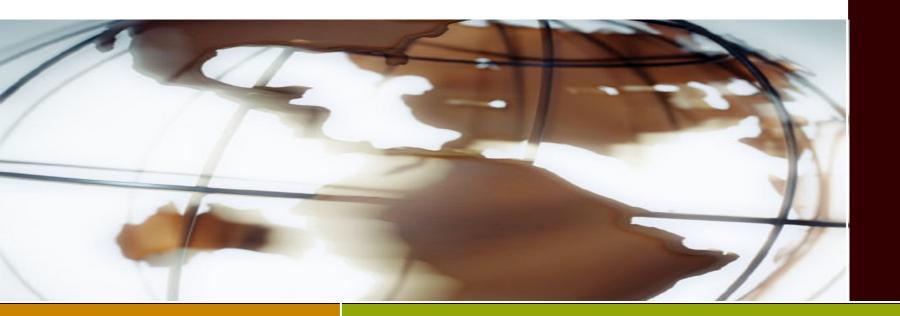
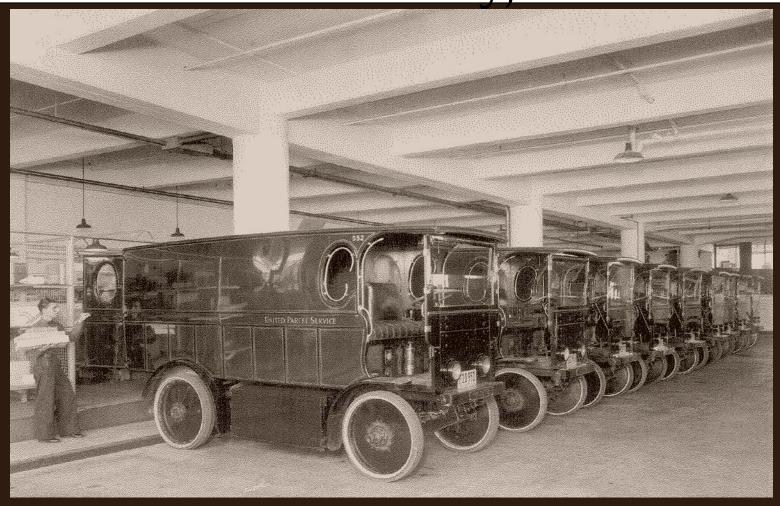
UPS Greening Freight Operations

Mike Britt December, 2016





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





Global Alternative Fuel & Advanced Technology Vehicles

Total Vehicles (U.S. & International):

United States Fleet: 6,483

(7% of US Small Pkg Fleet)

Compressed Natural Gas Vehicles: 3,026

Liquid Natural Gas Vehicles: 1,306

Hybrid Electric Vehicles: 415

Electric Vehicles: 122

Hydraulic Hybrid Vehicles: 41

Propane Vehicles: 1,175

Composite Body Diesel: 398





International Small Package Fleet: 1,267

(8.1% of International Small Pkg Fleet)

Propane Vehicles: 970

Compressed Natural Gas Vehicles: 76

Electric Vehicles: 120

E-Bikes 14

Ethanol Vehicles: 62

Biomethane Vehicles: 19

Hybrid Electric Vehicles: 6



Delivery Concept Hamburg

Sustainable delivery concept in the city of Hamburg





Delivery Concept Hamburg – Project Expansion
Welckersträsse Wedina Espianade Messehallen Lombardsbrücke Raboisen traße. gengeistfeld) Drehbahn Gänsemarkt U Hamburger Brahms Kunsthalle Kontor Binnenalster Hauptbahnhof Nord ADT amburger Planten Hauptbahnhof bendblatt un Blomen Hamburg Hbf (S-Bahn) Anzeigenannahme Alte l allindamin Fliegende Bauten Hamburg Thalia Museum für Hamburg Bei der Stadtwassermüßle Theater Kunst und @ Gewerbe Mönckebergstraße U Bleichenflee U St. Pauli St. Jacobi Rathaus [1] Hamburg S Stadthausbrücke Ludwig-Erhard-Straße Altstädter Straße Steinstraße [I] Hauptkirche St. Michaelis Alter Elbpark Chilehaus Großer 80 Rödingsmarkt (1) STADT Meßberg [I] Amsinckstr Böhmkenstraße Willy-Brandt-Straße Deichtorhallen Dovenfleet Venusberg Grimm Zollkanal Nikolaifleet Hamburg Alsterfleet Landungsbrücken Eichholz Katharinenstraße U Landungsbrücken Banksstraße Wandrahmsfleet BROOKTORKAL ımsschiff (2) Ericusgraben. stadtmuseum (= Rickmers Binnenhafen Vorsetzen Baumwall [1] Brooksfleet

Miniatur (a)

Wunderland



container staging area

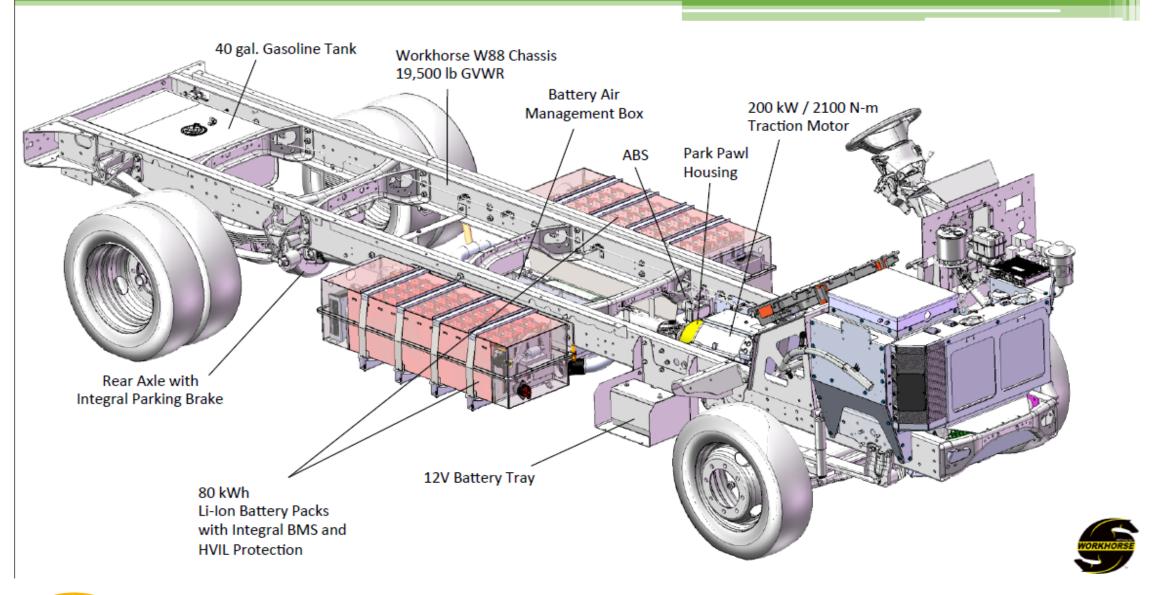
Internationales

Maritimes (2)



Cargo Cruiser





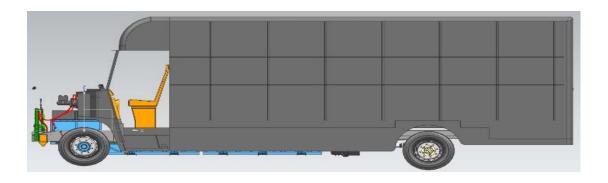


UPS Retrofit Project Overview

■ Scope of Project

- Convert Class 6 Diesel Trucks to Battery Electric
 - Deducted Components:
 - Diesel engine, transmission, driveshaft, fuel tank, exhaust, cooling & radiator
 - Added Components:
 - LiFePO (Lithium Iron Phosphate) Battery packs = 145 kWh 100 mile range
 - Motor 1,106 ft-lbs torque, 180 kW max power, 5,000 rpm
 - Associated electrical components: VTOG, inverters, high voltage distribution
 - 100 kW AC chargers





Electric Vehicles







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US EVI



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UPS Investments Drive Alternative Fuel Market

Diverse Fuel Investments

Since 2009

>\$750 million

global investment

in alternative fuel and advanced technology vehicles and fueling stations

planned by year end

31 CNG sites



LNG sites



Propane sites

64M **(**)

combined gallons (DGE) of natural gas

8M

gallons of Renewable Natural Gas (RNG) substitution gallons of Renewable Diesel (RD)



Kenworth Long Range CNG (HTCTX)

Quantum 180 DGE



Kenworth Long Range CNG (HTCTX)

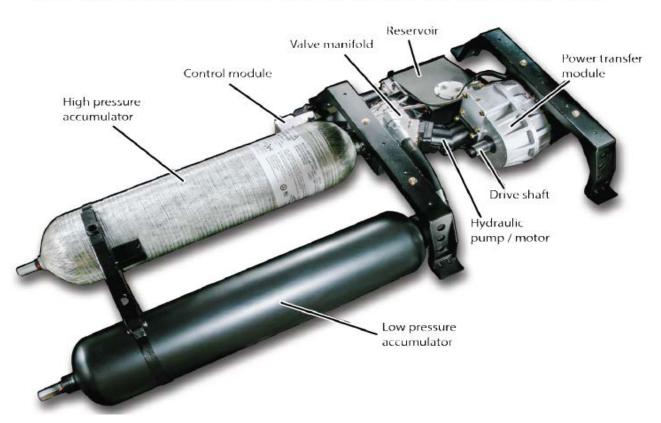
Agility 175 DGE



Lightning Hybrid / Drive Clean Chicago Project

50 conversions will be performed on gasoline package cars in the Metro Chicago area at the Jefferson St. and Bedford Park UPS locations. The retrofits are planned to begin deployment in September 2016.

The Lightning Hybrids Energy Recovery System (ERS)





Thank you

www.sustainability.ups.com

