

Users Forums and Policy Innovations: New Approaches to Engage Fleets & Industry on Fuel Efficiency



*Advanced Transportation
Technologies*

*Clean Transportation
Solutions* SM

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**ICCT/NESCCAF Workshop
Improving the Fuel Economy of Heavy-Duty Fleets
San Diego, California
February 20, 2008**



Agenda

- **WestStart-CALSTART Background**
- **Fuel Economy Drivers, Hybrids and the HTUF Process**
- **California Policy Innovations**
- **Summary**



Mission Statement

WestStart-CALSTART is a unique non-profit, member-supported organization dedicated to the growth of an **advanced transportation technologies industry** that will:

- **Create high-quality jobs;**
- **Clean the air;**
- **Reduce dependence on foreign oil; and**
- **Prevent global warming**

CALSTART: A Strategic Broker for Advanced Transportation



2008

**155+ Worldwide
Participant Network**

4 Offices in US

Four focus areas:
Efficient vehicles
New fuels
Mobility/transit
Industry support

Regional in Name

***National and
International in
Targeted Areas***



***CALSTART is WestStart's
California Operating Division***

CALSTART Has 155+ Member/ Participants *(partial list)*





Fighting Global Warming

IPCC Climate Change Mitigation Report (May 4):

Summary for Policymakers

IPCC Fourth Assessment Report Working Group II

Table SPM.3: Key mitigation technologies and practices by sector. Sectors and technologies are listed in no particular order. Non-technological practices, such as lifestyle changes, which are cross-cutting, are not included in this table (but are addressed in paragraph 7 in this SPM).

Sector	Key mitigation technologies and practices currently commercially available	Key mitigation technologies and practices projected to be commercialized before 2030
Energy Supply [4.3, 4.4]	Improved supply and distribution efficiency; fuel switching from coal to gas; nuclear power; renewable heat and power (hydropower, solar,	Carbon Capture and Storage (CCS) for gas, biomass and coal-fired electricity generating facilities; advanced nuclear power; advanced

Transport
[5.4]

More fuel efficient vehicles; hybrid vehicles; cleaner diesel vehicles; biofuels; modal shifts from road transport to rail and public transport systems; non-motorised transport (cycling, walking); land-use and transport planning

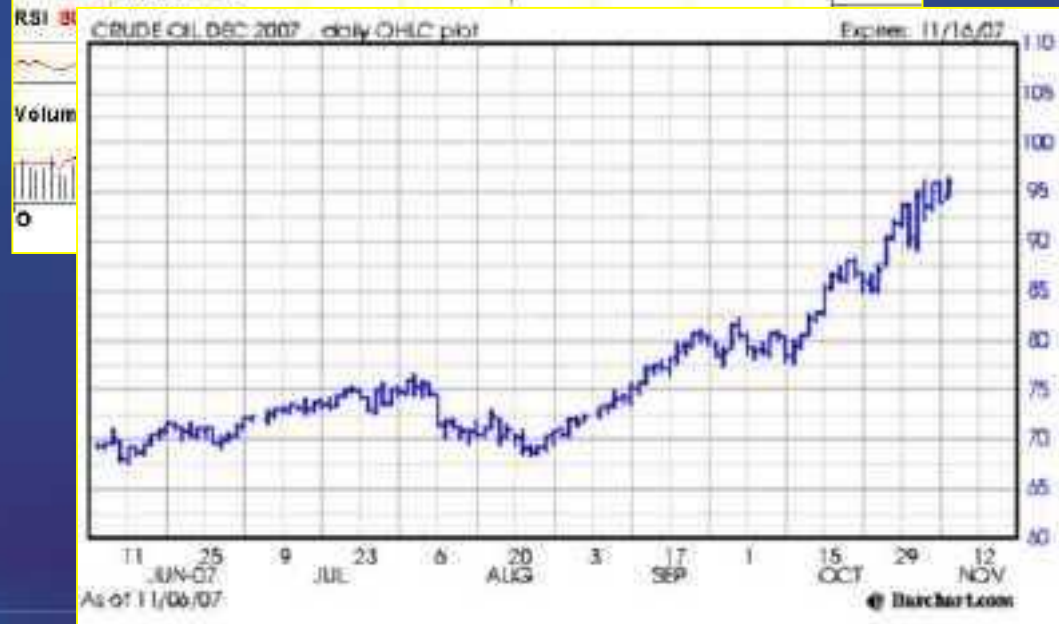
Second generation biofuels; higher efficiency aircraft; advanced electric and hybrid vehicles with more powerful and reliable batteries

- More fuel efficient vehicles
- Hybrid vehicles
- Cleaner diesel vehicles
- Biofuels
- Modal shifts to rail and public transport
- Non-motorized vehicles
- Land use and transit planning



High Energy Costs Here to Stay

- \$100 bbl oil?
- \$4 gal gasoline?
- US EIA forecasts heavy demand will keep imported oil prices on rise until 2014; new supplies after then may ease supply crunch, cause decline in crude costs





Why Hybrids Are Gaining Traction with Fleets

- **Rising fuel costs:** Optimizing urban truck drivelines is becoming critical for fuel efficiency, emissions
- **Major engine changes** – and increased cost/complexity – coming in 2007-2010 to comply with EPA emissions requirements
- **Idle Management** is a growing issue nationwide
- **Productivity/performance** complaints from cleaner engines
- **“Green Footprint”** – pressures from management to reduce carbon and overall environmental impacts
- **Trend toward integrated engine/drivelines** in trucks
- **Increasing electrical power needs** in heavy vehicles and equipment

Recent Heavy Hybrid News

There is Tremendous Momentum Growing



- Eaton sells 30 hybrid electric buses to China
- Freightliner to produce 1,500 M2 hybrid trucks in next 3 years
- Peterbilt/Eaton to enter production hydraulic refuse truck 2008
- Azure plans production of hybrid shuttles in 2008
- Kenworth and Peterbilt announce production plans for medium hybrid trucks in 2008
- International launches first hybrid production: Fall 2007
- Eaton moves into production of hybrid drive system
- Kenworth announces pre-production delivery hybrid truck
- FedEx/Azure announce partnership on gas-electric hybrids
- Peterbilt testing Class 8 hybrid with Eaton system
- ArvinMeritor signs Wal-Mart agreement for Class 8 hybrids
- Oshkosh unveils hybrid refuse truck at HTUF meeting
- Peterbilt introduces Class 7 hybrid truck for customer trials
- International builds first production-line hybrids in Nov 06
- Freightliner unveils Class 7 utility hybrid on M2 chassis
- Azure/StarTrans agreement on producing hybrid shuttles
- UPS testing advanced series hydraulic hybrid prototype
- Bosch-Rexroth buys Dana hydraulic hybrid drive unit
- Mitsubishi-Fuso Unveil Hybrid work truck (CI 4-5 delivery)
- ISE builds 50 advanced hybrid buses for Las Vegas
- Volvo announces hybrid heavy trucks for 2009 production



Hybrid Truck Users Forum (HTUF)



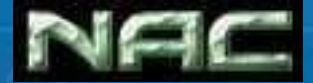
- **Goal:** Speed the development and introduction of commercially viable medium- and heavy-duty hybrid trucks in the U.S.
- **User driven process** involving more than 80 fleets with > 1 million trucks
- **Joint WestStart-U.S. Army program**





HTUF Working Groups Today

- **6 Core Working Groups of fleet truck users now operating, plus:**
 - *1 WG partnership with NTEA (light truck)*
 - *1 new Forum forming (construction equip.)*
 - *1 Task Force: Plug-in HE Trucks (PHET)*
- **Main Working Groups:**
 - *Utility/Specialty trucks – George Survant, Florida Power & Light, user lead*
 - *Parcel Delivery trucks – Jerry Swart, FedEx Ground; Robert Hall, UPS – user leads*
 - *Refuse Truck Working Group – Matt Stewart, City of Chicago Sanitation, user lead*
 - *Bus Working Group – Tony Bryant, Tri-Met, user lead (launched with support of Federal Transit Administration)*
 - *Class 8 Working Group – active*
 - *Incentives Working Group – active*



HTUF National Meeting 2007

Hybrid Truck Users Forum - 7th Meeting



- Two and a half day forum at Qwest Field, Seattle
- More than 430 attendees, one quarter fleet users – *a new record*
- 19 med. and heavy-duty hybrids in ride and drive – *a new industry record*
- All major trucks makers and suppliers involved in process





Key Findings at HTUF 2007



- HTUF process has taken 1-2 years off the development cycle of med and heavy-duty hybrids – *Paul Skalny, Director, Army's National Automotive Center*
- Hybrid trucks now at cusp of first production
 - International launching first production of medium duty hybrids Fall 2007
 - Peterbilt and Kenworth start production of medium duty hybrids in 2008
 - Peterbilt begins production of refuse truck hybrid in 2008, and Class 8 big-rig hybrid in 2009
 - Mack/Volvo to start hybrid truck production in 2009
- Class 8 hybrids are a key new capability emerging in more-efficient trucks – could impact biggest fuel users on road
- Better purchase incentives are needed to help fleets adopt technology sooner
- Need to speed pre-production trucks and equipment in additional applications (including small bus and Class 8)
- **New technology needed: energy storage; more efficient components; light-weight materials; power generation; optimized engines**



Timeline to Commercialization: Hybrid Tech Now Starting in Trucks



*Trucks are not Priuses!
Tech introduction 10 years behind cars
BUT: big fuel impact per truck*



TOOLS:

R&D Support →

← *Purchase Incentives*

→ *Pre-Production Deployment Support (HTUF)*

Class 6/7 Deployment Data to Date



- All 24 trucks delivered – 12 months of service on first trucks
- 391 total truck months of service through Aug 07; 409,352 miles
- Availability of trucks high: 99+% overall daily availability of hybrid systems
- Strong user acceptance and trucks meeting mission needs



Fuel economy varies by fleet and use

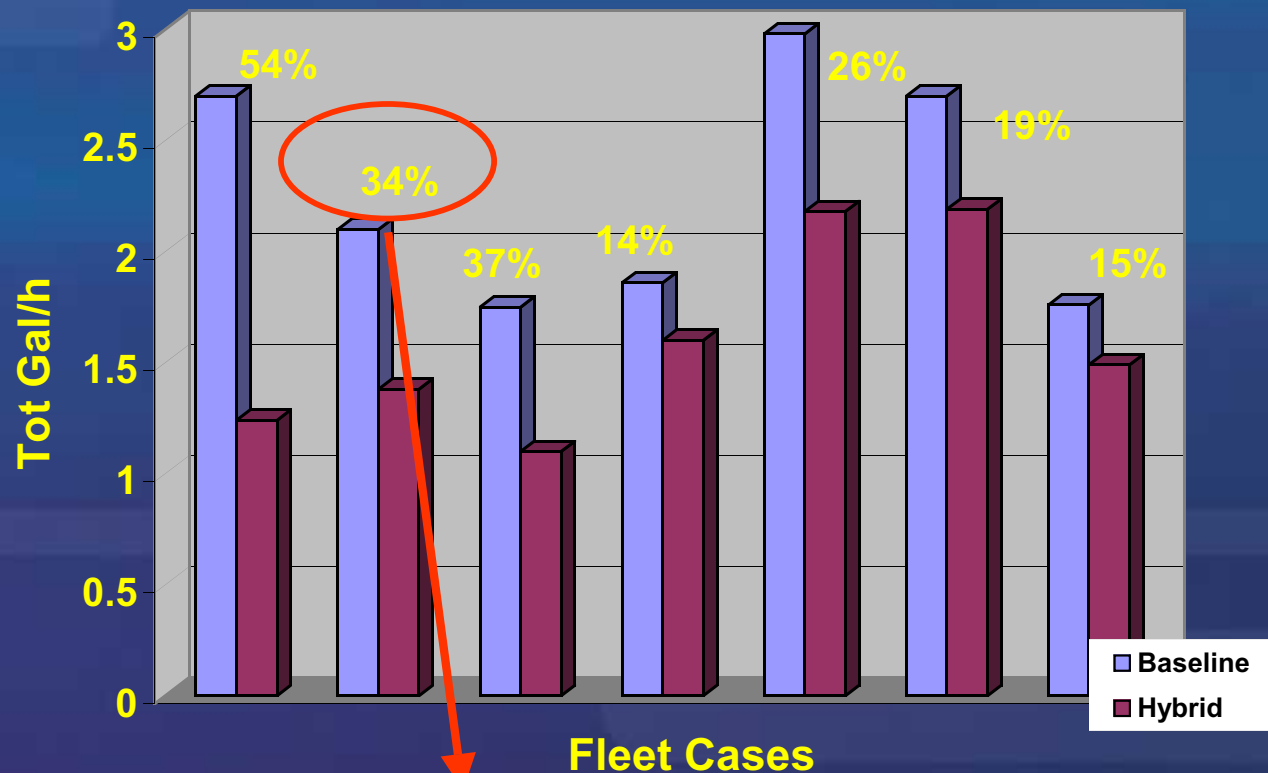
- 54% fuel economy gain for highest fleet
- 14% fuel economy gain for lowest fleet
- Biggest variables: mileage driven versus work site “boom” time (more work site time equals better mpg)



Overall Fuel Consumption Improvements

Improvements Total Gal/h

- Overall savings as high as 54%
- Total Gallons over Total Operation hours, capturing engine ON and OFF operation
- Dependant on duty cycle!



Decrease 2.1 to 1.4 gal/h totals fuel saving from 14.7 - 9.8 gallons, or 34%
Lab Testing savings from 12.5 - 7.5 gallons, or 40%



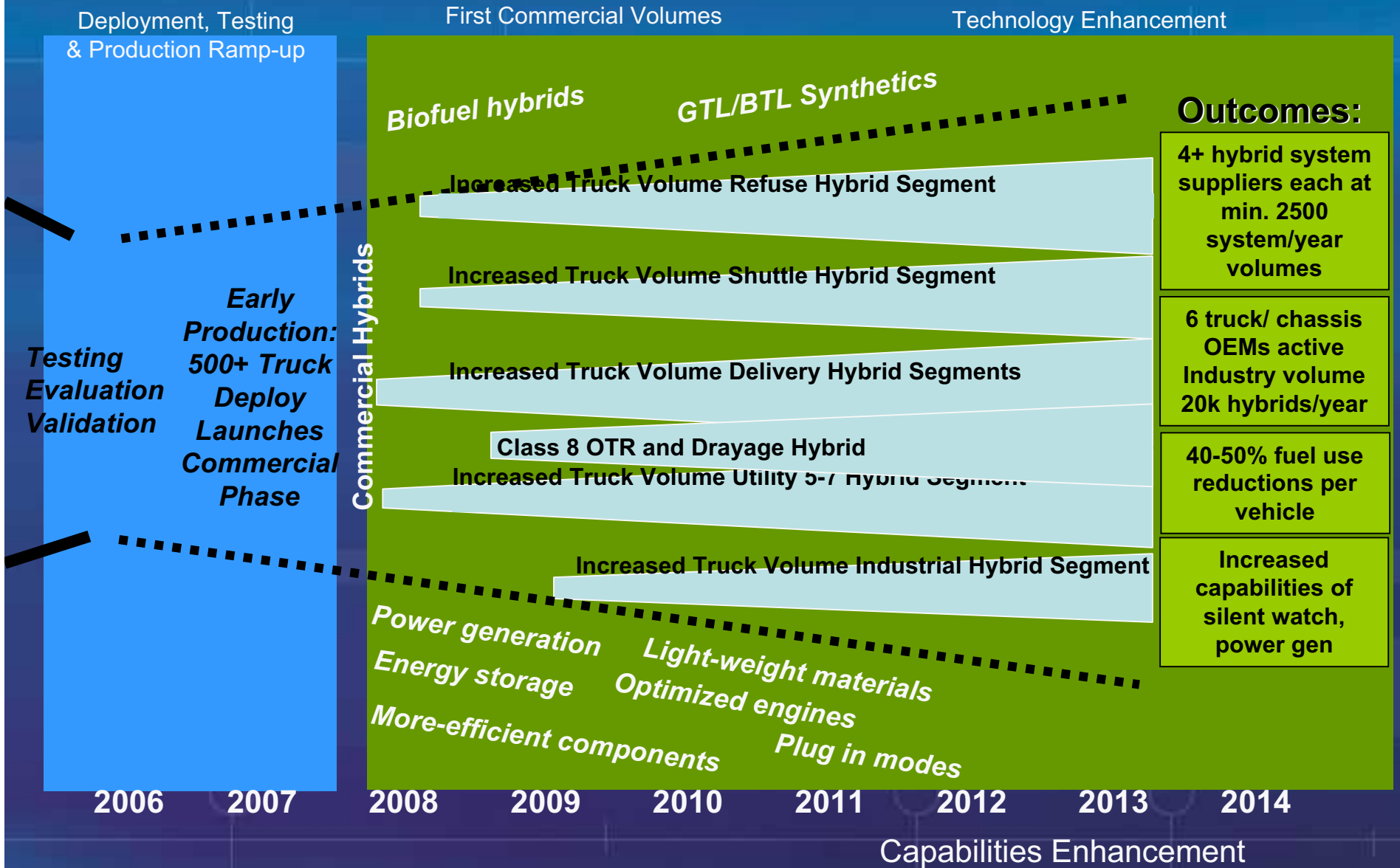
Class 8 Hybrids – New Possibility

- Peterbilt is now testing this hybrid prototype of its heavy-duty Model 386 tractor
- Example of the new capabilities and markets emerging for hybrid technology
- Port yard hostler hybrids to be developed in WestStart project with Ports of Long Beach and LA
- Vehicles common at port, rail and distribution centers



HTUF: "Expanding the Funnel"

From Hybrids to More Efficient Trucks





The New "Strike Zone" in Transportation

Air Quality

Balances all three competing needs

Integrated Solutions Needed

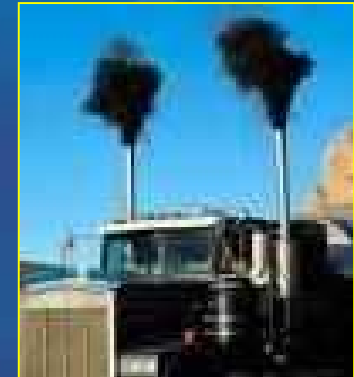
Energy Security

Climate Change



Moyer Program

- Moyer program has proven to be highly successful way to reduce smog forming emissions
- However, Moyer only focuses on reduction of smog forming emissions from *heavy-duty vehicle sector*
 - NOx and Particulate Matter reductions only considerations
 - No credit for greenhouse gas reduction or reducing dependence on oil
 - Most \$ used to replace old diesel engines with new ones
 - \$140 million/year indefinitely
 - Funded from vehicle registration fees
- Funds administered by regional air quality agencies in state





Governor's Greenhouse Gas (GHG) Reductions Put into Law in 2006

AB 32: Global Warming Solutions Act

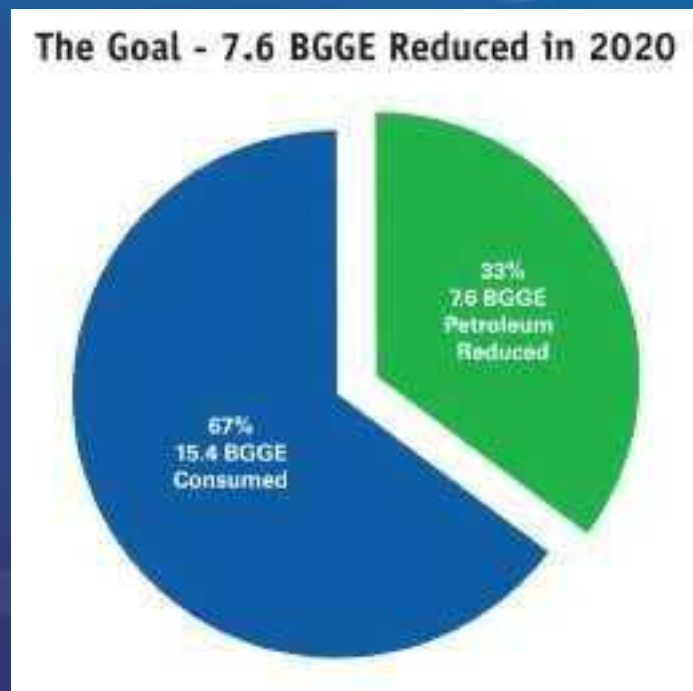


- By 2010 reduce GHG emissions to 2000 levels
- By 2020 reduce GHG emissions to 1990 levels
- By 2050 reduce GHG emissions 80% below 2000 levels
- *Transportation is responsible for >60% of CA's CO₂ emissions*
- *CA is the 12th largest emitter of GHG emissions in the world*



Defining The Target: CalSTEP Goals = AB 2076 Goals

- In 2003 California used 18.1 billion GGE of on-road gasoline and diesel
- Target is a 15% reduction from 2003 demand to 15.4 billion GGE per year by 2020
- Projected business-as-usual demand in 2025 is 23.8 billion GGE
- Required reduction from business-as-usual case to meet target would be 8.4 billion GGE



**AB 2076 Report Goals:
15% less oil consumed
and 20% alternative
fuels in 2020**



CalSTEP Action Plan: California Secure Transportation Energy Partnership

- CALSTART publishes major independent plan for transportation energy security: **CalSTEP Action Report**
- 10-point action plan for reducing oil use, increasing fuel diversity, cutting GHG emissions
- 18-months of review, analysis and consensus from auto, transit, tech and policy leaders
- Outlined steps to improve vehicle efficiency, increase fuel choice and lower vehicle miles traveled (VMT)



Two CalSTEP Policies Sponsored by CALSTART Become Law 2007



- **AB 118 (Núñez)** Would create new **annual \$120 million** transportation program in California
- Funding targeted at measures that would improve air quality, reduce greenhouse gases, and oil dependence
- Support both research, development, and demonstration of new technologies advanced vehicle incentives, and deployment (incentives) for low carbon fuels and advanced vehicles
- Additional **\$80 million** for measures to solely improve air quality from transportation
- **AB 236 (Lieu)** Establishes petroleum reduction goals for State of California's own fleet



Speaker
Núñez



Governor
Schwarzenegger



Assemblyman
Lieu



AB118 Language

Alternative and Renewable Fuel and Vehicle Technology Program

- Appropriates \$120M/year for seven and a half years
- Authorizes CEC to use this appropriation to provide *“grants, loans, loan guarantees, revolving loans or other appropriate measures to public agencies, businesses and projects, public-private partnerships, vehicle and technology consortia, workforce collaboratives, fleets owners, consumer, recreational boaters, and academic institutions to develop and deploy innovative technologies that transform California’s fuel and vehicle types to help attain the state’s climate change policies.”*
- *“The emphasis of the program shall be to develop and deploy technology and alternative and renewable fuels in the marketplace, without adopting any one preferred fuel or technology.”*



Feedback from Legislature & Governor's Office on AB 118

Clear preference for deployment over research, development, and demonstration

But not all or nothing

No fixed percentages

Designed to give California Energy Commission flexibility to recognize changing needs of market from year-to-year



Potential Deployment Funding Categories

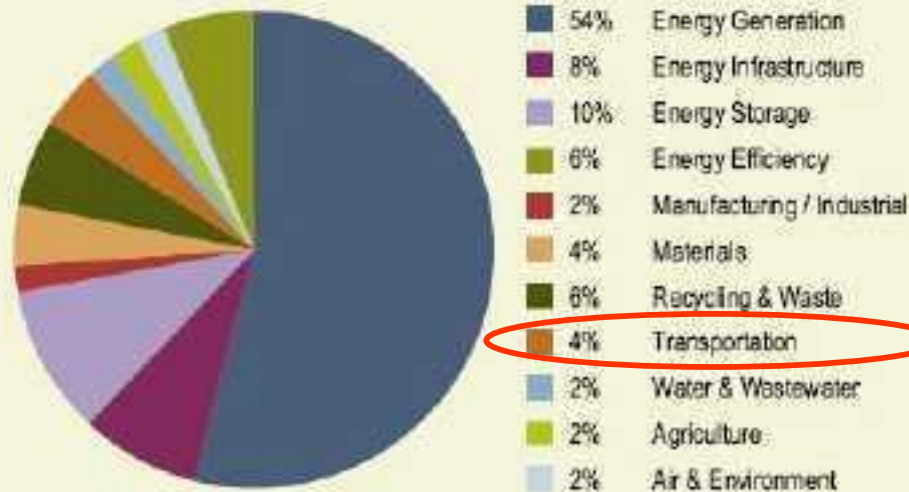
Key Need & Opportunity Areas

- Low carbon fuel infrastructure
- Medium- and Heavy-Duty Vehicles
- Non-Road Vehicles (i.e. construction equipment)
- Significantly more efficient passenger cars (beyond today's best hybrids)
- Low carbon fuel passenger cars
- Near-shore marine vessels (i.e. tugboats and ferries)
- New vehicles and retrofit systems & technologies



California Investment Significant

Cleantech Venture Amounts Invested in North America and Europe by Segment in 2006



Source: Cleantech Network™

Venture investments in Clean tech \$3B in 2006
4% of this in transportation
4% of \$3B = \$120 million (same level as AB 118)



Summary

- **Build Market “Pull” as well as Push**
 - HTUF model shows value of users sending market signals to manufacturers of what they want
- **Focus on Larger Policies Drivers That can Address Multiple Issues**
 - Climate change, emissions reduction, fuel economy
- **Reduce Risks with “Carrots” to go with Regulatory “Sticks”**
 - Builds partnerships with industry
 - Sends investment signal to go with policy signal

Clean Transportation Solutions SM
Advanced Transportation Technologies SM

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Primary Actions

CalSTEP Recommendations



FUEL DIVERSITY:

Alternative Fuels Portfolio Standard

- 10 percent by 2012 and at least 20 percent by 2020
- Codifies Governor's stated goal; Parallel AB 32 strategy

EFFICIENT VEHICLES:

'Energy Security Tax Relief and Realignment'

- A 'Foreign Oil Security' price floor coupled w/tax relief for all Californians of driving age

REDUCE NEED TO DRIVE:

'Smart Communities' Program

- Upgrade transportation models
- New state transportation funding to local governments who reduce driving by 10% over ~25 years





Supporting Actions



CalSTEP Recommendations

FUEL DIVERSITY:

- California Alternative Fuels Infrastructure Partnership
- California Renewable Fuel Production Initiative

EFFICIENT VEHICLES:

- State Fleet Leadership Challenge
- “New Transportation Future” Investment and Revolving Loan Programs
- ‘Energy Independent Vehicle’ Labeling Program

REDUCE NEED TO DRIVE:

- Revolving Loan Program for Neighborhood-scale Planning
- Facilitate Usage-based “Pay-as-you-drive” Insurance

