AUTONOMOUS VEHICLES IN THE PACIFIC NORTHWEST

JUNE 11, 2018 WORKSHOP, SEATTLE, WA

Becky Steckler, AICP
Urbanism Next Program Manager
beckys@uoregon.edu

Nico Larco, AIA
Urbanism Next Center Director
nlarco@uoregon.edu

Amanda Howell
Urbanism Next Program Coordinator
ahowell3@uoregon.edu

Rebecca Lewis, Ph.D.
Sustainable Cities Initiative Research Director
rlewis9@uoregon.edu
Purpose:
To better understand how new mobility policies, programs, and pricing can help the Cities of Portland, OR; Seattle, WA; and Vancouver, BC realize GHG emission reduction goals.
PROCESS / METHODS

• Literature review
• Policy analysis
• Comparative analysis
• Workshop #1
• Workshop #2

• Phase #2: In-depth research on select topics (Fall/Winter 2018-19)
LITERATURE REVIEW QUESTIONS

• AVs impact on travel and land use?
• Potential magnitudes of impacts?
• Effects of these changes on greenhouse gas emissions?
• Lessons we can draw from existing research and preliminary findings about new mobility technologies?
LITERATURE REVIEW OVERVIEW

• Topics:
  • Vehicle Distance Traveled (VMT/VKT)
    • Trip Generation
    • Shared Mobility
    • Mode Split
  • Energy Sources
  • Land Use / Metropolitan Footprint
  • Freight and Goods Movement
VEHICLE DISTANCE TRAVELED

AVs could lead to a 14-31% increase in vehicle distance traveled (Fehr & Peers)

• TNCs in San Francisco averaging 570,000 VMT on a typical weekday vs. 66,000 for taxis

• If AVs operate like TNCs have to consider:
  • In-service distance traveled
  • Out-of-service distance traveled (“zombie” trips)
TRIP GENERATION

AVs could increase vehicle trips

- New Users
  Overall increase in vehicle trips taken as new users (e.g., youth, elderly populations, etc.) take trips

- Induced Demand
  - UC Davis study about TNCs: 22% of survey respondents said they would have just made fewer trips
SHARED MOBILITY

Magnitude of impact will depend on fleets vs. personal ownership

• Carsharing contributes to reductions in vehicle distance traveled and vehicle ownership rates

• 2014 study modeled potential impacts of a fleet of AVs:
  • Shared fleet would incur 11% more travel compared to non-shared vehicles
  • Fleet could save participating users 10x numbers of cars
SHARED MOBILITY

Ridesharing will also have an impact

• Ridesharing (UberPOOL, Lyft Line) most popular in highly urbanized, dense areas and adoption is growing

• Boston study found only 1/5 of survey respondents took a shared ride and that a preference for a single passenger ride persists
MODE SPLIT

AVs could pull from other modes

• TNCs are impacting transit, walk, and bike
• Transit ridership is decreasing in most major U.S. cities
  • Boston study suggests TNCs are contributing
• UC Davis study found that only 39% of TNC trips would otherwise have been made by car
ENERGY SOURCES

AVs could be more fuel efficient and E-AVs hold promise

• AVs could reduce energy use by up to 80% from platooning, eco-driving, etc.
• Autonomous taxis could yield 87-94% reductions in GHG emissions in 2030
• Electric grid mix is factor but grids are getting cleaner
  • Driving on electricity is cleaner than a 50 MPG vehicle for 75% of US
LAND USE/METROPOLITAN FOOTPRINT

AVs could put pressure on sprawl

• Large body of evidence links sprawl with more vehicle travel, energy consumptions, and GHGs
• Pop. density is strongly and positively associated with VMT per capita
• Increasing street-network connectivity could reduce vehicle travel and emissions by ~8.8%
• Salt Lake City study found that a non-linear relationship between pop. growth and CO$_2$
FREIGHT AND GOODS MOVEMENT

Important to consider AV freight/goods

• Trucking volumes expected to continue increasing

• E-commerce continues to grow
  • Shorter delivery windows
  • Use of independent contractors for goods delivery

• Some trip replacement but net increase in vehicle trips is possible
## Policy Analysis

### Case Study City Climate Policy

<table>
<thead>
<tr>
<th>City of Portland</th>
<th>City of Portland and Multnomah County Climate Action Plan</th>
<th>Adoption Date</th>
<th>GHG Reduction Goals</th>
<th>VMT/VKT Reduction Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2015</td>
<td>2030: 40% reduction from 1990 levels</td>
<td>2030: 30% reduction in daily per capita VMT from 2008 levels</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2050: 80% reduction from 1990 levels</td>
<td></td>
</tr>
<tr>
<td>City of Seattle</td>
<td>Seattle Climate Action Plan</td>
<td>2013</td>
<td>2030: 58% reduction from 2008 levels</td>
<td>2030: 20% reduction in VMT from 2008 levels</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2050: 100% carbon neutral</td>
<td></td>
</tr>
<tr>
<td>City of Vancouver</td>
<td>Greenest City 2020 Action Plan</td>
<td>2015</td>
<td>2050: 80% reduction from 2007 levels</td>
<td>2020: 20% reduction per resident from 2007 levels</td>
</tr>
</tbody>
</table>
# Policy Analysis

## Case Study City New Mobility Policy, Guidance and Reports

<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
<th>Agency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Portland</td>
<td>Resolution 37296</td>
<td>June 2017</td>
<td>City of Portland, Guidance for AV pilot projects and implementation initiatives</td>
</tr>
<tr>
<td>City of Seattle</td>
<td>New Mobility Playbook, Version 1.0</td>
<td>Sept 2017</td>
<td>Seattle Dept. of Transportation, New mobility policy and strategy recommendations</td>
</tr>
<tr>
<td>City of Vancouver</td>
<td>Future of Driving</td>
<td>August 2016</td>
<td>TransLink, New mobility policy and strategy recommendations</td>
</tr>
</tbody>
</table>
# POLICY ANALYSIS

Select North America New Mobility Policy, Guidance and Reports

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Name</th>
<th>Date</th>
<th>Agency/Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlanta, GA</td>
<td>Regional Transportation Technology Policy Document</td>
<td>Dec 2016</td>
<td>Atlanta Regional Commission</td>
<td>Policy and strategy recommendations</td>
</tr>
<tr>
<td>Austin, TX</td>
<td>Smart Mobility Roadmap</td>
<td>Oct 2017</td>
<td>City of Austin and Capital Metro</td>
<td>Policy and strategy recommendations</td>
</tr>
<tr>
<td>Chandler, AZ</td>
<td>Ridesharing and Autonomous Vehicles Zoning Code Amendments</td>
<td>May 2018</td>
<td>City of Chandler</td>
<td>Adopted parking to passenger loading ratio zoning code updates</td>
</tr>
<tr>
<td>Los Angeles, CA</td>
<td>Urban Mobility in a Digital Age</td>
<td>2016</td>
<td>LA Dept. of Transportation</td>
<td>Policy and strategy recommendations</td>
</tr>
<tr>
<td></td>
<td>Mobility Plan 2035</td>
<td>Sept 2016</td>
<td>Dept. of City Planning</td>
<td>Adopted as part of the General Plan in 2016</td>
</tr>
<tr>
<td>NY/NJ/CT Region</td>
<td>New Mobility: AVs and the Region (Component of Fourth Regional Plan)</td>
<td>Oct 2017</td>
<td>Regional Plan Association</td>
<td>Policy and strategy recommendations included in the Fourth Regional Plan (Nov 2017)</td>
</tr>
<tr>
<td>St. Louis, MO Region</td>
<td>Emerging Transportation Technology Strategic Plan</td>
<td>June 2017</td>
<td>East-West Gateway Council of Governments</td>
<td>Policy and strategy recommendations</td>
</tr>
<tr>
<td>Toronto, ON</td>
<td>Preparing the City of Toronto for AVs</td>
<td>Jan 2018</td>
<td>Transportation Services</td>
<td>Report on steps taken and proposed next steps</td>
</tr>
<tr>
<td>Twin Cities, MN</td>
<td>Twin Cities Shared Mobility Action Plan</td>
<td>2017</td>
<td>Shared-Use Mobility Center</td>
<td>Policy and strategy recommendations</td>
</tr>
</tbody>
</table>
POLICY ANALYSIS

VEHICLE DISTANCE TRAVELED

• All case study cities identify the need to reduce vehicle distance traveled, directly or indirectly through mode shift and/or shared rides
POLICY ANALYSIS

VEHICLE DISTANCE TRAVELED

• **Portland:** FAVES / congestion, LOV, trips pay
• **Seattle:** People first, SECA / shift mode
• **Vancouver:** ACES
• **Los Angeles:** Decrease VMT 5% every 5 years
• **Austin:** SEAV, shared use, but no VMT reduction goal
• **Atlanta:** Use pricing and incentives to reduce VMT
POLICY ANALYSIS

MODE SPLIT

• Most plans focus on increasing walking, cycling, transit over vehicles (private or shared)
• Some plans primarily focus on transit
POLICY ANALYSIS

MODE SPLIT

- **Portland**: Walking; cycling; transit; taxi, commercial vehicle, shared; other private vehicles
- **Seattle**: Focus on public transit
- **Vancouver**: 50% of trips by active transportation
- **Los Angeles**: 90% of HH bike facilities within ½ mile; increase 0/1 car ownership HH from 50% to 75% (2035); reduce HH transportation costs to 10% (2035); 50% active
- **Toronto**: Focus on transit
- **NYC Region**: 80% of street space dedicated to active transportation (2040)
POLICY ANALYSIS

PRICING

All case study cities stated that road usage charge or congestion fee for both infrastructure AND manage demand

• Distance
• Time of day
• Location (cordon pricing)

Less common

• Empty vehicle
• Empty seats
POLICY ANALYSIS

PRICING

• **Portland**: Sustainable user-pays funding mechanism for infrastructure and system management

• **Seattle**: Establish new transportation funding mechanisms

• **Vancouver**: Introduce road usage charge to manage demand

• **Los Angeles**: Infrastructure as a service

• **Atlanta**: Tolling and parking credits, no distance fee
POLICY ANALYSIS

SOURCE OF ENERGY

• All case study cities and most others reviewed are promoting electric vehicles
• Most building charging infrastructure (regular and fast charging)
• Many requiring charging infrastructure in new buildings
POLICY ANALYSIS

SOURCE OF ENERGY

- **Portland**: Adopted EV strategy
- **Seattle and Vancouver**: Adopted EV strategy with 100% carbon neutral source
- **Los Angeles**: Infrastructure
- **Austin**: Aggressive deployment of chargers (600) and fast chargers (8-10)
POLICY ANALYSIS

LAND USE/METROPOLITAN FOOTPRINT

• Case study cities have centers/neighborhood policies and urban containment regulations

• Not all explicitly identify them in Climate Action Plans
POLICY ANALYSIS

LAND USE/METROPOLITAN FOOTPRINT

• **Portland:** Centers and Corridors, UGB
• **Seattle:** Urban Villages, UGA
• **Vancouver:** Urban Centres and Frequent Transit Development Areas, UCB
• **Los Angeles:** Mixed use areas, discourage cul-de-sacs
POLICY ANALYSIS

FREIGHT/GOODS DELIVERY

• Few cities identify freight and goods delivery or with much detail
POLICY ANALYSIS

FREIGHT/GOODS DELIVERY

• Portland and Vancouver: Does not identify freight/goods delivery strategies for AVs

• Seattle: Support efficient goods delivery

• Los Angeles: Limit trucks to arterials, encourage deliveries at off-peak hours, amend loading/unloading zones to reflect demand

• Atlanta: Provide tools to address increasing local freight deliveries
NEW MOBILITY POLICY DEVELOPMENT STATUS

Information Gathering
- Toronto, ON
- Vancouver, BC

Goals and Strategies
- Austin, TX
- NY/NJ/C 4th Rgnl. Plan
- St. Louis, MO
- Atlanta, GA
- Minn.-St. Paul, MN

Draft Policy Language
- Portland, OR
- Seattle, WA

Policy Adoption
- Los Angeles, CA
- Chandler, AZ
NEW MOBILITY POLICY DEVELOPMENT

Goals
- Transportation
- Land Use
- Environmental
- Equity
- Etc.

Objectives

Strategies

Implementation Actions
- Regulation
- Pricing (Taxes and Fees)
- Investment (Capital)
- Programs (Ops & Maint.)

Agency Needs
- Data
- Capacity
- Knowledge
POLICY GOALS

1. Maximize Accessibility
2. Enable Efficient Freight and Goods Movement
3. Prioritize Clean Energy Sources
4. Limit Metropolitan Footprint Expansion
5. Adapt to Land Use Changes
GOVERNANCE GOALS

1. Update Structures and Facilitate Communication

2. Promote Culture of Innovation and Flexibility
QUESTIONS AND DISCUSSION