5 Big Moves

NEXT OS
Enabling technology

COMPLETE CORRIDORS
Optimizing roadways

FLEXIBLE FLEETS
Last mile options

TRANSIT LEAP
Alternatives to automobiles

MOBILITY HUBS
Transfer points
Today’s Presenters

Coleen Clementson  
Acting Planning Director  
SANDAG

Susan Freedman  
Senior Regional Planner  
SANDAG

Kyle Whatley  
Zero Emissions Bus Project Specialist  
MTS

Dan Sperling  
Professor, Civil Engineering and Environmental Science  
UC Davis
• 2030 target: reduce statewide greenhouse gas emissions to 40% below 1990 levels
ZEVs in California

- 655,088 CA sales
- 1,354,820 USA sales
- 21,948 CA charging plugs
- 41 CA hydrogen stations
- 46 CA models available

Updated: October 7, 2019

Note: Assumes CA sales are approximately 40% of national sales.

Source: veloz.org
ZEVs in San Diego County

- **2011**: 1,000 ZEVs
- **2019**: 35,000 ZEVs
- **2025**: 110,000 ZEVs
- **2030**: 450,000 ZEVs
Charging Infrastructure

- Current electric vehicle charger locations in the San Diego region
Regional Readiness Planning
EV Charger Incentive Program

- Program launch in mid-2020
- Leveraging regional and state funds
- One-stop shop for EV infrastructure incentives in San Diego region
- Standard and quick charging
Kyle Whatley
Zero Emissions Bus Project Specialist
MTS
MTS Zero Emissions Bus (ZEB) Pilot Project
MTS Overview

MTS provides transit for San Diego and surrounding cities, rural parts of the County, and to the international border – 3,240 total square miles

- Bus, Light Rail, Paratransit, Taxicab
- Bus: Nearly 100 bus routes, 630 fixed route buses
- Light rail: Trolley - over 130 cars, 54 miles
- 300,000 passengers daily, 88 million annually
- Bus remains a transit workhorse in San Diego
Alternative Fuels in Transit

- 2000: Convert fleet to CNG vehicles
  - All renewable CNG
- 2018: Zero emission bus pilot
- 2023: 25% of new buses are zero emission
- 2026: 50% of new buses are zero emission
- 2029: 100% of new buses are zero emission
CTE Zero Emission Bus Projects

- Existing Zero Emission Bus (ZEB) Projects (more than 140 ZEB's with over 30 Transit Agencies)
- 2017 Low-No Awards with CTE (more than 50 ZEB's with 25 Agencies)
MTS ZEB Pilot & ZEB Study

- Pilot Assessment
- Pilot Program Design
- Pilot Implementation
- ZEB Roadmap
MTS ZEB Pilot Program

Key components to be evaluated:

• Costs
  - Initial capital and construction
  - Operating costs including fuel and maintenance, including battery replacement

• Operational characteristics, range, and fuel efficiency

• Training needs for employees

• Infrastructure for facilities and charging systems

• How to scale up an electric fleet, from pilot to 100% deployment
Battery Electric Bus (BEB) Procurement

- **New Flyer**
  - Six 40 ft. extended range BEB
  - 466 kWh of on-board storage (expected range 160 miles)
  - Arrived September 2019

- **Gillig**
  - Two 40 ft. extended range BEB
  - 444 kWh of on-board storage (expected range 154 miles)
  - Arriving September 2020
Charging Infrastructure

Phase I:
Installation of six (6) chargers at the Imperial Avenue Division to support pilot project

- Construction Completed: July 2019

Phase II:
Installation of two (2) chargers at Kearny Mesa Division, South Bay, and East County (six (6) chargers total)

- Design expected completion: November 2019
- Construction expected completion: July 2020
Charging Infrastructure – Phase I
Charging Operations - Software

- Set charging parameters/notifications
- Maintenance and repair monitoring/notifications
Next Steps

- ZEB Pilot
  - Bus validation testing
  - Collect and analyze data
  - Roadmap transition plan
- Assessment of Fuel Cell
  - Site analysis performed at the Kearny Mesa Division (fueling station)
- Evaluating additional funding options
- Working with SDG&E
Updates

• For additional information visit MTS ZEB project website

sdmts.com/inside-mts-current-projects/zero-emissions-bus-pilot-program
Clean Transportation
Heading Toward Zero
What will it take to drive deep decarbonization of the transportation sector?

Daniel Sperling

Distinguished Blue Planet Professor and Founding Director
Institute of Transportation Studies
University of California, Davis

and

Board Member, California Air Resources Board
UC Davis Institute of Transportation Studies

World’s Premier University Center for Sustainable Transportation
• 60 faculty and Ph.D. researchers
• 110 graduate students
• 100+ publications/year

Engagement/Sponsorship
• 60+ Company sponsorships
• 15 Government agencies
• Environmental NGO participation

➢ National Center for Sustainable Transportation

China-U.S. ZEV Policy Lab
Local and global focus

Governor Schwarzenegger announces California’s Hydrogen Highway at UC Davis
Three Principal Strategies to Reduce GHGs from Transportation

- Zero emission vehicles (including PHEVs)
- Low-carbon fuels electricity, hydrogen, biofuels
- Reduce VMT
Need Comprehensive “ZEV Action Plan”

- Vehicle sales requirements for automakers
- EV purchase incentives for consumers
- Government fleet purchases
- Subsidize chargers and hydrogen stations, engage utilities
- Non-monetary incentives (e.g., ZEVs in carpool lanes)
- Gradual electrification of most trucks
- Bus electrification
VMT (3rd Leg) is Most Problematic

![Graph showing trends in VMT (trillions) and VMT per capita over time from 1990 to 2015. The graph indicates an increase in total VMT and a decrease in VMT per capita, with both showing fluctuations over the years.]

State Smart Transportation Initiative

UC Davis ITS
How to Reduce VMT (but Increase PMT)

Electrification + Automation + Pooling/Sharing
Pooling/Sharing is the Solution
Automation + Pooling = Low-Cost Mobility
Ideas to Fix Transit… which is in decline in CA/US

• Replace low-density routes with private “mobility” companies
• Use new mobility companies for first/last mile service
• Focus on dense corridors/markets where transit works best
• Embrace micro-transit!
• Restructure public transit funding (for micro-transit, private mobility company partnerships)!
• Embrace automation (for fixed shuttle routes)

Many reforms needed in governance, public finance, management, partnerships—especially in suburbs and small cities
From Technical Fix to Behavior

• Historically, pollution regulation focused on smokestacks and tailpipes (technical fixes)

• Now need broader policy approach

  1. Innovation (new technologies and institutions)
     • Vehicles, fuels, mobility, institutions

  2. Behavior
     • Vehicle purchase
     • Vehicle use
     • Mobility (new modes, new services, inter-modalism)

  3. Partner with industry (to stimulate innovation and shift consumer behavior)
“We can not solve our problems with the same thinking [and institutions and research] we used when we created them.”

- Albert Einstein
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