Metro Regional Congestion Pricing Study

MODELING AND RESEARCH RESULTS – 06/03/21 FINDINGS

Key Takeaways

VMTB –charge per mile driven

1. Approximately 1.3 times the cost of driving in Base.
2. Improvements on all modeled performance measures.
3. VMTB shows impacts to driver behavior at a region-wide scale.
   a. Performs well at reducing VMT, drive alone rate, delay, and emissions.
   b. Also improves transit trips and job access via both transit and auto.
   c. Auto volumes decrease on most facilities
4. Second highest travel costs at a regional scale; costs are throughout MPA shared by all drivers.
5. Combines high increase in travel costs with low improvement in auto jobs access in some outer areas (many Equity Focus Areas[i]).
6. VMT scenarios had the highest revenue potential and could build on OReGO as a pilot trial project.

VMTC – higher charge per mile driven

1. Approximately 1.6 times the cost of driving in Base.
2. Even more improvement on all modeled performance measures than with VMTB.
3. VMTC shows a very substantial impact to driver behavior at a region-wide scale.
   a. Largest reduction in VMT, drive-alone rate, and emissions.
   b. Largest improvement in job access via both transit and auto
   c. Very effective at reducing delay
4. Highest travel costs at a regional scale; costs are throughout MPA shared by all drivers.
5. Combines high increase in travel cost with low improvements in auto accessibility to jobs occur in some outer areas (many Equity Focus Areas[i]).
6. VMT scenarios had the highest revenue potential and could build on OReGO as a pilot trial project.

CordonA – drivers charged to enter an area

1. Charge of $7 ($2020) to enter downtown, South Waterfront and Northwest Portland core from any direction.
2. No charge for using highways (US-26, I-405) to travel through the cordon area.
3. Benefits and impacts are diluted when observed at a regional scale. Benefits are localized.
4. Overall, increases delay (esp. on throughways near downtown Portland) as drivers avoiding paying toll shift to freeways and arterials adjacent to cordon.
5. Jobs access decreases via auto, improves slightly via transit.
6. Reductions in drive-alone rate and VMT, and increase in transit trips.
7. Cost to the region as a whole is low as is revenue potential. Charge applies only to those entering the cordon.
8. Highest travel costs occur to people living outside, but near the cordon.

CordonB – drivers charged to enter larger area

1. Same charge as CordonA, but extends boundary to Central Eastside and Lloyd District.
2. No charge for using highways (US-26, I-405, I-5) to travel through the cordon area.
3. Results similar to CordonA. Benefits and impacts are diluted when observed at a regional scale. Benefits are localized.
4. Overall, increases delay (esp. on throughways near downtown Portland) as drivers avoiding paying toll shift to freeways and arterials adjacent to cordon.
5. Jobs access decreases via auto, improves via transit.
6. Reductions in drive-alone rate and VMT, and increase in transit trips.
7. Cost to the region as a whole is low as is revenue potential. Charge applies only to those entering the cordon.
8. Highest travel costs occur to people living outside, but near the cordon.

ParkingA – higher charges to park

1. ParkingA scenario charges for parking locations identified in the 2040 FC RTP.
2. Benefits and impacts are diluted when observed at a regional scale. Benefits are localized.
3. VMT, delay, and drive alone rates decrease, and job access increases for both auto and transit. There is a minor increase in daily transit trips.
4. Some reduction in auto volumes mainly near downtown Portland, due to drivers shifting modes or changing destinations.
5. Cost to region as a whole is low. Only drivers who park in areas with parking charges will pay. Charges range from $0.16 to $16.32 per trip. Revenue generation is low.
6. Easiest to implement of all pricing types. Can be done by individual jurisdictions with existing collections infrastructure.

ParkingB – much higher charges to park

1. Same locations charged as ParkingA. 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, delay, and drive alone rates decrease, and job access increases for both auto and transit. Daily transit trips increase 10%.
4. Some reduction in auto volumes mainly near downtown Portland and other employment centers, due to drivers shifting modes or changing destinations.
5. Cost to region as a whole is low. Only drivers who park in areas with parking charges will pay. Charges range from $0.32 to $32.60 per trip. Revenue generation is low.
6. Easiest to implement of all pricing types. Can be done by individual jurisdictions with existing collections infrastructure.

RoadwayA – toll on highways

1. Charges tolls on throughways (freeways and limited access roadways) at same rate as VMTC: $03.12/mile. Other roadways are not charged.
2. Reduces VMT, drive alone rate, and emissions, and increases job access via auto.
3. Reduces delay on highways, but increases delay on arterials (traffic diverts onto arterials to avoid tolls).
4. 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.
5. More region-wide travel costs than Parking or Cordon scenarios, with more travelers paying a charge.
6. People living near freeways are subject to more congestion on nearby arterials, but can benefit from faster trips on nearby tolled roads if they choose to pay.
7. Roadway pricing enforcement can be difficult. Works best on limited access roadways.

RoadwayB – higher toll on highways

1. RoadwayB doubles the toll of RoadwayA for travel on throughways to $06.24/mile.
2. Reduces VMT, drive alone rate, and emissions, and increases job access via auto.
3. Largest reduction in delay on highways, but largest increase in delay on arterials (traffic diverts onto arterials to avoid tolls) for all scenarios.
4. Diversion onto arterials reduces access to jobs via transit even more than RoadwayA, impacting lower wage workers and people in equity focus areas more than the region as a whole.
5. Lower region-wide travel costs than RoadwayA despite a higher per-mile charge.
6. People living near freeways tend to pay higher costs.
7. Roadway pricing enforcement can be difficult. Works best on limited access roadways.

The table below shows a high-level summary of how well the eight modeled scenarios performed relative to the 2018 Regional Transportation Plan goals and metrics.

Table 1: DRAFT Summary Key Findings from Metro Regional Congestion Pricing Study

RTP Goal	Metrics	VMT B	VMT C	COR A	COR B	PARK A	PARK B	RD A	RD B
Congestion & Climate	Daily VMT								
	Drive Alone Rate								
	Daily Transit Trips								
	2HR Freeway VHD								
	2HR Arterial VHD								
Climate	Emissions								
Equity	Job Access (Auto)								
	Job Access (Transit)								
	Total Regional Travel Cost	Medium-High	High	Medium-Low	Medium-Low	Low	Low	Medium	Medium

Note: *Green indicates better alignment with regional goals when compared to the Baseline Alternative. Definitions of metrics are on the next page.*

Legend

	Large Positive Change
	Moderate Positive Change
	Small Positive Change
	Minimal Change
	Small Negative Change
	Moderate Negative Change
	Large Negative Change

*Positive and Negative refer to progress toward regional goals, and not to numerical values (i.e. a reduction in VMT is "positive")

All four types of pricing are shown to help address congestion and climate.

- All eight scenarios reduce the drive alone rate, vehicle miles traveled, and greenhouse gas and other emissions.
- All scenarios increase daily transit trips, though Roadway A results in a small change.

Regional travel costs and individual traveler costs vary by scenario.

- VMT scenarios have the highest total regional travel costs, but costs are spread among many travelers.
- Cordon and parking scenarios have relatively high individual traveler costs, but lower regional travel costs.

Geographic distributions of benefits and costs vary by scenario. There are tradeoffs between benefits and costs.

- The VMT scenarios performed well on all metrics. However, total travel costs (and conversely revenues) are highest for the region. At the same time, costs per traveler is not as high with charges applied to all miles driven.
- Parking scenarios also performed well on all metrics. However, costs would be higher for many individual parkers, especially in and around downtown.
- Cordon scenarios had mixed results with effects concentrated within the cordon and on arterials and freeways nearby. Traffic within the cordon improves, while congestion grows on roadways nearby as drivers avoid the charge.
- Roadway scenarios saw moderate to large negative changes in arterial delay, as well as minimal change to small negative change in Job Access via Transit. This appears to be the result of drivers avoiding the charge on the highways and diverting to arterial streets near the charged roadways.
- Roadway charges appear to have diminishing returns with higher charges leading to more congestion on arterials.
- Mapping to show benefits and costs can identify areas to focus investments or driver discounts to address concerns around equity and performance. Mapping can also illuminate impacts on Equity Focus Areas.

The results provided here ONLY show the effects of charging drivers under different scenarios; implementation of mitigations, discounts, or other changes to policies could result in changes to the performance of a scenario.

Scenario modeling results were compared to results from Metro's 2018 Regional Transportation Plan to determine approximate benchmarks to indicate positive or negative impacts for each metric. A legend that details the ranges for categorizing each metric is shown below, followed by descriptions of each metric.

Detailed Legend

Legend		Daily VMT	Drive Alone Rate	Job Access (Auto)	Job Access (Transit)	Daily Transit Trips	2HR Freeway VHD	2HR Arterial VHD	Emissions
	Large Positive Change	-5% or more	-5% or more	10% or more	5% or more	10% or more	-10% or more	-10% or more	-5% or more
	Moderate Positive Change	-2% to -5%	-2% to -5%	5% to 10%	2% to 5%	5% to 10%	-5% to -10%	-5% to -10%	-2% to -5%
	Small Positive Change	-0.5% to -2%	-0.5% to -2%	1% to 5%	0.5% to 2%	1% to 5%	-1% to -5%	-1% to -5%	-0.5% to -2%
	Minimal Change	0.5% to -0.5%	0.5% to -0.5%	1% to -1%	0.5% to -0.5%	1% to -1%	1% to -1%	1% to -1%	0.5% to -0.5%
	Small Negative Change	0.5% to 2%	0.5% to 2%	-1% to -5%	-0.5% to -2%	-1% to -5%	1% to 5%	1% to 5%	0.5% to 2%
	Moderate Negative Change	2% to 5%	2% to 5%	-5% to -10%	-2% to -5%	-5% to -10%	5% to 10%	5% to 10%	2% to 5%
	Large Negative Change	5% or more	5% or more	-10% or more	-5% or more	-10% or more	10% or more	10% or more	5% or more

*Positive and Negative refer to progress toward regional goals, and not to numerical values (i.e. a reduction in VMT is "positive")

Definitions of Performance Metrics:

Daily VMT: vehicle miles traveled (daily)

Drive Alone Rate: percentage of total daily trips undertaken by drivers without passengers

Daily Transit Trips: Number of total transit trips (daily)

2HR Freeway VHD: freeway vehicle hours of delay. The total time accrued by all vehicles traveling on model freeway links with volume-to-capacity ratio of over 0.9 during the PM peak

2HR Arterial VHD: arterial vehicle hours of delay. The total time accrued by all vehicles traveling on model arterial links with volume-to-capacity ratio of over 0.9 during the PM peak

Emissions: percent change in greenhouse gas and other emissions including: CO_{2e}, $PM_{2.5}$, PM_{10}, NOx, and VOC, calculated using Metro's Multi-Criteria Evaluation (MCE) tool, which estimates quantitative social return on investment of scenarios and applies emission rates derived from Metro's application of EPA's MOVES model to VMT of each scenario

Job Access (Auto): the number of jobs within 30 minutes by auto, averaged by TAZ and weighted by number of households

Job Access (Transit): the number of jobs within 45 minutes by transit, averaged by TAZ and weighted by number of households

Total Regional Travel Cost: the average weekday (2027) sum of all users' cost to travel, including auto operating cost, tolls, parking charges, and transit fares, expressed in thousands of 2010$

[i] **Equity Focus Areas:** locations identified as part of the 2018 RTP Equity analysis that include census tracts with high concentrations of people of color, people in poverty and people with limited English proficiency

Community	Geography Threshold
People of Color	The census tracts which are above the regional rate for people of color (28.6%) AND the census tract has twice (2x) the population density of the regional average (regional average is 1.1 person per acre).
People in Poverty	The census tracts which are above the regional rate for low-income households (28.5%) AND the census tract has twice (2x) the population density of the regional average (regional average is 1.1 person per acre).
People with Limited English Proficiency	The census tracts which are above the regional rate for limited English proficiency speakers (7.9%) AND the census tract has twice (2x) the population density of the regional average (regional average is .3 person per acre)

Source: Metro, 2018 RTP transportation equity work group