Overview of Trends and Shared-use Mobility Research

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Overview

➢ Trends: transportation & climate change
➢ Overview of Shared-use Mobility Research
   ➢ Carsharing
   ➢ Bikesharing
   ➢ Ridesharing
➢ Summary
➢ Acknowledgements
Trends

- Historic rising demand for automobiles and increased VMT
- Fossil fuel dependency
- Transport sector:
  - 28% of U.S. GHG emissions
  - ~40% of GHG emissions in California
- Transport emissions expected to grow faster than all sectors
- Climate change
- Advancements in information technology
- Growth of the Sharing Economy
Roundtrip Carsharing: A fleet of autos used for round trips that require users to pay by hour or mile

Peer-to-Peer Carsharing: Shared use of private vehicle typically managed by third party

One-Way Carsharing: A fleet of autos used for point-to-point trips, facilitated by parking agreements

Fractional Ownership Carsharing: Individuals sublease or subscribe to a vehicle owned by a third party
Carsharing Membership Growth: Americas

Shaheen and Cohen, 2014
Carsharing Vehicle Growth: Americas

Shaheen and Cohen, 2014
2008 N. American Carsharing Survey
Key Findings

- Between 9 to 13 vehicles removed, including postponed purchase
- 4 to 6 vehicles/carsharing vehicle sold due to carsharing
- 25% sell a vehicle; 25% postpone purchases
- Net CO2 reduction of ~27%

Martin, Shaheen, Lidicker, 2010
Public Bikesharing: Fleet of bicycles for short, point-to-point trips usually found at stations

Closed Community Bikesharing: Campuses and closed membership, mainly roundtrip

Peer-to-Peer Bikesharing: Rent or borrow hourly or daily from individuals or bike rental shops
Worldwide & US Bikesharing
June 2014

- **712 cities** with IT-based operating systems
  - ✔ 806,200 bikes
  - ✔ 37,500 stations
- **47 new city programs** since January 2014
- **US: 56 cities** with IT-based systems & 2 universities
  - ✔ 20,100 bikes
  - ✔ 2,000 stations

Source: Russell Meddin, 2014
### Some Public Bikesharing Impacts

<table>
<thead>
<tr>
<th>City</th>
<th>Change in Vehicle Ownership</th>
<th>Respondents Driving Less Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montreal</td>
<td>-3.60%</td>
<td>36.30%</td>
</tr>
<tr>
<td>Toronto</td>
<td>-2.00%</td>
<td>25.40%</td>
</tr>
<tr>
<td>Washington DC</td>
<td>-2.10%</td>
<td>41.0%</td>
</tr>
<tr>
<td>Minneapolis-Saint Paul</td>
<td>-1.90%</td>
<td>52.4%</td>
</tr>
</tbody>
</table>

Shaheen et al., 2012
Shifts in Public Transit

- Research has shown that shifts to and from public transit exhibited trends that were different and distinct among cities.

- There was a net shift away from Bus in all cities, but this was more pronounced in the larger cities.

- There was a net shift away from Rail in 3 of 4 cities, with Minneapolis showing a net shift towards rail.
Carpooling: Grouping of travelers into a privately owned vehicle, typically for commuting.

Vanpooling: Commuters traveling to/from a job center sharing a ride in a van.

Real-time ridesharing services: Match drivers and passengers, based on destination, through app before the trip starts.

Ridesourcing: A service that allows passengers to connect with and pay drivers who use their personal vehicles for trips facilitated through a mobile application.
638 North American Ridesharing Services (July 2011)

Shaheen and Chan, 2012
Ridesourcing: Some Early Understanding

- Between May and June 2014, surveyed 380 users at three “hot spots” in San Francisco: Mission, Marina, and North Beach districts

- Of all trip responses, 67% were social/leisure (bar, restaurant, concert, visit friends/family); 16% were work; 4% were to or from the airport; and 10% were other (e.g., doctor’s appointment, volunteer)

- Appears to substitute for longer public transit trips but otherwise complements transit

- Ridesourcing users tend to be younger, own fewer vehicles, and more frequently travel with companions than taxi users

Rayle et al, 2014
Summary

- Land use, auto ownership, fossil fuel dependency related to growing GHG emissions
- Transportation contributes ~30% of GHG emissions in US & ~40% in California
- Reduction strategies include: fuels, technologies, and demand management/land use
- Many strategies rely on ITS technologies
As carsharing continues to grow, so does the number and type of usage and ownership models (e.g., round-trip, one-way, peer-to-peer etc.)

Exponential growth of bikesharing in urban areas

Bikesharing maybe a targeted approach to increase transit ridership in small and medium cities and free transit capacity in larger more dense cities.

Renaissance in ridesharing being driven by real-time ridesharing services and ridesourcing.
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