“Alternative Fuel Vehicles at UPS, With Focus on Natural Gas”

Jim Bruce, Sr. VP UPS Corporate Public Affairs
An “All-of-the-Above” Strategy

“As the folks here at UPS understand, we’ve got to have an all-out, all-in, all-of-the-above strategy that develops every source of American energy.”

-Barack Obama, Jan. 26, 2012
What I Want to Leave You With

- Overview of the UPS alternative fuels fleet including natural gas powered vehicles
  - End of 2014
  - Projected end of 2015

- How UPS decides to deploy alternative fuel vehicles: what vehicles and where?

- Why UPS needs such a wide array of types of vehicles

- History of use of natural gas in vehicles and at UPS

- Future challenges for natural gas as a truck fuel

- Other truck issues
Total Alternative Fuel & Technology Vehicles

5,088 total vehicles in service as of 12/31/14

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

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 to Deploy through 2015: 7,781

U.S. Small Package Fleet: 6,480
(7.5% of US Small Pkg Fleet)
- Compressed Natural Gas Vehicles: 3,091
- Liquid Natural Gas Vehicles: 1,249
- Hybrid Electric Vehicles: 380
- Electric Vehicles: 120
- Hydraulic Hybrid Vehicles: 41
- Propane Vehicles: 1,182
- Composite Body Diesel: 400
- Hydrogen Vehicles: 17

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): 7,781
In DELMARVA in 2015

- VA: 117 CNG tractors (Richmond, Roanoke)
- VA: 111 CNG package cars (Richmond, Roanoke)
- What is unusual here – no State incentives
- Virtually all UPS alternative fuel deployments involved federal or state subsidies
- What goes into the decision to deploy – what and where?
Why Does UPS Need Such a Diversity of Vehicle Options?

Environmental Requirements and Prices of Fuel Vary Dramatically Worldwide
Europe

- Increasingly concerned about:
  - air quality emissions
  - noise and congestion
  - expect vehicle operators to contribute to the solutions
  - climate issues

- Extensive Low Emission Zones (LEZ)

- Conventional vehicle access prohibited to parts of the city due to air quality concerns
Paris: World’s Dirtiest Air in March, 2015

Paris’s air pollution: worse than Delhi, India and Peking, China
Urban Access Restrictions in Europe

Legend
- Low Emission Zones
- Major Access Regulation Schemes
Global Emissions Trading Schemes & Carbon Taxes

ETS: Emissions Trading Scheme

Source: The CarbonNeutral Company
Heavy Trucks and Natural Gas

- 1821 1st natural gas well dug 27 feet deep, in NY State by hand with shovels, gas pipeline was hollowed-out logs sealed with tar and rags.

- 1933 Mack introduced the first diesel truck, which swept heavy trucking and diesel displaced gasoline very quickly after World War II.

- UPS began using compressed natural gas (CNG) in delivery vans in 1980’s

- In heavy trucks, there was no viable alternative to diesel until after 2000.

- UPS began using liquid natural gas in 2002 in heavy tractors as CNG lacked range.

- (Sufficient range is now available in CNG tractors due to new storage cylinders)

- Natural gas was cheaper, cleaner, and domestic

- A long road of innovation
1920’s Cutting Edge Car
Further Advances in the 1930’s
Chinese Natural Gas Vehicles: 1980’s
2015 Mack LNG
2015 Kenworth CNG
But Natural Gas Is Still A Fossil Fuel

Potential for Transition to Renewable Fuels?

- UPS will have over 4,400 trucks on natural gas by end of 2015, over half our “rolling laboratory”

- Does not count 64 LNG tractors UPS just announced it will buy for heavy freight division

- Cheap natural gas and government incentives made these vehicle purchases and infrastructure possible

- The next chapter: Renewable Natural Gas (RNG) from “anything that rots”

- Cut carbon emissions by more than 90% --- Why?

- May 5, UPS announces it is buying RNG for 400 package cars in California – 1.5 million gallon equivalents
Other Issues for UPS Trucking

- Environmental:
  - Pope’s encyclical
  - Other groups’ shareholder resolutions
  - Climate change
  - “Drop-in synthetic diesel” -- 2.5 million gallons in 2014

- Highway Trust Fund and the fuel economy penalty of poor infrastructure

- Fuel Efficiency of spark-ignited LNG/CNG Trucks compared to diesel/LNG/CNG dual fuel

- EPA proposed Phase II heavy truck standards
Another Part of Our Rolling Laboratory
– Bikes to Trikes
Back to our Roots?
Thank you.