.50 to 0.10
	0.10 to 0.50
	0.50 to 1.00
	1.00 to 10.00

0   10   20   30
Miles

Findings are Preliminary and Subject to Change
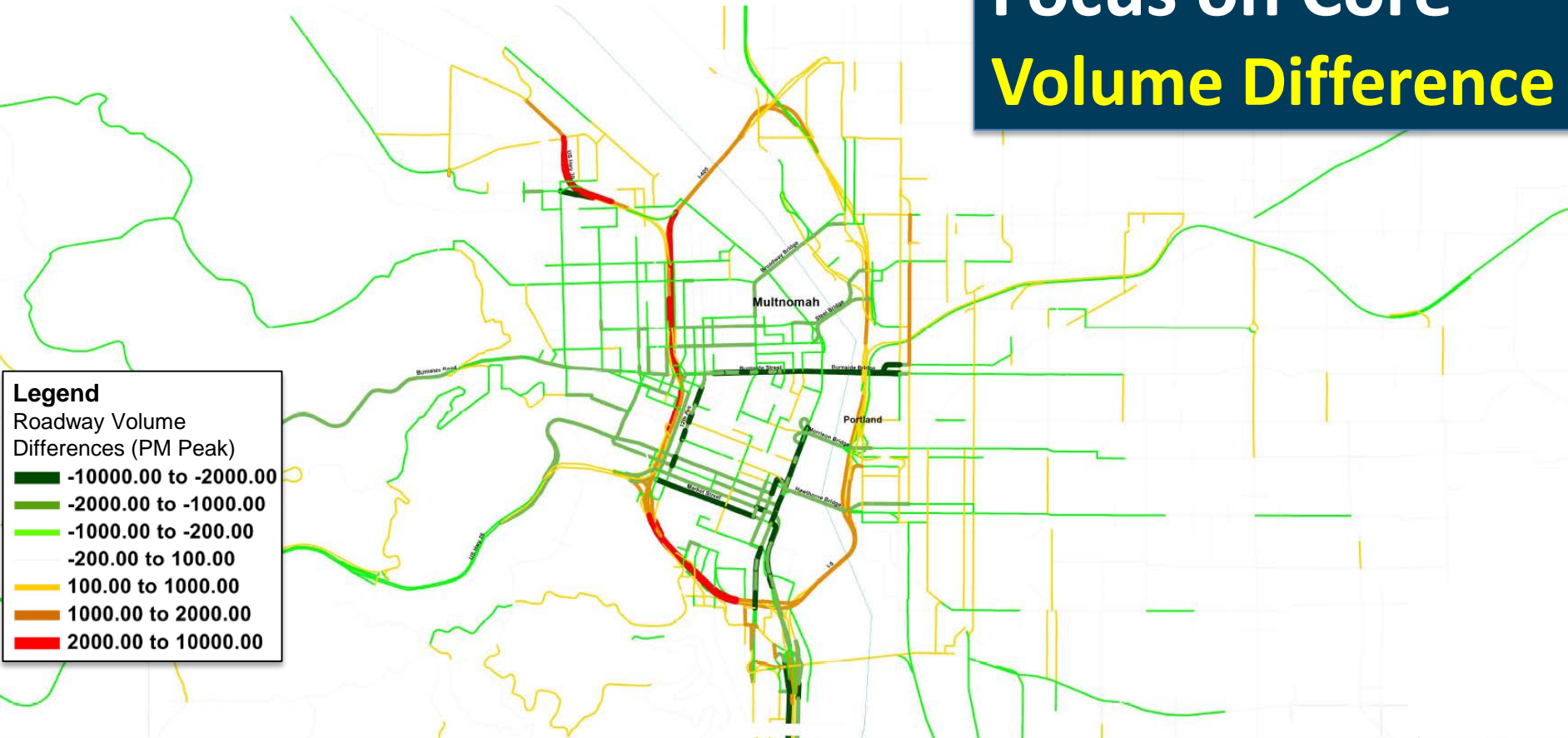
- This map considers travel time savings <u>and</u> costs
- It converts cost to travel time increases
- This changes things!
  - Much of the MPA is neither benefited or impacted
  - Portions of Portland, as well as Washington County, are impacted
  - Outer areas (especially outer Clackamas County) gain the most
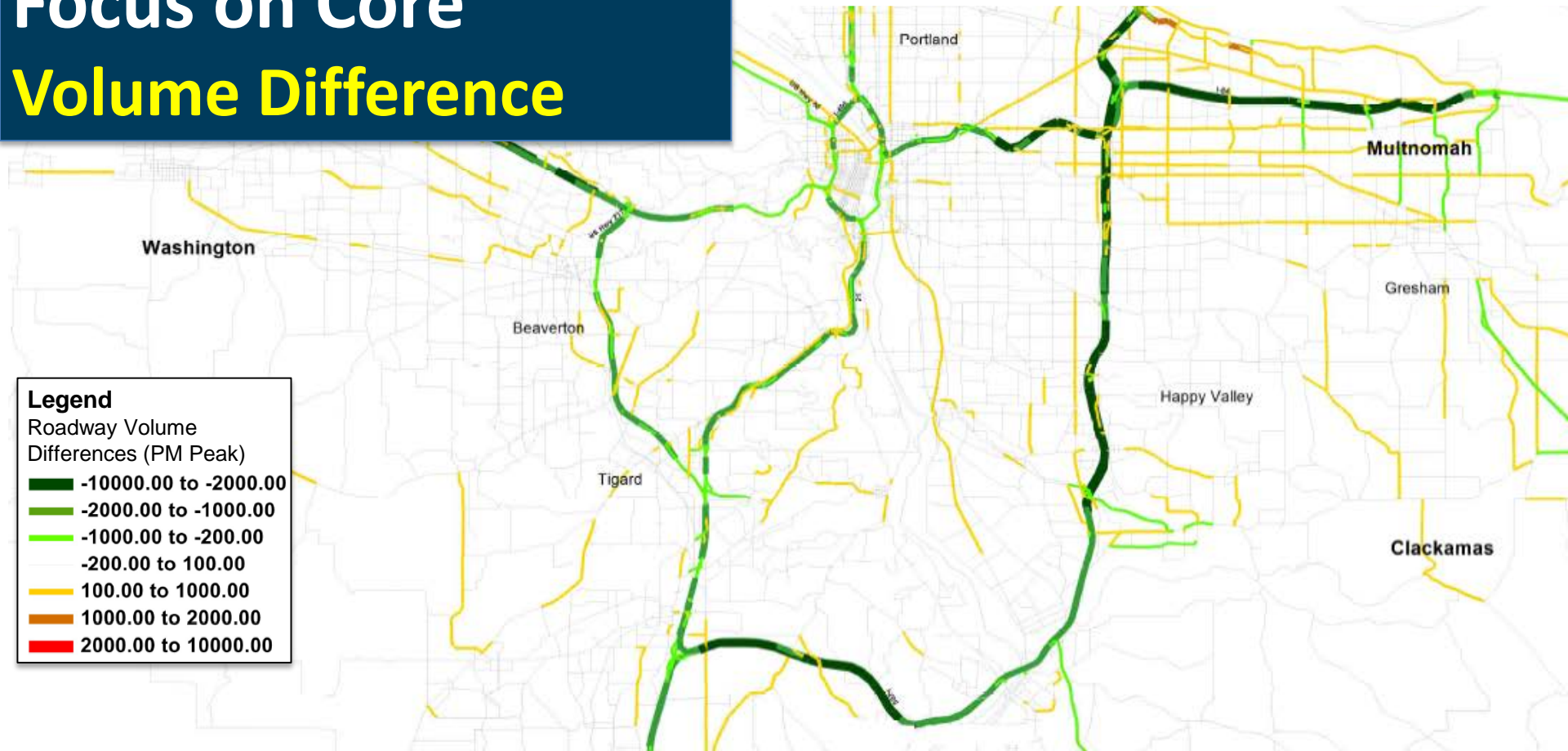
36

Area Scenario – Focus on Core Volume Difference

Legend
Roadway Volume Differences (PM Peak)
- -10000.00 to -2000.00
- -2000.00 to -1000.00
- -1000.00 to -200.00
- -200.00 to 100.00
- 100.00 to 1000.00
- 1000.00 to 2000.00
- 2000.00 to 10000.00

Roadway Scenario – Focus on Core **Volume Difference**

Legend
Roadway Volume Differences (PM Peak)

- -10000.00 to -2000.00
- -2000.00 to -1000.00
- -1000.00 to -200.00
- -200.00 to 100.00
- 100.00 to 1000.00
- 1000.00 to 2000.00
- 2000.00 to 10000.00

Key Findings from Geographic Analysis

- Helpful way to see
    - *where* the benefits of each pricing scenario are seen the most
    - unintended consequences of the scenarios

- May overlay with equity focus areas

- Caveat is that we did not map all scenarios, nor did we refine these preliminary results
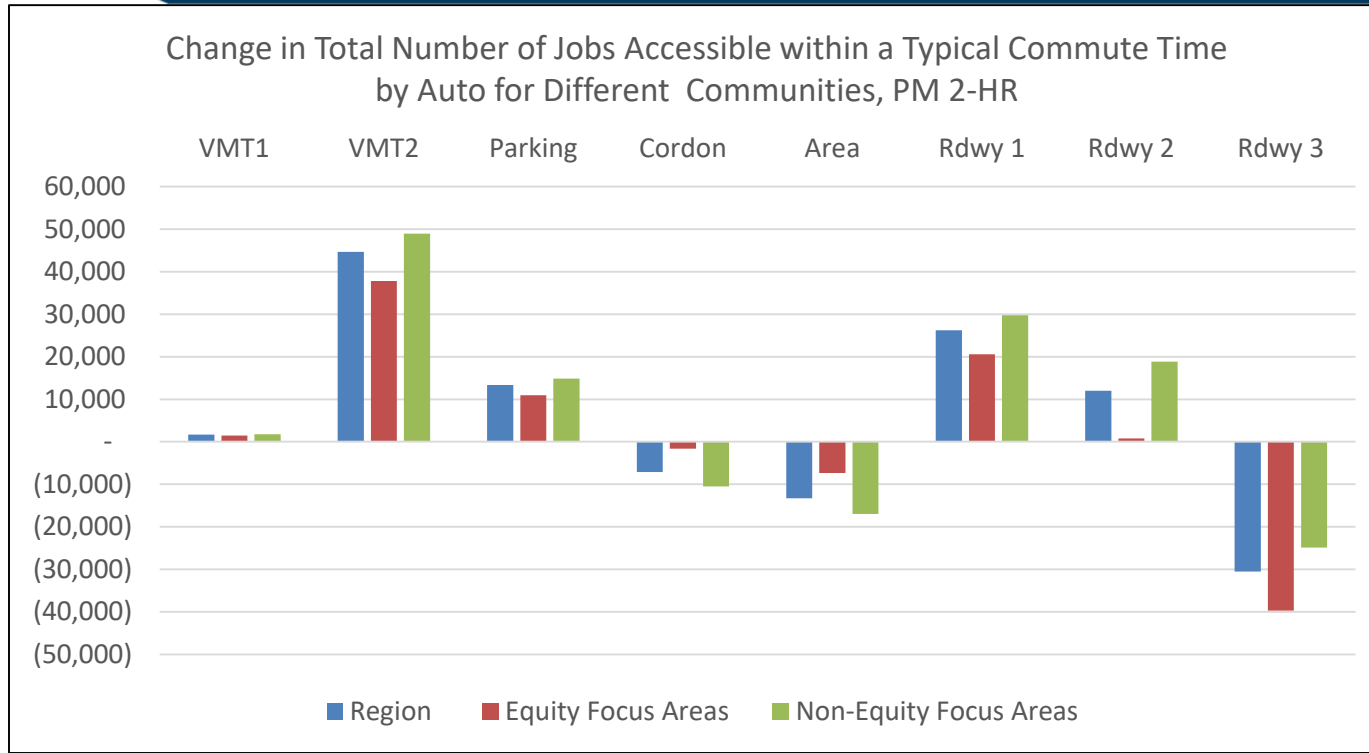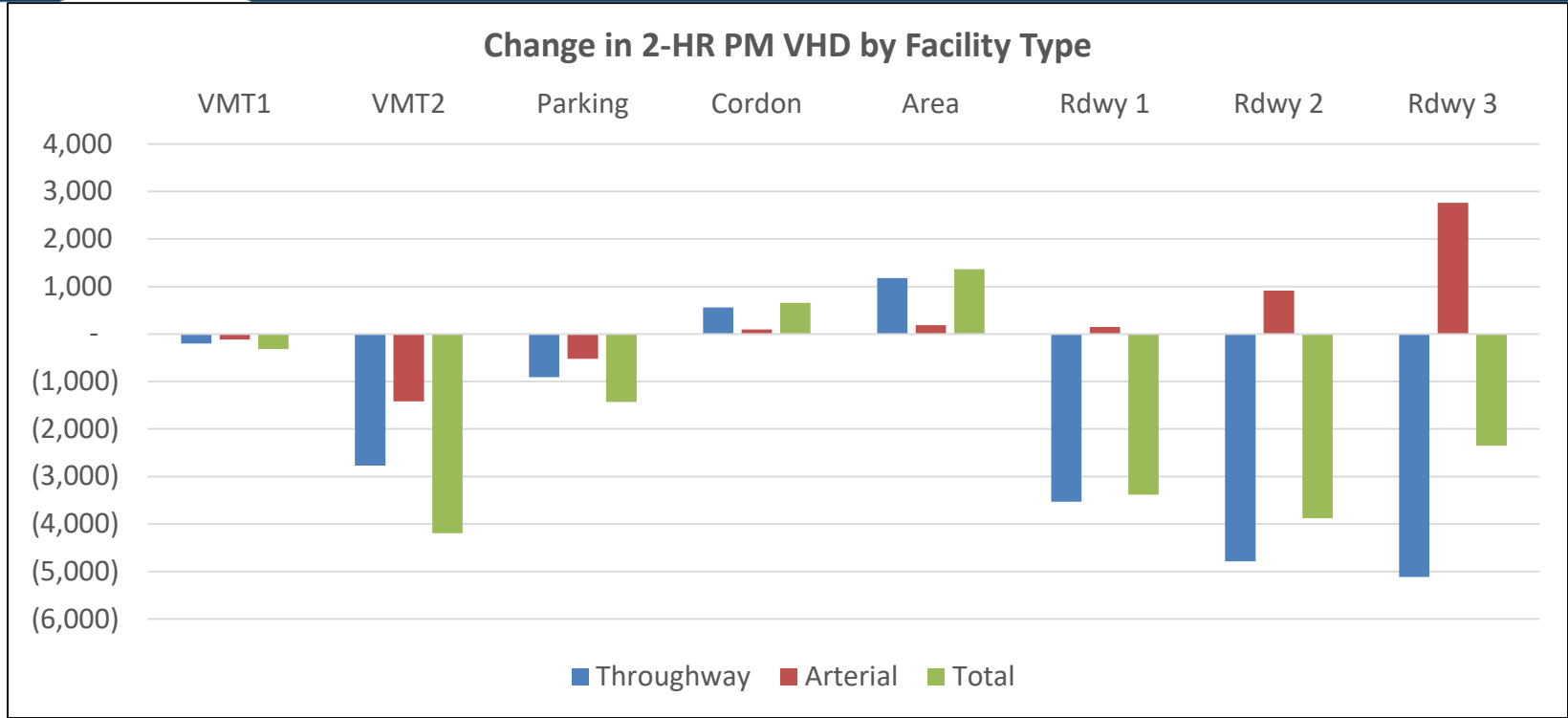
Mode Shift: Change from Baseline

Percentage Point Change in Mode Share by All Trips - MPA
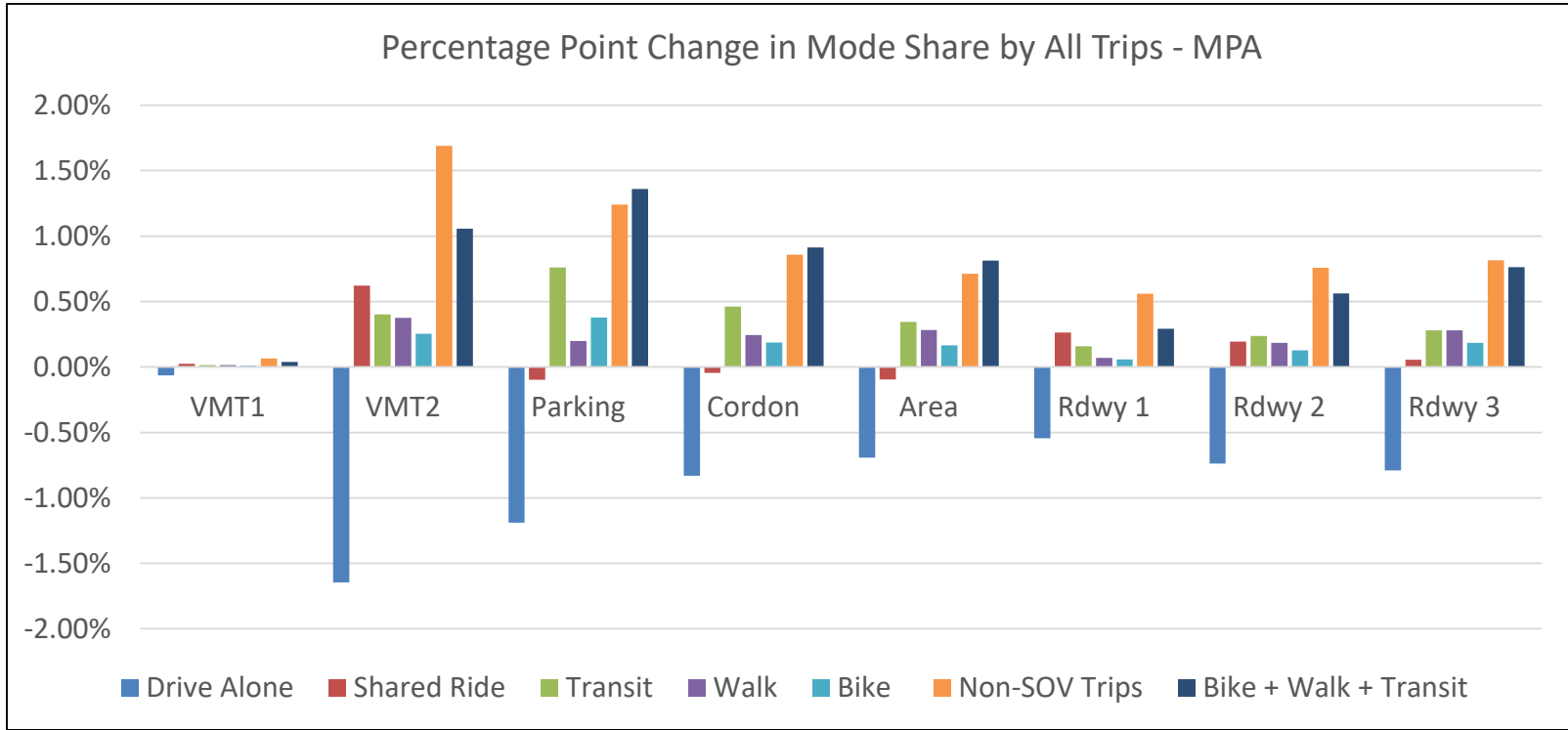
Accessibility: Change from Baseline (transit)

Change in Total Number of Jobs Accessible within a Typical Commute Time by Transit for Different Communities, PM 2-HR

Accessibility: Change from Baseline (Auto)

Change in Total Number of Jobs Accessible within a Typical Commute Time by Auto for Different Communities, PM 2-HR

Legend: Region, Equity Focus Areas, Non-Equity Focus Areas
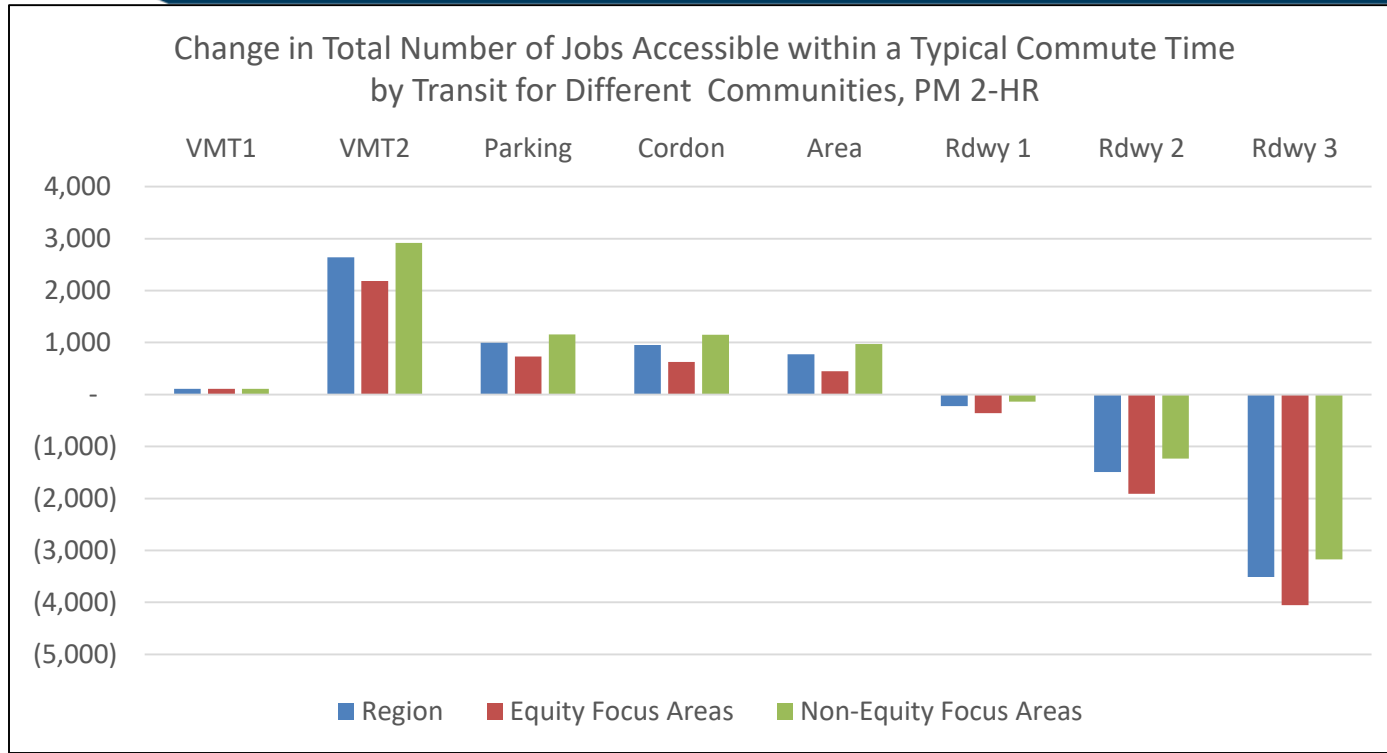
Delay: Change by Roadway Classification

Change in 2-HR PM VHD by Facility Type

Discussion

Discussion

Is this a helpful way to show findings? Are there other things you would like us to show? What questions do you have?

5-Minute Break

Pricing Scenarios:
Round 2 Approach

Purpose of Round 2 Modeling

- Round 1 helped us understand the order-of-magnitude benefits and costs associated with different ends of a pricing spectrum

- As expected, these modeling results raise more questions!

- Round 2 modeling refines the scenarios so we better understand what tools benefit the broadest spectrum of travelers

Round 1 Scenarios

	VMT (2 runs)	*Cordon*	*Area*	*Parking*	*Roadway (3 runs)*
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Geography	**Region (MPA)** See Figure 1	See Figure 2	See Figure 3	See Figure 4	**Region (MPA)**

Round 1 Results Summary and Round 2 Considerations - VMT

VMT1

- Did NOT move the needle. No change in
  - VMT
  - mode split
  - reduction in delay
- No change in access to jobs by transit or auto

VMT2

- Big impacts
  - Largest reduction in VMT
  - Largest shift in mode split for the region as a whole
  - Travel time savings, esp. outer region
- Total price to region's travelers highest for Round1

Next Round Considerations

What happens with a price between the two?
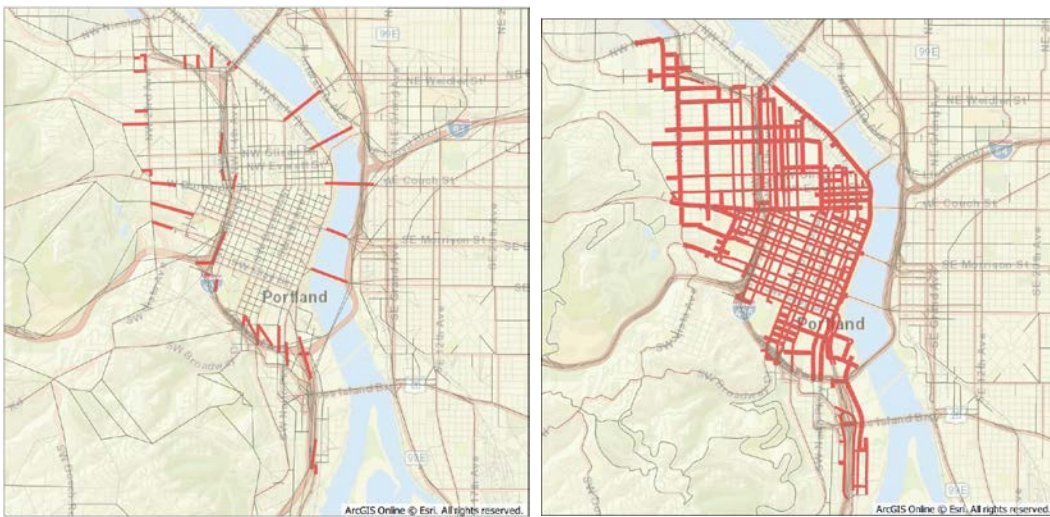
Round 1 Results Summary – Cordon and Area

Cordon1

- Effects are localized.
- Cost to the region as a whole is low. Only those entering the cordon pay.
- Increases delay (especially on throughways near downtown Portland).
- Jobs access via auto decreases; via transit slightly increases.
- Greatest mode shift in Portland alone (both work and non-work trips).

Area1

- Results very similar to Cordon1.
- Slight changes within downtown Portland from Cordon1.

Cordon and Area– Round 2 Considerations

Next Round Considerations

What happens if we expand or change the boundaries?

Round 1 Results Summary and Round 2 Considerations- Parking

Parking1

- Benefits/impacts are diluted when observed at a regional scale.
- 2040 FC locations with prices <u>doubled.</u>
- VMT increases (presumably as people drive farther to reach lower cost parking).
- No discernable change to accessibility.
- Strong mode shift, especially for work trips, both for Portland and the region as a whole, especially for a shift to transit.

Next Round Considerations

- Are there other locations that partners are interested in?
- Does testing a lower price make sense?

Round 1 Results Summary and Round 2
Roadway1 and Roadway 2

Roadway1

- Less VMT reduction and lower regional cost than VMT2
- Less effect on mode shift than other scenarios.
- Access to jobs increases slightly by auto, decreases slightly by transit.
- Substantially reduces delay on throughways; minimal increase to delay on arterials.
- Benefits not uniformly distributed across the region.

Roadway2

- Less VMT and person vehicle trips than Roadway1.
- Still no dramatic change in mode shift.
- Diversion onto arterials leads to less delay on throughways and increased delay on arterials.
- Reduced access to jobs via transit, impacting lower wage workers and people in equity focus areas more than the region as a whole.

Round 1 Results Summary and Round 2 Considerations— Roadway3

Roadway3

- Greater reduction in VMT and person vehicle trips than Roadway2.
- Still no dramatic change in mode shift.
- Greater diversion than Roadway2, leading to increased arterial delay and reduced access to jobs via transit.

Next Round Considerations

- *Can we improve results by adjusting the price by time of day or congestion levels?*
- *Consider adding or removing roadways?*

What Scenarios are we proposing to model in Round 2? VMT and Roadway

VMT

Toll applied to miles driven regardless of location

One run:
- **VMT3**: Test a cost per mile between the rates of VMT1 and VMT2

Roadway

Toll applied to miles driven only on throughways

One run:
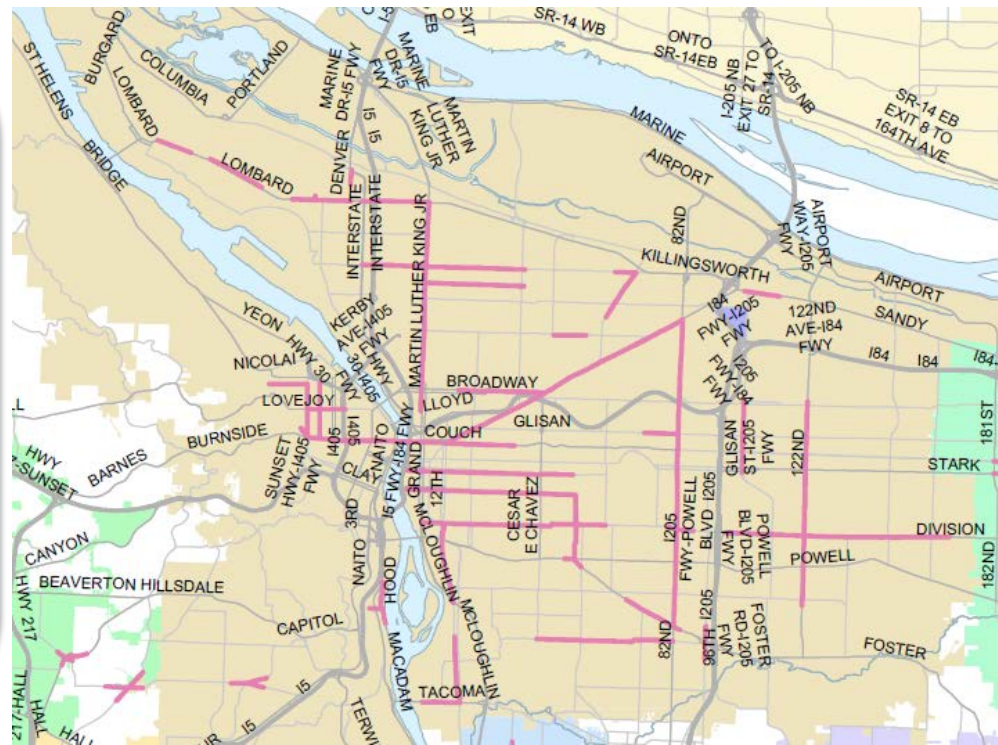- **Roadway4:** Optimize scenario by time of day / congestion levels

Parking

Parking prices increased in key locations region based on doubling the price assumptions in the 2018 RTP 2040 FC

Two runs:
- **Parking2:** lower rates than Parking1
- **Parking3:** Similar to Parking2 but adds new geographies – subset of Main Streets in Portland and input from Beaverton

What scenarios are we Proposing to model in Round 2? **Cordon/Area**

Cordon and Area

- No additional Area scenario tests
  – *can learn from cordon*

One run:
- **Cordon2:** Expansion to cordon boundaries east of Willamette as requested by PBOT

Discussion

Discussion

Are these findings intuitive to you?

What questions do you want the team to explore in the Round 2 scenarios?

Are there specific areas where you want more information?

Schedule and Next Steps