








On the Road to Sustainability: Where Do Electric Trucks Fit In?

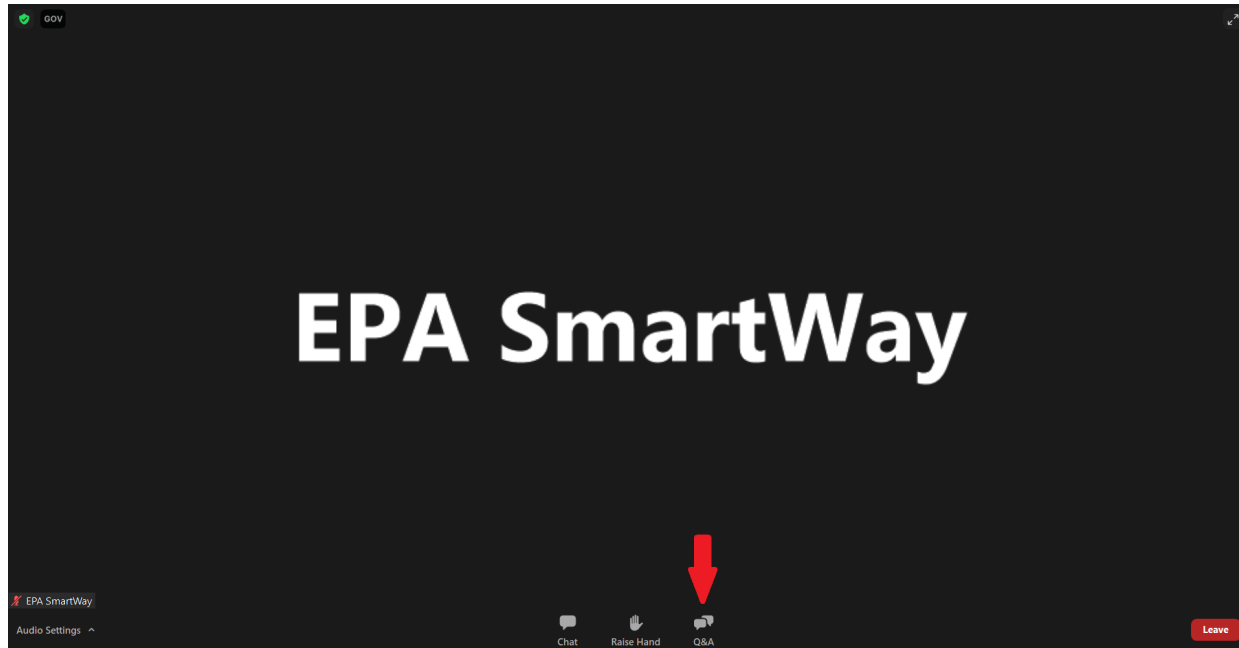


**Denise Kearns,
USEPA, Office of Transportation and Air Quality
SmartWay**



Webinar Housekeeping



-  The presentation slides will be shared after the webinar
-  Today's webinar is being recorded
-  Submit a question or comment via the Q&A pane on your Zoom control panel
-  After the presentation, as time permits, our EPA hosts and presenters will answer questions submitted via the Q&A box
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Date	Type	Event Name
Thursday, April 22, 2021	Education	The Benefits of Freight Railroad Transportation Capacity, Safety & Clean Air!
Wednesday, May 20, 2021	Education	SmartWay Shippers: Submitting Activity Data Gets You More Out of SmartWay!

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Webinar Type	Event Name	Primary Audience
Freight Matters!	Alternative Fuel Adoption Accelerates: Discussion with Penske and GNA	All Partners, General Audience



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On the Road to Sustainability: Where Do Electric Trucks Fit In?



**Denise Kearns,
USEPA, Office of Transportation and Air Quality
SmartWay**

Covered Today

-  Transportation, freight delivery emissions
-  Public health, environmental and economic impacts
-  Vehicle Electrification
 - Light duty
 - Heavy/medium-duty commercial vehicles
-  EPA SmartWay Partners
 - US Foods
 - Watsontown Trucking
 - North American Council for Freight Efficiency

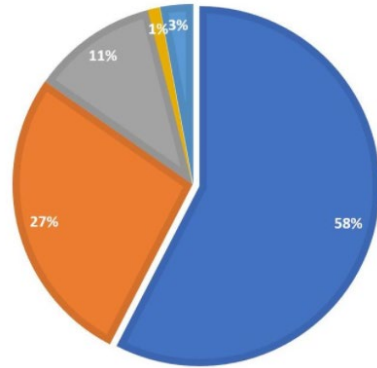


Transportation Emissions

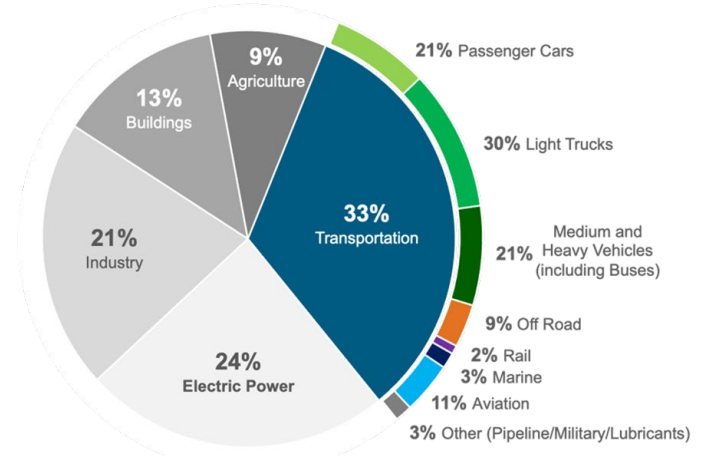


TOTAL NATIONAL NOX EMISSIONS BY SECTOR, 2018

■ Transportation ■ Stationary Source ■ Industrial Processes ■ Waste Disposal and Recycling ■ Other



2019 U.S. GHG Emissions



Aviation and marine include emissions from international aviation and maritime transport. Fractions may not add up to 100% due to rounding.

Transportation

- Largest source of NOx emissions (~60%)
- Largest source of GHG emissions (27%)
- Source of particulate matter, and other harmful emissions

Source: U.S. Environmental Protection Agency

Freight Emissions



- In the transportation sector, onroad HD/MD trucks account for around 50% of NO_x emissions and nearly ¼ of GHG emissions
- Among onroad HD/MD trucks:
 - Heavy-duty, line haul trucks account for around 60% of NO_x emissions; around 65% of GHG emissions
 - Vocational vehicles account for around 20% of GHG emissions
 - Delivery and service vehicles account for around 15% of GHG emissions



Freight emissions: public health, climate and economic impacts

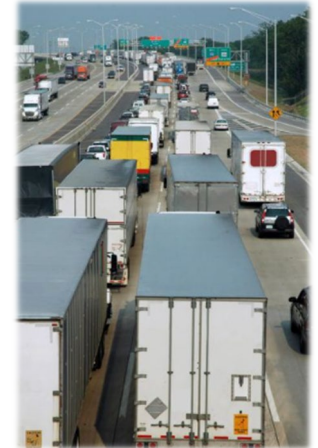


 **Near-port, railyards, inland ports, bus depots, near-road**

- **Criteria pollutants disproportionately impact public health in disadvantaged communities**

 **Weather, drought, flood, fire, and climate impacts on freight networks**

- **Supply chain disruptions**
- **Road, bridge, highway closures**
- **Widespread, +vulnerable communities**



Electricity, other diesel alternatives

- Compressed Natural Gas
- Liquid Natural Gas
- Renewable Diesel
- Renewable Natural Gas
- Electricity
- Hybrid – diesel/electric



Commercial Vehicle Electrification



- Existing electrification programs focus on passenger cars
- Increasing research, development and growth in commercial vehicle electrification
 - Freight emissions growing at faster rate than emissions from passenger vehicles
 - Freight industry seeks to lower fuel costs, improve efficiency, reduce emissions
 - Significant investment in commercial electric vehicles

> 140,000 pending
CBEV orders

> 160 zero-emission
truck models

> 17,700 deployments

~ 80% of deployments
cargo/delivery vans

Source: Calstart, Zeroing in on Zero-Emission Trucks



WE HELP YOU MAKE IT®

US Foods and Fleet Sustainability

Ken Marko, Sr Mgr Fleet Sustainability

Great Food. Made Easy.™ Distribution with Nationwide Presence

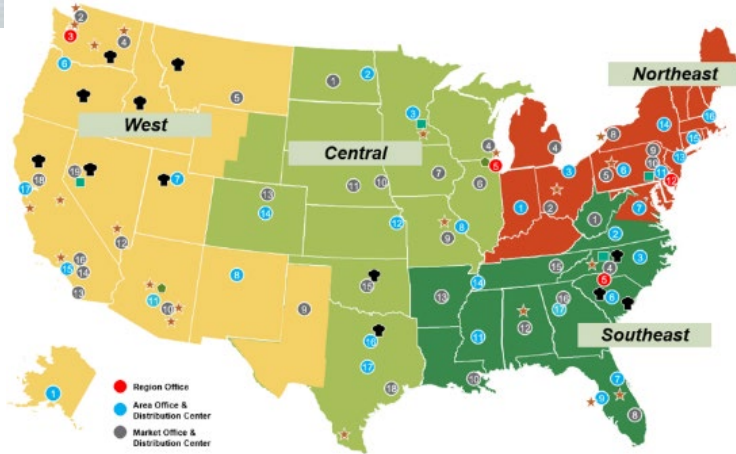


70+
Distribution
Facilities

16,000+
Vehicle
Assets

Offering Distinct Advantages To:

- ✓ Chefs
- ✓ Restauranteurs
- ✓ Foodservice operators
- ✓ Healthcare entities
- ✓ Government facilities
- ✓ Educational institutions



OUR STRATEGY

GREAT FOOD. MADE EASY.

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DELIVERED WITH EXCELLENCE.

We keep our service promise to our customers, safely and efficiently.

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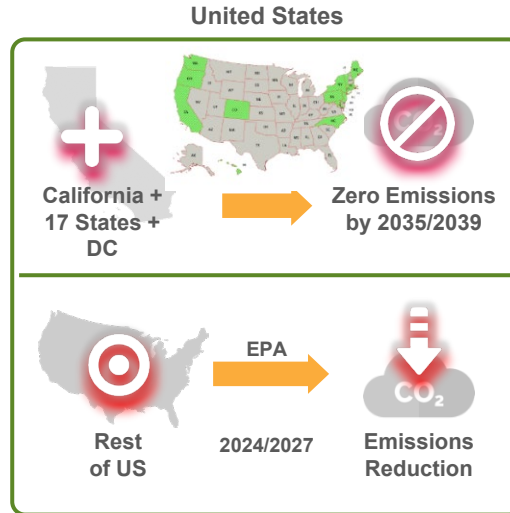
Industry trends are influenced by climate change

New Corporate Sustainability Goals

1,000+ companies have set formal GHG emissions reduction goals with SBTi, including US Foods



Increasing Regulatory Pressure



Growing Customer Demand



US Foods operates one of North America's largest private fleets

Over 16,000+ fleet assets in 70+ locations



Straight Trucks



Tractors



Trailers



Delivery Vans



Yard Tractors

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Fleet Electrification Considerations



Infrastructure Requires Additional Time and Planning



**Strategy
& Planning**



**Deployment
Plan**



**Prelim. Feasibility
& Design**



**Detailed
Engineering**

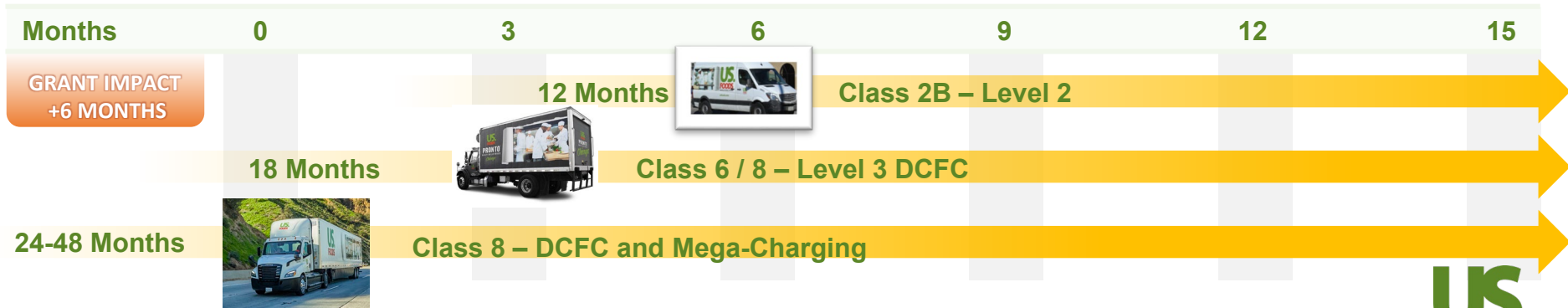


**Construction
& Commissioning**



**Operation
& Maintenance**

Need to begin infrastructure projects now to support future EV's



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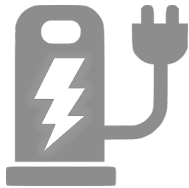


Challenges for Transition to Electrification

Infrastructure

Utilities

- Time of use
- Demand
- Seasonal
- Resilience



**Charging Solutions and
infrastructure timing**



Interoperability

Electric Vehicles



Weight/Payload



COST

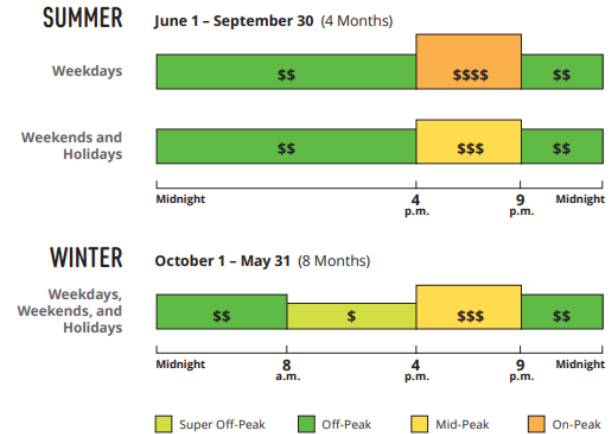


Range Capability

Charging rates and schedules

- Charge trucks fast enough to ensure they are charged when shift begins
- Focus charging when rates are lowest
- Consider demand charges

NEW STANDARD TIME-OF-USE (TOU) PERIODS March 2019



Holidays are New Year's Day, President's Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, and Christmas. When any holiday falls on a Sunday, the following Monday will be recognized as a holiday. However, no change will be made for holidays falling on a Saturday.

Example of a US Foods fleet electrification project in a disadvantage community in La Mirada, CA

Introduced Electric Vehicles:

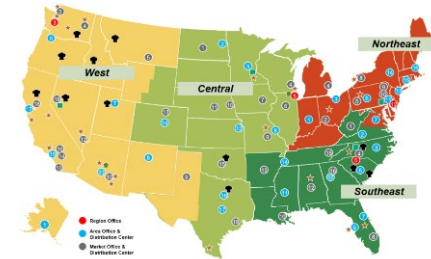
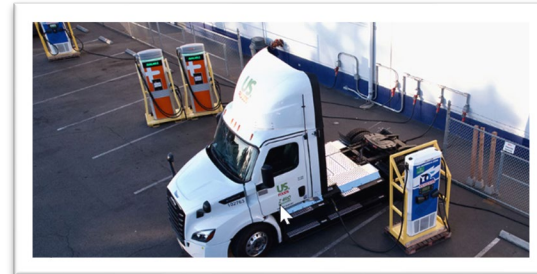
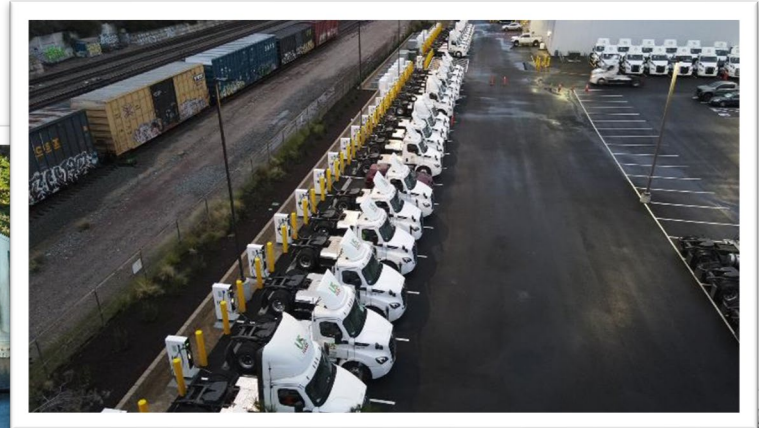
- (40) Class 8 tractors
- (8) Yard tractors
- (4) Vans

Added Infrastructure/EVSE*:

- Portable charging initially
- 3 MW electricity service
- DC fast charging stations

Electric Tractor Performance:

- Estimated range = 230 miles
- **Total – 200,000+ miles**
- Reduced scope 1 GHG emissions



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**US.
FOODS**

**Electric Vehicle Supply Equipment or Charging Stations*

US Foods' First Electric Vehicles and EVSE



Electric Vehicles are Performing

Successes

- Drivers prefer EV's
- EV range capability is less than diesel but acceptable for regional delivery applications
- Portable charging is helpful to early deployment success
- Electric vehicles and charging technology is improving

Challenges

- It takes too long for grid power to be delivered and for charging infrastructure to be installed
- Collaboration of industry stakeholders to achieve grid capacity expansion necessary
- The industry needs cost and weight reduction to improve total cost of ownership

Final Thoughts

- Regulations and corporate sustainability goals driving change
- Entire electric truck ecosystem collaboration is essential for an effective transformation





Ken Marko

US Foods, Inc

Ken.Marko@USFoods.com



THE
PATTON
LOGISTICS GROUP



The Patton Logistics Group

WatsonTown Trucking Company- Patton Logistics- Patton Warehousing



- 83 Years in Business
- Family Owned and Operated
- 100% Asset Based
- 500 Tractors
- 1500 Vans, 100 Open-Top Vans, 55 Flatbeds
- Operating throughout the U.S. and Canada
- SmartWay Approved Carrier
- FMCSA Satisfactory Safety Rating



The Patton Logistics Group

Watson Trucking Company- Patton Logistics- Patton Warehousing
Sustainability



Diesel truck fleet operation

Milton, PA to Chicago, IL 625 miles

Chicago, IL to Dallas, TX 925 miles

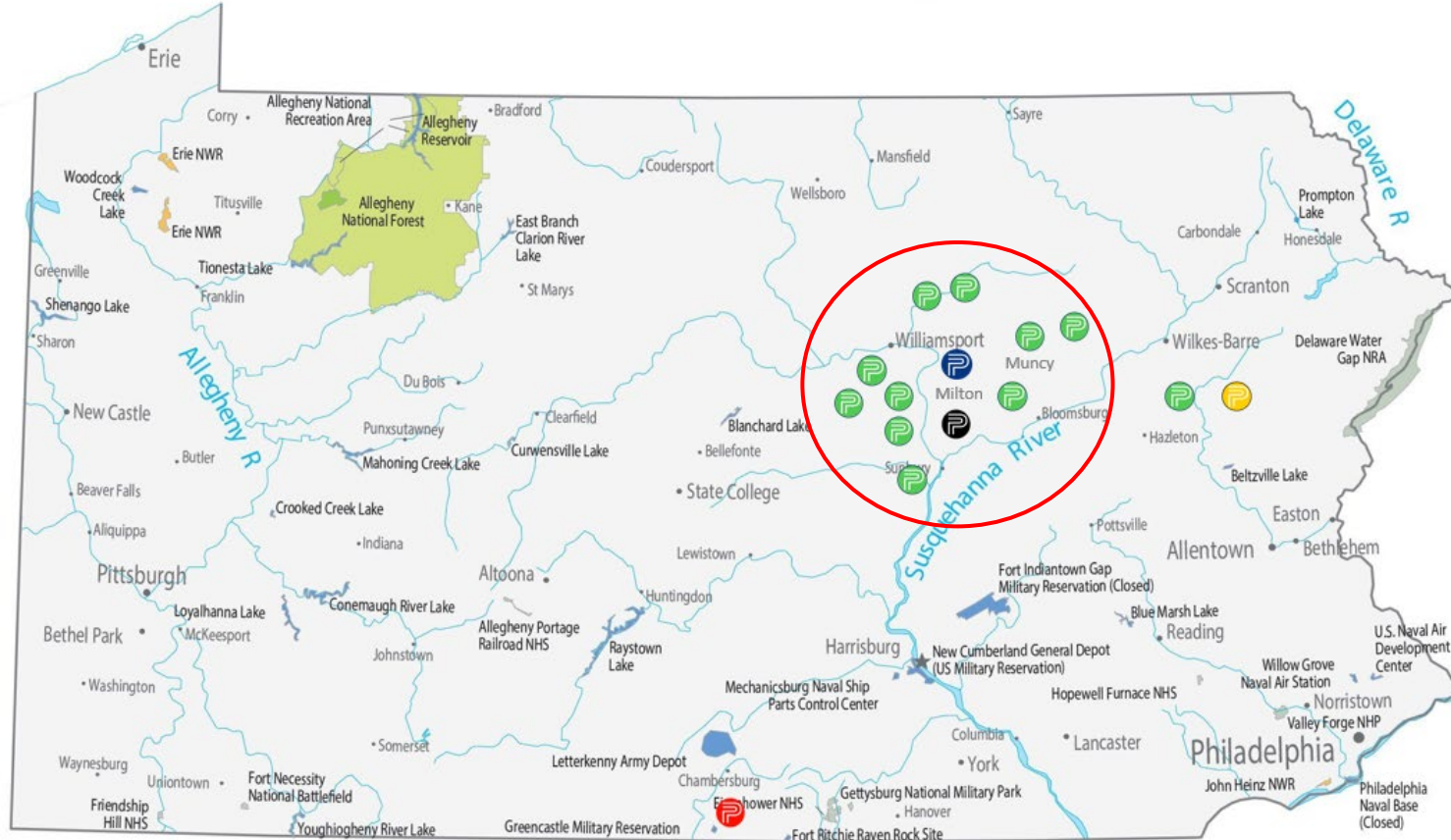
Dallas, TX to Charlotte, NC 1,025 miles

Charlotte, NC to Milton, PA 540 miles

Total miles: 3,115

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Sustainability



Electric truck fleet operation

Milton, PA to Williamsport, PA round trip 60 miles

Milton, PA to Bloomsburg, PA round trip 70 miles

Milton, PA to Gratz, PA round trip 80 miles

The Patton Logistics Group

Watsonstown Trucking Company- Patton Logistics- Patton Warehousing
Patton Logistics Group – Company Strategy



Established BEV flow Dublin, VA



- Truck components for a nearby assembly plant are stored at the Patton Warehouse in Dublin, VA.

- The components are sequenced and loaded onto Watsonstown Trucking trailers.

- Watsonstown's 5 BEV trucks deliver the sequenced parts directly to the assembly line 7 miles away.

- The five trucks reduce CO2 emissions by over 225 metric tons annually.

The Patton Logistics Group

Watsonstown Trucking Company- Patton Logistics- Patton Warehousing
Sustainability



Trucking company awarded nearly \$1.8M to convert trucks to electric

By Rick Dandes

rdandes@dailyitem.com

MILTON — Watsonstown Trucking was awarded nearly \$1,799,620 through a state grant by the Pennsylvania Department of Environmental Protection to replace zero-emission vehicles and add charging stations at its Milton facility.

Watsonstown Trucking was one of 16 applicants receiving awards as a part of the 20222023 \$39.6 million Medium and Heavy-Duty Zero-Emission Vehicle Pilot Grant.

The grant initiative targets diesel fleets of medium and heavy-duty freight and port drayage trucks, which are used to move seaport freight containers.

“We have been working with the state for about nine months on an application for the grant,” said Steve Patton, president of Patton Logistics. “I am very thankful to the state of Pennsylvania for awarding the grant to us and recognizing the commitment we have in reducing our carbon footprint and we are anxious to get this project started and get the trucks on the road locally.”

The company will replace five eligible Class 8 freight trucks and install two fast EV charging stations, according to information provided by the grant program.

Future electric fleet

In the summer of 2024 WTC will expand it’s BEV fleet into Pennsylvania and North Carolina.

With the help from Pennsylvania’s “Driving PA forward” grant, WTC will be purchasing three Volvo BEV tractors and two Autocar yard trucks.

The grant preparation process involved an extensive amount of research and operational planning over a nine month period. WTC identified shuttle operations that would have the greatest impact in Pennsylvania’s “environmental justice areas”. Removing 5 diesel trucks and replacing them with 5 electric trucks in these areas was a key component in Pennsylvania’s decision to award our company the grant.

WTC must provide detailed information for several key metrics to the state of Pennsylvania over the next 5 years concerning the work performed and the impact the electric trucks have during their operation.

Miles traveled

Fuel saved

Charging Kw/hr

CO2 reduction

The Patton Logistics Group

Watsonstown Trucking Company- Patton Logistics- Patton Warehousing
Patton Logistics Group – Company Strategy



Monthly cost differences between diesel and electric

Example of a shuttle operation where a truck travels approximately 170 miles daily over two shifts.

	Diesel	Electric
New truck with warranty	\$170,000	\$540,000
Life span (years)	9	6
Salvage value	\$20,000	\$0
Interest rate over 5 years	6%	6%
	Monthly costs	
Depreciation	\$1,825	\$8,699
Maintenance	\$1,325	\$895
Diesel Fuel	\$2,065	\$0
DEF	\$43	\$0
Charging station	\$0	\$575
Charging costs	\$0	\$735
Total monthly cost	\$5,258	\$10,904

The Patton Logistics Group

WatsonTown Trucking Company- Patton Logistics- Patton Warehousing
Sustainability



Driver Feedback

Pros:

- Some drivers like the instant torque because it feels like the truck pulls in some ways stronger than the diesel.
- There is no up shift or down shift which allows the electric to have instant steady power.
- The turn radius on the EV's is better than the diesel because of the raised tag axle.
- Because of the turning radius and instant torque/power, backing seems to be a little better than a diesel. (Easier to navigate and maneuver)
- The electric truck is very quiet compared to the diesel and combined with a smoother ride it creates a less stressful working environment.

Cons:

- Because of the high torque and single drive axle, traction in weather (snow) does not perform as well.
- The EV charge will not last an entire shift.



EV DEPOTS: Run on Less 2023

March 2024

Dave Schaller

Industry Engagement Director



Run on Less - Electric DEPOT 2023

- 10 fleet locations
- Each has at least 15 electric trucks
- Many had more
- Fleet videos
- Telematics data

All information at:
RunOnLess.com



Run on Less Electric DEPOT BEVs



RUN ON LESS – ELECTRIC DEPOT

WHAT IS IT?

BOOTCAMP

DEPOT
VISITS
PROFILES

DASHBOARD
DATA

STORIES
FROM
THE RUN

A real-world focus on
early electric truck deployments
in urban and
regional haul operations.

INDUSTRY
EVENTS

FINDINGS

DETAILED
REPORTS
IN 2024

Pepsi: Sacramento CA

Long Haul & City Delivery with Tesla Semis



- 21 Teslas (3 LH & 18 City)
- LH Beverages: 250-450 miles/day
- City Beverages: < 75 miles/day
- 4 Tesla 750 kW chargers
- Sacramento Municipal Utility District



Schneider: S El Monte CA

Fast 100% EV Conversion in Slip Seat Operation



- 82 Freightliner eCascadias
- 16 dual cable 350 kW chargers
- Multi-shift operations (“slip seat”)
- Multiple stop intermodal chassis drop and hook
- 5 MW from Southern Cal Edison

NACFE estimate: up to **44 MWh per day** for the 82 trucks (charging all day long)

Metrics

SELECT DAY: Day 13
 SELECT DEPOT: Performance Team (Commercial)
 SELECT TRUCK: VNR 2
 SELECT UNITS: US
 UPDATE

DATA FOR VNR 2



Total Miles **144** Average Miles/Day **144**

Estimated Deliveries **4** Average Deliveries/Day **4**

Battery Charge (%) & Speed (mph)



Battery Charge (%) & Distance (mi)



Truck Activity



Distance By Speed



Energy In



Energy Out



DATA at RunOnLess.com!

Select:

- 1) Fleet
- 2) Truck
- 3) Day
- 4) Units of Measure

New RH Metrics

- Tesla Semi at Pepsi
- Sacramento CA depot
- 1076 miles (1,732 kilometers) in 24 hours
- 5 deliveries
- Three charging sessions
- Some regenerative braking
- Most of the day above 50 MPH = 80.5 KPH (55 MPH/88.5 KPH speed limit in California)

November 2023



Total Miles **1076** Average Miles/Day **1076**

Estimated Deliveries **1** Average Deliveries/Day **1**

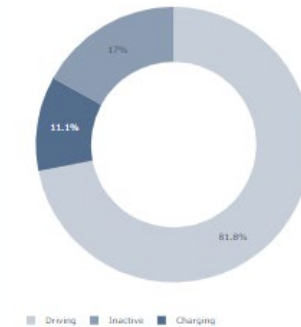
Battery Charge (%) & Speed (mph)



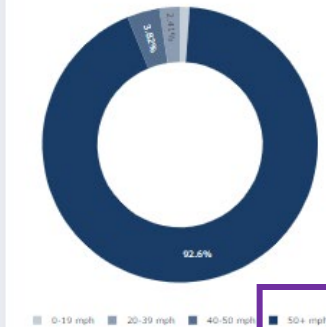
Battery Charge (%) & Distance (mi)



Truck Activity



Distance By Speed



Energy In



Energy Out





**COMMERCIAL
EV MARKET**

**5.2M electrifiable trucks
saving 100M MT CO2E*
still valid**
(Excluding long haul)

*2021 Run on Less - Electric infographic

121
candidates
representing
5200 EVs

10

Depots

operating 850 trucks in total

- 291 EVs
- 1044 MWh of power used
- 39 speakers in Bootcamp
- 139 chargers
- 446,831 miles traveled
- 122 interviews at depots

ROL-E DEPOT REPRESENTS THIS MARKET.

8 Charger
Companies

5
Utilities

11
OEMs



Total power
needed if all
trucks at all 10
depots were
electric

214

MWh
per day





ENERGIZING
THE SITES
TAKES
TOO LONG



AARGH!

Due diligence is needed to ensure
reliability of power and to avoid brownouts.

For the 10
depots in the
Run it took...

9 to 36
months

to energize the
infrastructure



TEMPORARY/
PORTABLE
CHARGERS CAN
HELP

Trucks are
arriving before
charging is in
place, sometimes
months earlier.



Large Power Demand

Small depots require less, but power
is a significant issue for medium or
large energy depots.

Roadblocks to Energizing

Site planning, utility approvals, site
permitting, etc. all contributing to
too much time to energize the depots.



UTILITIES MUST
SHORTEN
ENERGIZING
TIMELINES

TACTICS TO MITIGATE INCLUDE:

- Use a consultant with experience
- Add an early phase to get started
- But, get to 100% complete electrification quickly and possibly in a single effort

Small depots are ready for electrification now and electrification at large depots is gaining momentum.



There have been big improvements in trucks and chargers since Run on Less - Electric in 2021.

The industry needs cost and weight reductions to improve the total cost of ownership.



It's still taking too long for power to be delivered and infrastructure to be installed which is driving the use of portable/temporary charging.



GULP

FINDINGS

Range can be extended with multiple charges per shift at the depot and en route.

The diversity, passion and capability of the people involved is helping to scale electric trucks.

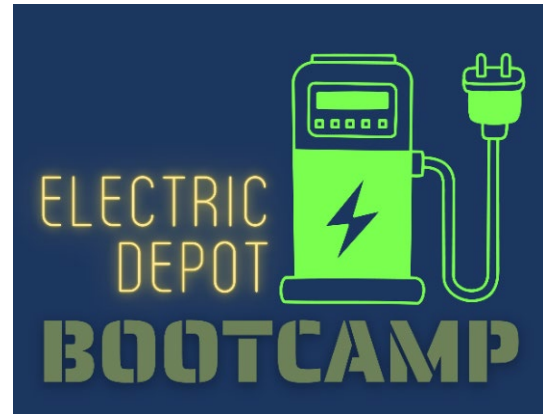


DEPOTS Electric Truck Bootcamp

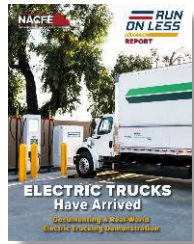
1. Best Practices for Utility-Fleet Relationships
2. Grants and Incentives for the Trucks and Infrastructure
3. Electric Truck Developments
4. Faster Charging — Opportunities and Challenges at 350KW and higher
5. Opportunities to Extend BEV Range (via charging technologies)
6. Electricity Resiliency and Availability (microgrids, renewable energy...)
7. Current and Future Regulations for Zero Emission Trucks
8. Managed Charging to Improve Availability, Cost and Range
9. Scaling Charging Infrastructure Equipment
10. Electric Depot Site Planning and Construction



Available at RunOnLess.com – click on [Bootcamp](#)



Key NACFE Reports on ZEV Trucks

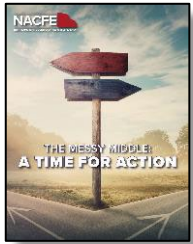


Jan 2022
Review Of Demonstration:
[Electric Trucks Have Arrived](#)

MD BOX TRUCKS NACFE
Market Segment & Fleet Profile Fact Sheet

General Characteristics	
Segment:	Medium-Duty
Use Case:	PKA, B, D, E, Haul
Average Range:	100-150 miles
Make:	Various
Trailer:	Conventional
Miles per gallon:	100
Replacement Cycle:	3-5
Average Age:	6.4
Sub-Categories:	25

[4 Market Segment Fact Sheets](#)



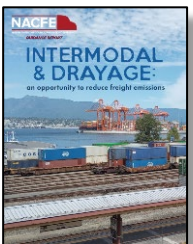
Feb 2023
[The Messy Middle: A Time For Action](#)



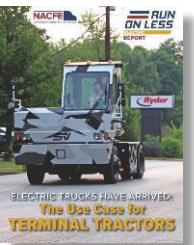
Dec 2020
[Making Sense of Heavy Duty Hydrogen Fuel Cell Tractors](#)



Apr 2023
[Hydrogen Trucks: Long-Hauls Future?](#)



Dec 2023
[Intermodal & Drayage](#)



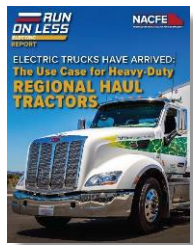
Mar 2022
The Use Case For
[Terminal Tractors](#)



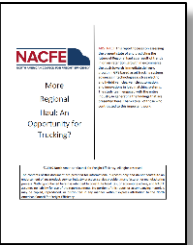
Apr 2022
The Use Case For
[Vans & Step Vans](#)



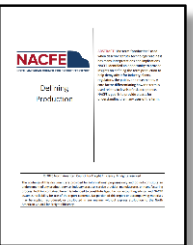
Jun 2022
The Use Case For
[Medium Duty Box Trucks](#)



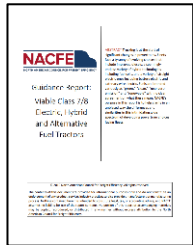
May 2022
The Use Case For
[Regional Haul Tractors](#)



Apr 2019
[More Regional Haul: An Opportunity for Trucking?](#)



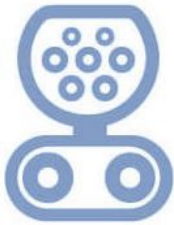
Jan 2020
[Defining Production](#)



Dec 2019
[Viable Class 7/8 Electric, Hybrid and Alternative Fuel Tractors](#)



CCS1



CCS2



NACS/Tesla



MCS or CharIN



[NACFE.org](https://www.nacfe.org)

**Let's Stay Connected...
...and Charged Up!**



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