

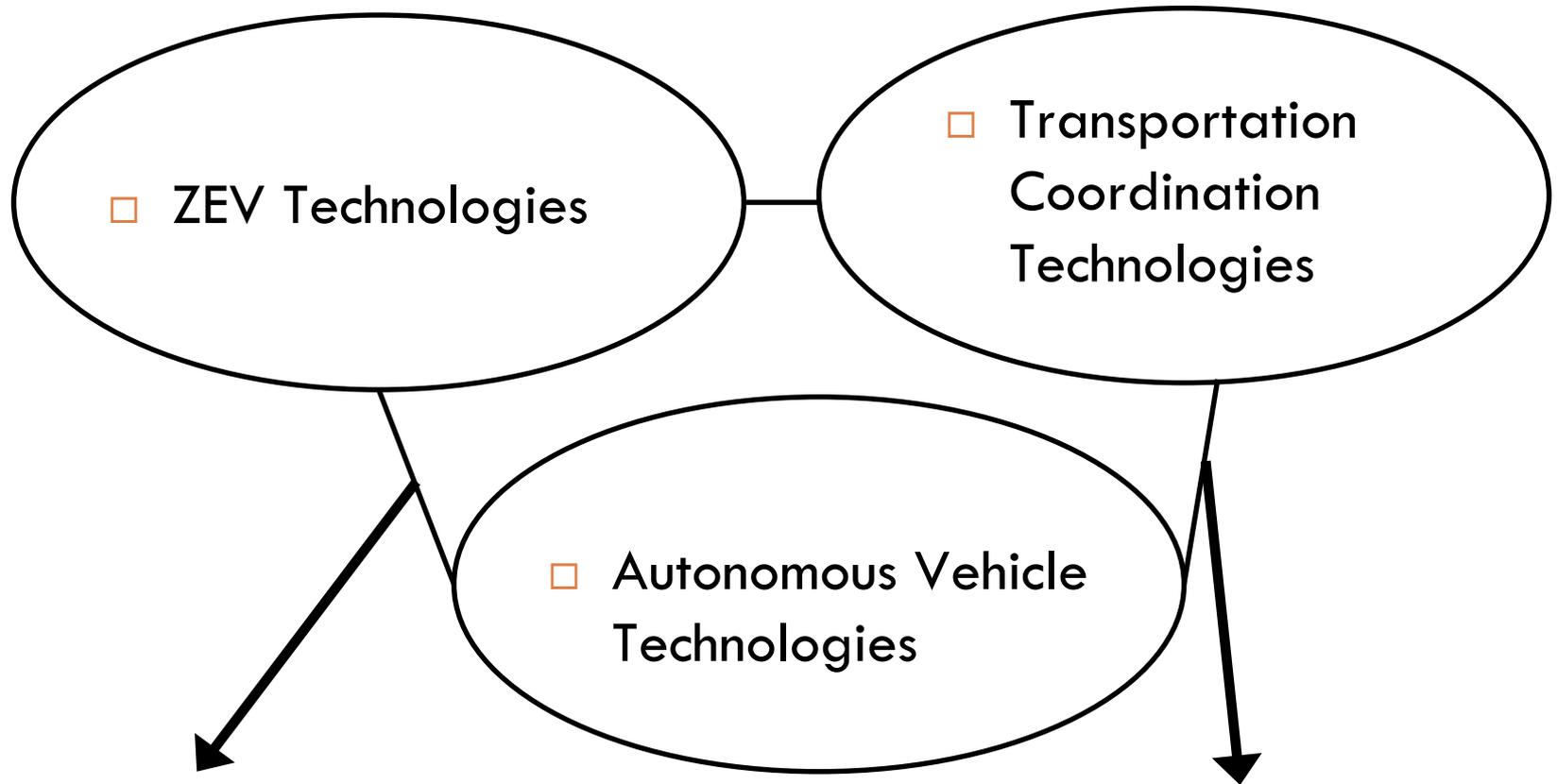
# A survey of emerging transportation technologies with local applications

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CBPR, University of the Pacific

Transportation Technology: Innovations in San Joaquin  
San Joaquin Council of Governments  
555 E. Weber Avenue, Stockton CA 95202  
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<http://pacific.edu/cbpr>

# Overview



□ Applied Technology:

A Megaregional Air Taxi Service



□ Local opportunities

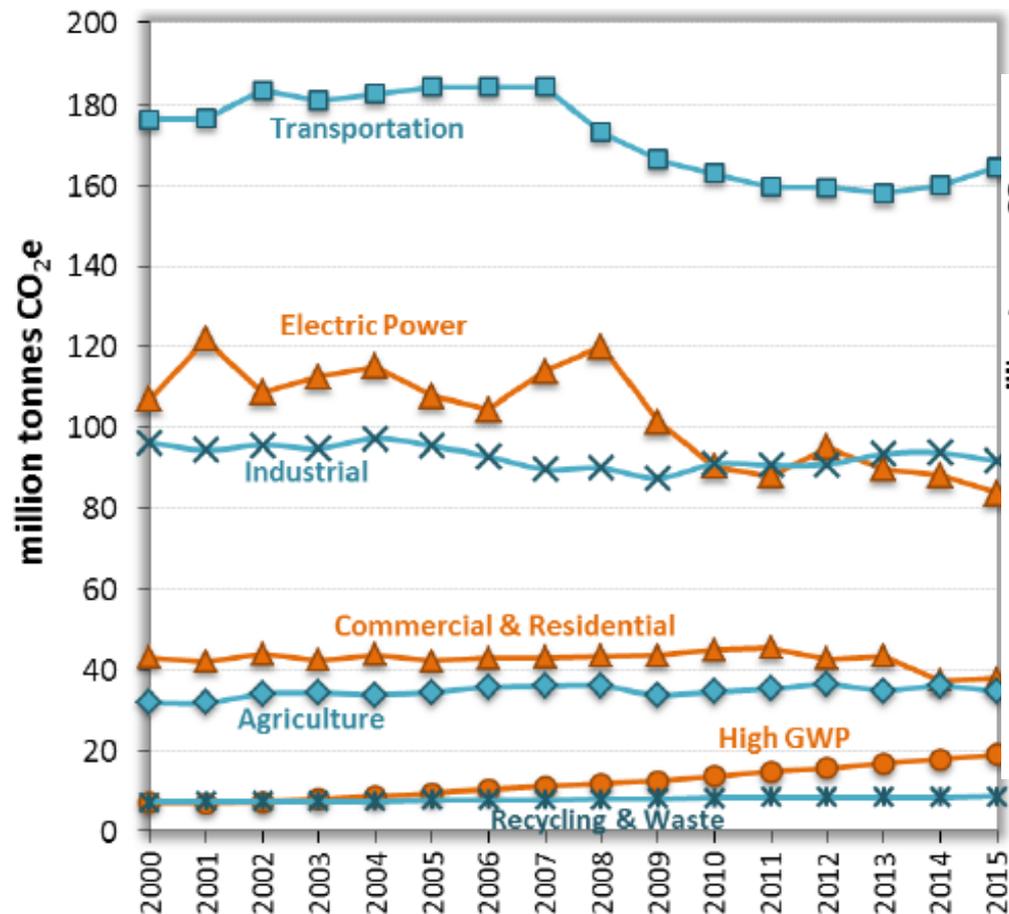
# ZEV Technologies

- Why do these technologies matter?
- California needs significant NO<sub>x</sub> and GHG reductions
  - ▣ Federal health-based ambient air quality standards (key milestones in 2023 and 2031)
  - ▣ 40 percent reduction in GHG emissions from 1990 levels by 2030
  - ▣ 80 percent reduction in GHG emissions from 1990 levels by 2050
  - ▣ 50 percent petroleum reduction target by 2030
  - ▣ Continued reductions in criteria pollutants and toxic air contaminants to protect public health

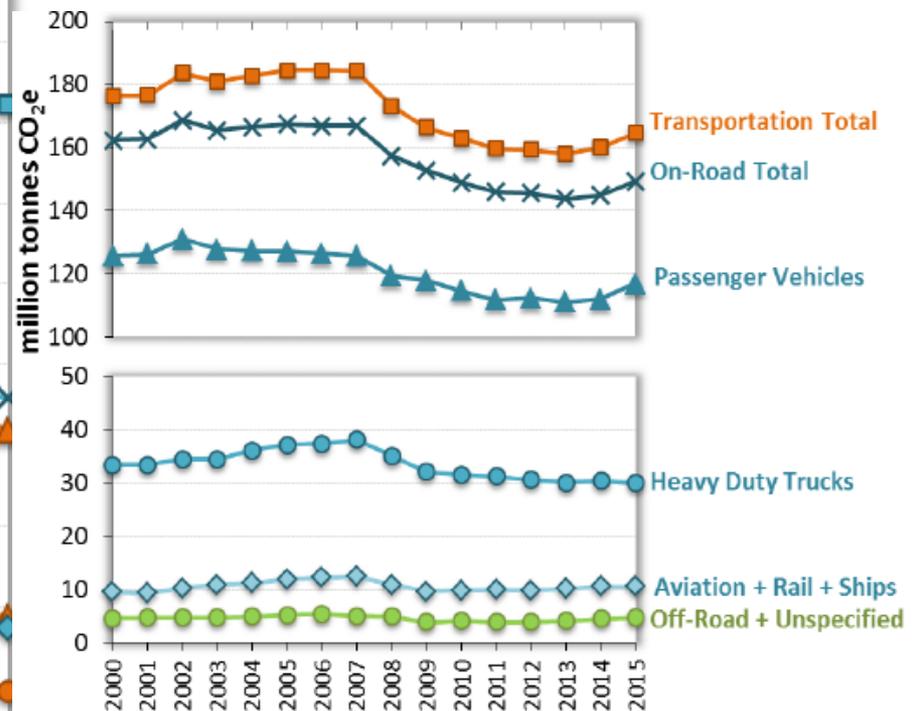
# ZEV Technologies

□ What does current situation look like?

### Trends in California GHG Emissions

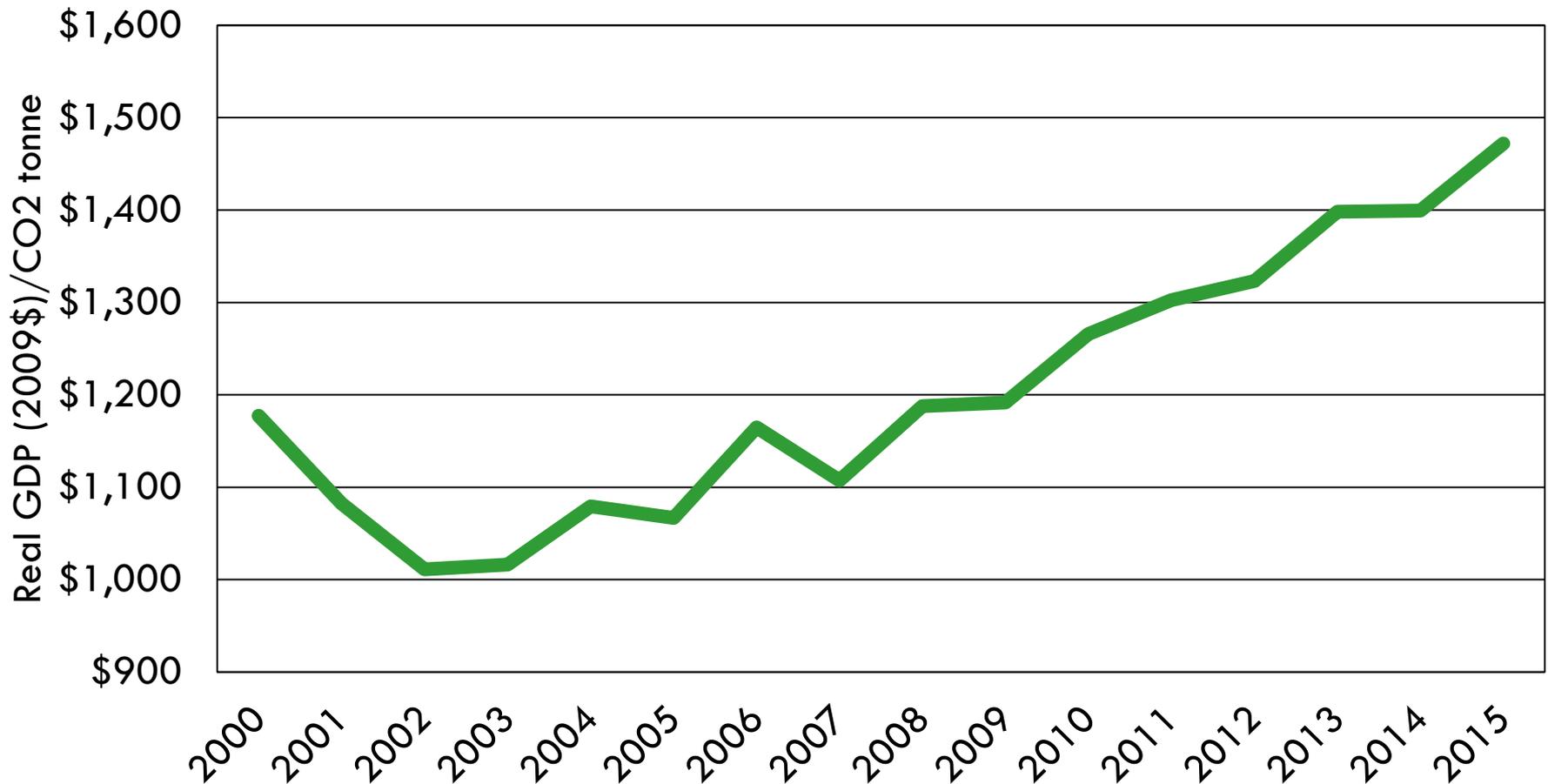


### GHG Emissions in Transportation



# ZEV Technologies

## □ Efficiencies in transportation & warehousing...



# ZEV Technologies

□ Fuel cell electric

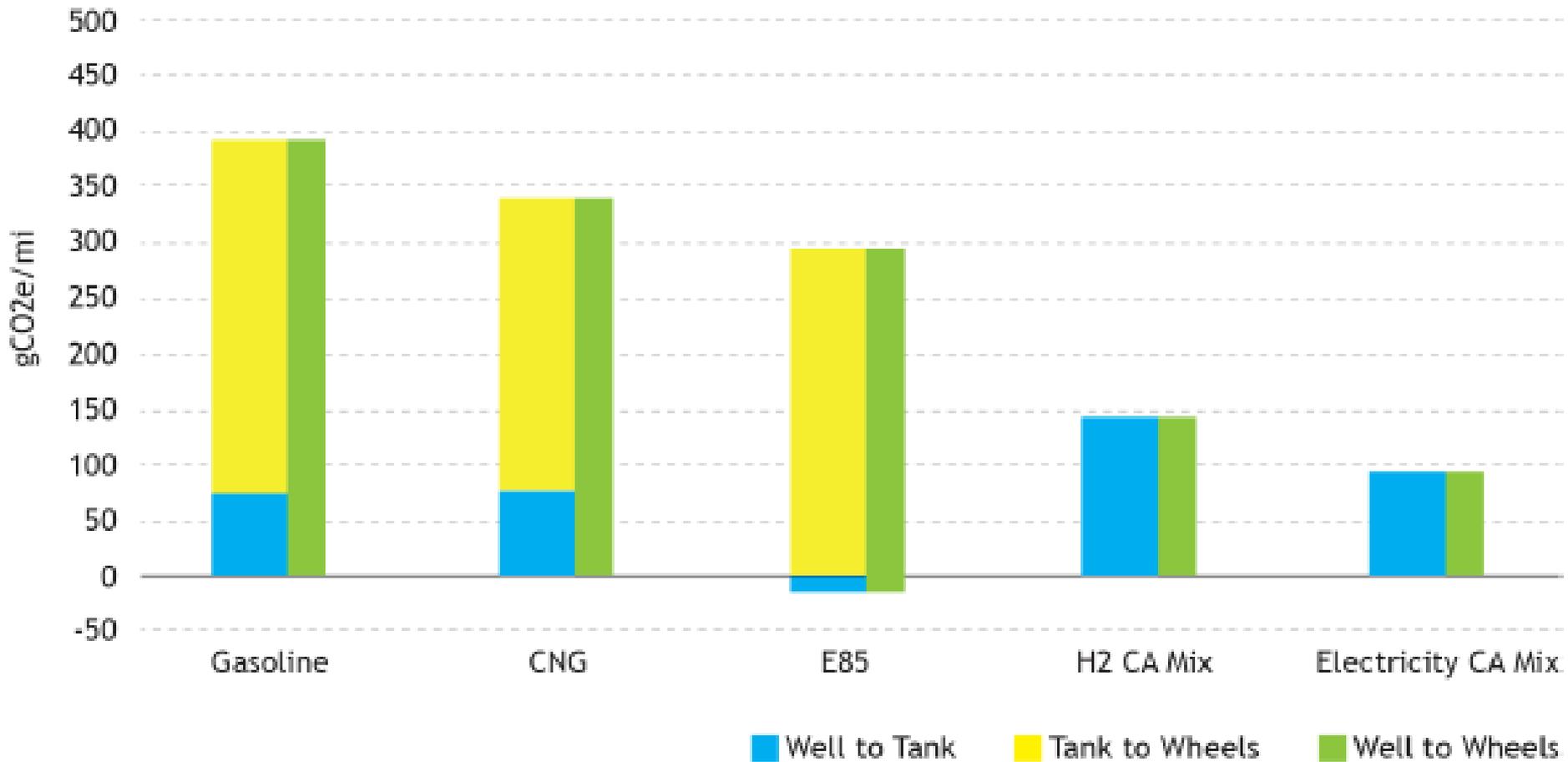


□ Battery electric



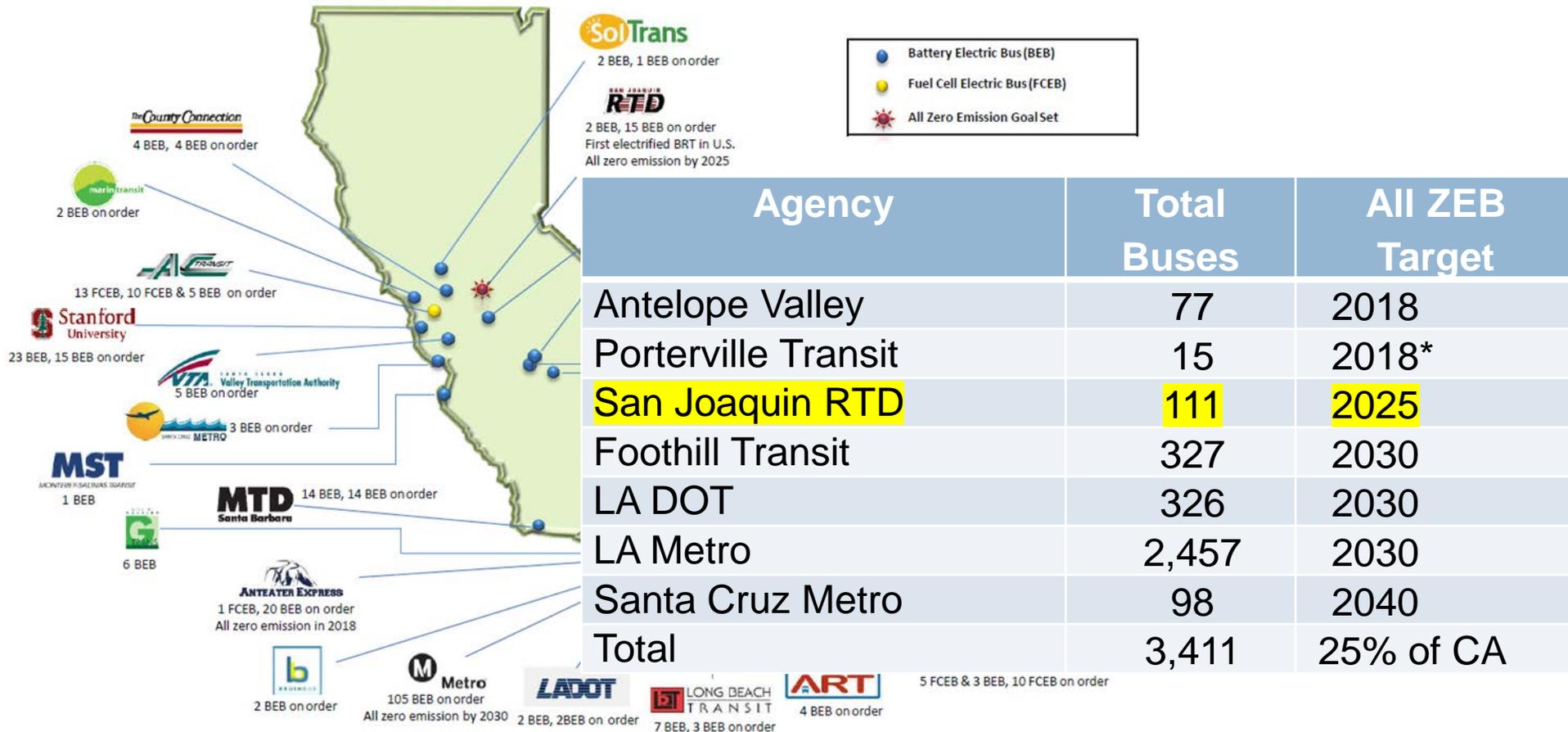
# ZEV Technologies

## Comparative GHG Emissions

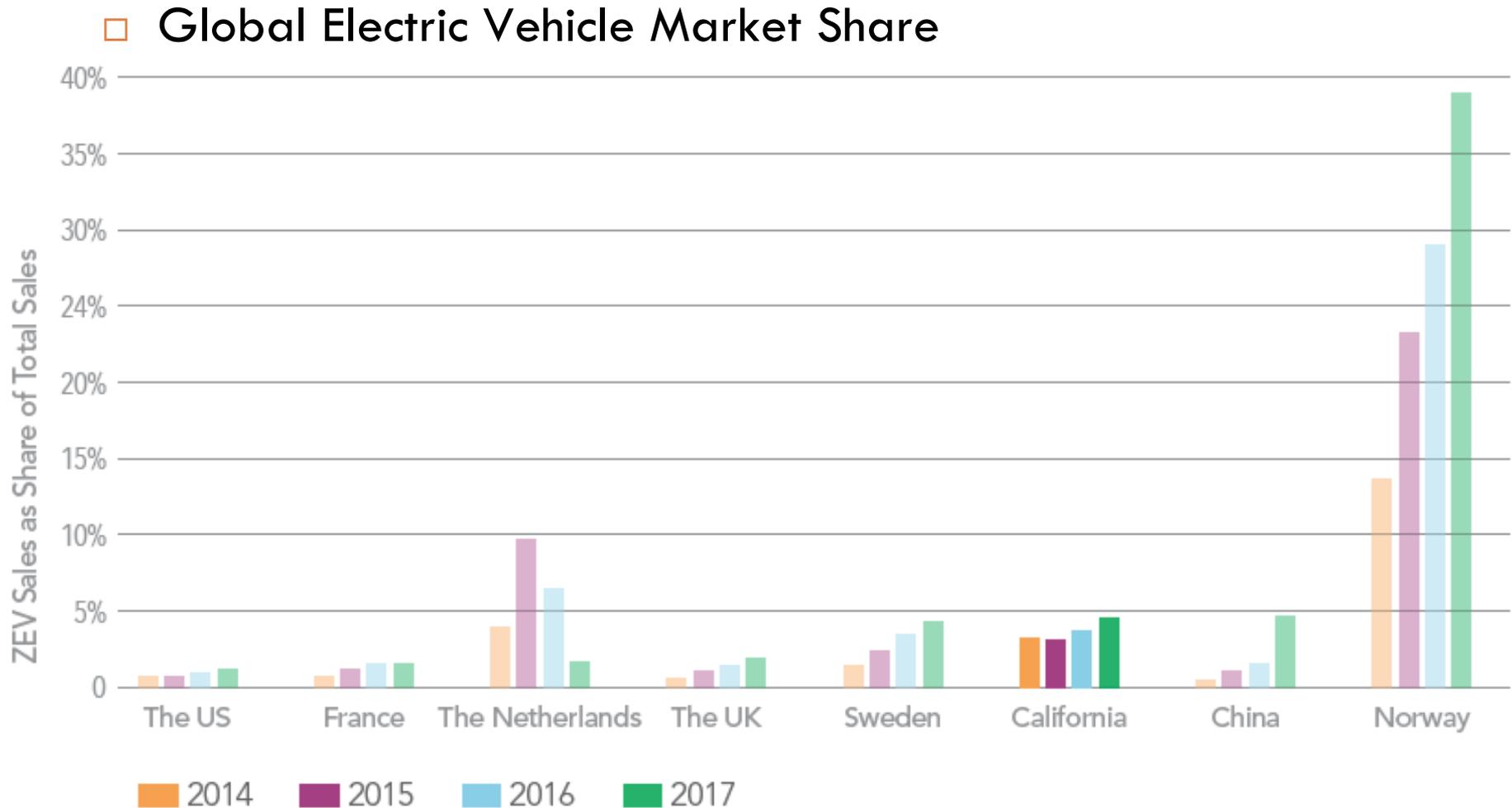


# ZEV Technologies

## □ Battery and Fuel Cell Electric Buses in California (107 in operation and 340 on order/awarded as of September 2017)



# ZEV Technologies



# Transportation Coordination Technologies

## □ Transit

- Integrated service information
- Real-time passenger information

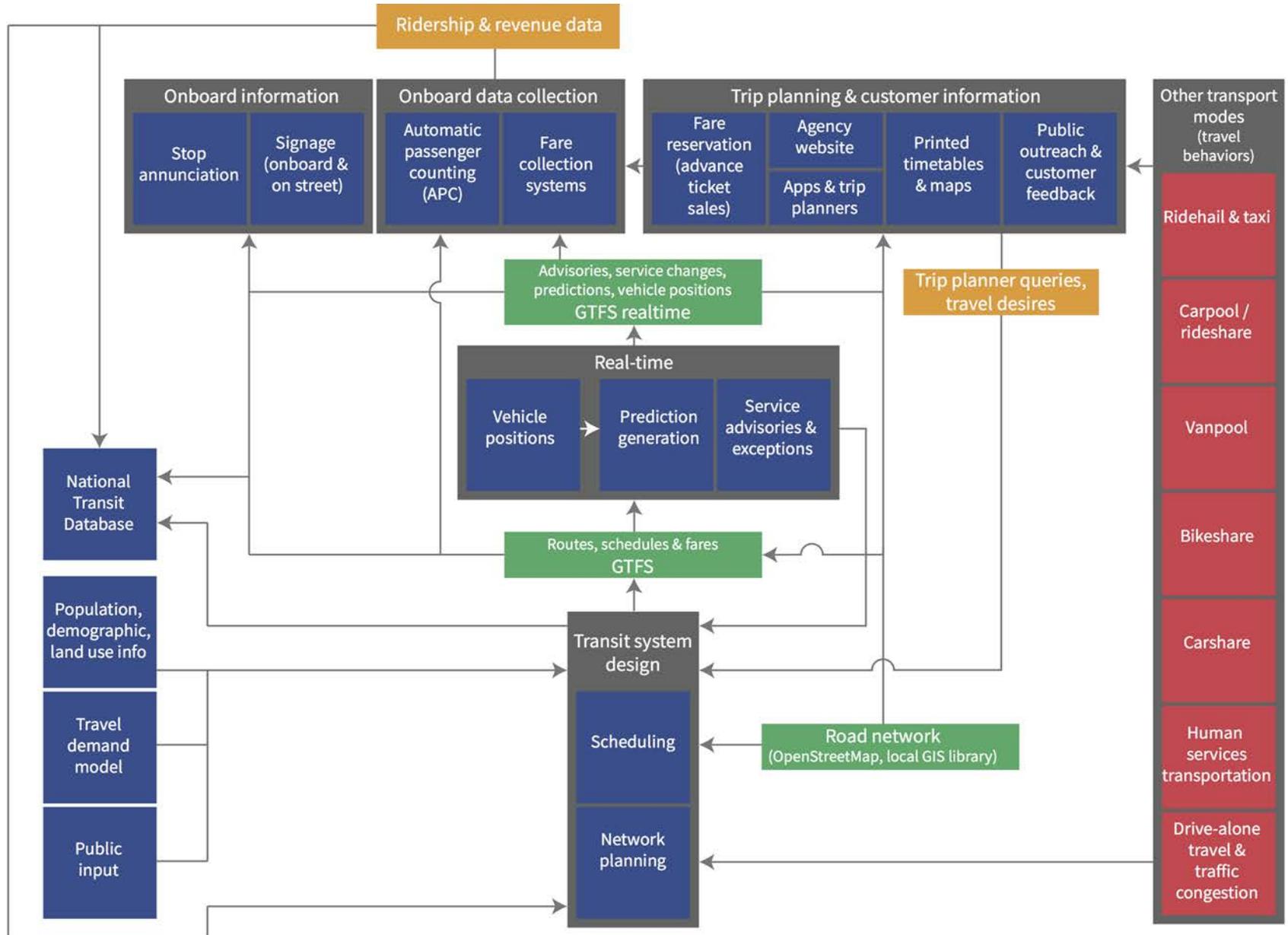
## □ Goods Movement and Supply Chain Management

- Intermodalism
- E-Commerce

## □ Shared Mobility Services

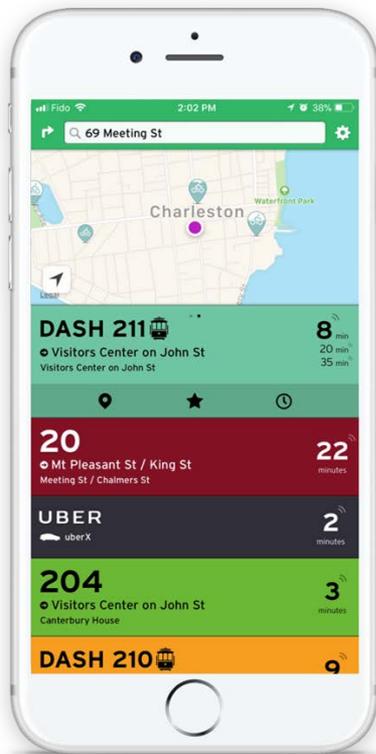
- Carsharing
- Ride-hailing
- Microtransit

# Transit: Integrated service information

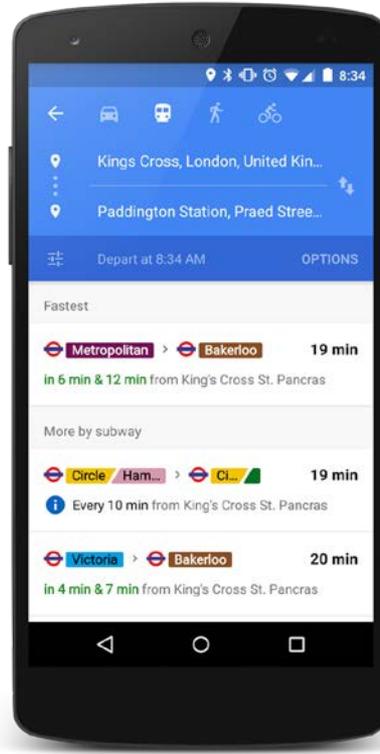


# Transportation Coordination Technologies

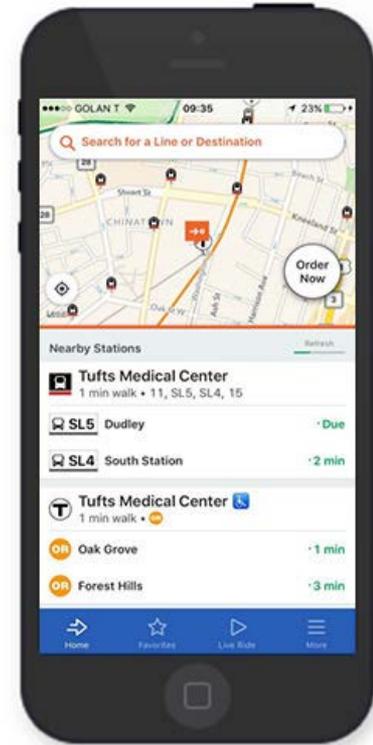
- **Transit:** Real-time passenger information to any app



**Transit**



**Google Maps**



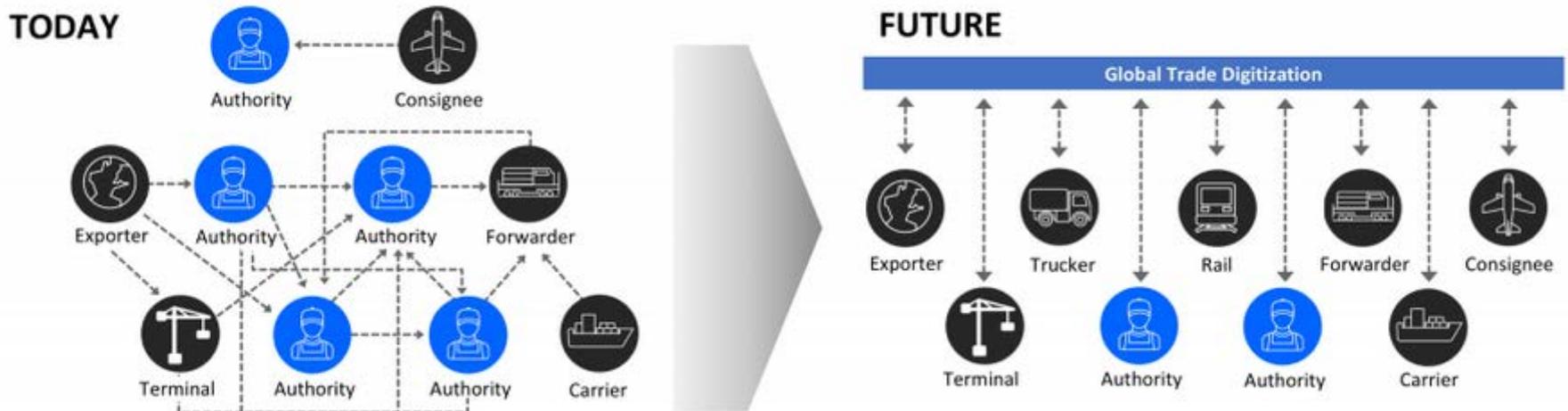
**Moovit**

# Transportation Coordination Technologies

## □ Goods Movement and Supply Chain Management

### ▣ Intermodalism

#### ■ Maersk-IBM blockchain

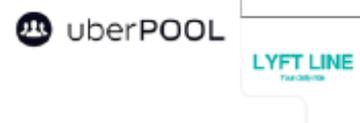


### ▣ E-Commerce

#### ■ Amazon, Walmart, etc

# Transportation Coordination Technologies

## Shared Mobility Services

<p><b>Carsharing 1.0</b> Station Based</p>		<p>Early model of carsharing where vehicles are picked up and returned to the same location; typically through an hourly rental</p>
<p><b>Carsharing 2.0</b> One-to-Many</p>		<p>Second generation of carsharing where vehicles can be picked up and dropped off in different locations (possibly by zone vs. designated parking spots); typically charged by minute</p>
<p><b>Carsharing 3.0</b> P2P</p>		<p>Peer-to-peer sharing where individuals can rent out their personal vehicles to others when not in use</p>
<p><b>Ride-hailing</b></p>		<p>Platform where individuals can hail and pay for a ride from a professional or part-time driver through an app</p>
<p><b>Shared Ride-hailing</b></p>		<p>Extension of ride-hailing where individuals can be matched in real-time to share rides with others going on a similar route</p>
<p><b>Microtransit</b></p>		<p>App and technology-enabled shuttle services, typically in a van-size vehicle; some with dynamic routing, others with semi-fixed routes</p>

Source: UC Davis ITS *Disruptive Transportation* October 2017

# Autonomous Vehicle Technologies

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- As of April 1, 2018 Permits for testing autonomous vehicles had been issued to 52 entities (CA DMV)
- Passenger vehicles
- Transit vehicles
- Aerial vehicles
- Marine vehicles

# Autonomous Vehicle Technologies

- Passenger vehicles



# Autonomous Vehicle Technologies

## □ Transit systems



# Autonomous Vehicle Technologies

- Aerial vehicles



# A Megaregional Air Taxi Service

- 2018-2022 Air Taxi Stockton-San Jose
  - 10-30 minutes
  - Fuel cost per seat \$0.93 to \$3
  - CALSTART



# A Megaregional Air Taxi Service



Passenger Elevators

Take-Off

Deboarding

Boarding

Landing

Aircraft Elevators



# Additional local opportunities (& challenges)

- Logistics and warehousing
  - ▣ Drayage equipment
  - ▣ Advanced manufacturing
- Applied technology and development center
- Increased megaregional integration
- Electronic engine maintenance center of excellence
- Leverage skills development to transformational opportunities
- Build new areas of competitive advantage

# THANK YOU!

For more information: [go.pacific.edu/cbpr](http://go.pacific.edu/cbpr)