



# UPS LNG use & Future Intended Use

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# About UPS

- A global leader in logistics
- Headquartered in Atlanta, serves more than 220 countries and territories worldwide
- 435,000 employees worldwide
- 18 million packages and documents per day
- 32 million packages on Peak Day
- 2014 revenue: \$48.8 billion
- 99,984 vehicles worldwide
- One of the world's largest airlines
- UPS and its employees contributed \$104 million to communities
- Employees gave 1.87 million hours in volunteer service



# Recent Recognition

- Ethisphere Institute – World’s Most Ethical Companies 2014
- Interbrand – Named one of 2014’s Best Global Green Brands
- Dow Jones North American & World Sustainability Indices
- CDP’s “Carbon Disclosure Leadership Index” of S&P companies
- NCOC, Bloomberg, Points of Light – “The Civic 50” 2014 List
- *Corporate Responsibility Magazine* – 100 Best Corporate Citizens in 2014
- Natural Gas Vehicles for America – 2013 Achievement Award
- U.S. Chamber of Commerce Foundation’s Business Civic Leadership Center – UPS named 2013 “Best Corporate Steward”

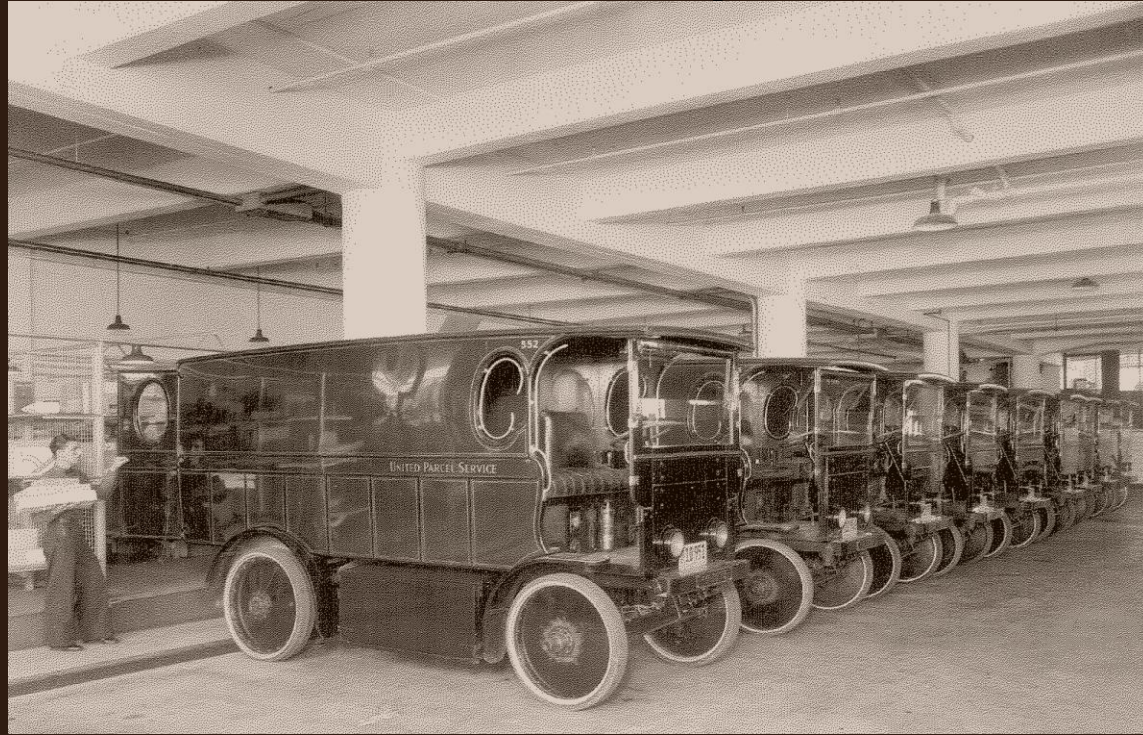


# UPS: No Bias As To Alternative Fuels/Advanced Technologies

- UPS' "rolling laboratory" tests virtually all alternative fuels/advanced technologies with 5,088 vehicles in operation worldwide
- Natural gas – CNG and LNG
- Hydraulic hybrid
- Propane
- Biomethane
- Hybrid electric
- First alternatively-fueled vehicle was all-electric in NYC – 1934
- Fleet to drive 1 billion alternative fuel miles by end of 2017



# UPS Fleet of Plug-in Electric Package Cars, New York City, 1930's





# Alternative Fuel and Advanced Technology Vehicles

Total (U.S. & International): 5,088

## U.S. Small Package Fleet: 4,003

(4.6% of US Small Pkg Fleet)

- Compressed Natural Gas Vehicles: 1,071
- Liquid Natural Gas Vehicles: 1,249
- Hybrid Electric Vehicles: 380
- Electric Vehicles: 102
- Hydraulic Hybrid Vehicles: 41
- Propane Vehicles: 760
- Composite Body Diesel: 400

## Alternative Fuel Stations

- Propane: 11
- CNG: 8
- LNG: 15
- Biomethane: 1



## International Small Package Fleet: 1,085

(7.3% of International Small Pkg Fleet)

- Propane Vehicles: 836
- Compressed Natural Gas Vehicles: 84
- Electric Vehicles: 78
- Ethanol Vehicles: 62
- Biomethane Vehicles: 19
- Hybrid Electric Vehicles: 6

# Planned Global Alternative Fuel and Advanced Technology Vehicles Approved through 2015

## U.S. Small Package Fleet: 6,544

*(7.5% of US Small Pkg Fleet)*

- Compressed Natural Gas Vehicles: 3,091
- Liquid Natural Gas Vehicles: 1,313
- Hybrid Electric Vehicles: 380
- Electric Vehicles: 120
- Hydraulic Hybrid Vehicles: 41
- Propane Vehicles: 1,182
- Composite Body Diesel: 400
- Hydrogen: 17

## Planned Fuel Stations by year end 2015

- |                      |    |              |
|----------------------|----|--------------|
| ■ Propane additions: | 55 | Total of: 66 |
| ■ CNG additions:     | 12 | Total of: 20 |
| ■ LNG additions:     | 0  | Total of: 15 |
| ■ Biomethane:        | 0  | Total of: 1  |



## International Small Package Fleet: 1,301

*(8.8% of International Small Pkg Fleet)*

- Propane Vehicles: 1,019
- Compressed Natural Gas Vehicles: 84
- Electric Vehicles: 111
- Ethanol Vehicles: 62
- Biomethane Vehicles: 19
- Hybrid Electric Vehicles: 6

**Planned Alternative Tech Vehicles (U.S. & International): 7,845**

## Kenworth T800

- Extended Day Cab
- Single Rear Axle
- Fuller 10 Speed Transmission





# Mack CXU632- 12G Cummins

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# Background

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1. There is an abundance of Natural Gas available in North America
2. Liquefied natural gas, or LNG, is natural gas that has been converted to liquid form for ease of storage or transport. .
3. Tractor Manufacturers have been developing tractors in order to utilize natural gas as a transportation fuel.
4. Various incentives (grants and tax) are available to offset some of the capital investment associated with LNG as a transportation fuel.
5. LNG fuel is substantially less expensive than Diesel
6. LNG/CNG fit the UPS sustainability mission



# *Fleet Perspective- The **LNG** experience”*

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## Experiences along the way

**Kenworth & Westport support on initial build was excellent for driver and mechanic training.**

**Good dealer support and network.**





# *Fleet Perspective- The **LNG** experience”*

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## Experiences along the way

### Tractor range was very dependent on:

- Driving skills
- Terrain
- Wind conditions
- Type of trailer combination
- Weight of loads
- Fueling skills of driver
- Conditioning tanks on initial fills





# *Fleet Perspective- The **LNG** experience”*

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## **Experiences along the way**

**LNG shop requirements were difficult to understand.**

**Limited locations to benchmark from.**

**Consultants were needed to move forward with shop designs.**

**Maintenance issues had a steep learning curve.**







# *Fleet Perspective- The **LNG** experience”*

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## **Experiences along the way**

**Very good driver acceptance after initial fear of LNG and a different design of truck.**

**Very good press and media coverage.**





# *Fleet Perspective- The **LNG** experience”*

## **Lessons Learned**

**Internal roles & responsibilities established for:**

- **Driver training**
- **Fueling**
- **Shop requirements & design**
- **Fueling station Maintenance**
- **LNG vehicle,tank inspections & maintenance**
- **Vehicle specific daily usage based on miles run**





# *Fleet Perspective- LNG Fueling stations*

## Public station needs

### Location is everything!

- **Close to main highways**
- **Accessible for long combinations**
- **Reliability of station- quick response & resolution**
- **24/7 operation**
- **Large enough to avoid wait time and congestion**
- **Consistent point of contact**



- Mercedes Axor 18t Euro5
  - Hardstaff gas system (UK)
  - Dual Fuel
    - Biomethan & Diesel
  - Single axle
- Range approx. 600 miles
- Up to 60% gas mix



# High Volume Trailers





# LNG Station – Jacksonville, Florida

- Capacity – 108,000 GGE
- Five (5) tanks
- Four (4) dispensers
- Largest system within the network



# Thank You

