

# **MOBILITY21**

**For the Puget Sound Region**

Mobility21, March 31, 2021

## FIRST, WHAT PROBLEMS ARE WE TRYING TO SOLVE?

- CONGESTION IS BAD & GETTING WORSE
- INVESTMENTS NOT IN BALANCE WITH PERFORMANCE
- GOVERNMENT HAS NO PLANS TO REVERSE THIS TREND
- CITY OF SEATTLE DOMINATES TRANSPORTATION DECISIONS
- EXCEEDINGLY HIGH COSTS

## PROBLEM: SEATTLE URBAN AREA CONGESTION IS BAD AND GETTING WORSE

- Commuters lost about 37 hours to congestion in 2019.  
(With the pandemic, this declined to 25 hours in 2020 (*INRIX Traffic Scorecard 2020*))
- The adopted Regional Transportation Plan projects a 10% increase in delay per trip by 2040, in spite of \$197 billion investment in transportation (*PSRC, 2018*)

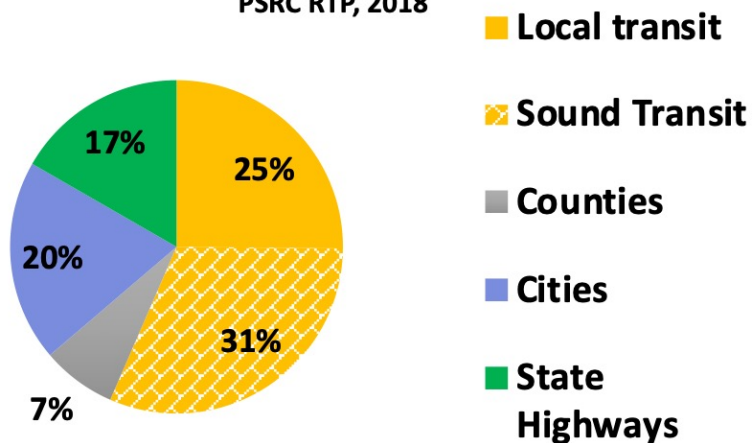
## PROBLEM: INVESTMENTS OUT-OF-BALANCE WITH PERFORMANCE

**56% OF REGION'S ADOPTED PLAN'S PUBLIC INVESTMENT IS FOR TRANSIT**

**ONLY ABOUT 4% OF THE REGION'S PERSON-TRIPS ARE BY TRANSIT**

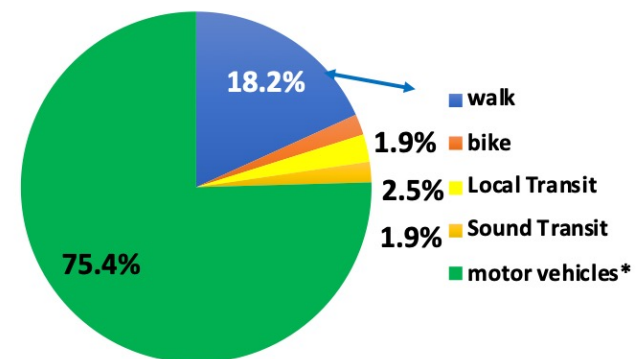
**Investment, 2018-2040**

PSRC RTP, 2018



**Mode Share, Weekday 2040**

PSRC RTP, 2018

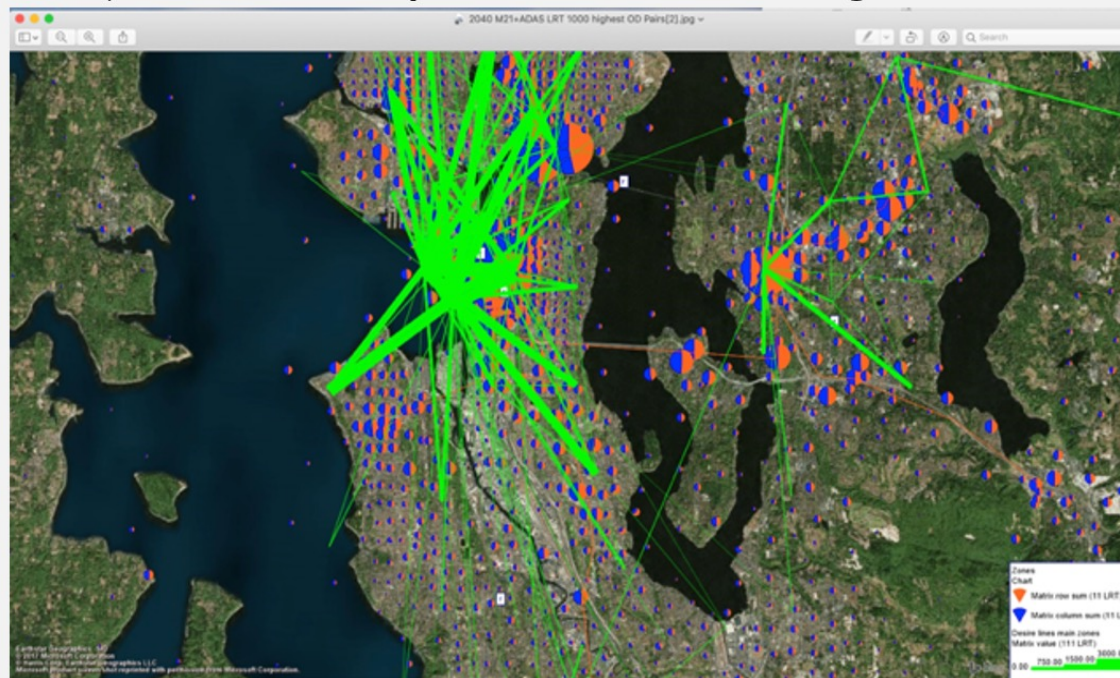


## PROBLEM: GOVERNMENT HAS NO PLANS TO REVERSE THIS CONGESTION TREND

- WSDOT:
  - DOT Secretary says it's not possible to reduce congestion, so forget it.
  - Building Express Toll Lanes (raises some \$, but reduces capacity, a step in the wrong direction)
- SOUND TRANSIT: \$65 billion or more to boost market share by 1%
- PSRC: Decades of advocating transit, higher density land use, pedestrians and bikes, but with little effect

## PROBLEM: CITY OF SEATTLE DOMINATES TRANSPORTATION DECISION

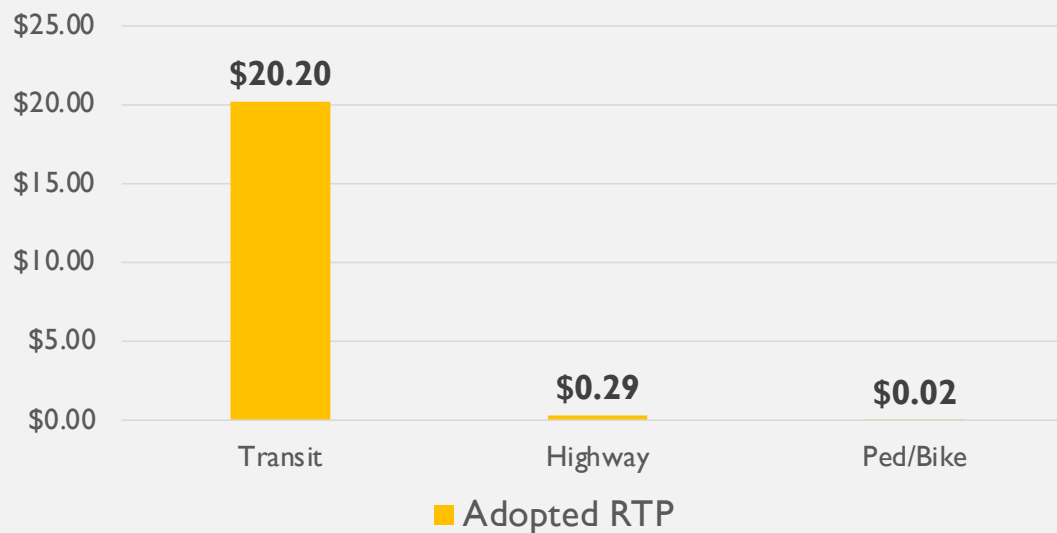
### Projected 2040 trips on Sound Transit light rail



Source: PSRC SoundCast model, Mobility2I Run 3C

## PROBLEM: TOTAL COSTS ARE TOO HIGH

**Public Investment to Serve Each Person-trip from 2018 to 2040, by Mode**



For the period 2014-2040, the adopted Regional Transportation Plans' capital and operating costs for each mode of travel are divided by that mode's total number of estimated person-trips for the same time period.

For example, , the figure for transit is:  
 $\$20.20 = \$111 \text{ billion} / 5.50 \text{ billion trips}$

# MOBILITY21 FACES THE PROBLEMS

- WHAT IS MOBILITY21?

- ⌘ WHAT WOULD MOBILITY21 ACHIEVE?

- ⌘ WHAT ACTIONS ARE INCLUDED IN MOBILITY21?

- ⌘ APPENDIX – BACK-UP DETAILS

Mobility21  
Regional Setting – where we are and how we got here



# WHAT IS MOBILITY21?

- *An alternative to the Regional Transportation Plan adopted by the Puget Sound Regional Council in 2018*
- *Privately funded by the Kemper Development Company with the goal of improved regional travel conditions at lower cost.*
- *It seeks to restore the public's long-established freedom to travel when, where and how they want.*

## WHAT WOULD MOBILITY21 ACHIEVE?

- *Serve a projected 30% increase on daily person-trips by 2040*
- *Cut 2040 delay per trip by 40%, compared to 2014*
- *Decrease regional plan costs by 30%*
- *Reduced congestion and new technology will further improve highway safety*

# WHAT ACTIONS ARE INCLUDED IN MOBILITY21?

- *INCORPORATES THE SAFETY AND CAPACITY BENEFITS OF ADVANCED DRIVER ASSISTANCE SYSTEMS (ADAS)*
- *ADDS FREEWAY AND ARTERIAL LANES IN SELECTED LOCATIONS*
  - *FUNDED WITH FLAT-RATE LOW-COST TOLLS*
- *CONVERTS HIGH-OCCUPANCY AND EXPRESS TOLL LANES TO GENERAL-PURPOSE LANES*
- *STOPS FURTHER ADDITIONS OF 19<sup>TH</sup> CENTURY TRANSIT TECHNOLOGIES :*
  - *LIGHT RAIL, COMMUTER RAIL, BIG BUSES, MULTIPLE TRANSFERS*
- *INCORPORATES 21<sup>ST</sup> CENTURY TRANSIT TECHNOLOGIES*

# APPENDICES

- MOBILITY2I DETAILS
- REGIONAL SETTING/CONDITIONS

# DETAILS OF MOBILITY21

- ADVANCED DRIVER ASSISTANCE SYSTEMS (ADAS)
- REDUCED DELAY PER TRIP
- REDUCED COST PER TRIP
- “BUCKET OF PAINT” OPPORTUNITIES
- MOBILITY21 TRANSIT
- VANPOOLS
- MOBILITY21 TOTAL COSTS COMPARED TO ADOPTED PLAN
- PAYING FOR MOBILITY21
- MOBILITY21 TEAM

# WHAT ARE ADVANCED DRIVER ASSISTANCE SYSTEMS (ADAS)??

## WHAT IS INCLUDED?

Collision-reducing features that are already available:

- Adaptive cruise control: smooth following, any speed
- Automated lane keeping on freeways
- Blind spot monitoring for safer lane changes
- Radar braking reduces collisions with pedestrians, bikes, cars

## WHAT ARE THE BENEFITS?

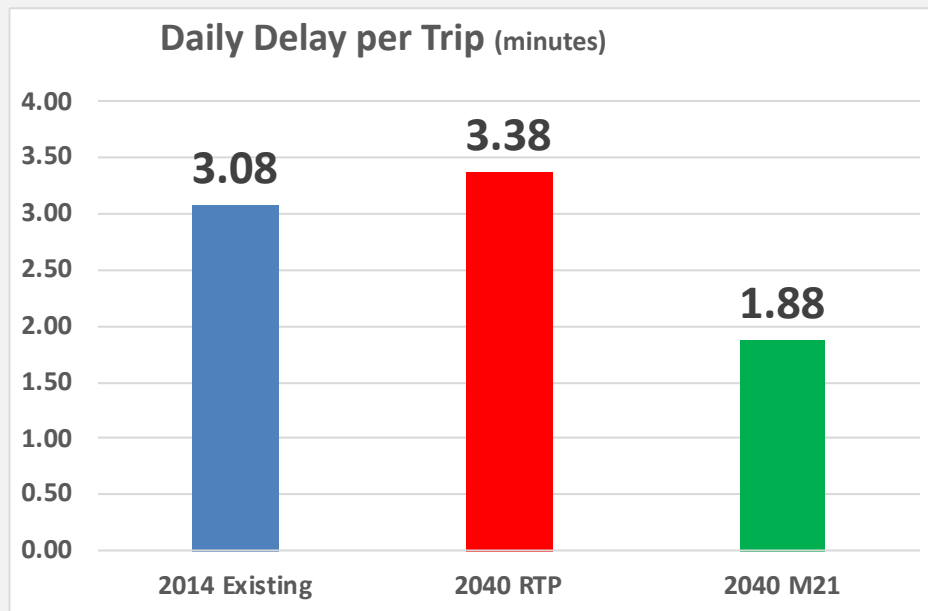
- Improved safety, reduced traffic incidents.
- Better service for transportation disadvantaged persons.
- By 2040 or sooner, with further features:
  - 50% more capacity per freeway lane
  - 30% more capacity per arterial lane

# GROWTH OF ADAS



- For year 2016, 11% of U.S. cars and light trucks had ADAS
- By 2030, it is probable that all new cars and light trucks will have ADAS. It may become a federally-mandated requirement, because of safety benefits.
- By 2040, it is reasonable to expect that 80% or more of all vehicles on the highways will have ADAS.
- By 2040, Mobility21 allows a freeway lane capacity increase up to 50%. However modeling results showed few locations where this much increase was needed. To meet demand, the average increase in lane volumes in 2040 was only 14% above those of the RTP.
- As autonomous vehicles become available, some theoretical research suggests that as few as one autonomous vehicle per 20 traditional vehicles can improve traffic flow.

# M21 REDUCES DELAY PER TRIP

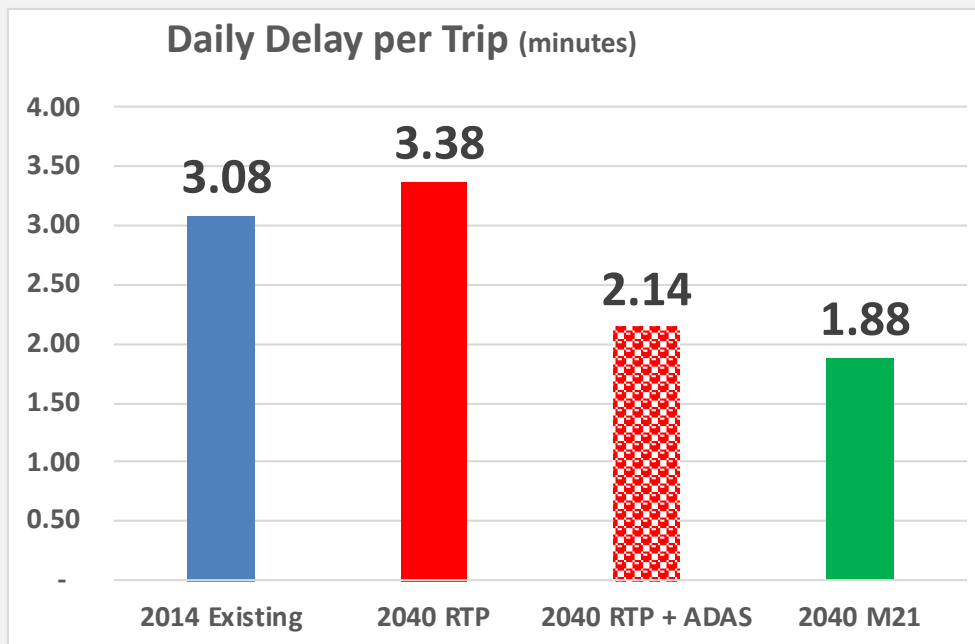


- The adopted Regional Transportation Plan increases delay by 10% compared to 2014.
- Mobility21 decreases delay by 40% compared to 2014

Source: Mobility21 SoundCast\_MOE\_Analysis\_3c, 26Feb19.xlsx]Net\_MOE



## ADAS WOULD REDUCE RTP DELAY, BUT MORE FOR M21

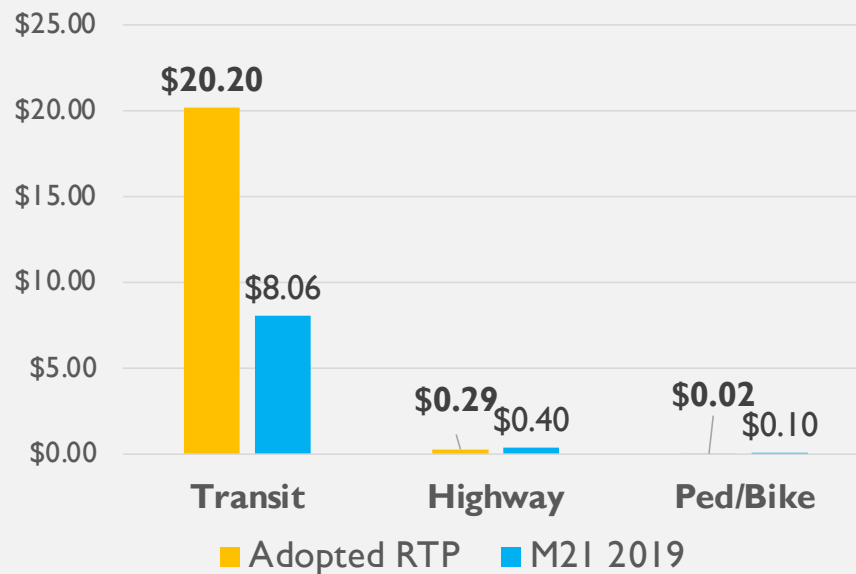


- The adopted RTP increases delay by 10% compared to 2014.
- RTP with ADAS would reduce delay by 31% compared to 2014
- Mobility21 reduces delay by 40% compared to 2014.

Source: Mobility21 SoundCast\_MOE\_Analysis\_3c, 26Feb19.xlsx]Net\_MOE, cell R88

# MOBILITY21 & RTP COSTS PER TRIP COMPARED

**Public Investment to Serve Each Person-trip from 2018 to 2040, by Mode**



- With Mobility21, public investment costs per transit trip are about one-third of the Adopted RTP's.
- Highway and Pedestrian/bike costs per trip are bargains because of lower costs and much higher usage.

Source: Regional Transportation Plan, Appx K, PSRC, 2018. Mobility21 assumption of straight-line growth, 2019 - 2040

# “BUCKET-OF-PAINT” OPPORTUNITIES



- Converting express toll lanes or HOV lanes to general-purpose lanes may require a bit more than a bucket of paint, but does not require major construction or more expensive rights-of-way.
- Other opportunities may include:
  - In some locations, added, slightly narrower lanes within existing paved surface
  - Additional ramp metering
  - Actions to encourage/permit transitions to advanced technology
  - Use of shoulders for traffic

# TRANSIT ELEMENTS OF MOBILITY21

- **Raise transit fares** to about 65% of operating and maintenance costs, for sustainability.
- **Focus on work trips** and commute hours (more than half of all transit trips)
- **Retain high-volume bus routes** for about 23% of 2040 bus riders. See next 2 pages.
- **For the remaining 77%**, provide a privately operated Alternative Mobility Service (AMS), similar to vanpools but with advanced technology. See next 2 pages
- **Replace Sounder Commuter rail with Express Buses**
- **Limit Link Light rail** to lines existing, under construction or covered by a Federal Record of Decision. .
- **Re-organize bus transit agencies** to reduce costs and dominance of the City of Seattle.

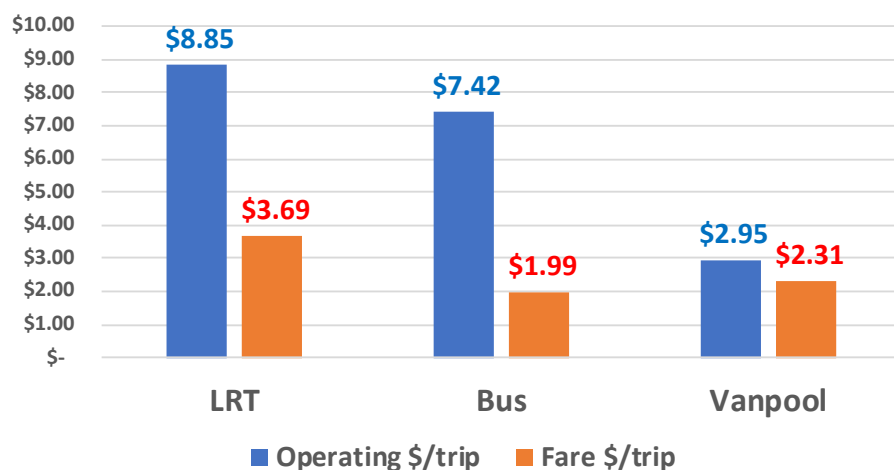
# WHY ARE ADVANCED VANPOOLS A LARGE OPPORTUNITY?

VANPOOL FARES NEARLY PAY OPERATING COSTS. LRT AND BUS FARES ONLY PAY 25% TO 40% OF OPERATING COSTS

WITH RARE TRANSFERS, VANPOOLS PROVIDE NEARLY DIRECT ORIGIN TO DESTINATION SERVICE

Operating Cost/Trip vs. Farebox Revenue/Trip, 2017

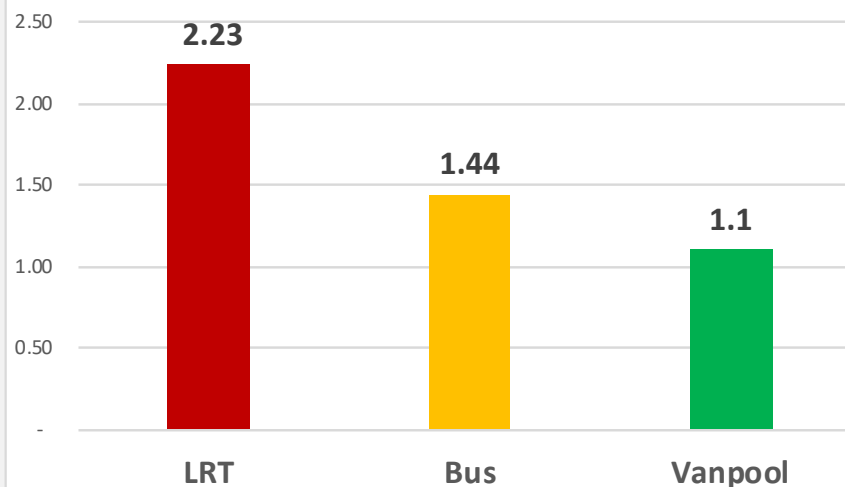
Sound Transit (LRT), King County Metro (bus & vanpool)



MOBILITY21

Regional Boardings per Trip

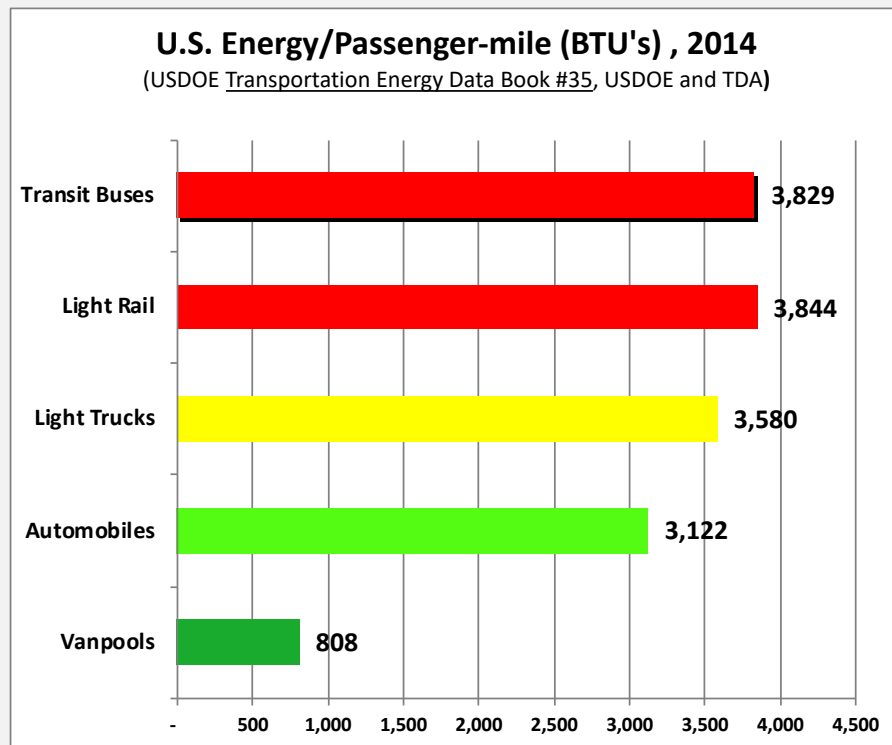
Sources: Sound Transit, st3 and TDA



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# U.S. VANPOOLS USE LESS ENERGY



## **VANPOOLS CONSUME LESS ENERGY THAN OTHER URBAN TRAVEL MODES.**

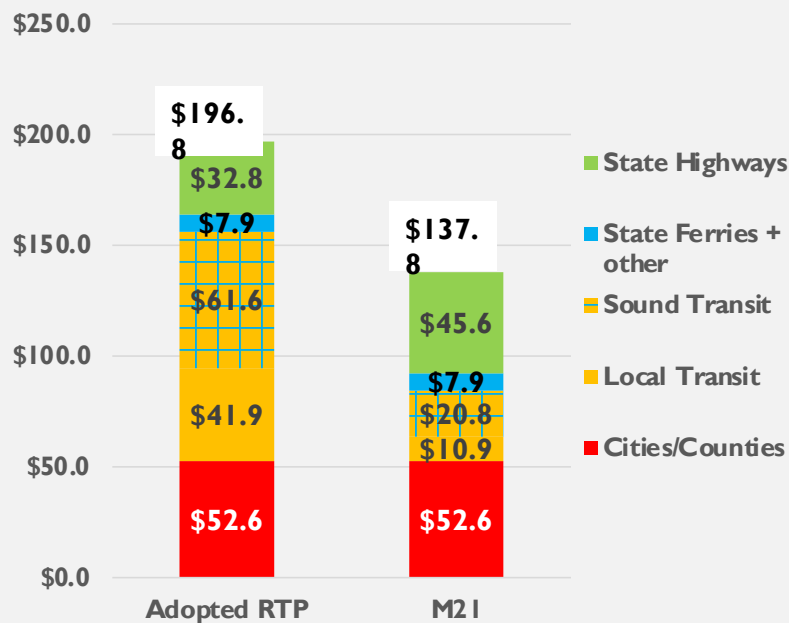
Both light rail and transit buses use more than 4 times as much. These differences impact CO<sub>2</sub> emissions. Also, transit buses are heavy and impact the roadway structure leading to more potholes. As an alternative transit mode, vanpools are light vehicles with minimum impact.

Source: [Transportation Energy Data Book #35](#), USDOE and TDA

# M21'S TOTAL COST 30% LESS THAN ADOPTED RTP'S COST

## Mobility21 is 30% Less Expensive

Total Costs, 2014-2040, \$billions



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- Highway costs are higher because of the added lane-miles
- Transit cost are lower because:
  - Curtailed light rail expansion
  - Commuter rail replaced with express buses
  - Replaced some bus route with small vehicle alternative mobility service
- “City & County” costs were not changed
- “State Ferry and other” not changed

Sources: PSRC's Regional Transportation Plan, 2018 , and Mobility21

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# PAYING FOR MOBILITY21

- **HIGHWAYS:** Flat tolls on freeways, expressways and urban arterials, 24/7. (starting in 2023 at 11¢ per vehicle-mile, or 91¢ per average trip)
- **FERRIES:** No change to Adopted RTP
- **TRANSIT:** Costs, reduced to 31% of Adopted RTP, paid from transit agency funds. Assumes that resulting surplus transit funds could not be transferred to other modes.
- **CITIES & COUNTIES:** No change to Adopted RTP.

## QUALIFICATIONS

- **Highway tolling may require change in Federal regulations**
- **For the other modes, the Adopted Regional Transportation Plan requires additional revenues including:**
  - **Carbon tax on fuel**
  - **Paid-parking surcharge**
  - **Transportation impact fees**
  - **Others in RTP Appendix P. Dec. 2017**



# MOBILITY21 TEAM

## ADVISORY PANEL

- Stephen Moore, Heritage Foundation
- Wendel Cox, Demographia
- Randall O'Toole, CATO Foundation
- Alan Pisarski, transportation research consultant
- Ronald Utt, retired Heritage Foundation
- Dick Mudge, Compass Transportation and Technology
- Charles Collins, ex Metro Manager

## PLANNING CONTRIBUTORS

- Bill Eager, Project Manager
- Bob Shull, modeling and highways
- Robert Tung, Modeling
- John Niles, transit
- Linda Cuadra, data research
- Jim Hill, KDC Manager
- Eastside Transportation Association

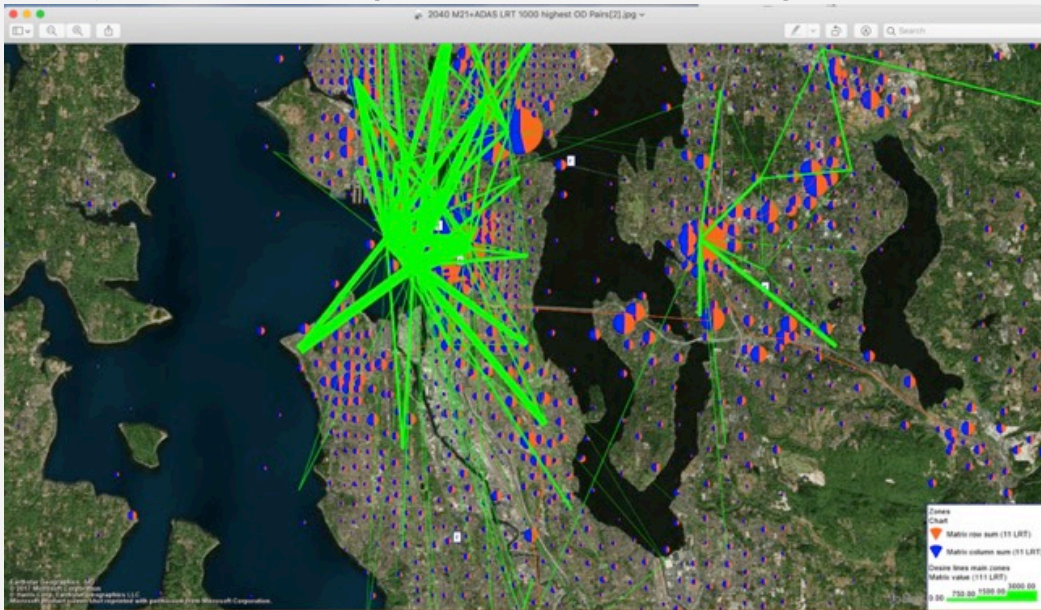
# REGIONAL SETTING

(OR, HOW DID WE GET INTO THIS MESS? )

- City of Seattle dominates transportation planning
- City of Seattle: 18% of regional population, 26% of jobs
- Transit spending out-of-balance with performance
- Government agencies are restricting travel
- Other transit issues
- Increasing competition for street space
- Restrictions on truck mobility

# CITY OF SEATTLE DOMINATES TRANSPORTATION PLANNING

## Projected 2040 trips on Sound Transit light rail



Source: PSRC SoundCast model, Mobility2I Run 3C

MOBILITY2I

Note the dominance of downtown Seattle and the corridor to the north. Also note how little cross-lake travel is projected.

### OTHER EXAMPLES:

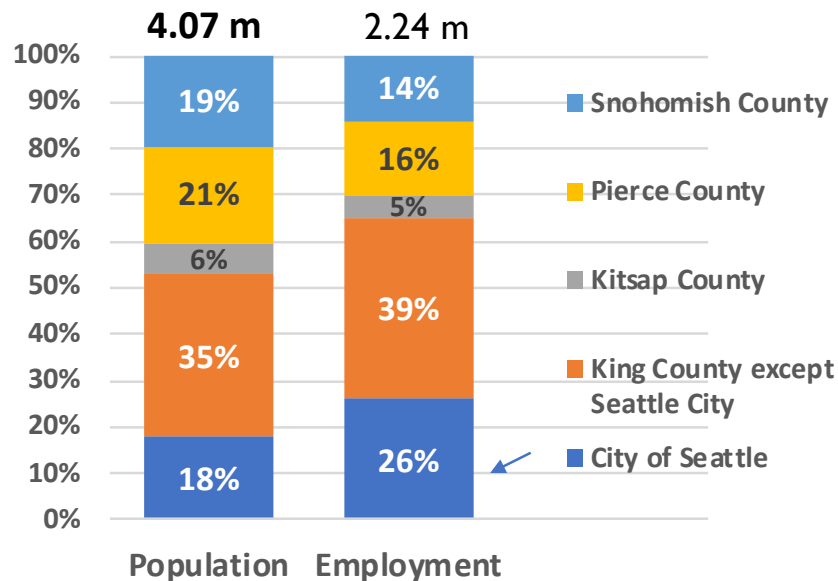
- **SR 520 Translake:** Seattle Council limits expansion to no more than six lanes, in spite of higher projected demand.
- **I-90 Cross-Lake center roadway.** Taking of the center roadway for light rail is to benefit Seattle, with little benefit to the Eastside.
- **Alaskan Way Viaduct Replacement.** This is a regional corridor. The City of Seattle's insistence on a tunnel to replace the viaduct opens-up the downtown waterfront, but only replaced the viaduct's 6-lanes with 4.

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# CITY OF SEATTLE DOES NOT DOMINATE REGIONAL POPULATION & EMPLOYMENT

Population & Employment by Sub-Area, 2017



- City of Seattle holds 18% of regional population and 26% of regional jobs.
- King County holds 53% of regional population and 65% of regional jobs

Sources US Census Bureau

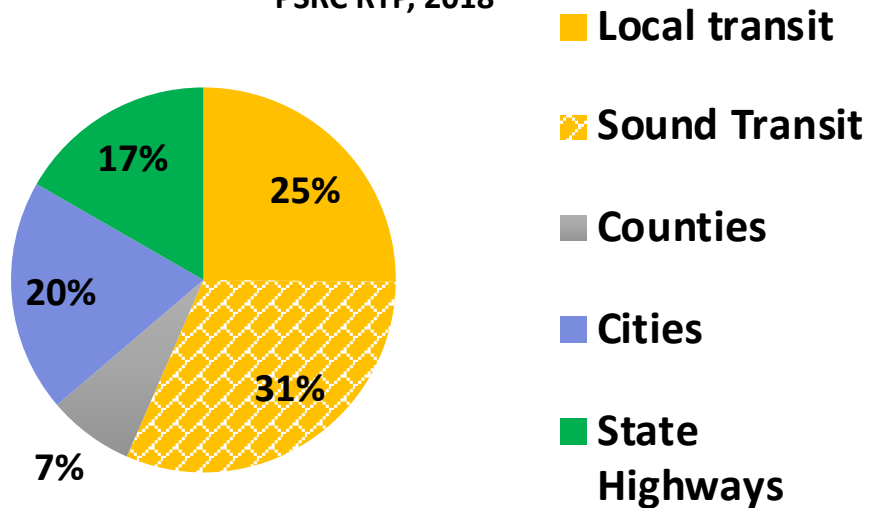
# TRANSIT SPENDING AND PERFORMANCE ARE FAR OUT-OF-BALANCE

**56% OF REGION'S ADOPTED PLAN'S PUBLIC INVESTMENT IS FOR TRANSIT**

**ONLY ABOUT 4% OF THE REGION'S PERSON-TRIPS ARE BY TRANSIT**

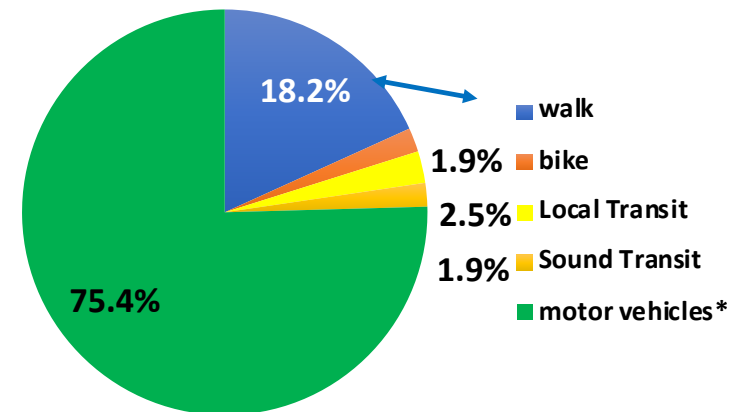
## Investment, 2018-2040

PSRC RTP, 2018

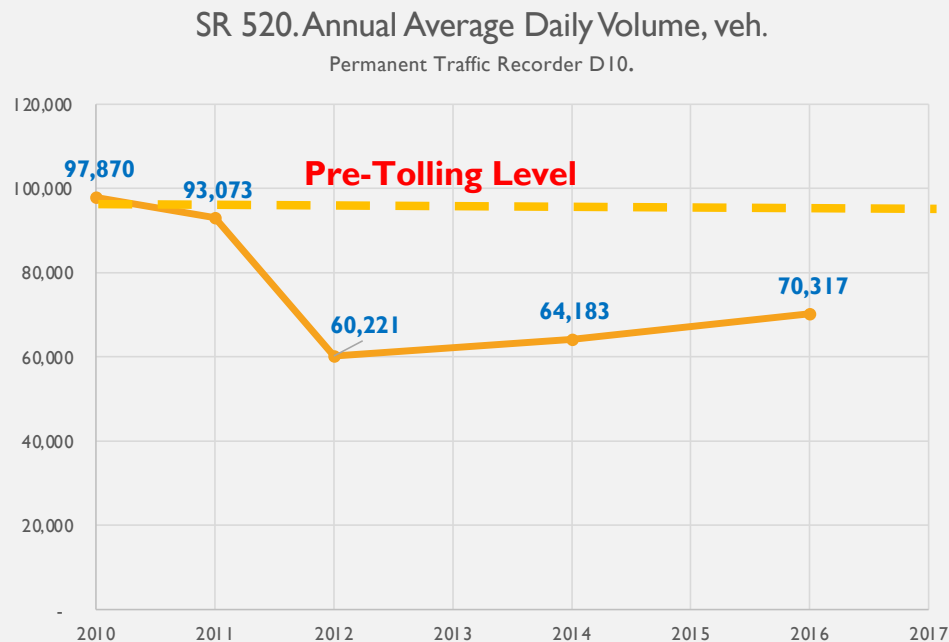


## Mode Share, Weekday 2040

PSRC RTP, 2018



# GOVERNMENT AGENCIES ARE RESTRICTING TRAVEL. HERE'S WHAT HAPPENED TO SR-520 DAILY TRAVEL



Imposing tolls on the new \$4.5 billion SR 520 cross-lake corridor reduced daily volumes by 40% in the first year. There were no alternative routes with excess capacity. Those volumes are slowly recovering, but at this rate will not return to pre-toll levels until 2026, 15 years after tolling started.

Sources: WSDOT (Permanent Traffic Recorder D10, TDA)

# EXPRESS TOLL LANES ON I-405, BELLEVUE TO LYNNWOOD

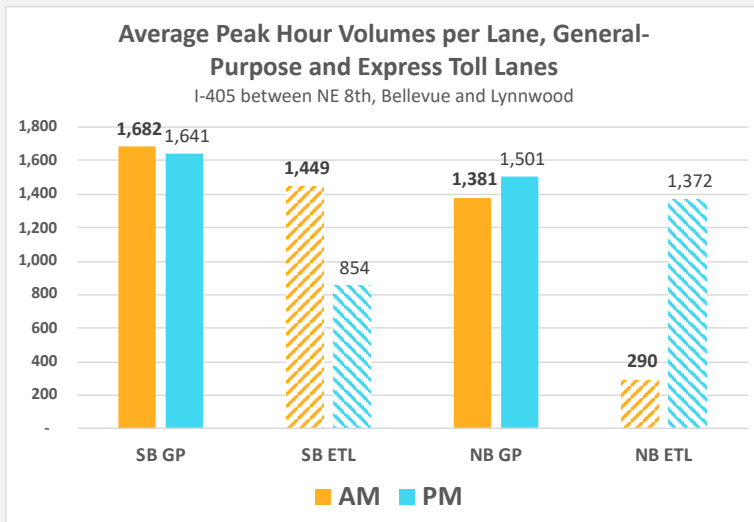


At 17 locations in this 14 mile corridor, Mobility2I compared existing volumes in Express Toll Lanes (ETL) to those in general-purpose (GP) lanes.

- Average GP lane volumes exceeded those in ETL lanes, both AM & PM, and in both directions (see next page)
- For all-day, GP lane volumes were about double those of ETL.

In contrast, WSDOT compared a single location on I-405 and on I-5 to reach a global conclusion that volumes increase with ETL.

# IN PEAK PERIODS, GENERAL-PURPOSE LANES SERVE MORE VOLUME THAN EXPRESS TOLL LANES



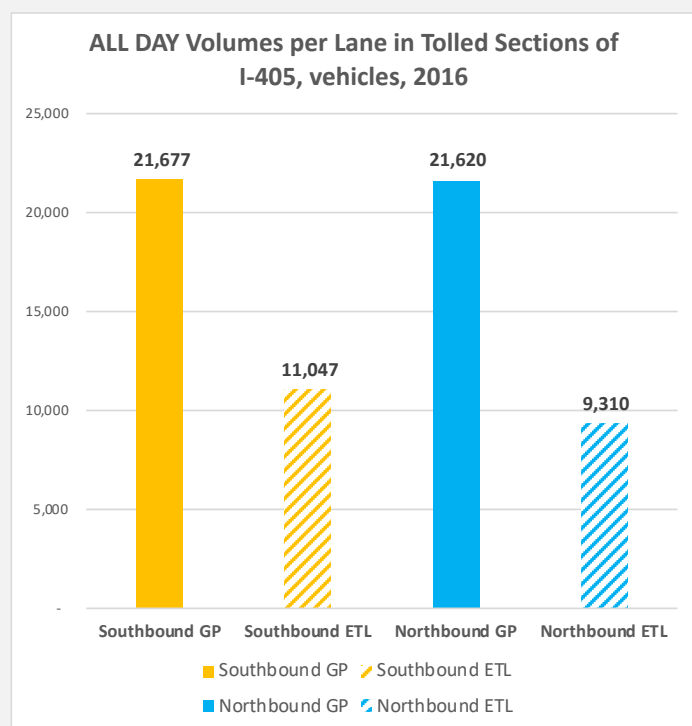
**This compares the performance of general purpose (GP) lanes with that of Express Toll Lanes (ETL) on I-405 between downtown Bellevue and Lynnwood. The vehicle volume are averages for 17 locations in this 14-mile corridor. Included are:**

- **All GP and ETL pairs, both reported for the AM peak period (6:00 to 10:00 AM), and PM peak period (2:30 to 7:00 PM)**
- **All GP and ETL pairs reported for non-peak AM and PM, but occurring within 30 minutes of each other.**
- **Volumes at 5:45 AM, while technically non-peak by WSDOT rules, were included in the AM peak period.**

**Sources: WSDOT's 2016 Ramp and Roadway Report, and Mobility21**



## DAILY, GENERAL-PURPOSE LANES SERVE DOUBLE THE VOLUME OF EXPRESS TOLL LANES



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This compares the daily performance of general purpose (GP) lanes with that of Express Toll Lanes (ETL) on I-405 between downtown Bellevue and Lynnwood. The vehicle volume are averages for 15 locations in this 14 mile corridor. The volumes are from WSDOT's 2016 Ramp and Roadway Report.

This portion of I-405 is an all-day corridor. Many of the non-peak volumes were at or near noon and many started before 6 AM.

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## ISSUE: TRANSIT PERFORMANCE IS UPSIDE DOWN

- Advocates claim: better access to jobs especially for low income transit dependents, lower pollution, higher capacity, lower cost
- The reality is way different. For example:
  - In 2014, less than 2% of the region's jobs were reachable in 30 minutes by transit; by auto, 18%, or 9 times more, were reachable. (See p.6)
  - In 2017, transit buses consumed almost 60% more energy per passenger-mile than the average automobile. (USDOE)
  - As a general rule, trip time by transit is double that by car.
  - In the Seattle region, the RTP's public investment required to add capacity for each person-trip by transit is about 70 times that for highways. Mobility21 would reduce transit's per trip cost to about 20 times highway cost.

## ISSUE: DENSITY ISN'T WHAT IT'S CRACKED UP TO BE.

- Increases in population density (persons per square-mile) is a central theme for governmental planners. Claimed virtues include: reduced auto travel, increased transit ridership and lower cost.
- Real world experience, shows the opposite to be true:
  - Over realistic ranges, a density increase results in an nearly equal traffic increase.
  - Growth boundaries imposed to increase density result in major increases in land prices, and, therefore, home prices.
  - Redevelopment requires expensive retrofit of new utilities.
  - Transit's share of trips increases only at very high densities (e.g. Manhattan)

## ISSUE: WHO IS RIDING PUBLIC TRANSIT TO WORK?

Transit is an important public service for some, by virtue of income, disability or age.

Transit's growth market in the Seattle area is among people who earn more than \$75,000 a year.\*. These riders are taking advantage of a system with a large subsidy they don't need.

Between 2014 and 2018, people who earn less than \$25,000 a year were less likely to commute by transit than in 2014\*

Downtown Seattle office workers are avoiding high parking costs by using subsidized park & ride and subsidized transit.

Jobs for most likely transit commuters:\*\*

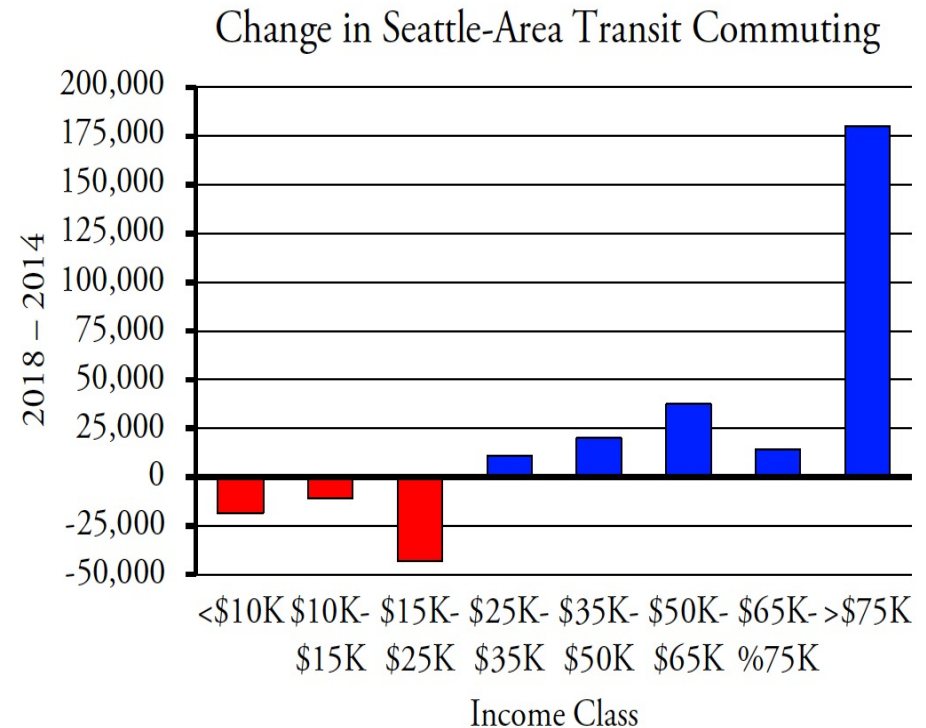
College professors

Housekeepers

Computer Programmers

\* Randal O'Toole, Antiplanner #38, Feb. 2020

\*\* Seattle Times, 9/23/18



## INCREASING COMPETITION FOR STREET SPACE

In lieu of hard decisions to finance, repair and expand our roadway system, there is a growing search for easy solutions, such as:

- Bike lanes
- Shared bikes.
- Electric scooters

In spite of enthusiastic advocates, it is not clear how effective these are. Also, there are downsides:

- Loss of roadway capacity
- Traffic conflicts
- Sidewalks littered with left-behind bikes and scooters

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# *ISSUE:* TRUCK MOBILITY

Regional actions are restricting truck mobility. Here are examples:

- Taking of the I-90 center roadway for low performance light rail. I-90 is the major E-W freight corridor in Washington.
- Reduced lane width on I-90 (11 ft.)
- 10.5 foot lane width in I-90 Mt. Baker tunnels
- Introduction of Express Toll Lanes reducing capacity of the paved surface, and not available to trucks weighing over 10,000 pounds
- Bike lanes adjacent to the curb restricting delivery of freight (and of Uber & Lyft passengers)
- Like other West Coast Ports, schedules and operating hours are changing to deal with increasing congestion



THE END...