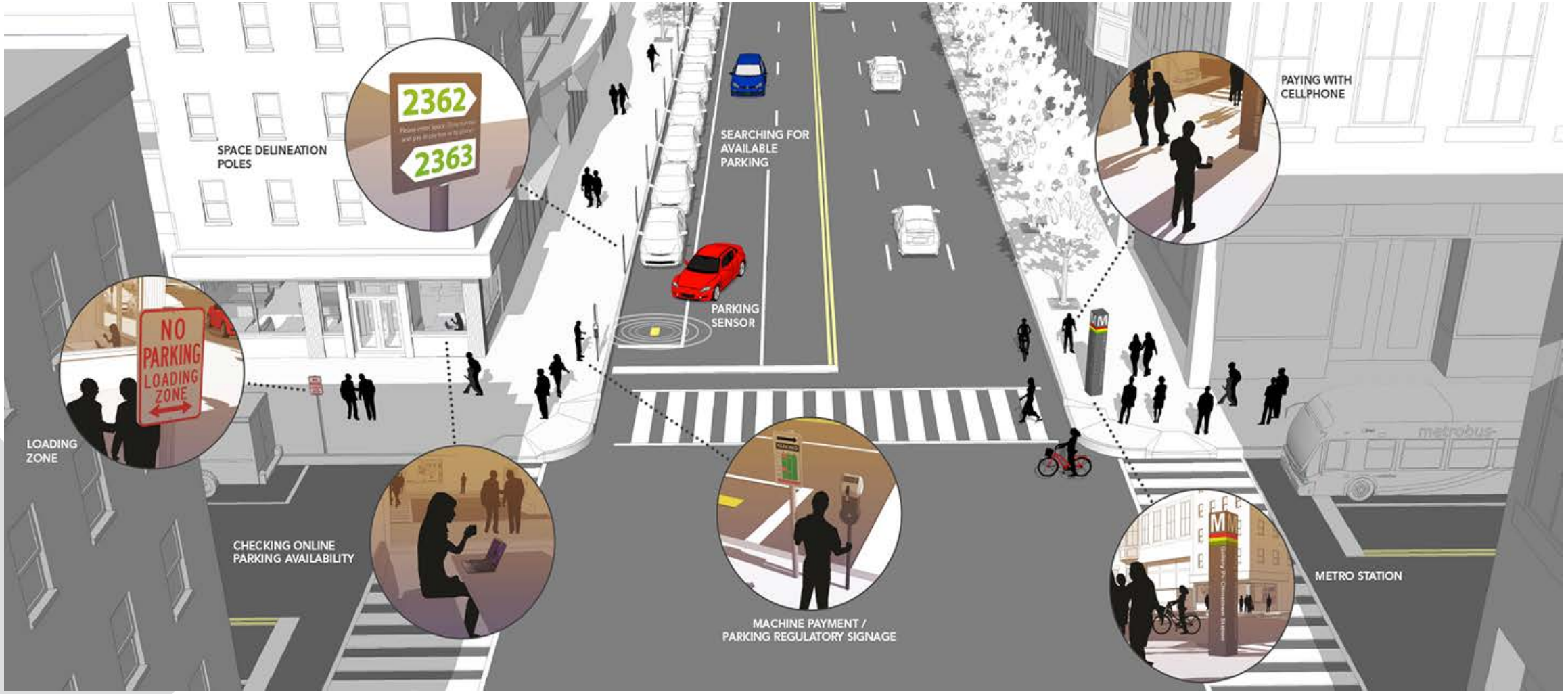
BEND TSP – CTAC BROWN BAG SERIES

FRIDAY, JANUARY 18, 2019

KITTELSON & ASSOCIATES

Opening Remarks



WHAT ARE TRANSFORMATIONAL TECHNOLOGIES?

Definition

- Transformational technologies (TTs) are:
  - Any of a broad range of evolving applications of science, engineering, and societal organization
  - With the potential to **transform how people and institutions use land and transportation systems**

Examples: wireless telecommunications, ride hailing apps, shared systems (bikes, e-scooters, cars, etc.), connected vehicles, automated vehicles, alternative-fuel vehicles, smart cities, big data analytics, internet of things (IoT), unmanned aerial vehicles, 3D printing, and more…

Types of Technologies

The technologies with the greatest impacts usually overlap **2 or more** of these categories

Internet of Things (IoT)

Internet, smartphone applications that affect travel demand

Passenger Vehicle Technologies

Deployed in passenger motor vehicles

Infrastructure Technologies

Deployed on urban ground transportation infrastructure (highways, rail, bus)

Logistics Technologies

Focus on goods movement vehicles, applications and logistics infrastructure

Why Worry?

- **Some desirable technologies have unintended consequences today**
  - Parking of shared bicycles, e-bikes, e-scooters

- **Some desirable technologies may not succeed without some public agency help**
  - Electric vehicle charging stations

- **Other technologies may cause problems in future**
  Autonomous vehicles mode shift implications

HOW FAST ARE THEY COMING?

How fast are they coming?

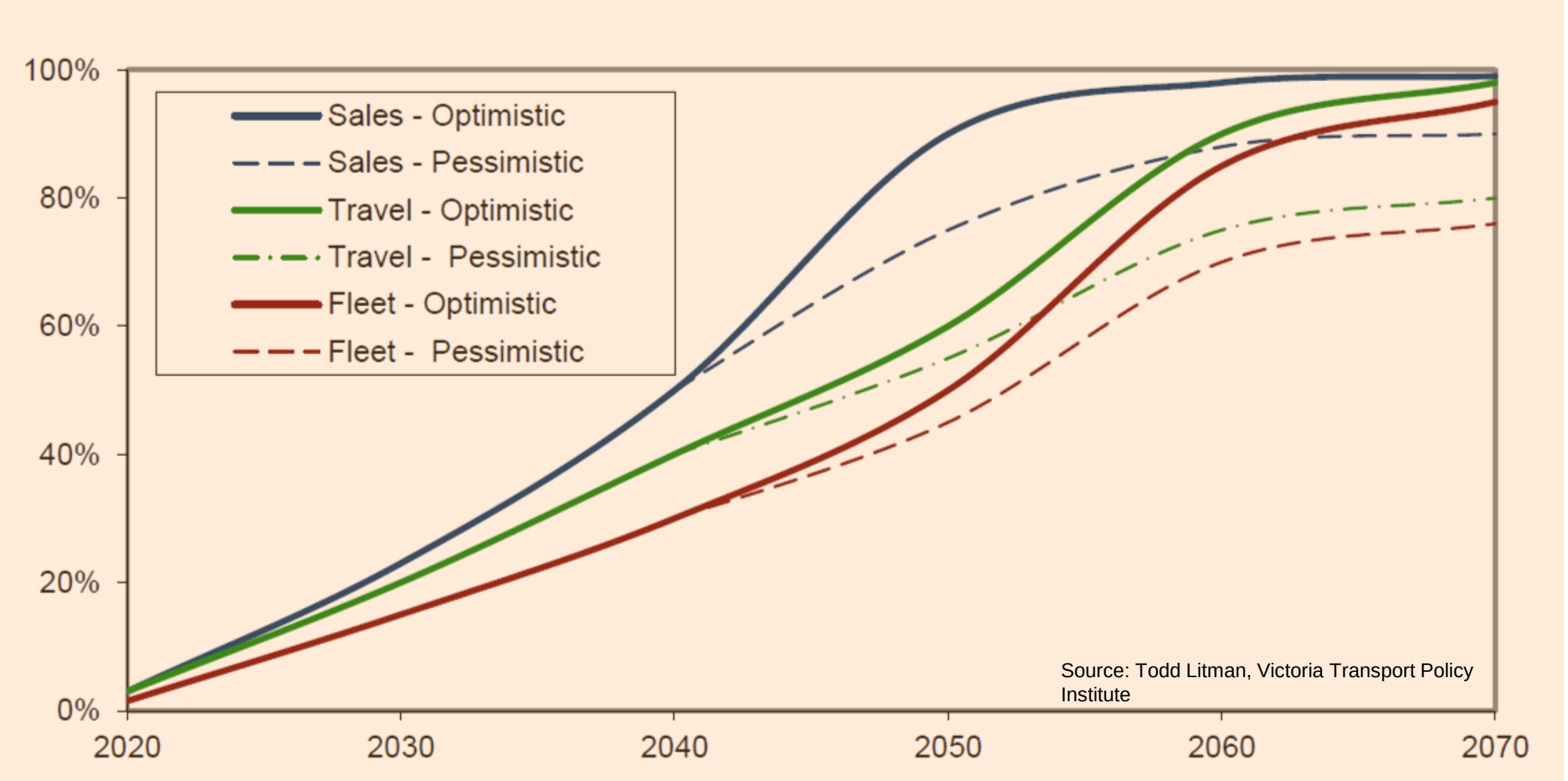
Technology	Implementation Status			
	Under Development	Pilot Testing	Loss Leader	Self Sustaining
1. Internet Applications				
1.1 Replace Need to Travel				X
1.2 Improve System Efficiency			X	
1.3 Smart Cities and Communities		X		
2. Passenger Vehicle Technologies				
2.1 Alternate Vehicle Power Sources			X	
2.2 Vehicle Com and Control Tech		X		
3. Infrastructure Technologies				
3.1 Active Traffic Manage (ATDM)				X
3.2 Active Parking Manage (APM)		X		
3.3 Curbside and ROW Management	X			
3.4 Transit Fleet Management				X
4. Logistics (Freight) Technologies				
4.1 Intercity Line Haul	X			
4.2 Last Few Miles	X			
4.3 Last 50 Feet		X		

Autonomous Vehicle (AV) Projections

Stage		Decade	Vehicle Sales	Vehicle Fleet	Vehicle Travel
$$$	Available with **high** price premium	2020s	2-5%	1-2%	1-4%
$$	Available with **moderate** price premium	2030s	20-40%	10-20%	10-30%
$	Available with **minimal** price premium	2040s	40-60%	20-40%	30-50%
NA	Standard feature included in most new vehicles	2050s	80-100%	40-60%	50-80%
NA	Saturation (everyone who wants it has it)	2060s	?	?	?
NA	Required for all new and operating vehicles	???	100%	100%	100%

Source: Todd Litman, Victoria Transport Policy Institute

Autonomous Vehicle (AV) Projections



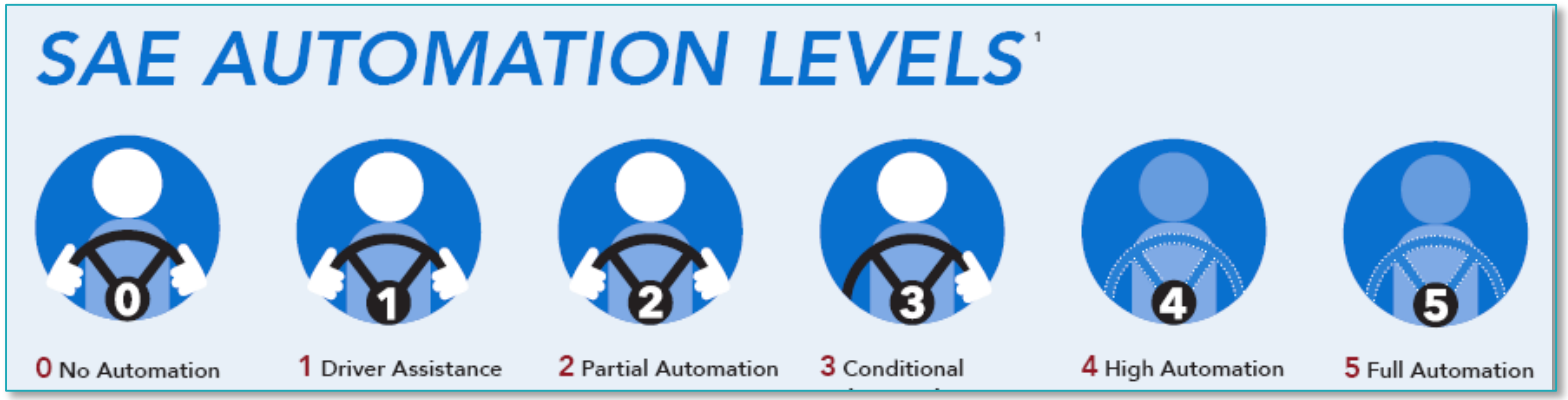
WHAT DO WE KNOW ABOUT THEIR LIKELY IMPACTS?

Likely Impacts

- Little is really known.
  - It depends on the cost and quality of service delivered.
  - The technologies are rapidly evolving.
  - Many technologies are currently being offered as “loss leaders” so we do not really know what their prices will be in the long run. Some services may disappear.
- Best approach
  - Monitor, monitor, monitor

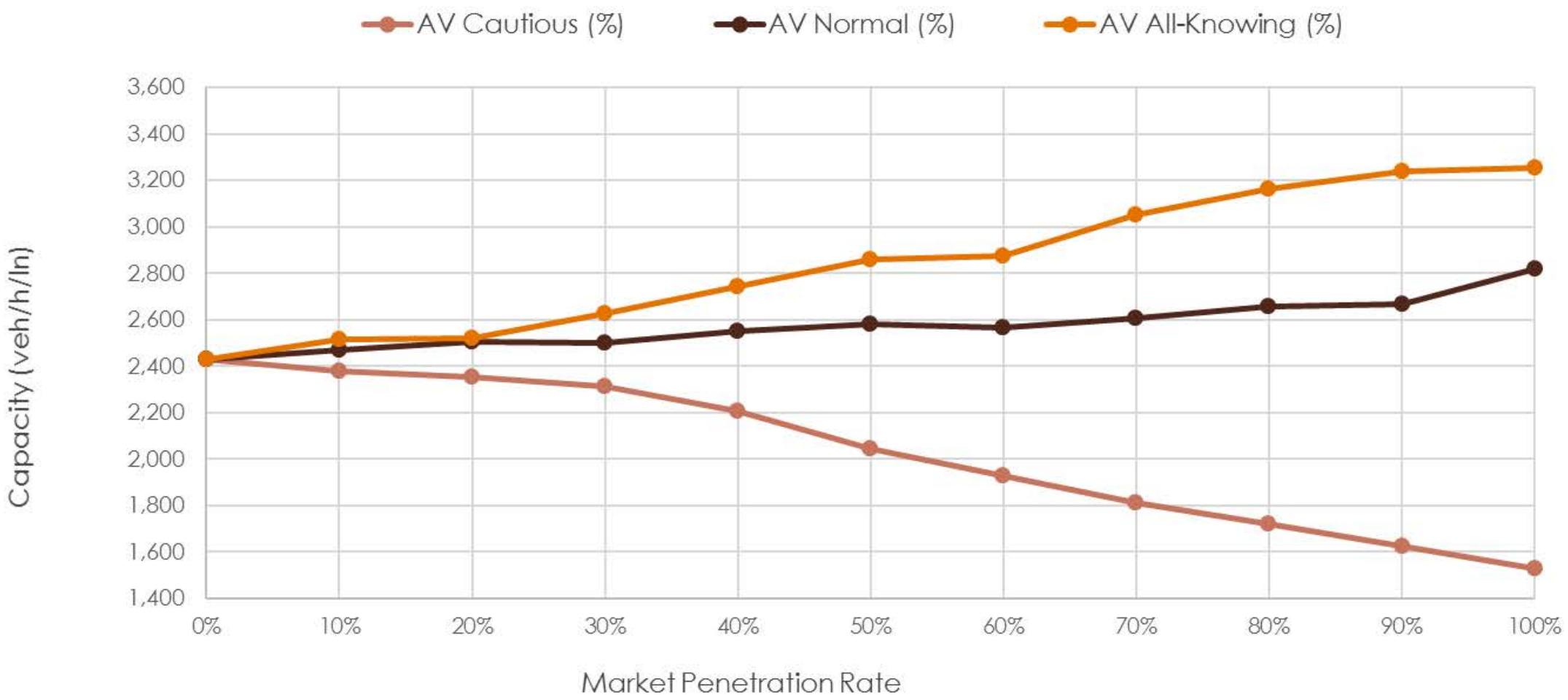
WHAT ABOUT CAPACITY OF ROADS?

Literature Review of Timelines



- **U.S. Light Duty Fleet Turnover Rate: 14.8 years**
- **Technology availability:**
  - Partial Automation (Levels 1-2): 2017-2019
  - Conditional Automation (Level 3): 2020 (limited operational design domains)
  - High/Full Automation (Levels 4-5): 2025-2030
- **Market Penetration:**
  - Once technology is perfected, it will take another 13 years for 50% market penetration and 27 years for 90% market penetration

Early Sensitivity Tests



WHAT DO I NEED TO LOOK AT TODAY? WHAT CAN WAIT?

What to tackle today?

Technology	Codes & Ordinances	CIP/TIP	Short Range	Long Range
1. Internet Applications				
1.1 Replace Need to Travel				X
1.2 Improve System Efficiency	X		X	X
1.3 Smart Cities and Communities		X	X	X
2. Passenger Vehicle Technologies				
2.1 Alternate Vehicle Power Sources	X	X	X	X
2.2 Vehicle Com and Control Tech		X	X	X
3. Infrastructure Technologies				
3.1 Active Traffic Manage (ATDM)		X	X	X
3.2 Active Parking Manage (APM)		X	X	X
3.3 Curbside and ROW Management	X	X	X	X
3.4 Transit Fleet Management		X	X	X
4. Logistics (Freight) Technologies				
4.1 Intercity Line Haul				
4.2 Last Few Miles				X
4.3 Last 50 Feet	X		X	X

HOW DO I MONITOR THE TRENDS?

Resources

- FHWA TPM Guidebook
- EPA Guide to Sustainable Transportation Performance Measures
- Various state DOT guides on performance management
- UC Davis paper: Measuring Land Use Performance: Policy, Plan, and Outcome

Monitoring Trends

- Monitoring Growth
- Monitoring Land Use and Location Changes
  - Early Indicators of Problems
- Monitoring Parking Usage Changes
- Monitoring Travel Behavior Changes

Monitoring Growth

METRICS

- Population, employment, sales tax receipts, property tax receipts, transient occupancy tax receipts, permits issued, and licenses issued

GETTING THE DATA

- State, Local agency
- Can be significant lag time to acquiring data
- Helps if tax receipts, licenses and permits are digitized and geolocated in accessible searchable database

Land Use and Location

METRICS

- Building permits, occupancy permits

EARLY INDICATORS OF PLANNING PROBLEMS

- Complaints and requests for code enforcement
  - Must be digitized, geolocated in accessible database

GETTING THE DATA

- Data often stored in inaccessible, agency and department specific formats.
- Geolocating and digitizing local agency data in accessible and searchable database helps a great deal

Parking Demand Changes

METRICS

- Parking utilization by vehicle type, location, time of day
  - Cars, EVs, trucks, bicycles, scooters
  - Curb usage, sidewalk usage, off-street parking
- Average duration or turnover rates

GETTING THE DATA

- Manual methods expensive
- Make monitoring and reporting parking use a condition of approval for permits, licenses
- Crowdsource, recruit volunteer monitors
- Purchase device geolocation data
- Install video monitors in public right of way

Travel Demand Changes

METRICS

- Overall trends – VMT, PMT, by mode and MaaS provider
- For modeling: person mode specific ODs, times, costs.

GETTING THE DATA

- Condition of approval for licenses and permits
- Purchase device geolocation and activity data.
- Crowdsource volunteers to field survey trip data.
- Recruit internet volunteers to report travel activities.

INVOLVING NEW STAKEHOLDERS

New Stakeholders

- **Why involve new stakeholders in planning process?**
  - Because other departments within agency and technology companies will impact the success of the planning product
- **Who to involve?**
  - Other departments within agency (Police, Fire, Maintenance)
  - Technology companies, MaaS providers
- **Finding them:**
  - Go to trade groups for tech companies
- **Getting and Keeping Them Interested**

EFFECT ON LAND USE AND DEVELOPMENT

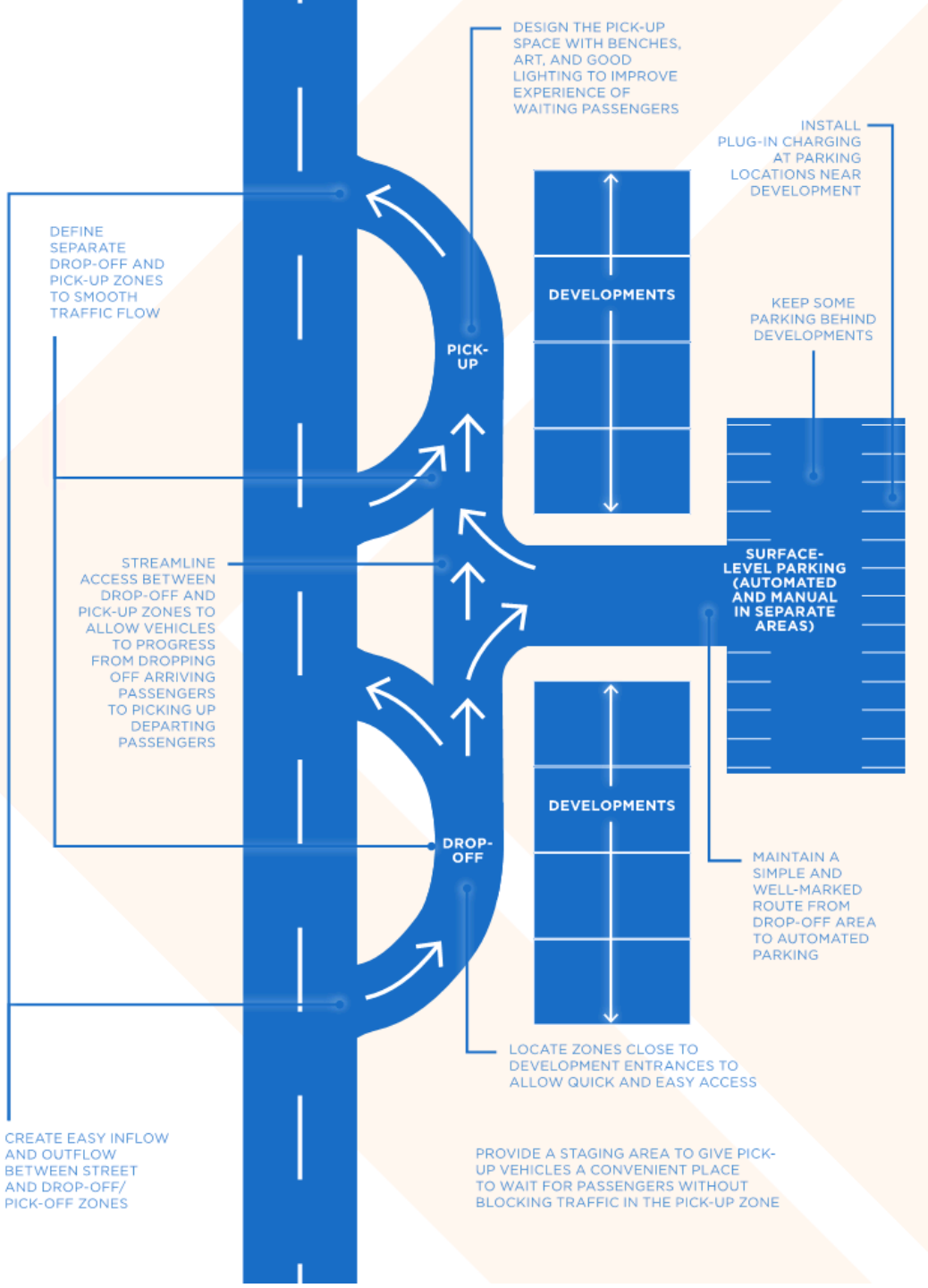
What is Changing?

- Near Term
  - Riding Sharing
  - Electric vehicles
- Long Term
  - Autonomous Vehicles

How Do We Adapt?

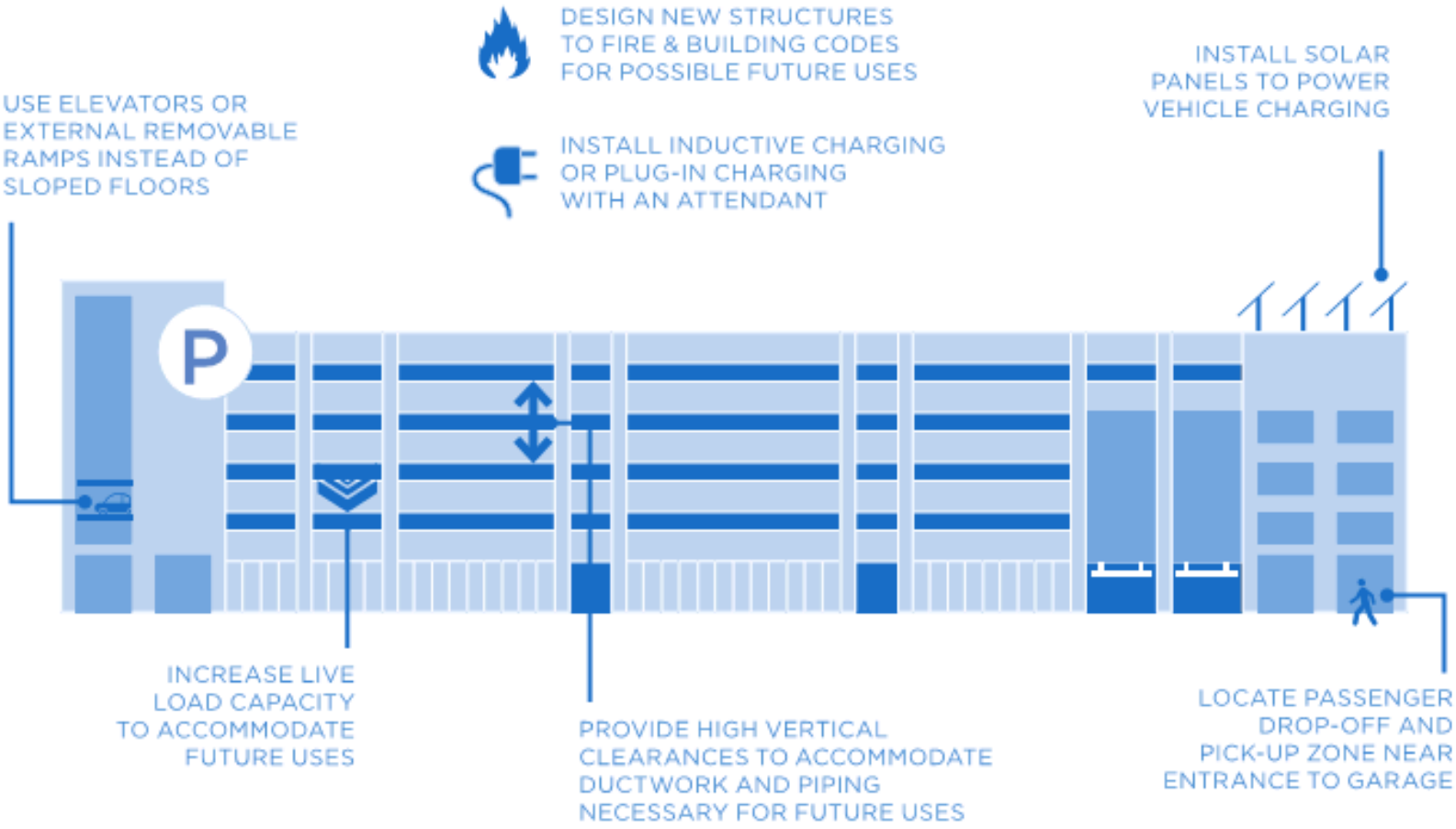
– Pick-up/Drop-off Areas

- Close to entrances
- Distinct and different areas
- Allow for movement between pick-up and drop-off areas
- Staging areas



How Do We Adapt?

- Parking
  - Plan for future uses
  - Include charging infrastructure
  - Locate entrances strategically



DISCUSSION – YOUR EXPERIENCES

Key Planning Issues

- What do you see as the key planning issues posed by evolving transformational technologies?
  - Parking
  - Residential, retail, and employment land uses
  - Logistics/freight systems
  - ITS infrastructure investment, management and planning
  - Streetscape and right-of-way space allocation and design
  - Unique rural considerations

Key Planning Issues

- **Parking**
  - focus on off-street (it's a "land use")
  - design,
  - management,
  - repurposing,
  - demand

- **Residential, retail, and employment land uses**
  - Housing types, location, densities (including rural)
  - Affordable housing
  - Retail types and location
  - Employment (e.g. work from home, service economy)
  - Aging in place
  - Access to healthcare/jobs

Key Planning Issues

- **Logistics/freight systems**
  - Goods movement
  - Warehousing
  - Distribution centers
  - Freight mode shifts/trip characteristics/emerging freight modes
- **ITS infrastructure investment, management and planning**
  - Includes ATM
  - ADM
  - Signals
  - Communications tech

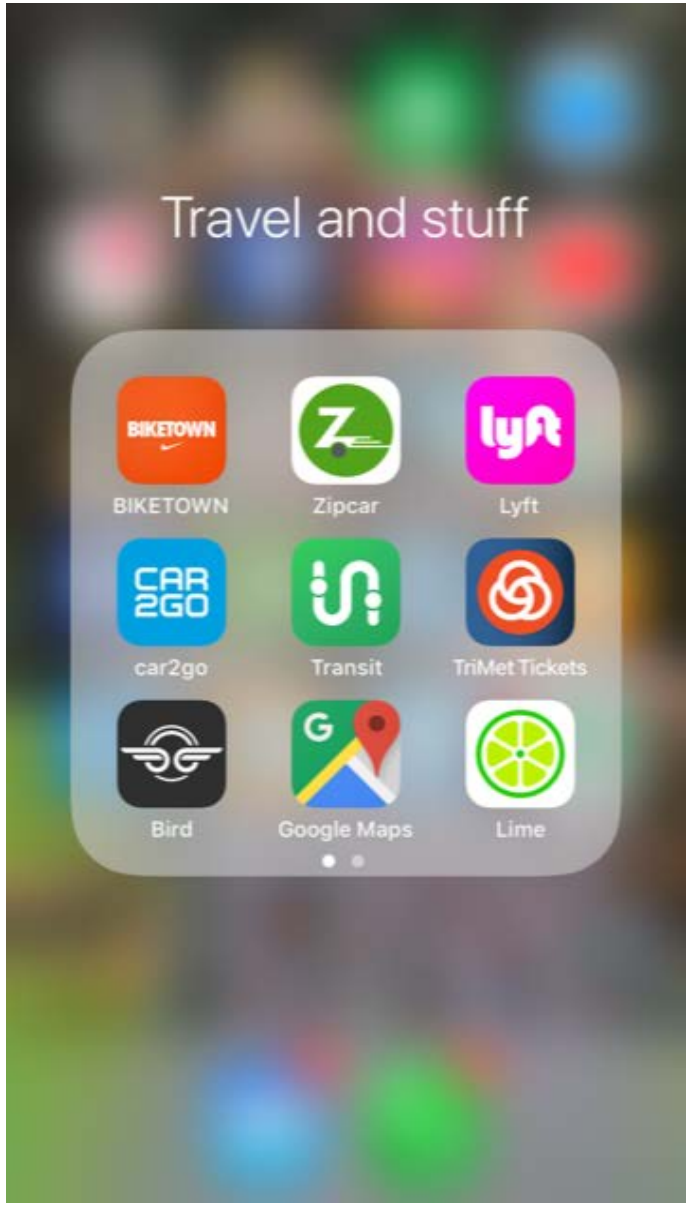
Key Planning Issues

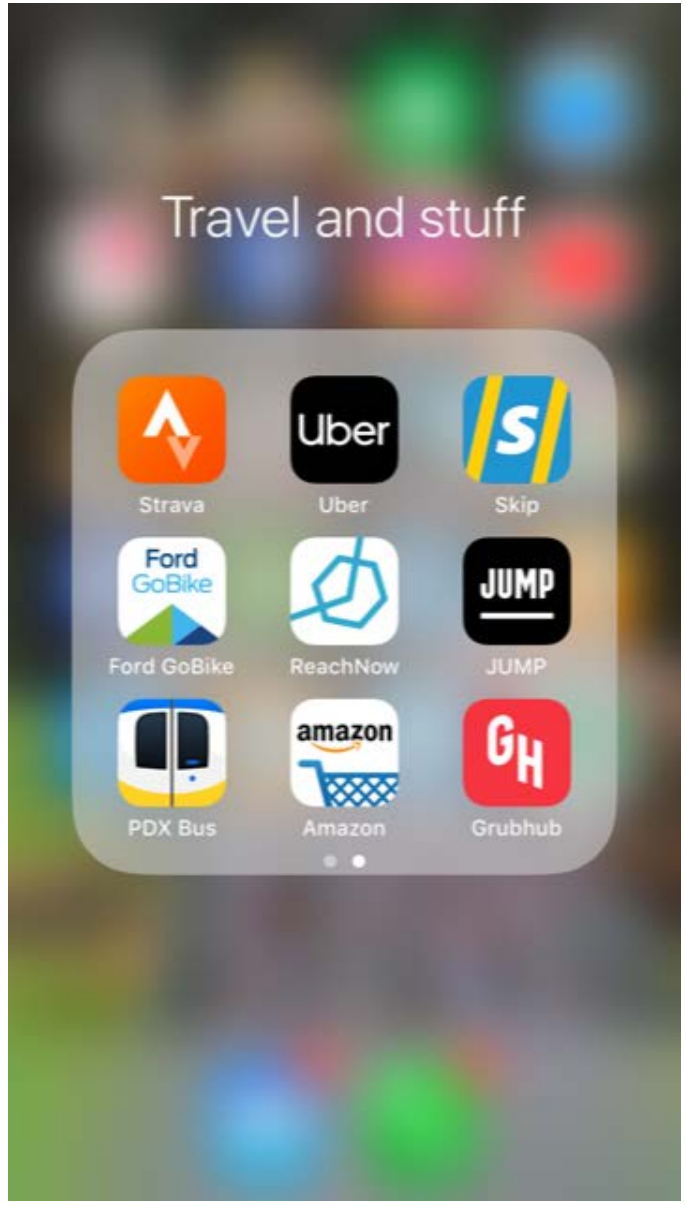
- **Streetscape and right-of-way space allocation and design**
  - curb management
  - space for logistics/deliveries
  - non-auto personal travel modes - “micromobility”
  - street/freeway capacity and ops
  - utilities/power grid/fiber
  - safety and performance

- **Unique rural considerations**
  - Agriculture
  - Basic access to healthcare, transportation, jobs
  - Lack of technology deployment
  - Tourism
  - Development pressure

Early Lessons Learned?

- Many of these technologies are in widespread deployment (if as loss leaders).
- What are the early “lessons learned” from your perspective?





Thank you!