

## World's First Full Hydraulic Hybrid in a Delivery Truck

- The U.S. Environmental Protection Agency (EPA) and its industry partners unveiled an innovative new technology vehicle – the first-ever delivery van with a full series hydraulic hybrid drivetrain in a UPS vehicle.
- EPA is leading the development of hydraulic hybrid vehicles. This breakthrough technology can cost-effectively reduce emissions and drastically reduce fuel consumption while maintaining or improving performance.



- This advanced technology UPS demonstration vehicle achieves:
  - ✓ 60-70% better fuel economy in laboratory tests
  - ✓ 40% or more reduction in carbon dioxide, the primary greenhouse gas
  - ✓ Ability to recoup additional cost for new hydraulic hybrid technology in less than 3 years.

□ In a full hydraulic hybrid, a hydraulic drivetrain replaces the conventional drivetrain and eliminates the need for a conventional transmission. It increases vehicle fuel economy in three ways: it permits the recovery of energy that is otherwise wasted in vehicle braking, it allows the engine to be operated at much more efficient modes, and it enables the engine to be shutoff during many operating conditions such as when the vehicle is decelerating and stopped at a light.

- A delivery vehicle is an excellent application for hybrid technology since its service cycles involve numerous braking events. Hydraulic hybrid technology has significant commercial potential for a wide range of medium-sized vehicles such as urban delivery trucks, shuttle/transit buses, and waste disposal vehicles.

- The organizations that contributed to the development of the UPS demonstration vehicle are: EPA, Eaton Corporation, UPS, International Truck and Engine Corporation, U.S. Army – National Automotive Center, and Morgan-Olson. Major technical support was provided by FEV Engine Technology, Inc. and Southwest Research Institute.



Primary rear drive in EPA's hydraulic hybrid UPS demonstration vehicle

- Eaton Corporation - played a key role with EPA to develop the innovative integrated hydraulic rear-drive used in this UPS package vehicle.
- EPA estimates that the added costs for the hybrid components, produced in high volume, for a package delivery vehicle have the potential to be less than \$7,000, which would be recouped in less than three years by the lower fuel and brake maintenance costs. In today's dollars, the net lifetime savings over this vehicle's typical 20 year lifespan are estimated to be more than \$50,000. If fuel prices continue to increase at a faster rate than inflation, the lifetime savings would be even greater.
- EPA and UPS plan to evaluate the demonstration vehicle in on-the-road service during 2006.
- EPA is developing a second UPS demonstration vehicle in a second phase of this partnership in order to explore the cost effectiveness of a different full hydraulic hybrid system configuration under a variety of load and driving cycle conditions. EPA also plans to install an EPA Clean Diesel Combustion (CDC) engine in the phase 2 vehicle. The CDC engine does not need NOx aftertreatment to achieve 2010 NOx standards.