Shared Mobility: Past, Present, and Future

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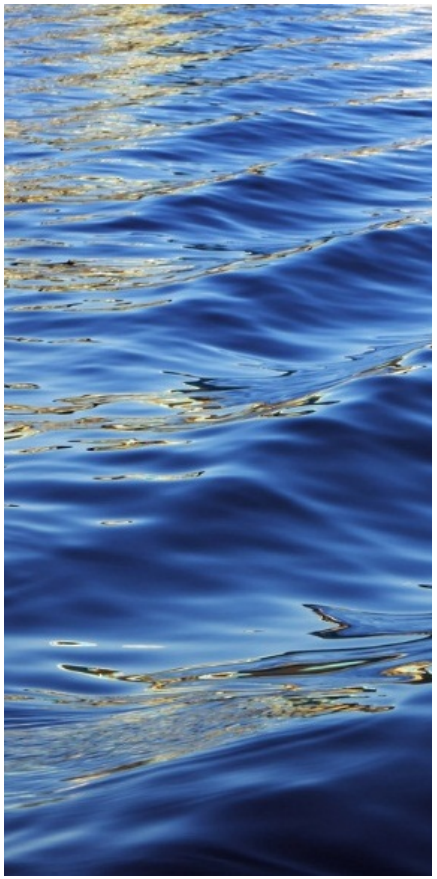

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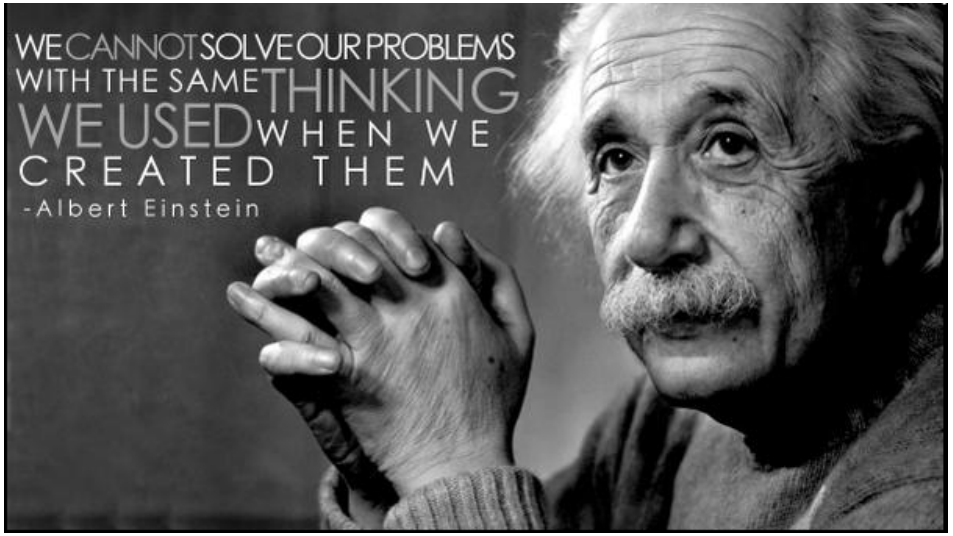
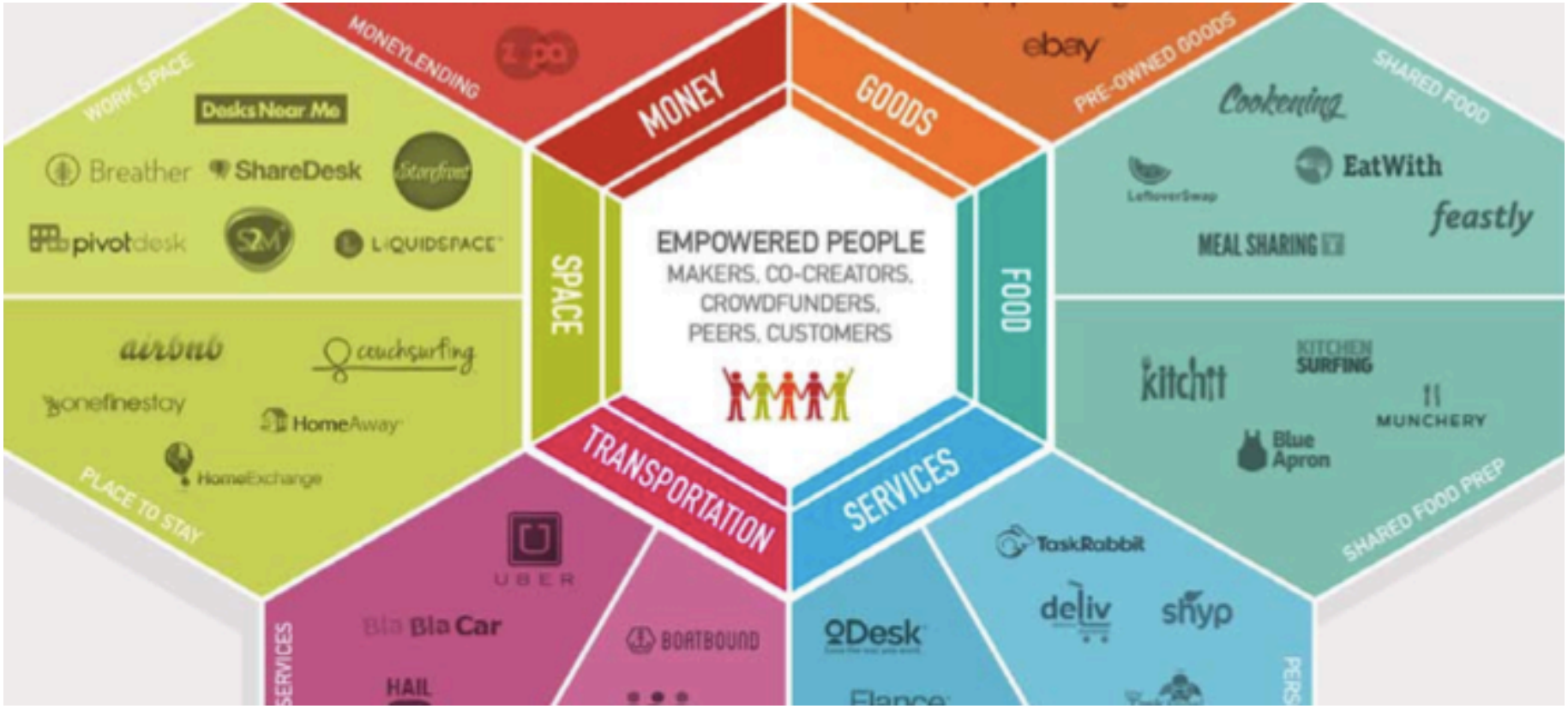
Presentation Overview

- Shared Mobility Ecosystem
- Current Trends and Impacts
- Convergence
- SECA Opportunities and Challenges
- SECA Research and Methods
- Concluding Thoughts
- Acknowledgments

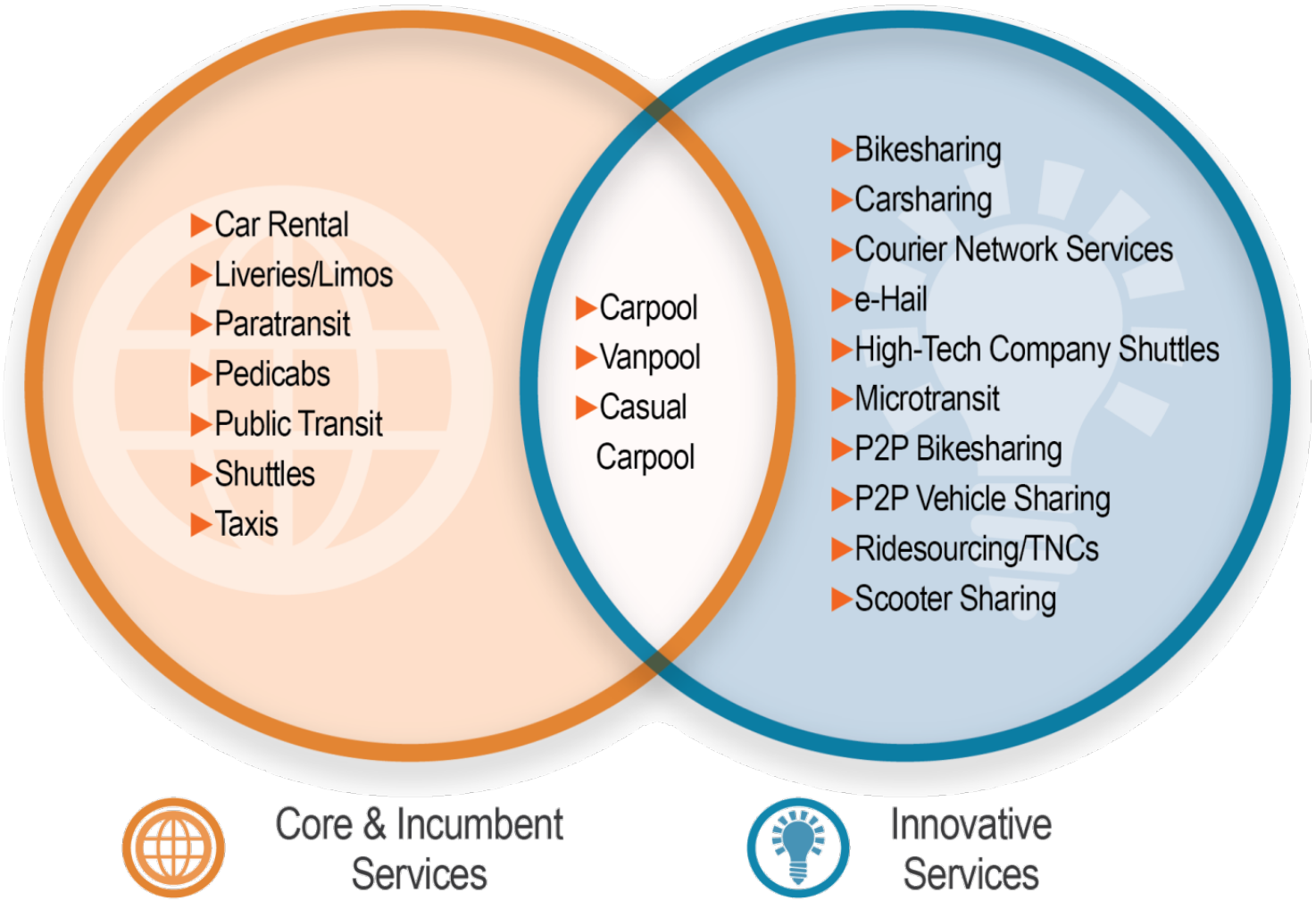


The Sharing Economy



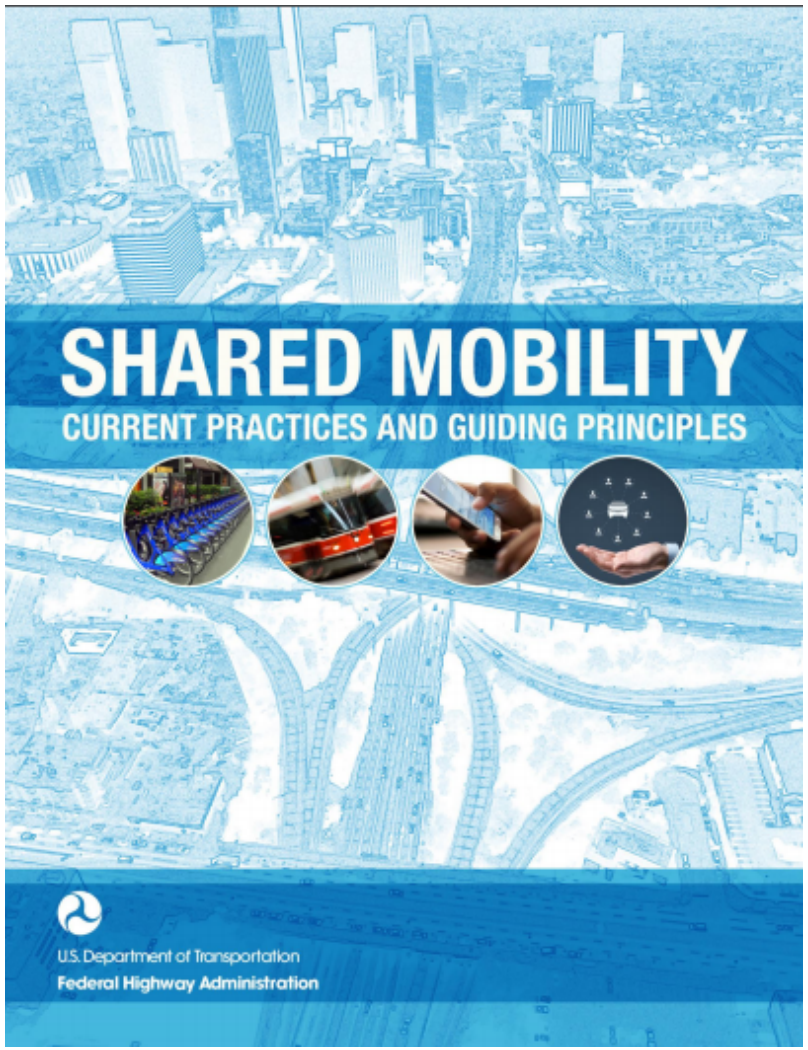
Shared Mobility

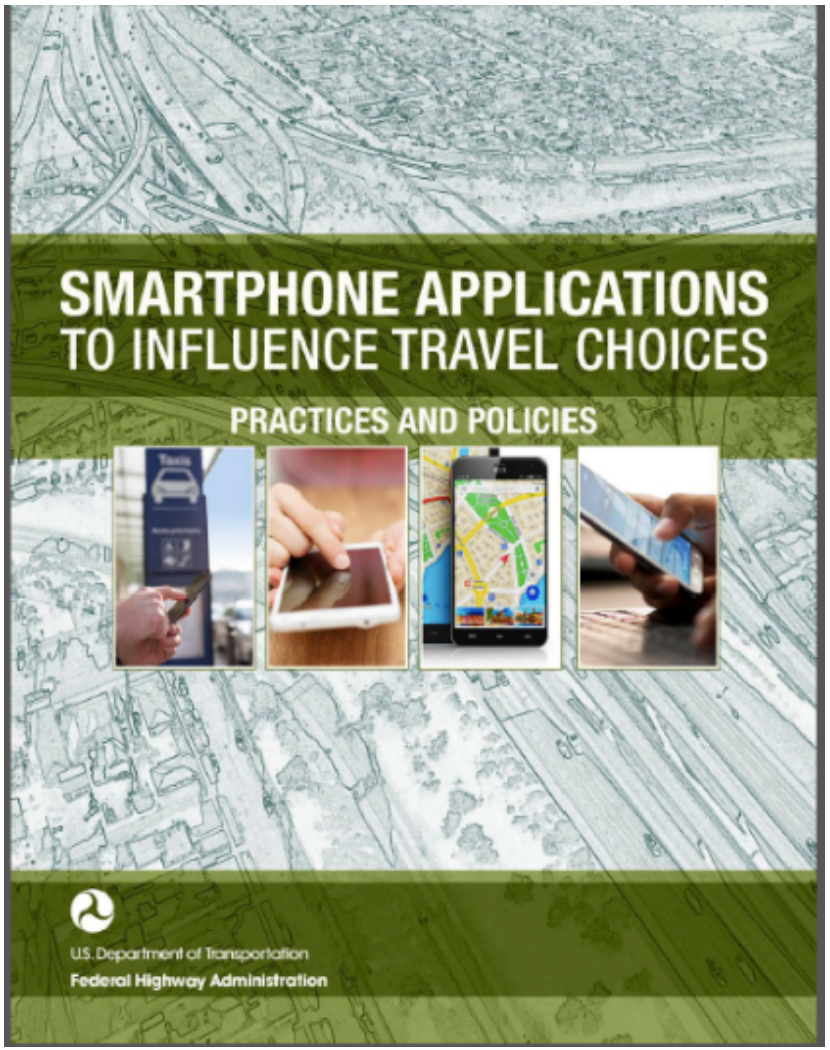
Shared Mobility Ecosystem



Shaheen et al., 2016

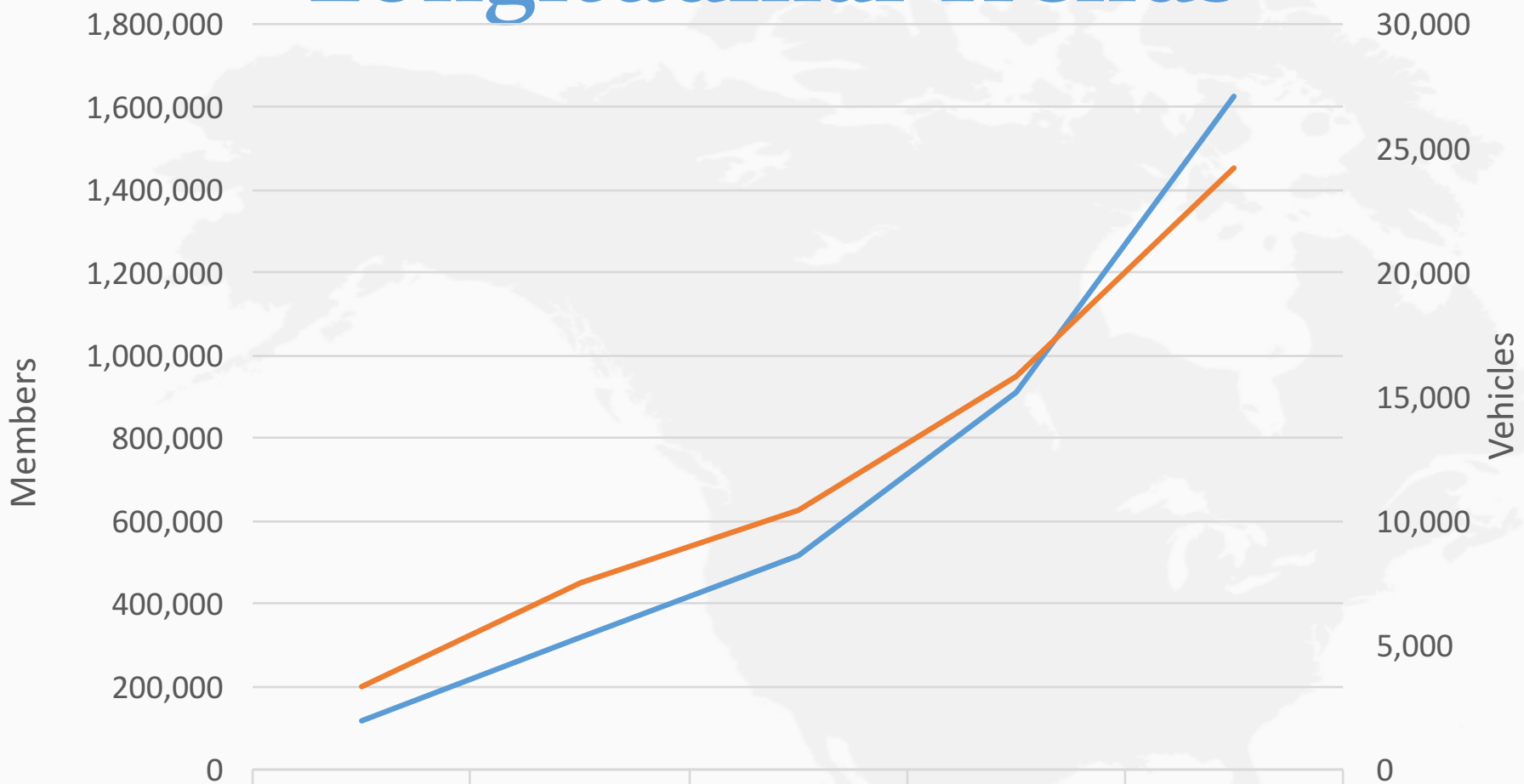
USDOT Primers





Shaheen et al., 2016

N. American Carsharing Longitudinal Trends



	2006	2008	2010	2012	2014
Members	117,656	318,898	516,100	908,584	1,625,652
Vehicles	3,337	7,505	10,420	15,795	24,210

Recent Study of One-Way Free-Floating Carsharing

Methodology:

- Online survey from ~9,500 North American car2go members residing in Calgary; San Diego; Seattle; Vancouver; and Washington, D.C.
- Activity data analysis

Recent Study of One-Way Carsharing

ONE-WAY CARSHARING IMPACTS

Member Vehicle Holdings

2% - 5%	sold a vehicle
1 - 3	vehicles sold per car2go vehicle
7% - 10%	postponed a vehicle purchase
4 - 9	vehicle acquisitions suppressed per car2go vehicle

1 car2go vehicle replaces 7-11 vehicles

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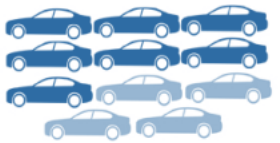


or 28,000 vehicles across 5-city study

Reduction of VMT and GHG emissions

- 6% - 16% Average reduction of VMT per car2go household
- 4% - 18% Average reduction of GHG emissions per car2go household

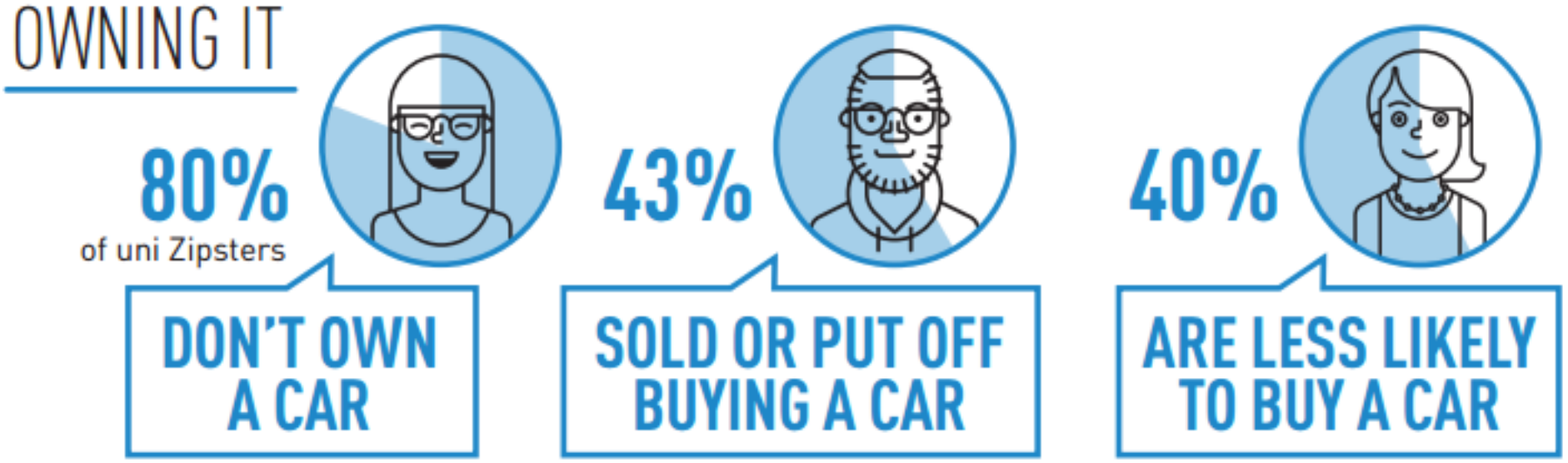
Martin and Shaheen, 2016

Recent Study of Zipcar's College/University Market: Fall 2016

- Survey design conducted as joint effort among TSRC UC Berkeley, Zipcar, and university representatives

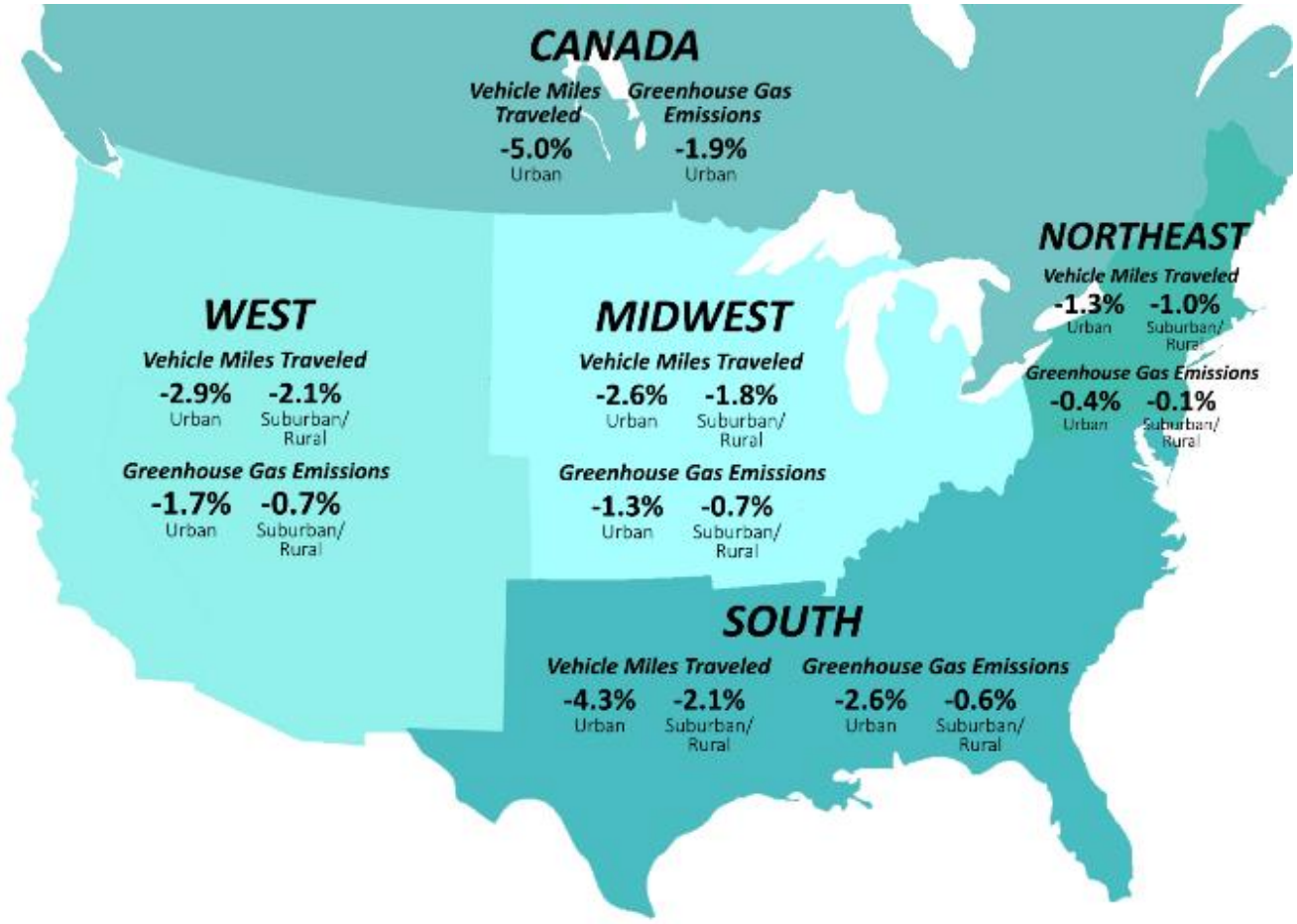
- November 2015: online survey distributed via email by Zipcar to all North American Zipcar members
  - 534 North American universities. 31 universities in Canada and 503 in the U.S.
  - 27,781 respondents completed the survey
  - 10,040 complete responses by current college/university students, staff, or faculty

Recent Study of Zipcar's College/University Market: Impacts



n=~10,000

Impact on Vehicle Miles Traveled (VMT) and Greenhouse Gas (GHG) Emissions



- VMT reduction ranges from -1% to -5%
- GHG reduction ranges from -0.1% to -2.6%
- VMT reductions are greatest in urban land-use contexts
- Members of Southern and Canadian campuses have the greatest VMT reductions

Stocker et al., 2016

Worldwide and US Bikesharing: April 2016

Worldwide: **1,019 cities** with IT-based operating systems

- **1,324,530 bikes**
- 1,060,850 bikes in China (and 390 cities)

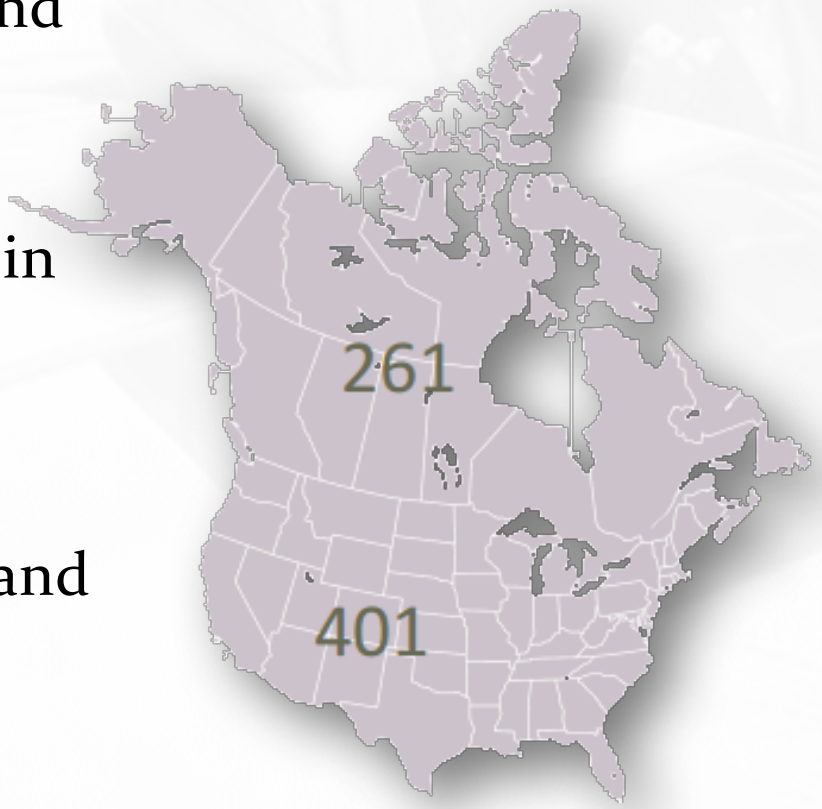
U.S.: **99 cities** with IT-based systems (61 programs)

- **~32,200 bikes**
- **3,400 stations**

In 2016, so far, 24 new programs began operating in world: 13 in China and 5 in US

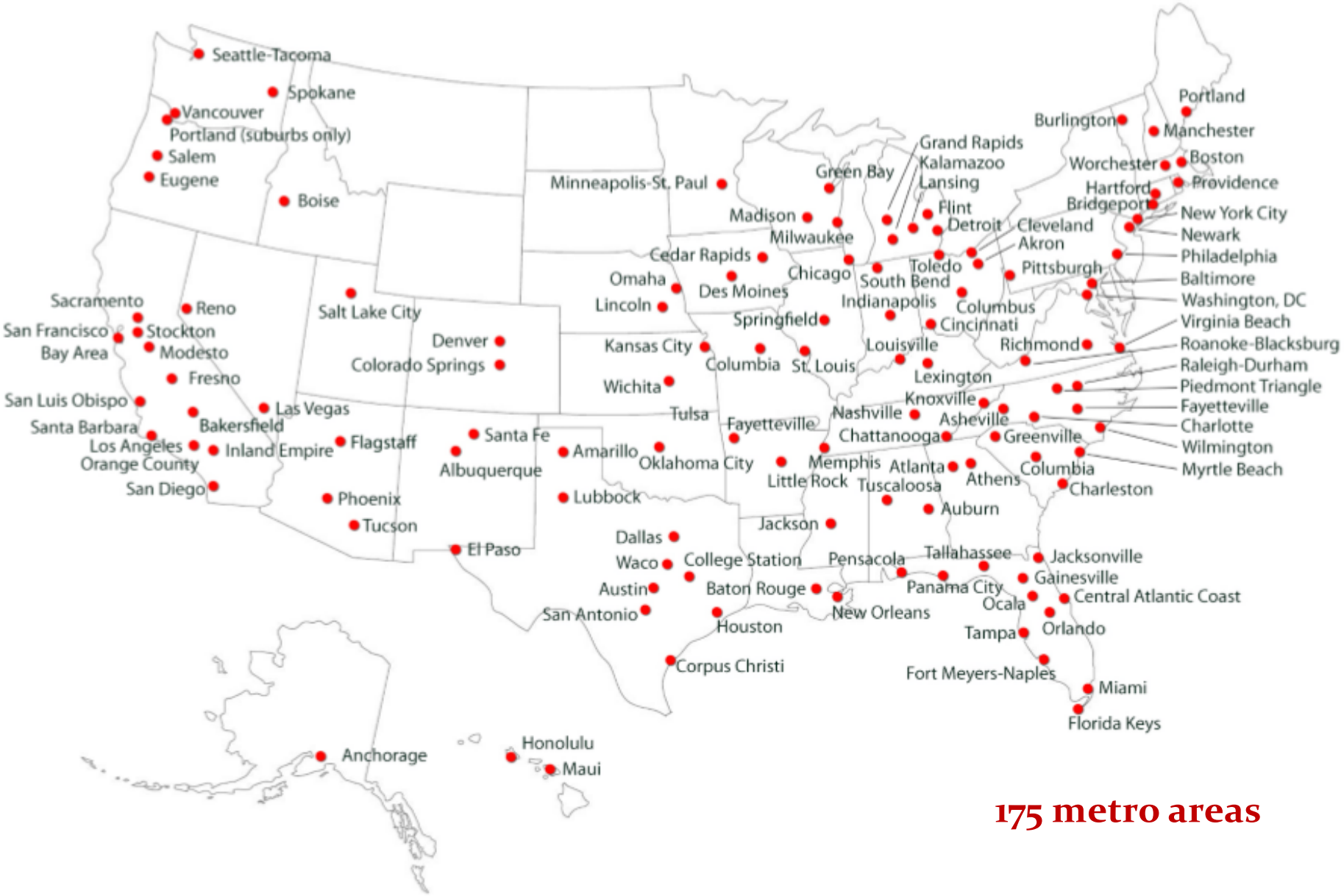
Traditional Ridesharing

- Grouping of travelers into common trips by private auto/van (e.g., carpooling and vanpooling)
- Historically, differs from ridesourcing in financial motivation and trip origin/destination
- 662 ridematching services in the U.S. and Canada (24 span both countries)
  - 612 programs offer carpooling
  - 153 programs offer vanpooling
  - 127 programs offered carpooling and vanpooling



Chan and Shaheen, 2011

Ridesourcing Service Locations (July 2015)

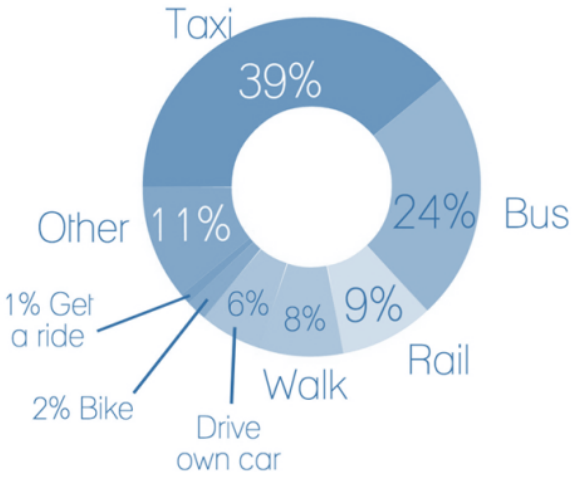


175 metro areas

Impacts of Ridesourcing in San Francisco: 2014

RIDESOURCING/TNC IMPACTS

How would you have made this trip if Uber/Lyft/Sidecar were not available?



n=380

92% would still have made this trip
8% induced travel effect

33% would have taken public transit (bus or rail)

4% named transit station as origin/destination, suggesting some use ridesourcing to access transit

20% avoided driving after drinking*

* 3% of study population would have actually driven

Microtransit Examples

- Fixed routes and fixed scheduling
  - Chariot, San Francisco
- Flexible routes and on-demand scheduling
  - Bridj: Austin, Boston, Kansas City, DC
  - Ride KC: Bridj first public-private partnership among shared mobility company, automaker, and transit agency
  - Via: New York City

Courier Network Services

For-hire delivery services using an online platform to connect couriers using personal vehicles with freight (e.g., packages, food)

P2P Delivery Services:
Drivers use their own private vehicle or bike to conduct deliveries
Postmates, Instacart, Shipbird, etc.

Paired On-Demand Passenger Ride and Courier Services:
Dual ride services + package deliveries

Convergence

Electrification

Mobile Technologies

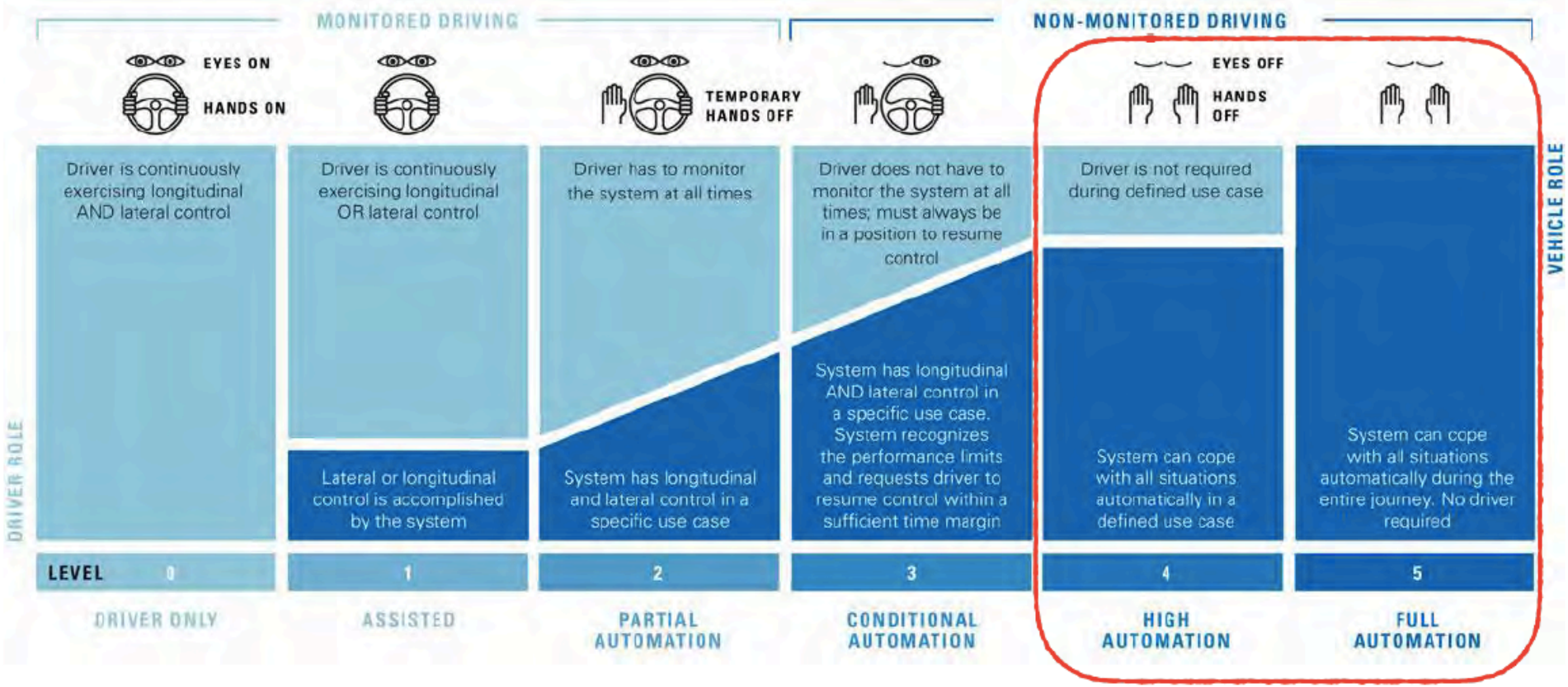
SECA

T. Papandreou, 2016

Shared Mobility

Automation

Levels of Automation



Planned Pilots: Level 4-5 Automation and Shared Mobility

- No large-scale SAV deployments with full automation, at present
- Many companies beginning to discuss shared fully automated fleets
- Notable Developments:
  - Lyft received a $500 million investment from GM in Jan 2016
  - Uber testing in Pittsburgh
  - New Tesla vehicles will be equipped with fully self-driving hardware (announced Oct 2016)
  - Ford, GM, Fiat Chrysler, BMW, Daimler, Volvo, and others making strategic investments to transition to a mobility provider away from sole focus on auto manufacturing
  - USDOT selects Columbus, OH as the winner of the Smart City Challenge in June 2016

SECA Potential Benefits

- Reduce GHG emissions and improve safety
- Increase capacity (smaller vehicles, closer spacing, shared rides, etc.)
- Increased auto sales (higher fleet turnover from increased vehicle use)
- Reduce per mile cost (over privately-owned vehicles)
- Opportunity to add density through redevelopment
- Downsize number of privately-owned vehicles

SECA Potential Challenges

- Higher upfront vehicle costs
- Increased VMT (due to lower costs, increased use, modal shift away from public transit, longer commutes, roaming AVs, etc.)
- Will people give up private ownership?

SECA Research and Methods

- Most studies develop or modify existing travel behavior models with differing assumptions about operations and vehicle type
- Some document prior demographic trends and forecast future projections based on expert guidance
- Other studies survey potential users to develop projected impacts
- Many studies include an **array of scenarios** such as: no AV sharing (privately owned), shared fleet (without pooling), shared fleet (with pooling)
- Numerous studies predict **modal shift away from privately owned vehicles, under specific sharing scenarios**

Future impact on VMT and congestion uncertain due to a range of possible effects

Concluding Thoughts

- AVs, if **shared**, will begin to blur the lines between public and private transportation options
- SECA could help achieve **efficient and affordable public transportation** that improves **access to jobs and healthcare**
- Deployment opportunities for SECA in **first/last mile connections, underserved populations**, and **areas lacking quality public transit service**
- **Cities and sites are different**, so SECA deployments need to be tailored to varying technical, social, and legal contexts
- **Pilot programs, enabled by public-private partnerships,** could encourage private shared services to adapt and expand functionality to meet the needs of public transit users
- **More research and informed policy needed**

Acknowledgements

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