

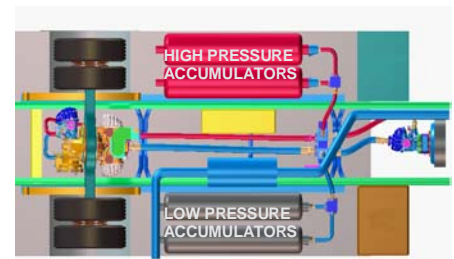
EPA Announces Partnership to Demonstrate World's First Full Hydraulic Hybrid Urban Delivery Vehicle

- The U.S. Environmental Protection Agency (EPA) has announced a new partnership to show the benefits of EPA's full hydraulic hybrid technology for urban pick-up and delivery fleets. This unique technology is based on numerous EPA pioneering hybrid patents.



- EPA and its partner, Eaton Corporation – Fluid Power, will fabricate EPA's new and innovative integrated hydraulic rear-drive for a United Parcel Service (UPS) package vehicle.
 - The members contributing to this exciting partnership include: EPA, Eaton Corporation – Fluid Power, UPS, International Truck and Engine Corporation, U.S. Army – National Automotive Center, and Morgan-Olson.
- Hydraulic hybrid technology that will be used in the UPS demonstration vehicle:
 - ✓ Uses a hydraulic energy storage and propulsion system (versus a battery system in electric hybrids)
 - ✓ Captures and stores a large fraction of the energy normally wasted in vehicle braking
 - ✓ Uses this energy to help propel the vehicle during the next vehicle acceleration
 - ✓ Enables the engine to operate more efficiently when it is needed

- The demonstration UPS package vehicle will include:
 - ✓ Two power sources to operate the vehicle - the EPA Clean Diesel Combustion engine and hydraulic hybrid components
 - ✓ Full hydraulic hybrid technology that replaces the conventional drivetrain with a hydraulic drivetrain and eliminates the need for a transmission
 - ✓ Primary hydraulic components consisting of two hydraulic accumulator vessels, one engine hydraulic pump, and one integrated rear-drive hydraulic pump-motor assembly



Layout –Full Series Hydraulic Hybrid in an Urban Delivery Vehicle

- Clean Diesel Combustion technology is the combination of several innovative improvements in diesel fuel injection system performance, reoptimization and refinement of air management\ turbocharging systems, and an improved combustion system – creating a diesel engine capable of meeting the 2010 NOx standards without NOx aftertreatment.
- The EPA's advanced technology in the UPS demonstration vehicle is targeted to achieve:
 - ✓ 60-70 percent better fuel economy
 - ✓ 2010 heavy-duty vehicle NOx standard
 - ✓ Ability to recoup additional cost for new hydraulic hybrid technology in less than 3 years