FACT SHEET

UPS Alternative Fuel and Advanced Technology Vehicles

UPS operates one of the largest private alternative fuel and advanced technology fleets in the U.S. with more than 8,500 vehicles. This includes all-electric, hybrid electric, hydraulic hybrid, ethanol, compressed natural gas (CNG), liquefied natural gas (LNG), propane, renewable natural gas (RNG)/biomethane, and light-weight fuel-saving composite body vehicles.

In 2016, UPS achieved its goal of driving 1 billion miles in its alternative fuel and advanced technology fleet one year earlier than planned.

UPS takes a rolling laboratory approach to its fleet – replacing vehicles with alternative fuel or advanced technology vehicles whenever possible. Alternate fuel or advanced technologies adopted by UPS must meet the following criteria:

- It’s safe.
- It must have a reliable fueling infrastructure.
- The supply of vehicles and parts must be predictable.
- There is a measurable improvement in emissions and/or fuel savings.
- It must be economically viable in terms of initial purchase price, maintenance costs and reliability and adapt to our fleet use characteristics.

The rolling laboratory approach allows UPS to test prototypes on the road. The company works with manufacturers, government agencies and other stakeholders around the world to pilot projects before new vehicles are ready for commercial deployment.
Compressed Natural Gas (in fleet since 1989)

**How it Works:**
CNG is made by compressing natural gas to less than 1 percent of the volume it occupies at normal atmospheric pressure. It is used in vehicles with engines that have been modified or vehicles manufactured for CNG use.

**Benefits:**
- Natural gas emits 6-11 percent lower levels of greenhouse gas emissions than gasoline throughout the fuel life cycle.
- CNG fuel systems are sealed and produce no evaporative emissions.

**Number and Location:**
1,543 tractor-trailers and 1,795 delivery trucks in the United States (Alabama, Arizona, California, Colorado, Florida, Georgia, Kansas, Kentucky, Louisiana, Nevada, New Mexico, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Virginia and West Virginia); 80 trucks in our international operations (Argentina, Germany, Netherlands and Thailand); UPS operates 31 fueling locations in the United States.

Liquefied Natural Gas (in fleet since 2002)

**How it Works:**
Natural gas is liquefied by reducing the temperature to negative 260 F. In liquid form the gas is condensed to 1/600th of its volume at normal environmental temperatures. This allows for ease of storage and transportation, as well as the ability to carry sufficient volume on the LNG vehicle.

The LNG tractor-trailers use two 150-gallon LNG tanks. This makes LNG an excellent fuel for large trucks that need to travel a long distance before refueling.

**Benefits:**
- Natural gas emits approximately 6-11 percent lower levels of greenhouse gas emissions than gasoline throughout the fuel life cycle.
- Does not compromise performance or drivability.
- Tractor-trailers can have a 600-mile range.

**Number and Location:**
More than 1,350 tractor-trailers in the United States (Arizona, California, Florida, Illinois, Indiana, Mississippi, Missouri, Nevada, Ohio, Pennsylvania, Tennessee, Texas and Utah); UPS operates 15 fueling locations in the United States.
**How it Works:**
Electric vehicles run solely on electricity. They are propelled by one or more electric motors and powered either by rechargeable battery packs or through electricity from off-vehicle sources.

**Benefits:**
- Zero tailpipe emissions.
- Vehicles have a range of up to 75 miles.
- Quieter.

**Number and Location:**
UPS first had electric vehicles in its fleet in the 1930s and reintroduced modern electric vehicles in 2001.

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**Renewable Natural Gas/Biomethane (in fleet since 2012)**

**How it Works:**
Biomethane is a renewable energy source produced from organic waste. It provides a number of environmental benefits by reducing the need for fossil fuels and supporting the capture and use of harmful methane gas. It can be obtained via landfills or by using an anaerobic digester to break down organic waste.

**Benefits:**
- Can travel between 400 and 600 miles.
- Up to 90 percent less carbon than diesel.
- Can be used in any natural gas vehicle.

**Number and Location:**
UPS used 4.6 million gallons of RNG in 2016. UPS also operates 19 tractor-trailers in the UK.

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**Renewable Diesel Fuel (in fleet since 2012)**

**How it Works:**
Renewable Diesel fuel is produced using a hydro-processing refining technology that converts natural fats and oils to a fuel that is chemically equivalent to petroleum-based fuel. Renewable diesel fuel can be made from oils from sources as diverse as restaurant waste, fish, beef, chicken, palm and algae.

**Benefits:**
- Up to 80 percent fewer life cycle carbon emissions than petroleum-based diesel.
- Performs well in cold weather.
- Is a drop-in fuel that can be used in our existing diesel trucks and equipment without modifications.

**Recent announcement:**
In 2015, UPS signed agreements with Solazyme, Inc., Neste Oil and Renewable Energy Group (REG) Synthetic Fuels to secure access to up to 46 million gallons of renewable diesel fuel over the next three years.

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**Electric Vehicles (in fleet since 2001)**

**How it Works:**
Electric vehicles run solely on electricity. They are propelled by one or more electric motors and powered either by rechargeable battery packs or through electricity from off-vehicle sources.

**Benefits:**
- Zero tailpipe emissions.
- Vehicles have a range of up to 75 miles.
- Quieter.

**Number and Location:**
More than 120 delivery trucks in the United States (California, New York and Texas); more than 140 delivery trucks in our international operations (Barbados, Belgium, Canada, France, Germany, Ireland, Japan, Netherlands and the UK).

*UPS first had electric vehicles in its fleet in the 1930s and reintroduced modern electric vehicles in 2001.*
Hybrid Electric Vehicles (in fleet since 1998)

How it Works:
Hybrid electric vehicles (HEVs) combine a conventional internal combustion engine propulsion system with an electric propulsion system. HEVs use efficiency-improving technologies such as regenerative braking, which convert the vehicle’s kinetic energy into electric energy to charge the battery. HEVs reduce idle emissions by shutting down the internal combustion engine at idle and restarting it when needed.

Benefits:
• 200 percent improvement in fuel economy over vehicles they are replacing.
• Quieter.

Number and Location:
500 delivery trucks in the United States (Alabama, Arizona, California, Florida, Georgia, Illinois, Kentucky, Maryland, Minnesota, Mississippi, Nevada, New Jersey, New York, Ohio, Pennsylvania and Texas); 10 in our international operations (Hong Kong, Mexico and the UK).

Hydraulic Hybrid (HHV) (in fleet since 2012)

How it Works:
The HHVs operate on two power sources – a fuel-efficient diesel combustion engine and advanced series hydraulic hybrid. Energy created by the vehicle’s continued braking action is stored in the HHVs’ hydraulic high-pressure accumulator, similar to what is done with electric motors and batteries in a hybrid electric vehicle. When sufficient energy is stored in the accumulator, the HHV will turn off the engine and drive the vehicle using the stored energy to propel the vehicle. This engine-off strategy can reduce up to 90 minutes of engine run time on a typical route. Because the HHVs’ efficiency relies on constant braking, the vehicles are best suited for urban routes, which typically involve frequent stopping and starting.

Benefits:
• Up to 15 percent improved fuel economy.

Number and Location:
91 delivery trucks in the United States (California, Georgia, Illinois and Maryland).

Lightweight Fuel-Saving Composite Vehicles (in fleet since 2012)

How it Works:
Vehicles built with advanced, lightweight materials, such as plastic, help reduce the weight of the vehicle, allowing UPS to use a smaller engine which provides improved fuel efficiency.

Benefits:
• 900 pounds lighter than a conventional vehicle.
• 40 percent improvement in fuel efficiency because they are light duty and use small diesel engines.

Number and Location:
Nearly 400 delivery trucks in the United States.
Propane-Powered Engines (in fleet since 1982)

How it Works:
The propane vehicle technology is similar to a conventional gasoline delivery truck. A standard delivery truck is converted to use propane fuel. As with gasoline, the propane is in a liquid state when it is delivered to the fuel injectors via an electric fuel pump. And like its gasoline counterpart, the propane vehicle’s engine also uses a spark ignition. This makes operation of the propane vehicle virtually identical to a standard gasoline model.

Benefits:
• Growing domestic supply, insulated from market volatility.
• Does not compromise delivery truck’s abilities, fuel economy or drivability.
• Delivery trucks have 100+-mile range.

Number and Location:
More than 1,100 delivery trucks in the United States (California, Colorado, Georgia, Louisiana, Minnesota, North Carolina, Oklahoma, Puerto Rico and Texas); more than 1,110 in our international operations in Canada and Mexico; UPS operates 55 fueling stations.

Ethanol (in fleet since 2011)

How it Works:
Ethanol is a renewable fuel made from corn, sugar cane or other plant materials. E85, a flex fuel, is an ethanol-gasoline blend containing 51 to 83 percent ethanol and is used in specially designed flexible fuel vehicles (FFVs).

Benefits:
• 19 to 86 percent fewer life cycle carbon emissions.

Number and Location:
More than 80 delivery trucks in Brazil.

Cycle Solutions (in fleet since 1998)

How it Works:
From old-fashioned pedal power to electric-assisted bicycles, UPS offers numerous cycle solutions around the world. In some areas, mountain bikes pull a custom trailer which holds 15-20 packages. In other places, UPS uses electric trikes to help combat urban traffic and congestion.

Benefits:
• Zero emissions.
• No fuel consumption. Every three bikes deployed saves 17 gallons of fuel per day.
• Improved maneuverability.

Location:
In the United States (California, Maine, New Hampshire, Oregon, Tennessee, and Washington); In our international operations (Belgium, France, Germany, Ireland and Italy).