

# Hybrid Trucks Users Forum (HTUF): A National Program to Speed Commercialization of Heavy-Duty Hybrids



*Advanced Transportation  
Technologies*

*Clean Transportation  
Solutions* <sup>SM</sup>



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**Clean Cities Conference – Ft. Lauderdale**  
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# MISSION STATEMENT

WESTSTART-CALSTART IS DEDICATED TO CREATING AND EXPANDING A GLOBAL ADVANCED TRANSPORTATION TECHNOLOGIES INDUSTRY AND ITS MARKETS THAT WILL:

- Clean the air;
- Increase energy efficiency in transportation; and
- Create high-quality jobs

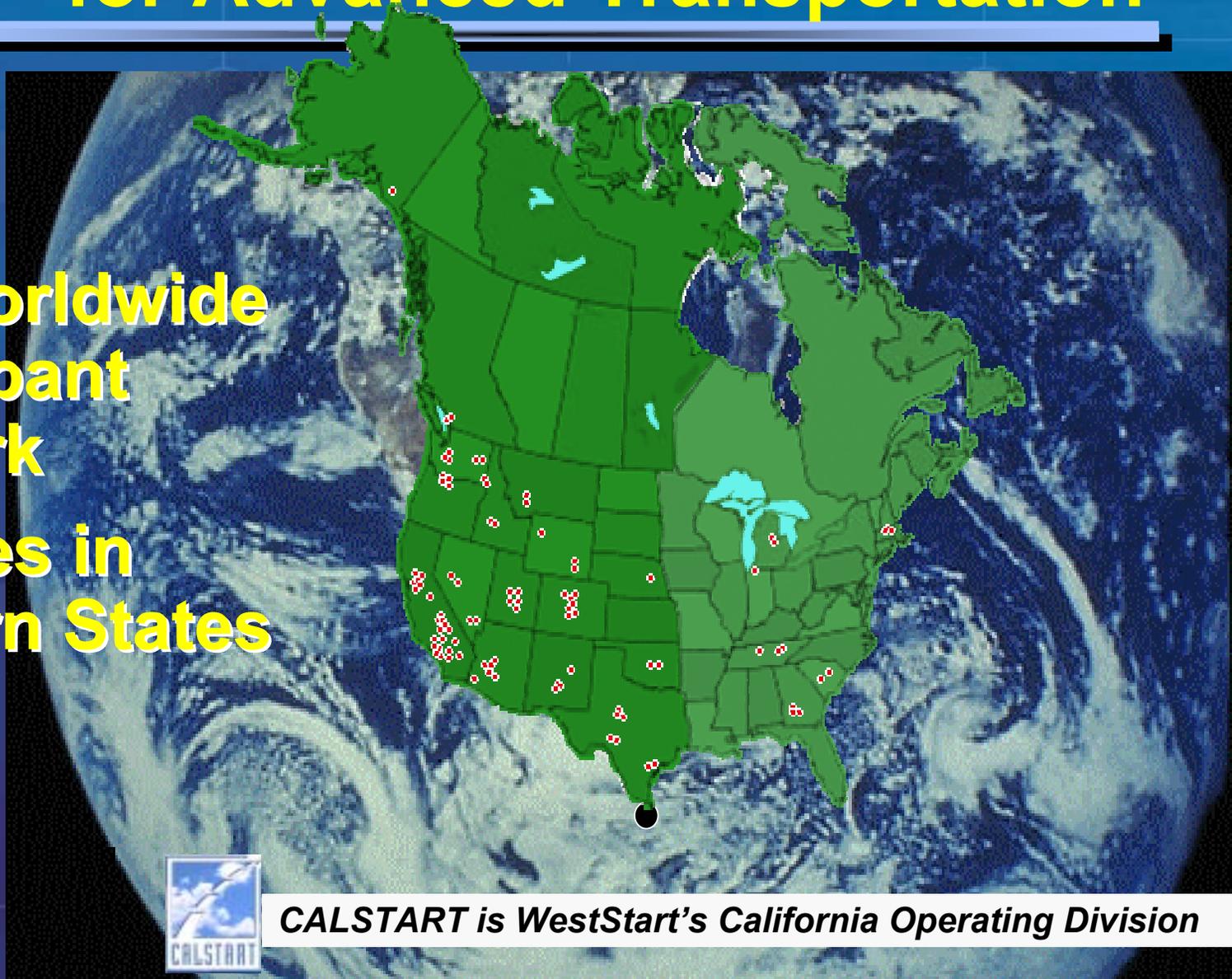
# WestStart: A Strategic Broker for Advanced Transportation



**2004**

**115+ Worldwide Participant Network**

**3 Offices in Western States**



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

# WestStart-CALSTART

## Participants (partial list)



# Some Current Trends Impacting Heavy-Duty



- Trucks and equipment have increasing basic electrical needs on board
- Some truck makers already adding secondary electrical systems, larger battery packs, readying move to higher voltage systems
- Idle Management is a growing issue
- Optimizing urban truck drivelines is becoming critical for fuel efficiency, emissions

# U.S. Army Vision



## *21<sup>ST</sup> Century Truck Initiative* **Trucks are Vital to the Army**

Trucks Provide the **Logistical Backbone** to the Army



Fuel constitutes 70% of bulk tonnage needed to sustain a military force on the battlefield. This equates to about 600,000 gallons per day.

- Fuel Efficient AAN Task Force

The US Army has a fleet of over 246,000 tactical wheeled vehicles and drives 823 million miles annually.

### **Army After 2010 Goal:**

**"...75% Reduction in Fuel Requirements for a Deployed Force..."**

- Hybrid Technology exhibiting
  - 25% Better Fuel Economy
  - Potential of up to 50%
- Hybrids also offer opportunities to
  - Reduce Stateside Emissions
  - Audible Noise through Electric Only Drive
  - Heat Signatures
  - Improved terrain Mobility
  - Fast Launch technology
  - Elimination of Generator Trailers

# Hybrid Platforms Are Being Tested



- Multiple military platforms moving forward
- All help advance hybrid drivelines
- Multiple hybrid “flavors”
  - Hybrid electric; Hybrid hydraulic
- FMTV, HMMWV, HEMMT of most interest to commercial users for capability
- NAC now launching FTTS – Future Tactical Truck Systems – focus is light platform (10,000+ GVRW) and med/heavy platform



*Shadow  
Hybrid  
RST-V*



# Hybrid Electric Propulsion Technology Benefits



## Military Benefits

- 25% - 50% Better Fuel Economy
- Flexible Electrical Power Generation
- Reduced Signature (Stealth Mode)
- Improved Performance
- Reduced Maintenance (brakes, transmission)
- Uses Standard Fuels
- Similar to Today's Vehicles

## Commercial Benefits

- Reduced Emissions (up to 90%)
- 25% - 50% Better Fuel Economy
- Improved Driveability, Quieter
- Improved Performance
- Reduced Maintenance (brakes, transmission)
- Uses Standard Fuels
- Similar to Today's Vehicles

**Technology that Benefits Military and  
Commercial Markets**

# HD Hybrid Drive Train Providers: Most Active



- Emerging and robust collection of companies providing/integrating HD hybrid drive trains
- Hybrid electric and Hybrid hydraulic
- New supplier base: includes large commercial truck/automotive suppliers, aerospace, military and high tech firms
- Roughly 30 suppliers now active in US

# Hybrid Truck Users Forum (H-TUF)



- Joint WestStart/US Army National Automotive Center (NAC) effort to expand commercial market for heavy-duty hybrid vehicles
- Link commercial needs with military development to drive down cost, increase volumes
- Forum proceeding through stages of:
  - education/outreach
  - familiarization
  - specification and business case development
  - commitment/ deployment
- Forum now in specification development stage, moving toward pre-production purchase commitments



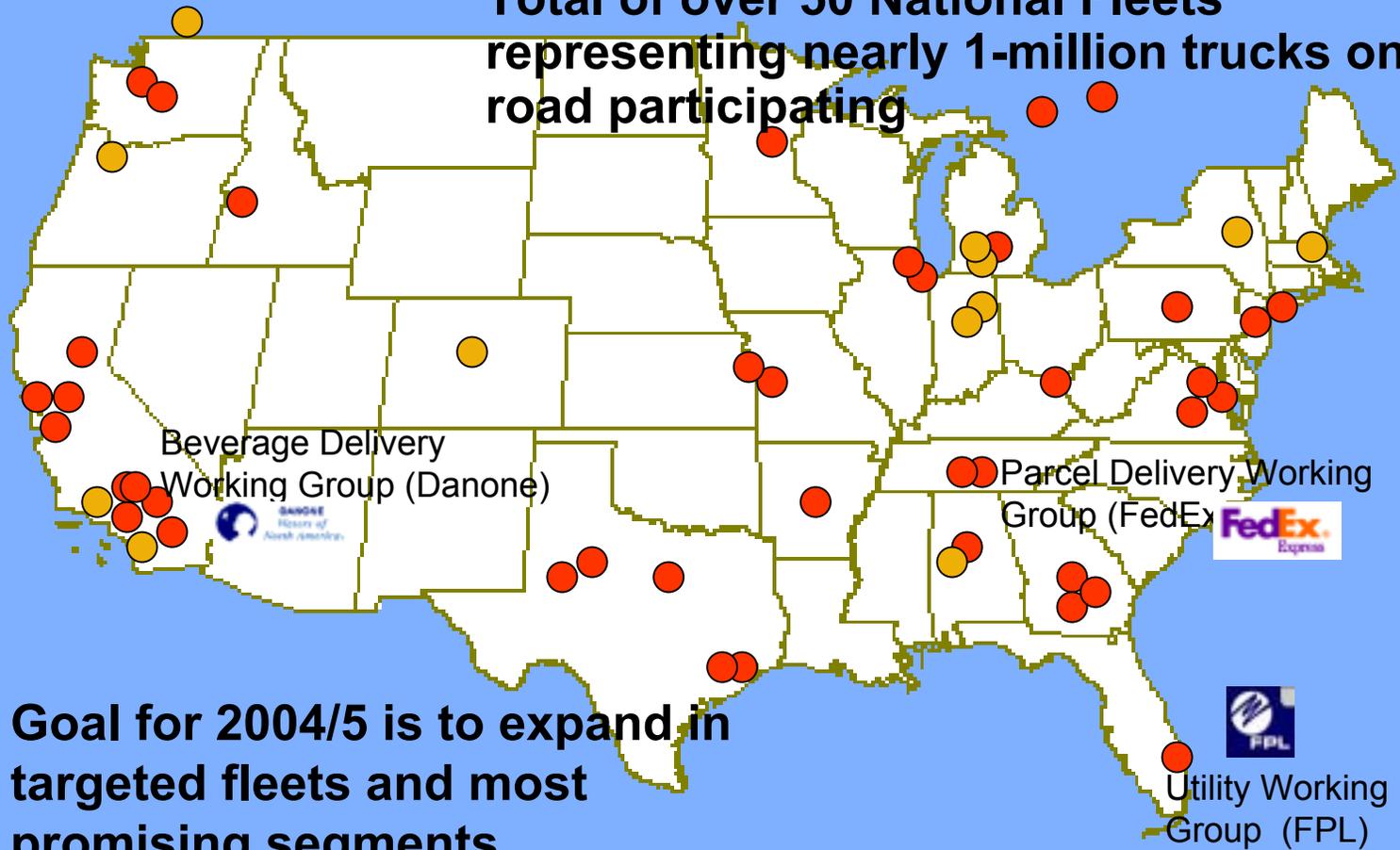
# H-TUF: A National Program Continues to Expand



●  
*Selected  
OEM/  
Supplier  
locations  
shown*

●  
*Selected  
fleet  
locations  
shown*

**Total of over 50 National Fleets  
representing nearly 1-million trucks on  
road participating**



**Goal for 2004/5 is to expand in  
targeted fleets and most  
promising segments**

# H-TUF National Forum 3 San Antonio



- 170+ attendees
- More than 50 fleet attendees
- Tech briefings from the NAC, SwRI, FedEx, Eaton, Dana, Stewart & Stevenson, PEI, Solectria, Azure Dynamics, ISE, Alliance for Environmental Innovation, and HARC



# Fleet Familiarization – San Antonio



More than 50 targeted fleet attendees experience leading-edge heavy-duty hybrid trucks



Hybrid electric parcel delivery van – Eaton/ FedEx

Conventional FMTV – Stewart & Stevenson

Class 8 Hydraulic CVT – SuperDrive

Hybrid hydraulic FMTV- Dana/ PermoDrive

Class 8 Fuel cell APU – Sunline/ SwRI

Hybrid electric Class 7 delivery truck - Solectria

### Beverage Company

- Coca Cola Sacramento
- Danone Waters
- Perrier ( Nestles Water Group)
- Pepsico/Frito-Lay
- Yosemite Waters

### Refuse

- Waste Management
- Los Angeles Dept of General Services
- New York City Sanitation
- Houston Sanitation

### Government Agency

- Canadian Army
- General Services Administration
- Idaho National Energy labs
- San Joaquin Valley Clean Cities
- United States Army
- United States Army Aviation
- United States Air Force

### Parcel/Mail Delivery

- FedEx Express
- FedEx Ground
- United Parcel Service
- United States Postal Service
- DHL Worldwide Express
- Purolator Courier

### Less Than Load & Regional Delivery and Line Haul

- American Trucking Association ( TMC)
- Ryder Transportation Services
- Schneider National
- Wal-Mart Transportation
- Enterprise Truck Rental
- GE Fleet Services

### Grocery Chain

- Safeway/Vons
- Kroger

### University

- Indiana University Motor pool

### Power Company/Utilities (over 25)

- Alabama Power
- AEP
- Baltimore Gas & Electric
- Duke Energy
- Electric Power Research Institute
- Florida Power and Light
- Illinois Power
- New York Power Authority
- Pacific Gas and Electric
- Southern California Edison
- Tennessee Valley Authority
- Memphis Light Gas and Water
- Georgia Power
- Gulf Power
- Los Angeles Dept of Water and Power
- Sacramento Municipal Utility District
- TXU

**H-TUF  
Member  
Fleets  
(partial list)**

# Focus Area for H-TUF: Top Early Hybrid Applications

## **Class 7/8 Refuse trucks**

## **Class 3-6 Urban delivery trucks**

- package delivery
- beverage delivery

## **Specialty Truck Applications (Class 4-6)**

- Utility “Bucket” trucks
- Telecom/cable trucks
- Fire/rescue trucks

## **Class 6-8 Heavy Urban delivery trucks**

- regional heavy distribution (beverage, grocery, postal)

# H-TUF Working Groups



**NAC**



- User-focused effort led by fleets
- 4 Working Groups of fleet truck users operating; one forming (refuse trucks)

– **Utility/Specialty trucks – George Survant, Florida Power & Light, lead**



– **Parcel Delivery trucks – Sid Gooch, Fed Ex Express, lead**



– **Beverage Delivery/Heavy Regional trucks – Frank Guercio, Danone Waters NA, lead**



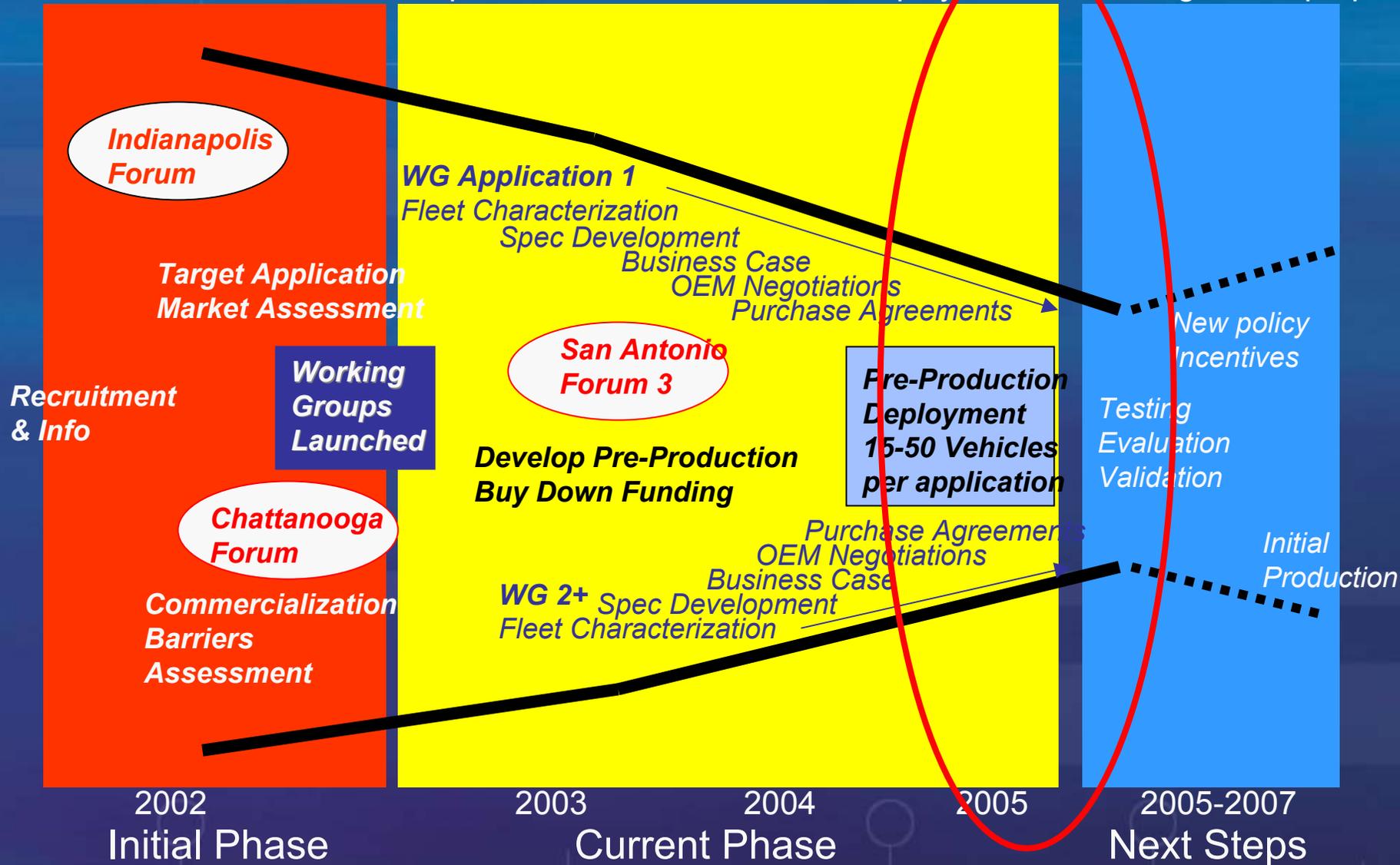
– **Hybrid Ground Service Equipment (GSE) – User lead TBD**

# H-TUF "Commercialization Funnel"

Familiarization & Outreach

Specification, Commitment & Deployment

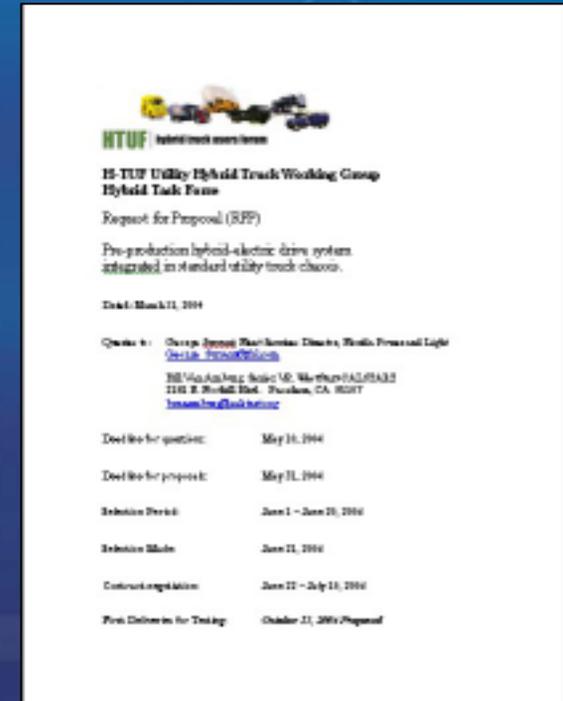
Testing & Ramp-up



# Utility Working Group Progress



- Sent RFP for 20 hybrid utility trucks (27,000 –33,000 lb GVWR size) March 31
  - Second lighter truck (17,500 range) will be next effort
- **Timeline Goals:**
  - RFP out March 2004;
  - Select OEM/supplier team by mid-year;
  - Vehicle deliveries by first quarter 2005



# Utility Working Group KPPs

continued



- Significant increase in fuel economy
  - 50% increase
- Reduce emissions over diesel
  - Meet or exceed 2010 requirements
- Overall life-cycle costs less than or equal to diesel
- Reduced noise levels compared to diesel
  - Operate at work sites on stored energy
- Generate field power
  - 25 kW output – engine off 2-4-6 hours

# H-TUF – Entering Initial Buy-Down Phase



- CALSTART has raised \$1+-million in federal DOD funding for H-TUF partial “buy-down” of **incremental** cost of commercial path pre-production trucks – nationwide
  - Will be matched by several million (\$4-5M) investment from Working Group participants
- Teaming with different state and regional funds to extend reach of program
- \$5.5-7M in federal and private sector funding

# Delivery Working Groups

## Hydraulic Hybrid Sub-Committee



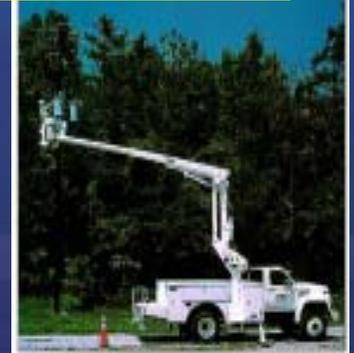
- Interest from 7 significant national fleets (FedEx Ground; UPS; USPS; FedEx Express; Danone; Frito-Lay; Nestle) in exploring a hydraulic hybrid option in a 10-14,000; 19-22,000; 26,000 lb platform
  - Parcel and Package, Water/Beverage Delivery & Regional (Food) Delivery, considering adding refuse fleets to effort
- Group now collecting fleet and common duty cycle data (sharing duty cycle data among competitors big breakthrough)
  - Significant commonality of platform and driveline
  - Interest in new vehicles and retrofit
- Focusing on common “driveline” – group wants to move toward an RFP by mid year
- Data developed benefits all hybridization efforts in these categories – not just hydraulic



# H-TUF Summary



- HTUF assisting the **largest commercial deployments** of hybrid trucks in nation
- HTUF commercial hybrid trucks **match the size and powertrain requirements of Army platforms** – helping speed commercialization and lower overall costs (leveraging investments)
- Goal is 20-60 commercial path hybrids deployed by end 2005- including hybrid utility trouble trucks deploying to fleets nationwide in early 2005 – and deployments of hybrid urban and regional delivery trucks, specifications for refuse trucks and GSE
- Rigorous emission, performance and business case evaluation for 2005
- Hybrid electric and hybrid hydraulic platforms



# What Does HTUF Need?



- **More Fleets Always Wanted to Participate!**
- Working Groups continue to expand, new ones form
- Good opportunity to:
  - Learn
  - Share information
  - Shape commercial offerings
  - Be involved in early deployments

***Clean Transportation Solutions <sup>SM</sup>***

***Advanced Transportation Technologies <sup>SM</sup>***



**[www.weststart.org](http://www.weststart.org)**

**[www.htuf.org](http://www.htuf.org)**