

# Trends in Automated, Connected, Electric and Shared Vehicles—ACES

## Kirkland Business Roundtable

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UW Foster School of Business

Steve Marshall

Transportation Technology Partnership Manager for Bellevue  
[smarshall@bellevuewa.gov](mailto:smarshall@bellevuewa.gov)

# State Transportation Goals

- Target Zero. Zero vehicle deaths and serious injuries by 2030
- Cut Green House Gas to 1990 levels by 2020
- Commute Trip Reduction Act Goals
- Cut VMT (Vehicle Miles Traveled) 18% by 2020

## Unmet Goals: WSDOT's Recent Gray Notebook Report

- Target Zero: Traffic deaths in Washington last year were 537, up from 419 in 2014. Serious injuries increased to 2,209.
- GHG reduction: “Added carbon pollution”
- Commute Trip Reduction: “A 22 % increase in urban delays due to congestion”
- VMT: “Washington state drivers traveled 6.4 percent more highway miles than two years ago”



“GM’s vision is a world with zero crashes, zero emissions and zero congestion.”

“GM believes the future of personal mobility will be driven by the convergence of electrification, autonomous vehicles, connectivity and shared mobility services.”

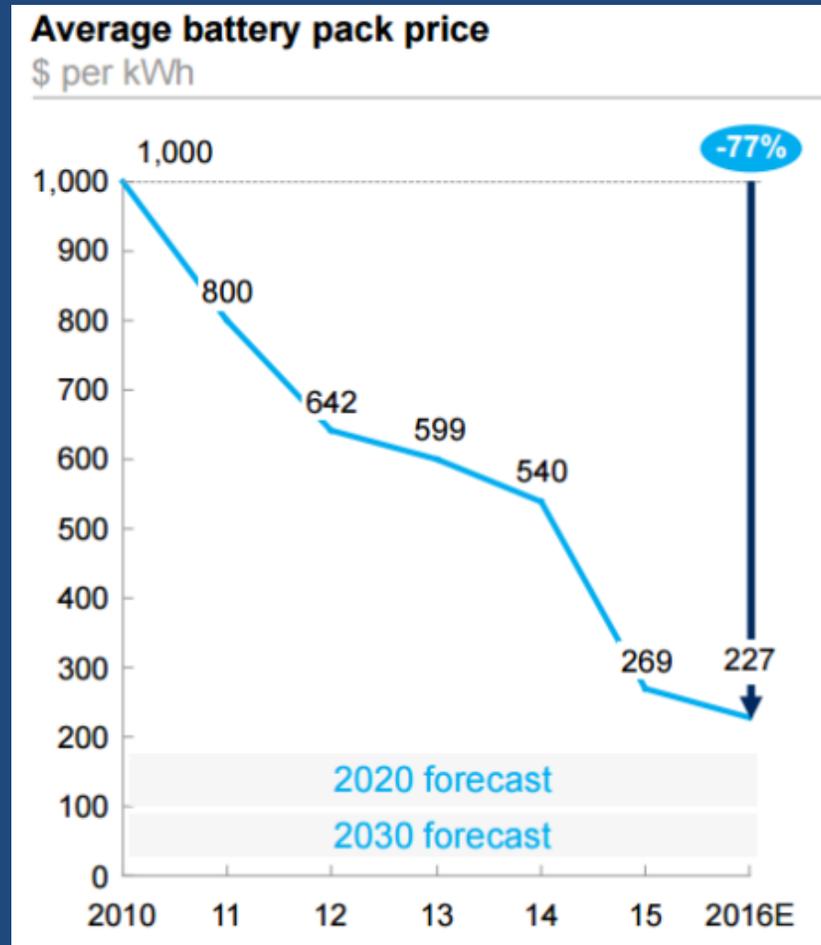
--Mary Barra, CEO of General Motors

# Major trends in Autonomous, Connected, Electric and Shared Vehicles–ACES

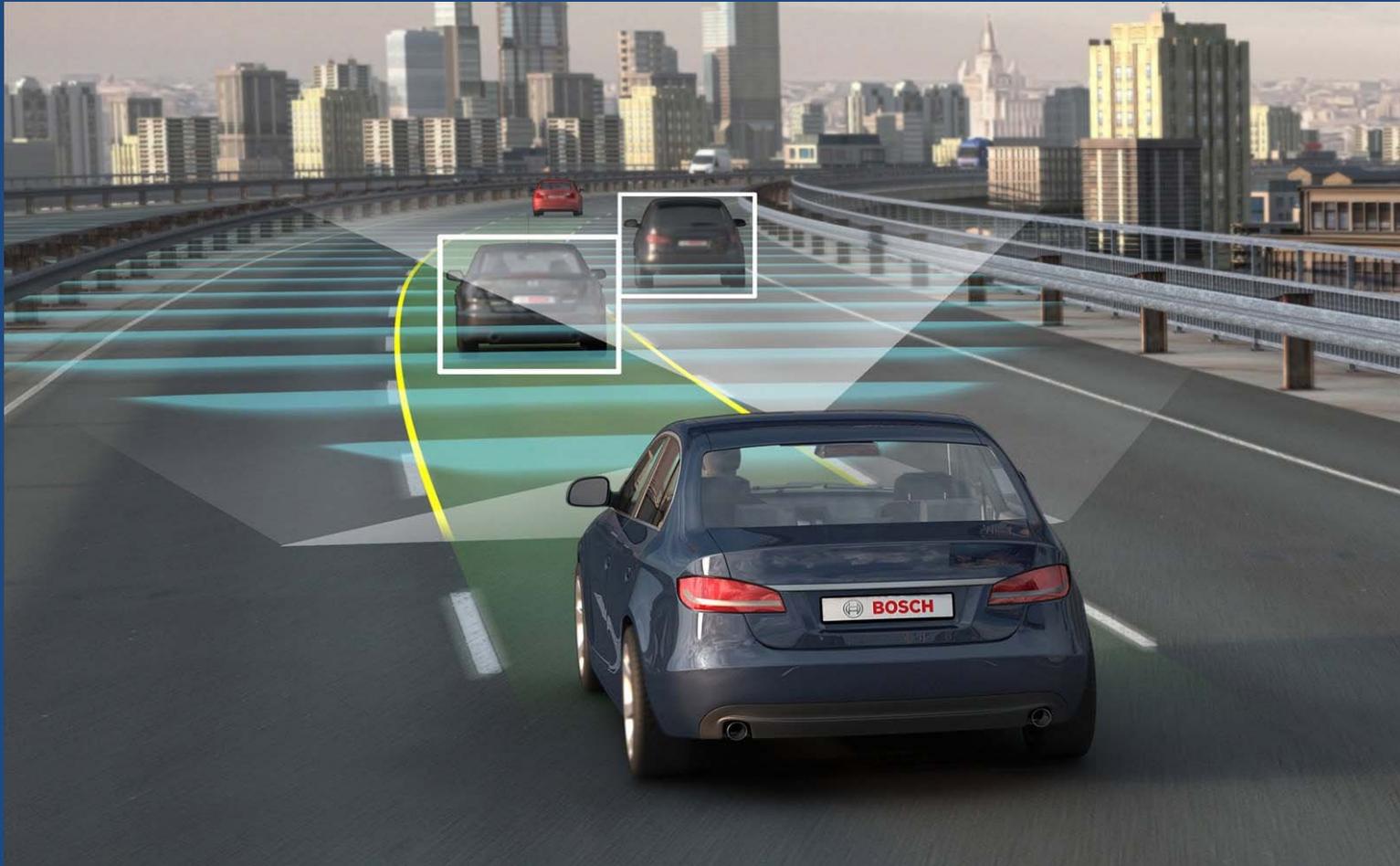
- Battery costs fell from \$1,000/kWh in 2010 to below \$200 now
- Sensor prices have dropped dramatically
- Moore's Law is in the "Second Half of the Chess Board"
- Major automakers and tech companies are in full competitive mode
- The tort liability system will in effect require automatic crash avoidance systems

EV battery costs drop from \$1,000 to \$200/kWh

Tesla reports costs below \$190/kWh since early 2016



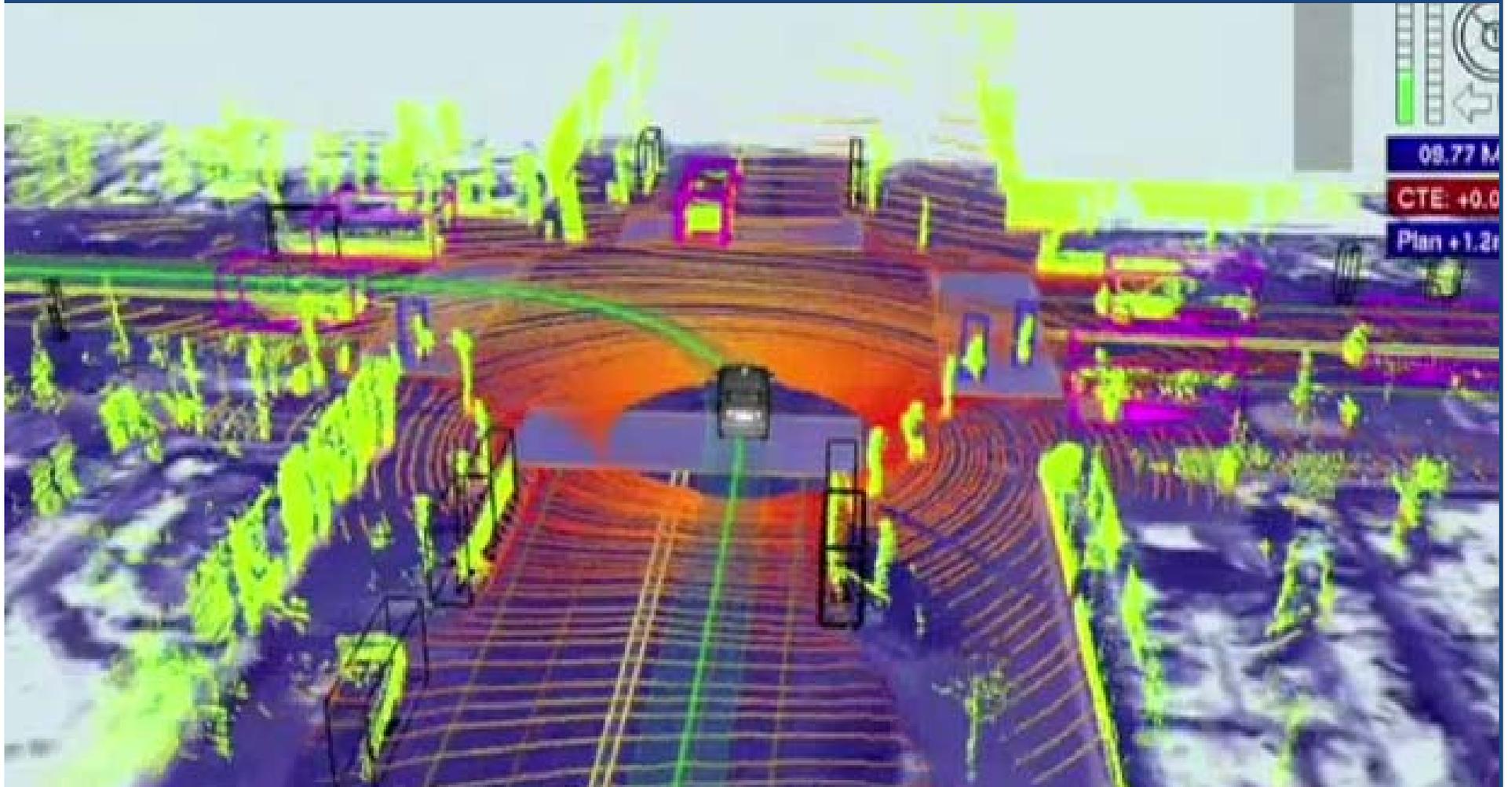
# Automated vehicle sensors costs are falling



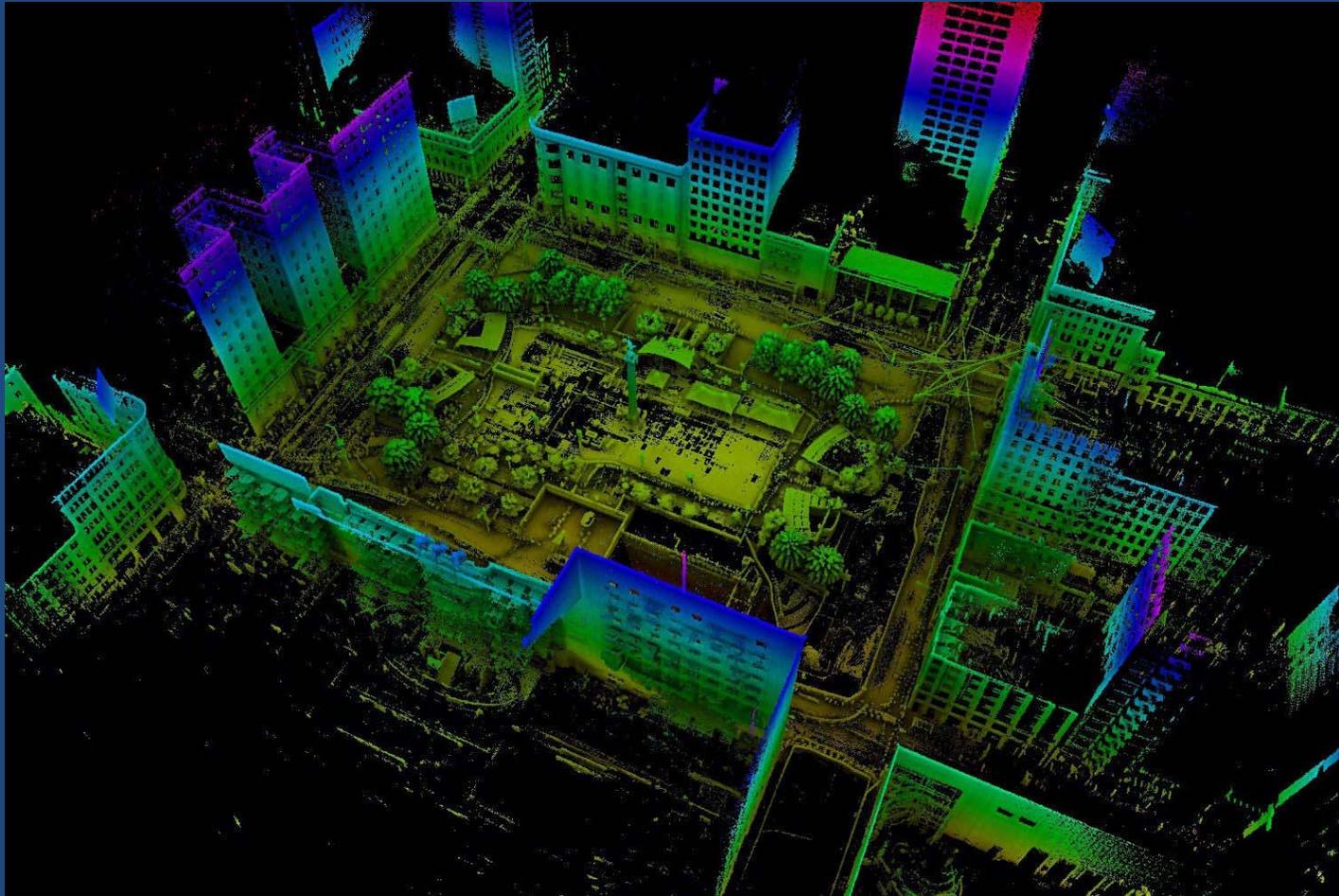
LiDAR costs drop from \$70,000 to \$95



# LiDAR in Autonomous vehicles



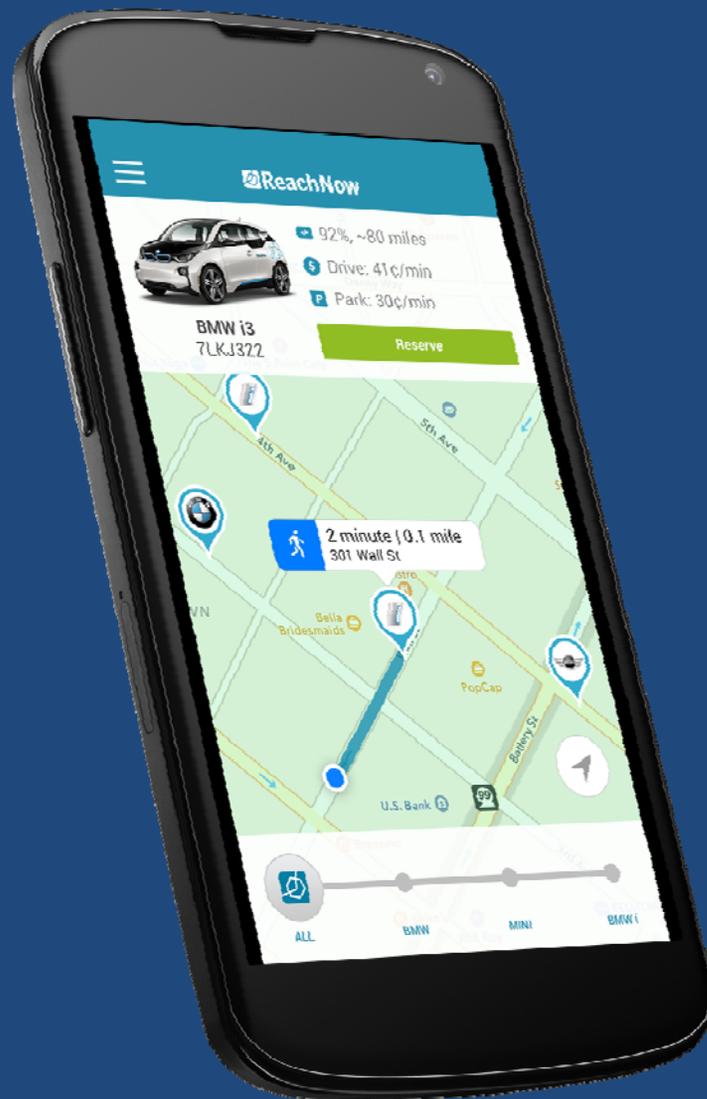
# 3D LiDAR Urban Mapping





# Mercedes Maybach Concept EV





# BMW's ReachNow Car-share/ Ride Share Service



# Autonomous, Connected, Electric Vanpools



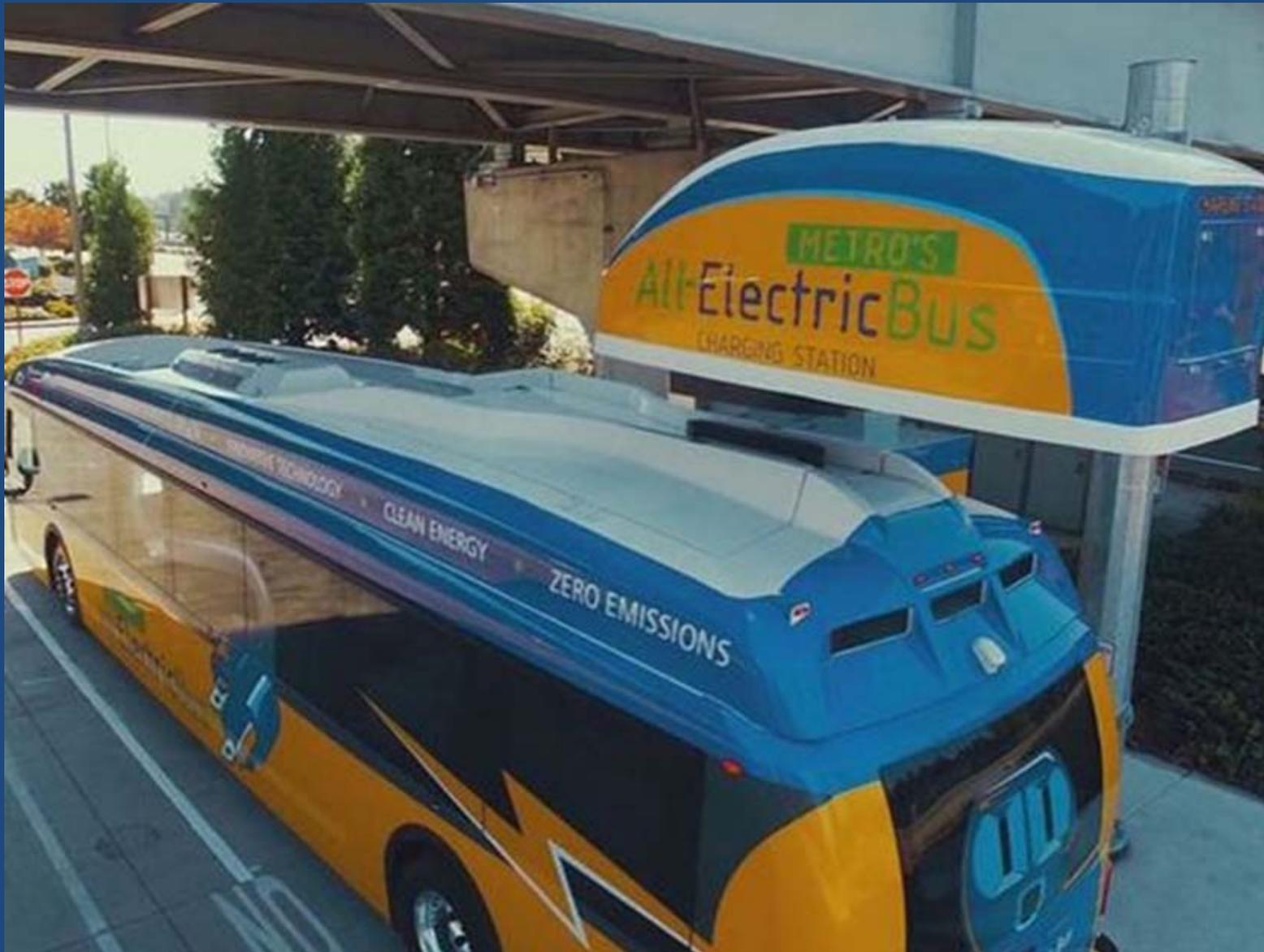
# Ford's Chariot Vanpool Service



# Easy Mile's Autonomous, Electric Shuttle



# All-Electric Metro Buses



# What can the Eastside do?

- Deploy flexible, electric, autonomous vanpool commuter services with help from a USDOT grant
- Design and deploy autonomous electric shuttle routes
- Use the Innovation Triangle to attract ACES related companies and investment
- Implement smart curb management policies
- Prepare for a larger EV fleet in building parking rules
- Lead by example with municipal EV fleets and electric bus service

# New Technologies to Achieve State Goals

- Encourage faster deployment of autonomous vehicles to cut deaths and injuries by 80%
- EV incentives to cut GHG.
- Allow flexible, electric vanpools and ride-share services to reduce commute delays and VMT
- Foster the Mobility Internet. Cloud, data and AI

# Examples of Other Public Policy Issues

- Update the Commute Trip Reduction Act
- Align electric utility regulation with ACES goals
- Avoid restrictive autonomous vehicle regulation
- Create public/private parking partnerships
- Transform park-and-ride lots into Mobility Hubs
- Open commuter parking to all providers
- Municipal cooperation on car and ride sharing and other ACES opportunities

