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HTUF

hybrid truck users forum

HTUF DiaLog

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Commercializing Hybrid & High Efficiency Trucks

Expansion of Clean Truck Industry Highlighted at HTUF National Meeting



36-vehicle hybrid truck & bus convoy launches ride and drive at HTUF.

Big Growth in Hybrid Capability at HTUF 2008

CALSTART's 2008 HTUF National Conference highlighted several impressive new milestones for the rapidly expanding medium- and heavy-duty hybrid industry. To say this year's event was a significant step up for the industry is an understatement. With nearly 600 attendees, the 2008 event itself expanded by almost 35 percent compared to 2007.

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Incentives Update: Fleets – Prepare NOW!

Significant Hybrid Purchase Incentives Coming in 2009

Significant funding that could assist the purchase of medium and heavy-duty hybrids is now emerging at both the state and national level. The most useful and leading-edge of these is the AB 118 purchase buy-down "voucher" plan now under development by the state of California; however, the new national "stimulus" bill has the most funds in a generation aimed at alternative fuel and clean vehicles – and hybrids should qualify for those.

Some of this is directly the result of HTUF Incentive Working Group action, which is expanding. But the key take-away is that fleets – even in the midst of the economic downturn – should be planning

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Purchasing a Hybrid? Try a Lifecycle Cost Approach

A common complaint about new technology is that the "back of the envelope calculation just doesn't pencil out". Most new technologies come up against this challenge as they struggle to be implemented in commercial industries that have become accustomed to the status quo but are looking for ways to reduce costs. A simple payback calculation is a quick

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HTUF at Clean Heavy-Duty Vehicle Conference

HTUF will hold a mid-year meeting to launch the CHDV Conference in Long Beach, CA on March 16 – 18, 2009, so plan to attend. We're

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Fleets: AB 118 Recruitment & Purchase Meeting March 16

HTUF will hold a special fleet recruitment and purchase planning meeting to discuss AB 118 and other incentives at the Clean Heavy Duty Vehicle Conference March 16, 10:30 am – Noon, in Long Beach: visit www.chdv.org.

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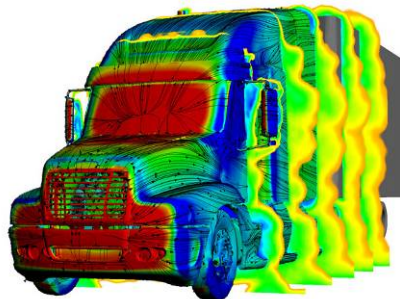
More engines, more coach/cab types, more chassis options:

- Lighter and heavier weight classes
- Emergence of Class 8 and 7 tractors
- Heavy delivery and regional hauling



Many more units than before

- Sales growing in the first year of commercial availability
- Volume should substantially grow as premium declines



Airflow Graphic: Freightliner

Increasing emphasis on high efficiency *by whatever means*

- Beginnings of hybrid- and electric-driven accessories
 - Refrigeration units
 - Air conditioning
- Growing competition from hydraulic hybrids in refuse
- Increasing focus on improving overall engine and vehicle performance

Hybrid Types and Components Multiply to Fit Expanding Opportunities

One thing that emerged from the HTUF Conference in South Bend, IN, is the reality that the combinations of engines, drive systems and chassis types available in the medium- and heavy-duty hybrid market are rapidly expanding.

Only a short time ago, the choices were limited: one or two engines mated with diesel hybrid-electric drivetrain designs, mainly for medium-duty truck and transit applications. That landscape has changed and the offerings are blossoming.

- Gasoline hybrid-electrics appeared, attracting interest for new applications
- Hydraulic hybrid systems moving into first applications, refuse vehicles, and attracting competition
- As hybrid-electric systems became more tested and reliable, variants for medium-duty delivery and shuttle vehicles emerged as well as heavy-duty tractors
- Hybrid systems began to expand beyond propulsion to onboard system power

The applications that hybrid systems can address have started to multiply. As hybrids have been put into service, they demonstrated quantifiable benefits in reducing fuel consumption and emissions, and even cutting maintenance costs. In transit applications, they also improved the rider experience by virtue of reducing noise and improving performance.

There are still obstacles, primarily economic: low volume means high price. However, incentives for buying down the cost of the new technology, the volatile cost of fuel and ever-tightening emissions standards all help encourage hybrid drive train development, providing a counter to the high premium attached to hybrid technology.

So hybrid systems are percolating into a variety of new service types and classes, including combination truck tractors in higher weight ranges. With the expansion of hybrid technology, the opportunity for substantial increases in production volume will erode the premium barrier, and as lifecycle costs demonstrate, payback on initial premiums will come more and more quickly.

It's an area where domestic manufacturers currently have a leadership position. One truck maker boasts hybrid offerings of six engine horsepower/torque combinations with a variety of chassis/coach/cab options. But foreign suppliers are revising their opinion of hybrid technology.

What was once seen as an expensive and questionably beneficial alternative best-suited to light duty vehicles is poised to steadily expand into the medium- and heavy-duty markets, particularly where early incentives can help spur purchases.

Purchase Incentives Coming! – *continued from page 1*
immediately how to take advantage of these funds and plan to make hybrid truck and bus purchases this year.

The California plan creates a simplified voucher to provide fleets a significant buy-down right at the time of purchase of a hybrid truck. It is an extremely innovative plan that builds directly on the HTUF Incentives Working Group recommendations and is supported by HTUF. More details on that plan and its timeline below.

First, let's look at the stimulus (American Recovery and Reinvestment Act) plan opportunities. Significant new funds – most in a generation – have been placed in both the EPA's Diesel Emission Reduction Act (DERA) program - \$300 million – and the Department of Energy's (DOE) Alternative Fueled Vehicles Pilot Program - \$300 million – to be run through Clean Cities. Both programs are aimed at vehicle deployments and have a job-creation goal. Both programs allow hybrid vehicle purchase either explicitly or by inference. However, both programs also will require relatively complicated proposals be submitted to be competitively judged. It also appears that the DOE funds may require a state or local public agency, or metropolitan planning organization, to submit the proposals.

Fleets should be aware that the timing on these funds is fast, and they should be considering their potential purchase commitments immediately. The solicitations may hit the streets before or in March. This is a moving target, so check back often: the HTUF Web site will have information as it comes.

Our initial information is that the agencies will prefer larger proposals to help them manage the funds. CALSTART's HTUF program and its partners at EDF hope to help fleets organize large multi-fleet, vehicle and regional proposals. Please contact us to let us know your interest in purchase and being involved in a proposal. *(There are other funding opportunities, as well. CALSTART members will be receiving updates on the full stimulus bill breakdown.)*

Meanwhile, the California Air Resources Board (CARB) is finalizing plans – pending approval – of a significant and meaningful incentive program targeted directly at medium and heavy-duty hybrids. CARB proposes dedicating \$26 million in 2009/2010 funds for purchase vouchers to be paid directly to fleets who buy qualifying hybrid trucks for use in the state. The vouchers will likely range from \$20,000 to \$40,000 per vehicle, and would be paid at time of purchase. The goal is to reduce the upfront incremental cost of the vehicles by about half, something strongly supported by HTUF which applauds the state's efforts. The funds come from a special clean transportation investment program CALSTART helped create widely known as AB 118. The California Energy Commission (CEC) will also be managing funds, some of which will likely assist hybrid deployment, demonstrations and development.

We encourage fleets and manufacturers to provide comments and support to these agencies as they finalize their rules. Most importantly, we encourage fleets to work with us to commit to purchasing hybrid trucks, and notify us of their desired purchase volumes and timing so we can assist the state plan for the program. Join us for a special fleet purchase commitment workshop March 16 in Long Beach as part of the Clean Heavy Duty Vehicle Conference (www.chdv.org).

Funding Resources:

www.htuf.org

CARB Hybrid Purchase Voucher Plans:

http://www.arb.ca.gov/msprog/agip/meetings/hyip_wg_discussion_paper_01_13_09.pdf

CEC AB 118 Investment Plan:

<http://www.energy.ca.gov/proceedings/2008-ALT-1/documents/index.html>

DERA Site:

<http://www.epa.gov/otaq/diesel/grantfund.htm>

DOE Notice of Intent:

<http://e-center2.doe.gov/doebiz.nsf/d76fbc294818822885256d98006c63b6/159ba05be82a95e28625755a005eddb?OpenDocument>

Utility /Telecom Working Group – Next Steps

The **Utility / Telecom Working Group** met at the HTUF2008 National Meeting in South Bend, IN. The meeting was well attended with close to forty members from the utility, telecom, and city and municipal fleets. The main topic of the meeting was the next phase work truck that the group should focus on as well suggestions on how the group can most effectively act.

The four platforms that were discussed were: Class 7/8 – Class 4/5 – Step Van – Class 2B/3. From the surveys collected and the discussion of the group it was concluded that Class 4/5, Step Vans and Class 2B/3 remain of interest for the next phase. Class 4/5 is interesting both for the utility and telecom fleets for bucket truck applications. Step Vans are more of interest to the utility sector and potentially with auxiliary power units (APUs) but much less so in the telecom. Finally, Class 2B/3 is very highly represented among the telecom fleets. There was also discussion in the commonality between the use of Step Vans in the utility fleet and the parcel and delivery fleets which can further open up the market for this class of hybrids vehicles.



The Group discussed interest in hybrids to reduce idling specifically or to improve overall driving efficiency of the units for applications that do not have a lot of idle time. Interest was expressed in looking at gasoline hybrids in addition to diesel.

We are currently looking at the commonalities between the vehicles used in the different fleets in terms of chassis and engines. This would provide a better direction which truck types and unit types would provide the largest volumes that the group should focus on.

The goal of the group is to select a platform for the next phase by the end of the year and send a letter to the industry about the selected platform. Getting broad participation among fleets across the country is important.

For more information on the Utility/Telecom Working group and to join the effort, contact Jasna Tomic, CALSTART at JTomic@calstart.org

Commercial Construction Equipment Users Forum

HTUF's newest effort, the **Commercial Construction Equipment Users Forum (CCEUF)** was kicked off at the HTUF National Conference in South Bend, IN. Over 70 individuals representing manufacturers, suppliers, and end-users, were spilling into the hallway for the first CCEUF working group meeting.



The group provided excellent input into how the Forum should be organized and which technologies and strategies should be investigated further. The goal of the Forum is to provide a framework for the industry to develop and implement more efficient construction equipment. Background surveys were circulated at the meeting. A general session on construction equipment was also conducted at the HTUF conference and panelists representing each of the major stakeholder groups discussed the key drivers to technology innovations and the effects of new state and federal emissions regulations. **The next major activity will be a half-day information-sharing event at the Clean Heavy Duty Vehicle Conference on March 16.** In the interim, a detailed survey will be sent to stakeholders and at least two teleconferences will be conducted.

Those interested in participating in the CCEUF should contact Steven Sokolsky at (510) 307-8772 or ssokolsky@calstart.org.

Parcel Delivery Working Group

The Parcel Delivery Working Group has selected Hybra-Drive Systems to provide 3 hydraulic hybrid vehicles to be leased for evaluation and testing by Purolator, UPS, and FedEx.

For more information on the Parcel Delivery Working group and to join the effort, contact Richard Parish, CALSTART at RParish@calstart.org.



Refuse Working Group

The Refuse Working Group is finalizing plans with Crane Carrier for both electric (ISE) and hydraulic (Bosch Rexroth) hybrids to be incorporated into fleets in New York City, Houston, and Chicago.

For more information on the Parcel Delivery Working group and to join the effort, contact Richard Parish, CALSTART at RParish@calstart.org.



The HTUF Hybrid Parcel Delivery and Refuse Working Groups are both in a phase of contract development and negotiation. Vehicles for each of these applications, parcel delivery and refuse, are expected to be ready for preliminary testing during the second quarter of calendar year 2009.

Class 8 Working Group

The HTUF **Class 8 Hybrid Over-the-Road, Regional Delivery, and Drayage Working Group** met on Tuesday morning, October 14, during the first day of the 2009 HTUF National Conference. Much to the surprise of the CALSTART-HTUF staff, the open meeting attracted a standing room only crowd, composed mainly of industry OEMs and suppliers, but with a healthy representation from fleets as well. The attendees received excellent updates on the status of Class 8 hybrid vehicle and system development from Mack, Peterbilt, and Arvin Meritor.

During the open discussion, it became apparent that the appropriate platform for the working group to pursue would be for regional delivery and drayage applications. This recognition helped to focus the working group in a subsequent teleconference meeting held on Nov. 18.

Richard Parish/CALSTART, leading the teleconference, provided a brief summary of some key takeaways from the HTUF National Conference held in South Bend, Indiana in October. These included the proliferation of hybrid trucks being offered by the OEMs, the significant interest by OEMs and suppliers in the Class 8 working group meeting, and the un-paralleled Ride & Drive event at the Bosch Proving Grounds.

During the teleconference meeting, Richard presented the concept that the working group should focus on Class 8 regional delivery applications. It was projected that this application would be "low hanging fruit" that would have good utilization of the hybrid technology due to typically urban environments at the front and back end (as well as middle, potentially) of the vehicle's daily service

For more information or to participate in user Working Groups, contact:

- Parcel Delivery, Refuse, and Class 8 Working Groups: Richard Parish – rparish@calstart.org.
- Incentive Working Group: Bill Van Amburg – bvanamburg@calstart.org.
- Utility/Telecom Working Group and Plug-in Hybrid Truck Task Force: Jasna Tomić – JTomic@calstart.org.
- Bus Working Group: Susan Romeo – sromeo@calstart.org.
- Commercial Construction Equip Users Forum: Steve Sokolsky – ssokolsky@calstart.org.

cycle. Additionally, this type of vehicle platform would be appropriate for drayage applications at the ports. Drayage vehicles have additional requirements for hybrid drive systems that include an ability to creep while waiting in a queue (a capability which doesn't exist in current Class 8 hybrid trucks); however preliminary capabilities for hybrid technology can be demonstrated in this application and refined as necessary once the drive cycle is better defined. Other applications of Class 8 tractors, such as long-haul, could be further developments of this hybrid drivetrain as it matures.

The participants in the teleconference agreed with this approach to focus on a Class 8 day cab vehicle used in regional delivery applications. Richard requested vehicle specification information from the fleets so that a coherent spec can be developed (if possible) to which OEMs could develop their vehicle offerings.



The next topic was the concept of fleets leasing rather than purchasing vehicles, which Richard had proposed to several different OEM; and they have appeared receptive. The representative from Penske was asked if they would be willing to act as the leasing agent between the OEMs and the fleets. He responded positively, given appropriate agreements and funding. Fleets participating in the teleconference were agreeable with the proposed lease approach.

Parish noted that HTUF has funding from the U.S. Army National Automotive Center (NAC) to help reduce the cost of leasing the vehicles and that he hopes to leverage those dollars with the Ports of LA and Long Beach, as well as indicated interest from South Coast Air Quality Management District (SCAQMD) to develop this into a good demonstration activity.

Penske has been leasing Class 6/7 hybrid straight trucks, so they have some familiarity with the challenges and unique characteristics of this type of vehicle. They are also acquiring some performance data from the vehicles they've placed in service, although drive cycle information is not part of that data set. CALSTART would like to acquire drive cycle data in addition to performance data and will work with the participating working group fleets to acquire that information during the vehicle demonstration process. Kevin Maggay/Port of LA suggested that drive cycle information for drayage applications could also be developed. Richard will be coordinating with Penske to discuss the vehicle lease concept further. Some items that still need to be determined:



• Project schedule	• Participating OEMs
• Participating fleets	• Lease duration per vehicle per fleet
• Projected lease cost	• Data acquisition and evaluation

For more information on the Parcel Delivery Working group and to join the effort, contact Richard Parish, CALSTART at RParish@calstart.org.

Preview: HTUF Day @ CHDV Confernece - continued from Page 1

scheduling a half-day session on the morning of Monday, March 16, to discuss Commercial Construction Equipment (CCE), investigating how this segment can become more fuel efficient and less polluting.

Concurrent with the CCE forum, we'll be running our HTUF Class 8 and Utility/Telecom Working Groups, providing information on the activities within these particular sectors and establishing how we'll be moving forward. Following the working group meetings, we'll have a special California Fleet Recruitment meeting to provide information on the California AB118

legislation, identifying how fleets can take advantage of funding that is expected to become available in 2009. We'd like to see fleets stepping up to the line to make commitments for hybrid purchases based upon this potential funding.

Monday afternoon HTUF will provide an update on all of our activities, followed by presentations by truck OEMs and suppliers on their latest products, including hybrids and alternative fuel vehicles. This should enable participants to gather a significant bit of valuable information in a relatively short period of time.

But there's more! On Tuesday and Wednesday of the CHDV Conference, plenary sessions will cover a large range of topics concerning the truck industry and more efficient trucks. Breakout sessions will focus on various alternative fuels, purchase incentives, and advances in fuel efficiency.

The CHDV Conference, dealing with all aspects of increased fuel efficiency and lower truck emissions, has a broader focus than our fall HTUF Conference, so it's a perfect complement to our HTUF work. Go to www.calstart.org to get more information.

Purchasing a Hybrid: Life Cycle Analysis - *continued from Page 1*

and easy method to assess the benefit of a new cost-saving technology; but it isn't necessarily very accurate, and in assessing the case for hybrid drivetrains, a deeper dive is required.

Simple payback (SPB) is typically defined as the initial cost of an improvement divided by the cost savings recognized as a result of that improvement over a set period of time. For example, a technology improvement that has an initial cost of \$10,000 and which saves \$1,000 per year results in a 10 year SPB ($\$10,000 \text{ initial cost} / \$1,000 \text{ savings per year} = 10 \text{ year payback}$). So, it takes 10 years for the improvement to pay for its initial cost.

However, life cycle cost analysis (LCCA) is a method used in the building and energy industries (and by some fleets) to better characterize and understand the true impact of energy and cost saving technologies over time. SPB calculations don't typically incorporate an adjustment for fuel cost inflation over the vehicles service life, nor do they take into consideration the cost of maintenance and the residual value of the unit. In many instances, taking the full account of the LCCA will result in a significantly positive benefit for a new, efficient technology where a SPB calculation results in a less positive or even negative impression. So, from the HTUF perspective, the objective of accomplishing LCCA for fleets is to compare the life cycle cost of a conventional vehicle compared to an advanced technology or, in our case, a hybrid vehicle in current-year dollar values.

Let's take a look at an example of how LCCA works in comparison to SPB. As noted above, SPB is a straightforward, simple calculation that can many times be performed on a hand calculator or in the head of a mathematically inclined person. Not so with LCCA: you actually have to use a spreadsheet model to get the information you're looking for. CALSTART-HTUF is building a spreadsheet model for use by its member organizations, but we'll address the basic principles here.

LCCA attempts to take into account all of the costs associated with an asset (in this case, a vehicle) over its useful lifetime or normal life in an application. The costs are evaluated based on the current year (or some other specified base year) but are escalated over time to account for the effects of inflation (in a normal growing economy). For example, tires purchased in the second year of a vehicle's life would be less expensive than tires purchased in the fifth year due to annual inflation, which is typically on the order of 1% to 3%, which increases the cost of all products in the marketplace. So operation and maintenance costs are identified and adjusted over the course of the vehicle's life to attempt to more accurately portray the real cost at the time the service is performed.

Also taken into account in the LCCA are upfront incentives, tax benefits, and the downstream residual or salvage value of the vehicle at the time of disposal. All of these costs are escalated as appropriate as they occur in time and then are “discounted” to the present or base year’s value. The Cisco Systems Capital website defines the discount rate as an “*interest rate that is used to bring a series of future cash flows to their present value in order to state them in current, or today’s, dollars. Use of a discount rate removes the time value of money from future cash flows*”. The actual value of the discount rate is taken to be the interest a private bank pays for a loan from the US Federal Reserve System. We’ve seen this change rather markedly in the last year or so, so picking a single value for this is admittedly an approximation...but forecasting the future does require some educated guesswork.

Okay, so let’s use the example of a Utility Bucket Truck using the following criteria, assuming no major service, such as an engine or transmission rebuild during the vehicles’ service life and driving mpg improvements only. Many of these numbers displayed in the following table are approximations, but we’re trying to be somewhat realistic.

Criterion	Conventional Truck	Hybrid Truck
Initial vehicle cost	\$100,000	\$140,000
Tax credits	0	\$12,000
Buy-down funding (state incentives, grants, etc.)	0	\$10,000
Salvage value	\$25,000	\$30,000
Vehicle service life	10	10
Miles/year	25,000	25,000
Fuel cost/gallon	\$3.00	\$3.00
MPG	8	12 (50% improvement)
Fuel cost escalation rate/year	5%	5%
Inflation rate/year	4%	4%
Discount rate/year	4%	4%
Maintenance cost/year (brakes, engine oil)	\$2,000	\$1,000

Using a SPB calculation results in the following:

Initial cost differential - \$40,000

Fuel Savings per year – 25,000 mi./8 mpg (conventional) minus 25,000/12 mpg (hybrid) = 3,125 – 2,083 gals = 1042 gals x \$3.00/gal = \$3,126 savings/year in fuel cost

SPB = \$40,000/\$3,126 savings per year = 12.8 years to recover the hybrid differential cost; so “the back of the envelope doesn’t pencil out” since this is longer than the service life of the vehicle, 10 years.

Now, let’s plug these values into a LCCA model. The results are as follows:

Present Value of the Conventional Vehicle Cost over 10 years - \$227,574

Present Value of the Hybrid Vehicle Cost over 10 years - \$201,055

Hybrid Benefit - \$26,519

So, using LCCA, the hybrid vehicle shows a distinctive cost benefit over the conventional vehicle.

The reasons for the bottom-line benefit of the hybrid, using the LCCA, are the cumulative effect of the tax credit, the buy-down incentive, the higher salvage value, and the escalating differential costs for fuel and maintenance. Of course, the numbers we used in the example can all be disputed, but the purpose is to provide an illustration of the different approaches to cost evaluation and how that may affect the decision you make as a fleet manager. Stay tuned for more information concerning LCCA methods in the future.

HTUF 2008 Conference Highlights - *continued from Page 1*

Hybrid Convoy!

More impressive still were the more than 35 heavy hybrid trucks and buses taking part in an exciting convoy at the ride-and-drive site – showcasing the increasing competition and production of hybrids, and the tremendous expansion of engine-chassis-body combinations now available – followed by the biggest ride-and-drive event to date.

In addition, every major truck maker provided product briefings that outlined their new and existing products, from cutaway shuttle buses and delivery vehicles to utility, dump, wrecker and refrigerator units, and even refuse truck and 60-foot bus applications. There were strip chassis versions, straight truck variants galore and an increasing number of hybrid truck tractors for beverage, regional heavy and over the road service.



The U.S. Army also unveiled a new prototype high-speed, light-weight hybrid scout vehicle, the **JAMMA (Joint All-Terrain Modular Mobility Asset)**, emphasizing the dual-use benefits of hybrid systems to the military.

*Above right: ride-and-drive at HTUF 2008 sets new records with 36 vehicles.
Below right: military JAMMA hybrid prototype takes part in hybrid convoy*

Staged in the American manufacturing heartland of Indiana, the HTUF conference highlighted one other key fact: heavy hybrid systems represent a technology at which North American firms are currently the





leaders, and illustrate a market sector model that can retain and create quality jobs, develop needed products for home and for export that save users money, and cut oil imports as well as reduce urban and climate emissions.

Huge Expansion of Platforms, Applications

2008 has seen a huge blossoming of hybrid options that now include most urban work truck applications and an increasing number of applications in heavy hauling duty. As a result, four truck makers have entered some form of low volume early production on hybrid products: Navistar (International Trucks); Kenworth; Peterbilt; and Daimler Trucks North America (Freightliner and Freightliner Custom Chassis). Mack and Volvo are very close. Part of this expansion is owed to a growing number of engine-hybrid system combinations, offering expanded capability in both lighter and heavier applications than was possible just two years ago.

The business case has also improved and the market is starting to grow; though all truck and system makers want to see faster growth to speed improvements, investment and price reductions. While fuel prices are fluctuating as we write, the high diesel prices of the last year and a half, combined with the steady reduction in hybrid incremental cost, helped show fleets a pay back – particularly when evaluated on a life cycle basis, and particularly in high fuel use applications. As incremental prices fall lower, more applications open for hybrid pay back.

Fleet Needs Heard

Much of the discussion by fleets during the two days of briefings focused on three issues: that hybrids in service were reliable and performed well; that they did save significant fuel, particularly when placed in the best applications; and that fleets could start buying a lot more if incremental costs were lower. In the early years, that premium was 50 percent and more.



Top left: Peterbilt Class 8 hybrid tractor
 Middle left: Kenworth Class 7/8 hybrid tractor
 Bottom left: Freightliner M2 hybrid truck
 Bottom right: Navistar Class 7/8 hybrid tractor

Fleets ideally want to see a 20-30 percent premium for hybrids, based on growing production volume. Nearly 500 truck orders were placed this year alone – the first year of any commercial production – and that is expected to more than double each of the coming years, especially with the expansion of product applications and offerings. Good data is now showing that current prices can be brought down to within the fleet “strike zone” with moderate volume

Incentives Discussion

Nonetheless, the importance of early assistance to move the first market was a key topic, kicked off by an incentives panel that outlined progress to date and highly promising work underway to secure a short term (3-5 year in duration) hybrid purchase rebate. The rebate, developed by the HTUF Incentives Working Group, would target funds on half the incremental cost to help first-mover fleets buy greater volumes of trucks and expand the market. HTUF research has shown that the payback – in fuel and other savings – more than justifies purchase with this help. Given expected reductions in incremental cost as volumes rise, this incentive funding is seen as a short-term “kick-start” – not a long term need. However, the session called for an expansion of joint work to secure better incentives if fleets and industry want to speed the introduction of these fuel saving technologies.

Next Step Technologies

The HTUF conference kept an eye on what comes next as well. Though hybrids are the first step into the world of high efficiency truck technology, the manufacturers and suppliers are starting to outline development ideas for technologies that enhance and complement hybrids, including:

- More efficient and smarter operating components to take accessory loads off the main engine;
- Auxiliary power devices and anti-idling systems, such as a electric refrigeration units;
- Engine improvements, including turbo-compounding, camless engines and enhanced thermal energy recovery;
- Better engine- transmission and engine-hybrid matching and optimization; and
- Start-stop engine operation to further cut fuel use.

*From top:
Crane Carrier/Bosch Rexroth hydraulic hybrid refuse truck
Peterbilt/Eaton hydraulic hybrid refuse truck
Azure Dynamics hybrid electric parcel delivery vehicle
Terex/Navistar plug in boom truck*



Maintaining Momentum

The momentum moving forward is significant, both in terms of moving hybrid systems into conventional trucks, and in beginning the transition to more-efficient trucks in general. We are now moving into our first thousand production vehicles, delivered and on order. However, we must increase this production to several thousand and very soon tens of thousands of units per year. Truck makers and system suppliers want to build these new technologies, and have already made substantial investments in the first generation of production-ready hybrid vehicles.

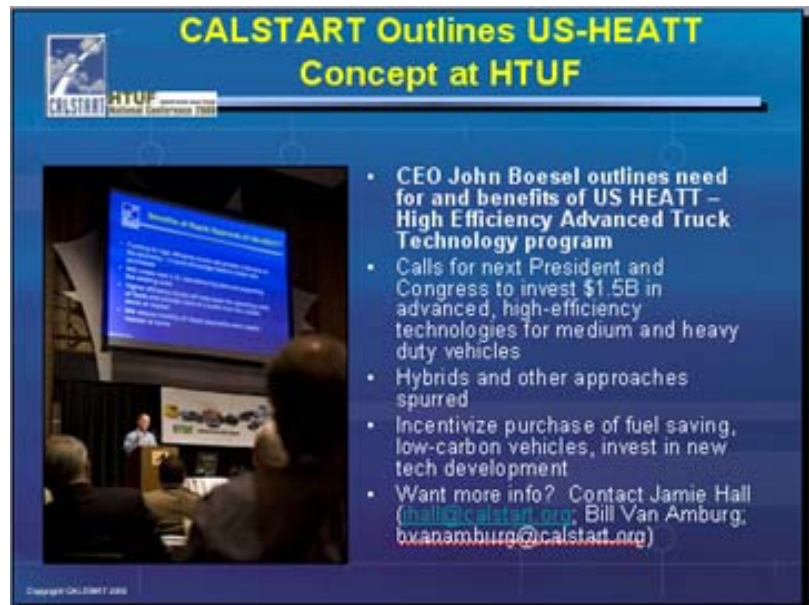
To that end, CALSTART is strongly recommending that national efforts must be enhanced to support this industry and the HTUF efforts to bring hybrid and high-efficiency medium- and heavy-duty vehicles to market. The HTUF Incentive Working Group supports expanded investments in the three core areas needed to commercialize advanced technology:

- consistent and well funded research and development, in new components, systems and capabilities;
- expanded demonstration and assessment of pre-production vehicles with fleets users; and
- longer term purchase incentives to get early production products on the road.

To maintain that momentum as fuel prices fluctuate and the economy weakens, will take an on-going commitment from industry, fleet and government to invest in, support and provide purchase incentives for these efficient, low-emitting trucks and the green jobs they bring to the nation.



Above: NABI/Allison hybrid electric transit bus drives passengers at HTUF



CALSTART Outlines US-HEATT Concept at HTUF

- CEO John Boesel outlines need for and benefits of US HEATT – High Efficiency Advanced Truck Technology program
- Calls for next President and Congress to invest \$1.5B in advanced, high-efficiency technologies for medium and heavy duty vehicles
- Hybrids and other approaches spurred
- Incentivize purchase of fuel saving, low-carbon vehicles, invest in new tech development
- Want more info? Contact Jamie Hall (jhall@calstart.org); Bill Van Amburg; (bvanamburg@calstart.org)

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The Hybrid Truck Users Forum (HTUF) is a North American program to speed the commercialization of heavy-duty hybrid technologies. It is a project operated by CALSTART to assist fleet truck users to identify hybrid requirements and organize joint purchases of early production vehicles. The U.S. Army National Automotive Center (NAC) is CALSTART's partner in HTUF, and the Hewlett Foundation provides support funding, with project support from the Department of Energy (DOE). HTUF focuses on developing the commercial industry through increasing user-driven volumes, ultimately to provide the dual-use hybrid benefits of reduced fuel use, lowered emissions and increased performance.

For HTUF program information, contact:

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