No More Business as Usual – Surviving and Thriving in a Low Carbon Economy

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1930's

2020+

Trucks Are Essential to the U.S. Economy

- Practically everything moves by truck and ecommerce will accelerate that
- In the absence of rail or water, heavy trucks are the only efficient means of moving goods in rural areas or to urban centers.
- Trucks are now compatible with several alternatives to conventional diesel and gasoline.

Global Alternative Fuel & Advanced Technology Vehicles

Total Vehicles (U.S. & International): 10,445

Hybrid Electric: 688
- **670** Package Cars (US)
- **18** Package Cars (International)

Electric: 437
- **121** Package Cars (US)
- **224** Package Cars (International)
- **66** Electric Bikes (International)
- **6** Electric Bikes (US)

Propane: 2,441
- **1,175** Package Cars, Shifters (US)
- **1,266** Package Cars, Shifters (International)

Hydraulic Hybrid: 69
- **69** Package Cars (US)

Compressed Natural Gas: 5,050
- **4,896** Package Cars, Shifters, Tractors (US)
- **147** Package Cars (International)
- **7** Tractors (International)

Liquid Natural Gas: 1,301
- **1,241** Tractors (US)
- **34** Tractors (International)
- **26** Shifters (US)

Ethanol: 69
- **69** Package Cars (International)

Composite Diesel: 397
- **397** Package Cars (US)

The Carbon Challenge

UPS Globally:

- 100,000+ trucks
- 500+ aircraft
- 1 billion+ gal petroleum annually
- Urban last mile delivery emissions to increase 30% by 2030 (WEF)
- Urban congestion fees, bans on delivery vehicles
- UPS seeks absolute GHG reductions, while growing

CLCPA - NY:

- 40% absolute reduction by 2030 from 1990 baseline
- 85% reduction by 2050
- Net zero emissions through offsets, if compliance otherwise technologically infeasible
- Separate reduction targets for electric sector

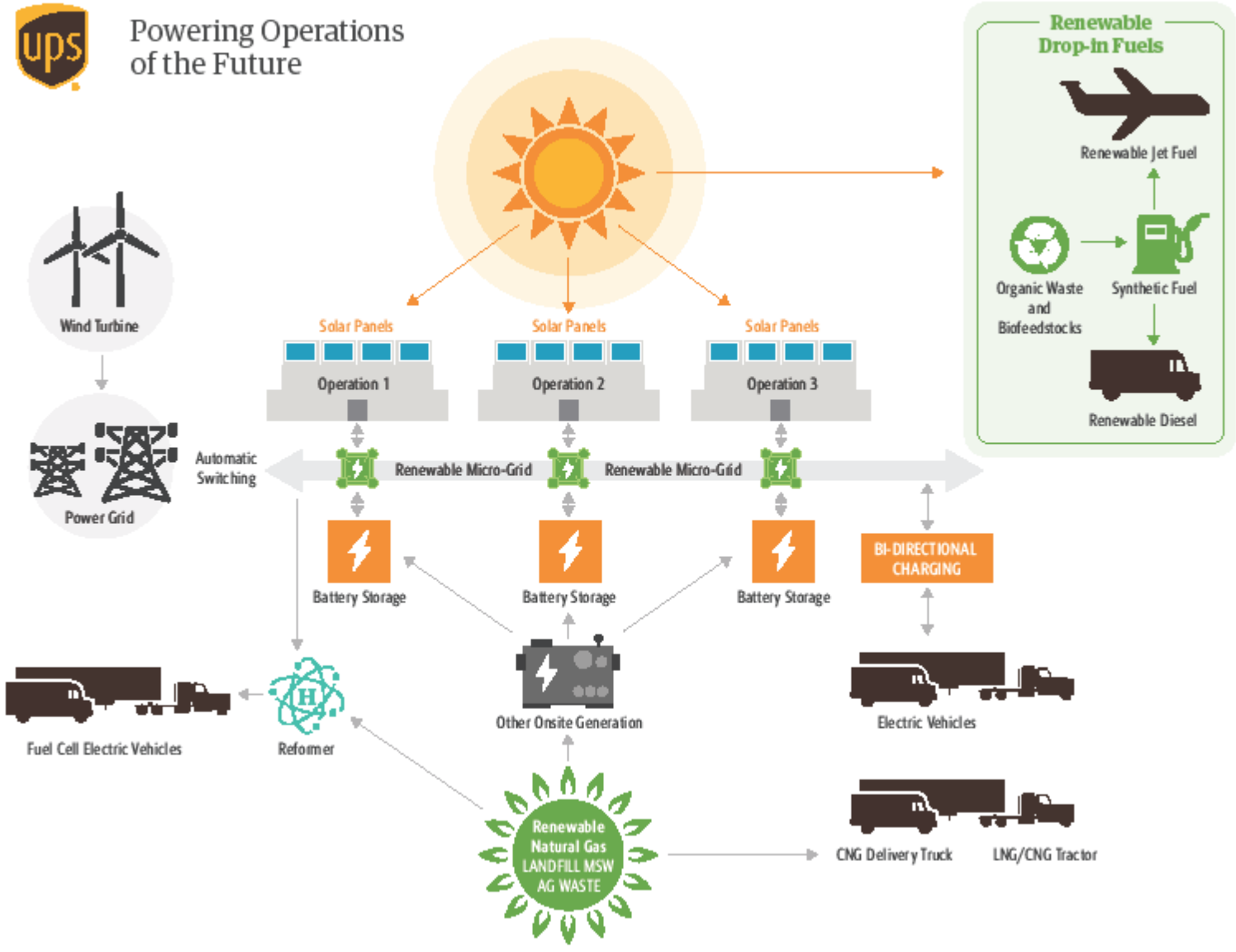
The Fleet Turnover Problem

- Feeder trucks (class 8 semis) last 10 -12 years
- Package delivery vans last 20 years
- We are buying both delivery trucks and feeders today that will still be on the road in 2030, yet we must reduce our carbon by at least 40% by then.
- UPS is buying EVs to test, but nobody has deployed EVs before at scale. The electric infrastructure requirements are unprecedented.
- UPS knows how to deploy at scale, we did it with natural gas (CNG/LNG) trucks.

Deploy EVs At Scale?

- In UPS' view, no medium or heavy duty EV trucks are available today that meet our requirements for deployment at scale in the U.S.
  - Durability testing
  - In-service testing
  - May have 100 or so package cars by mid-2020 for real world testing
  - Test in real world conditions for 6 months to a year
- UPS waiting for vehicles to test, meanwhile we test hybrids in pure electric mode for operational experience
- Once available, the EVs must penetrate the fleet over 10 to 20 years as older trucks are replaced

The EV Infrastructure Challenge



Renewable Fuels Needed for Many Years to Come

- Methane is a powerful GHG.
- Renewable natural gas and renewable diesel can beat EVs on carbon, depending on the grid
- Accommodate long-haul trucking routes in excess of EV range, especially in colder climates.
- CLCPA seeks performance based standards, so appears to recognize RNG
- There are 65,000 trucks on the road today powered by natural gas. All could operate on RNG.
- UPS has 6,000 nat gas trucks, will buy 6,000 more

Incentives Matter for Commercial fleets

- Heavy vehicles consume the highest annual average gallons of fuel consumed per vehicle
- Fleets are generally centrally fueled, so range anxiety and need for remote charging are less critical.
- Financial incentives work with commercial fleets because fleet owners are very sensitive to costs
- Commercial fleets can pave the way for non-commercial vehicle owners
- Vehicle tax credits might accelerate availability
- Relief from congestion fees, special parking incentives

What Federal or State Incentives Could Help on Addressing Climate?

Incentivize investments that appear now as prudent responses to climate change.

- Jump start electrification: heavy/medium duty trucks with tax credits, including FEIT exclusion.
- Incentivize renewable fuels for existing trucks, jets
    - Provide certainty about the future of EPA treatment of renewable natural gas (RINS, etc.)
    - Incentivize renewable diesel fuel

Meanwhile, UPS Is Avoiding GHG Emissions, One Molecule at a Time

- Consolidated package delivery reduces carbon emissions
- Orion – optimal delivery routes
- Coyote – filling empty backhauls
- Electric trikes for last mile delivery
- Solar arrays on our rooftops
- LED upgrades
- Most Urgent delivery? Don't send a truck, send a drone

Future Technology Is Vital, But Not A Given

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