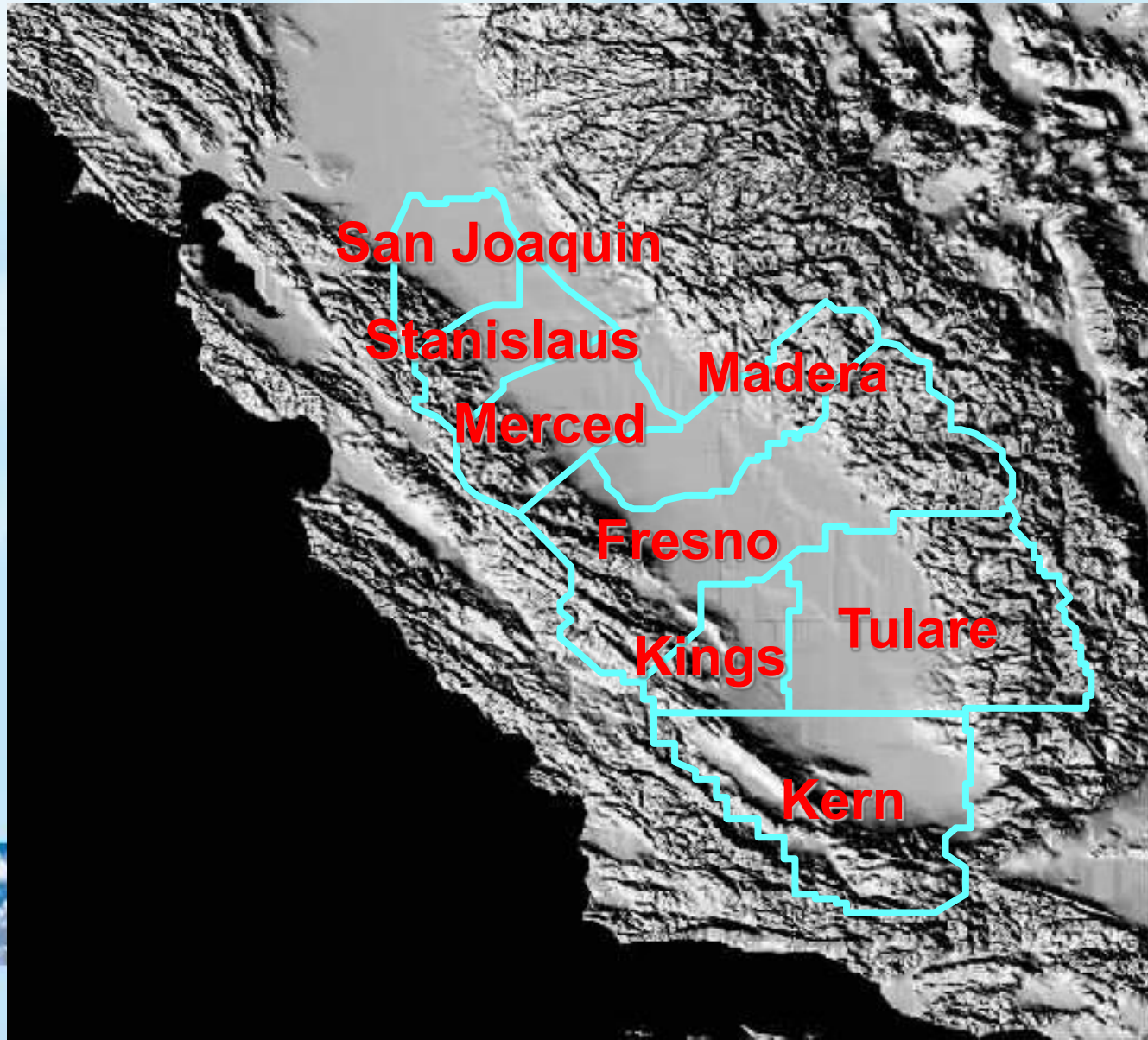


Update on San Joaquin Valley's Implementation of Prop 1B Heavy-Duty Truck Program & Hydraulic Hybrid Truck Demonstration Project

Samir Sheikh
Director of Emission Reduction Incentives



San Joaquin Valley



San Joaquin Valley



While the air quality has improved in the San Joaquin Valley due to concerted efforts by all sectors, there are still many challenges:

1. Topography
2. Climate
3. *Emissions Sources...*



San Joaquin Valley

Where do HHD trucks fit in?

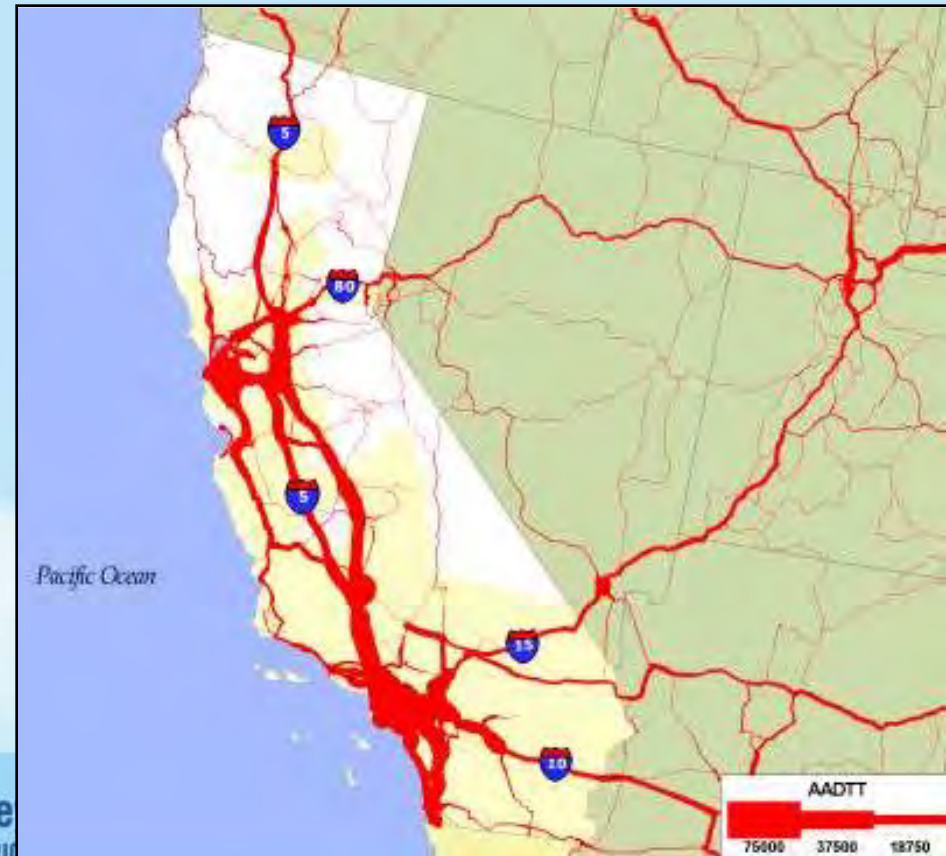
- Over 80% of NO_x inventory from mobile sources
- HHD diesel trucks are #1 NO_x source at ~200 tpd NO_x (35% of total inventory)
- 45% of all truck traffic in the major trade corridors of CA occurs within the SJV
- 66,000 trucks travel > 4 million miles/year along Highway 99 and Interstate 5 corridors



Truck traffic is projected to more than double in the next 20 years

1998

2020



Proposition 1B – Goods Movement Emission Reduction Program

- **Nov 2006 – CA voters approved Prop 1B**
- **Authorizes \$1 Billion to reduce air pollution from goods movement**
- **Central Valley allocated \$250 million, with SJV allocated \$46 million in 1st year**



Proposition 1B Year 1 Plan for SJV

Enough funding for:

- Retrofit ~1,000 trucks @ \$5,000 per truck
- Replace ~600 trucks @ \$50,000 per truck
- Repower ~25 trucks @ \$20,000 per truck
- Tiered transaction ~50 trucks @ \$50,000 per truck
- Reduce 5,000 tons NO_x & 360 tons PM10



Comprehensive Outreach Campaign

- Presentations at various meetings
- Assistance workshops
- Website with up-to-date information
- Advertising at truck stops
- Outdoor billboards
- Radio advertising



CALLING ALL TRUCKERS

HEALTHY AIR LIVING

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT
1-800-SMOG-INFO
valleyair.org

Grants up to **\$50,000** to Replace or Retrofit Your Rig!

Funds provided through the State of California's Proposition 18, Global Warming Emission Reduction Program.



So what were the results of Year
One RFP (July-Sep/2008)?



Retrofit

- Received applications to retrofit 42 trucks
- Statewide demand for retrofit projects was significantly less than anticipated
- Uncertainty about CARB proposed on-road regulation and how retrofit devices would help meet compliance deadlines
- Additional cost associated with 2009 NO₂ compliant retrofit device



Repower

- Received applications to repower 28 trucks
- Estimated cost to repower an on-road heavy duty diesel truck is \$60,000 -70,000
- High out of pocket expense makes this option unattractive to most applicants



Tiered Transaction

- Received 0 applications for the Tiered Transaction
- Difficulty meeting eligibility requirements for a tiered transaction option
- Requires 2003-2006 MY truck to be retrofitted at owners expense and used to replace a 1990 or older MY truck
- No additional funds to offset the cost of the retrofit device



Replacement

- Received applications to replace 2,688 trucks
- Replacement option was the „best value“ in terms of applicant out-of-pocket expense and long term benefit
- Demand exceeds available funds for the program by \$92 million



...and switching
gears...

San Joaquin Valley's
Hydraulic Hybrid
Demonstration Project



HEV and HHV Comparison

- The value proposition for any hybrid is dependent on the vehicle's duty cycle.
- Hybrid electric systems have much higher energy storage capacity, and generally have low to moderate power capabilities.
- In addition, hybrid electric systems can more easily provide an auxiliary electric power source from the vehicle.
- Hybrid hydraulic systems have much higher power capabilities, for a shorter length of time.
- In addition, they typically regenerate more braking energy than hybrid electric systems.



HHV Type Comparison

Parallel

- Vehicle driveline is **supplemented** by the hybrid system.
 - Engine cannot be run purely at its optimal parameters.
- No idle reduction.
- Suitable for primarily stop and go applications (i.e. Refuse Trucks)

Series

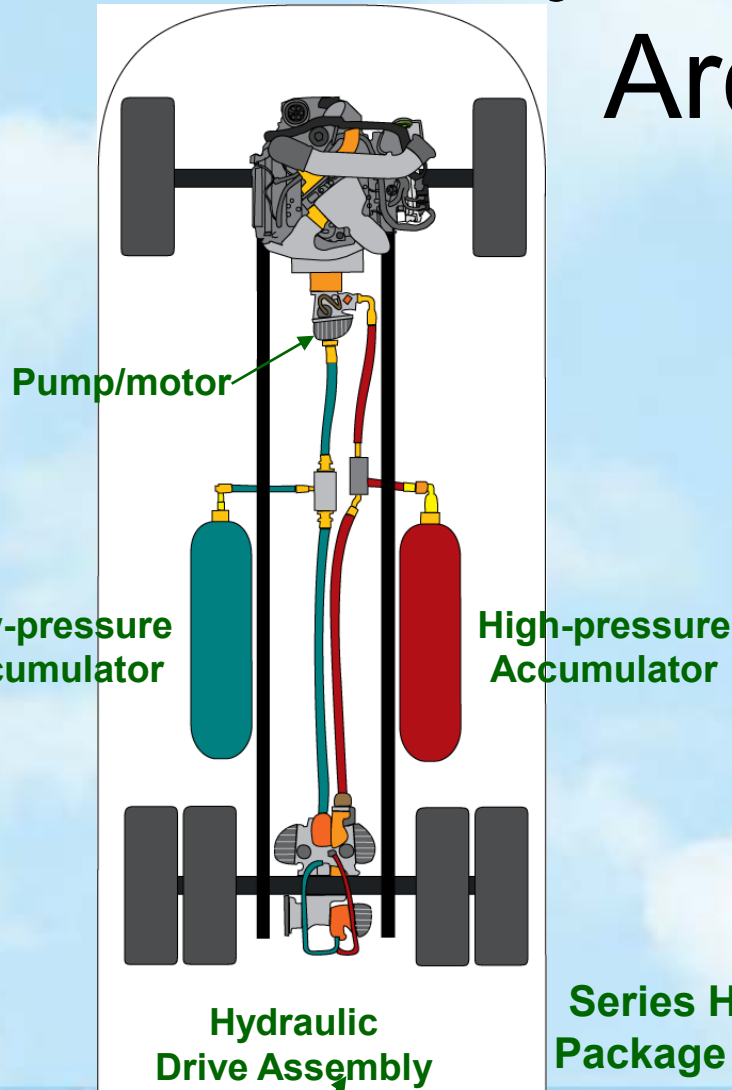
- The series hybrid hydraulic system **replaces** the conventional transmission.
 - Engine can operate at its most efficient “sweet spot”.
- Capable of engine off operation providing idle reduction benefits.
- Suitable to a broader range of applications, but best on stop and go duty cycles.



Series Hybrid Hydraulic System

Architecture

- The series hybrid hydraulic system **replaces** the conventional transmission.
- The core of the system is a hydrostatic transmission (HST). The HST has been the preferred drivetrain architecture for off-road vehicles for many decades.
- The technology is suited to a broader range of applications than a parallel hybrid system though benefits are still greatest in stop and go duty cycles.



Series Hybrid Hydraulic Package Delivery Vehicle

Current Status of Series HHV

- Vehicle configuration:
 - International 1652-SC chassis with VT-365 engine
 - 23,400 lb GVW
- The series hybrid hydraulic UPS truck demonstrated 50-70% better fuel economy than a standard UPS truck over the EPA City Cycle with no degradation in performance.



- A UPS truck equipped with the series hybrid hydraulic drivetrain was put into service in the Detroit area and achieved 45-50% better fuel economy in “real world” use.



Hydraulic Hybrid Demonstration Project

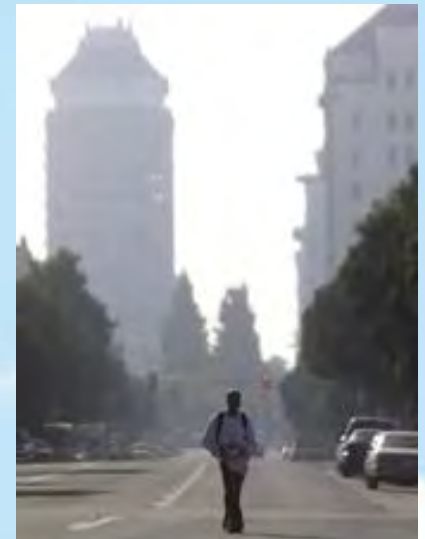
- SJV Air District recently received \$300,000 *West Coast Collaborative Innovations in Clean Diesel Grant*
- Matching with \$100,000 of local funds
- Partnering with EPA, UPS, and Eaton to bring HHV package delivery vehicles to UPS's fleet in San Joaquin Valley.



Hydraulic Hybrid Demonstration Project

Objectives:

- Developing the technology in the Valley's diverse meteorological conditions.
- Demonstrating to valley fleet owners the benefit of HHV technology.
- Advancing the technology for widespread deployment.
- **Reducing emissions in the San Joaquin Valley and beyond.**



Emission Reduction Incentive Program

Questions?

Samir Sheikh

559-230-5800

samir.sheikh@valleyair.org

