

# **Opportunities and Challenges of Adopting** Alternative Fuel Vehicles (AFV) in Shared Mobility

S-Lab - Team: Matthias Egert, Rohit Gawande, Lucas He, Naomi Sleeper



### **BACKGROUND & OBJECTIVE**

Can Shared Mobility be a path to increased adoption of AFVs?



Background: Urban mobility faces transformation given the rise of shared and electric mobility and the need for fuel efficiency as well as improved mobility for everyone. Toyota has committed to a 90% reduction in fossil fuel fleet emissions by 2050, and aims to increase sales of AFVs while improving access to mobility globally.

Objective: (1) Identify opportunities/challenges to introduce AFVs in shared mobility, (2) improve mobility for underserved people.

Alternative Fuel Vehicle (AFV): Battery Electric, Plug-in Hybrid, Fuel Cell

# 6

Some environmental benefits

Improved urban mobility Potential harm for public transportation and mobility for

low income communities

High and Mid Income

Customers with underserved

### ANALYSIS

### Is Shared Mobility Sustainability-Oriented Innovation (SOI)? Yes.

Shared Mobility

(Today, w/o AFV)

= Fulfilled

( < ) = Partly fulfilled

SUSTAINABILITY ORIENTED INNOVATION

### Businesses profitable and scalable





### Customer mobility needs met

Urban/suburban Customer segments	Drive			Be Driven		
	1-/2-way Car Sharing	P2P Car Sharing	Corporate Car Sharing	Ride Sharing	Ride Hailing	Shuttle Transit
Mid/high income	+	+	+	+	+	+
Low income	(+)	(+)		(+)	(+)	(+)
Children/Families				(+)	(+)	(+)
Senior	+			+	+	+
Disabled					(+)	(+)

### shared mobility providers Profitable for drivers mobility options

Can Shared Mobility with AFVs be SOI? Not today.

Good for System

SOI

Good for

Customer

## SCENARIO ANALYSIS

### Shared Mobility with Electric and Plug-in Hybrid Vehicles are costly, inconvenient, and difficult to scale

### SUSTAINABILITY-ORIENTED INNOVATION

Good for

Business

Viable & scalable for



### **FINDINGS & RECOMMENDATIONS**

The Future of Shared Mobility is not Electric, but Hybrid.

- Shared Mobility is unlikely a sustainable path to increased adoption of AFVs in the near future
- Shared Mobility can help improve mobility for underserved communities in conjunction with public transportation. Highly cost and fuel efficient (hybrid) vehicles are needed
- Opportunities: (1) Expand Hybrid Portfolio for Shared Mobility, (2) Expand pilots with Electric Two-Seaters (i.e., iRoad), (3) Shared Mobility pilot with long-range/fast charging AFVs & public private partnerships, (4) Evaluate SOI w/ Fuel Cell Vehicles, (5) Autonomous Electric Vehicles
- Challenges: Charging Infrastructure, Costs, Scalability, Acceptance, Standards, Range Anxiety