Energize Your Fleet:
Save Money, Improve Health
and Protect the Environment

Welcome!
Objectives

- Fleet electrification is good for business, but complex!
  - Webinar series & educational forum
  - Share best practices
Speakers

BEN MOORE
SUSTAINABILITY LEADER
RS&H

WANDA FORREST
CLEAN FUELS COORDINATOR
NORTH FLORIDA TPO

GREG HOLZMEYER
VP & GENERAL MANAGER
NORTH FLORIDA SALES SALES

ALEX VOETS
eMOBILITY MANAGER
DAIMLER

DAVE MCKEE
ELECTRIFICATION PROGRAM MANAGER
JEA
Participate

- Type your questions into the comment box at any time

- Your questions will be answered during Q&A
- Webinar materials will be available at NorthFloridaCleanFuels.com
- Not pre-registered? Provide contact info below survey to receive follow-up and future announcements
Agenda

- Introduction
  - Wanda Forrest, North Florida TPO
  - Dave McKee, JEA

- Why EVs and How Do I Fit In?
  - Ben Moore, RS&H

- What EVs Can I Use?
  - Alex Voets, Daimler

- EV Case Study
  - Greg Holzmeyer, North Florida Sales

- Q&A
North Florida Clean Fuels Coalition

- Alternative Fuels Masterplan (2013)
- $6.5M infrastructure & vehicle projects including 40 level 2 charging stations (2013 – Present)
- TPO North Florida Clean Fuels coalition designated by DOE (2016)
- Alternative Fuel Corridors FHWA designation (2016)
- Clay & Nassau counties feasibility assessments (2017-18)
- Alternative fuel infrastructure gap analysis (2019)
- Fleet electrification support (2020)
Why Electric Vehicles?

Business Benefits
Ben Moore
Sustainability Leader
RS&H
Why EVs? - Trends

- 1,800+ PHEVs & EVs in North Florida (2019)
- 49% sales growth (2019)
- 10% - 58% of all sales by 2040 (light duty)

Sources: EIA AEO 2017-2020 (Low); BNEF 2020 (High)
Why EVs? – Triple Bottom Line Benefits

Drive Clean

Drive Happy

Drive Efficient
Why EVs? – Drive Clean

- GHG Emissions
  - Transportation #1 source of GHGs in US (US EPA)
  - EVs cut GHGs 50% or more (IEA, 2020)

- Air Quality
  - Transportation major source of smog, soot that negatively affect health (US EPA)
  - EVs reduce environmental damages by 50% or more (Shindell 2015)

- Water Quality
  - Florida leads nation in underground fuel tanks awaiting cleanup (TBT 2018)
  - No spill / contamination risk (fuel, fluids, etc.) from EVs
Why EVs? – Drive Happy

- Freight Demand Growth
  - 36% more delivery vehicles by 2030 (WEF 2020)

- Worker Health and Safety
  - Quiet, No fumes, No vibration
  - Decreased fatigue, Increased retention

- Brand Enhancement
  - Corporate Electric Vehicle Alliance
    - Amazon – Purchasing 100,000 EVs
    - Clif Bar – 100% EV fleet by 2030; incentivized 700+ employee EVs / HEVs
  - Smart Cities
    - City of Columbus (OH) Smart Cities – 300 EVs by end of year
Why EVs? – Drive Efficient

- **Fuel Economy**
  - EVs 50%+ more efficient

- **Operating Costs**
  - Lower fuel costs
  - Lower maintenance costs (2000 moving parts vs. 20)
  - Reduced downtime (Emissions systems #1 case now)

- **Price Volatility**
  - Diesel / gas higher risk

- **Incentives**
  - Tax, Utility, Grants
Upfront cost parity
- Light Duty (LD): w/in ~5 years (ICCT 2019)
- Medium / Heavy Duty (MD / HD): 5-10 years (Atlas 2020)

Total cost of ownership (TCO)
- LDs (ICCT 2019)
  - All EVs (cars, SUVs) 5-year TCO lower by 2022 – 2025
- MD / HD (Atlas 2020):
  - EVs lowest w/ “depot charging”
  - Incentives important, but not always necessary

Intangible costs / benefits often excluded from TCO
### Why EVs? - Parity to Diesel

#### Now - 2025

<table>
<thead>
<tr>
<th>Category</th>
<th>NOW</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
<th>BEYOND</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tare Weight</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>Typical Freight Weight</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>Max Freight Weight</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial Cost</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>Net After All Factors</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>Operating Cost</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>Residual Value Used Market</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>Residual Value Salvage/Reconditioning</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>Maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service Center</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>Remote Diagnostics</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>Breakdown Recovery</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>10-Year Service Life</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>Max Life Before Obsolete</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical Daily Range</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>Max Daily Range</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>Security</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yard &quot;Fueling&quot;</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>Truck Stop &quot;Fueling&quot;</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>&quot;Fuel&quot; Pump</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>&quot;Turn&quot; Time</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>General</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall Technology Maturity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>Safety</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td>Parity</td>
<td></td>
</tr>
</tbody>
</table>

Key: Comparison to "Parity" Diesel Alternative

- **NOW**: Now
- **Parity**: Parity
- **Beyond**: Beyond
Fueling Shifts Locations Duty Cycle Drive Cycle Routes Change 
Shifts Size
Where Do I Fit In? – Duty / Drive Cycle

- **Duty Cycle**
  - Performance is based on the duty cycle; duty cycles can be unique
  - Can you use telematics to understand performance and fine tune EV use?
  - Mixed fleets: match fuel to duty cycle

- **Drive Cycle**
  - “Light”: bigger batteries, lower depth of recharge, slower charging
  - “Heavy”: bigger batteries, high depth of recharge, faster charging needed
Where Do I Fit In? – Locations / Routes

- **Routes**
  - Well-defined repetitive routes under 100 miles
  - Random, multipoint, long routes

- **Locations**
  - Do vehicles always come back to the same location?
  - Is flexibility required?
Where Do I Fit In? – Shifts / Fueling

- **Shifts**
  - Single Shift
  - Dual drive / team driver / slip seating

- **Fueling**
  - Timing & Labor
    - 1-2 times per week vs. daily
    - 5 minutes vs. ½ hr – several hours
  - Time(s) of Day
    - Nighttime?
    - Daytime?
    - Multiple times per day?
Where Do I Fit In? – Size / Change Mgt.

- Fleet Size
  - Large: more resources (business planning, internal testing, access to grants)
  - Small: less resources?

- Change Management
  - Learning curve for new technology / change
    - *Can expectations be moderated?*
    - *Will drivers, maintenance staff, managers withhold judgement?*
Where Do I Fit In? – Operations

ICE vs EV: Silos vs Interdependence

Vehicles
Fuels
Facilities

Source: Mike Rowand, Duke Energy
What Ev’s can I use?

VENDOR PERSPECTIVES
Alex Voets
eMobility Manager
Daimler
Agenda

GAINING KNOWLEDGE
Co-creation of Innovation Fleet

PUTTING CUSTOMER READINESS TO THE TEST
Customer Experience (CX) Fleet

SERIES PRODUCTION
Freightliner Electric Trucks at scale out of our established Portland Truck Manufacturing Plant

Alexander Voets / eMobility Sales and Marketing Manager / September 2020
From Diesel to eTruck: the Impact of Electrification

Powertrain: Engine Transmissions ATS

Drive Line

Diesel tanks

Electric Auxiliaries

ICE TO BEV

eAxle

Batteries

Alexander Voets / eMobility Sales and Marketing Manager / September 2020
Freightliner Electric Innovation Fleet

- 30 fully battery-electric medium-duty and heavy-duty trucks; 20 eCascadias and 10 eM2
- Putting electric trucks to the test: Real Customers, Real Routes, Real Freight
- Collaboration and Learning
Learnings and Driver Feedback

“This thing is whisper quiet, I don’t need to crank my radio up”

“I don’t smell like diesel”

“Other drivers ask about it – they can’t believe it”

“I love the regenerative braking”

“This rig is stable with no turn”

Less fatigue at the end of the day

Easier pre- and post-trip inspection

Low center of gravity provides nice ride comfort – especially when turning

Alexander Voets / eMobility Sales and Marketing Manager / September 2020
The success of the Innovation Fleet led us to build an additional 8 fully battery-electric medium-duty and heavy-duty trucks; 6 eCascadias and 2 eM2.

Cycle through a number of customers to experience the eTrucks in their own operation.
With the CX Fleet we expand the reach of our Pilot Project

Mobile charger to minimize capital investments for customers in a trial phase

Ability to understand charging, optimal routes, utility inclusion

Commissioning charger in Fontana, CA. June, 2020

Compton, CA. June, 2020

Alexander Voets / eMobility Sales and Marketing Manager / September 2020
Specification targets for series production vehicles from our Portland plant

**eM2**  
*Designed for Pick-Up and Delivery Application*

<table>
<thead>
<tr>
<th>Specification</th>
<th>eM2 Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Truck Class</strong></td>
<td>6-7</td>
</tr>
<tr>
<td><strong>GVWR</strong></td>
<td>26K to 33K lbs</td>
</tr>
<tr>
<td><strong>Battery Size</strong></td>
<td>Up to 315 kWh</td>
</tr>
<tr>
<td><strong>Horse Power</strong></td>
<td>300 hp (224 kW)</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>230 miles</td>
</tr>
</tbody>
</table>

**eCascadia Day Cab**  
*Designed for Distribution Application*

<table>
<thead>
<tr>
<th>Specification</th>
<th>eCascadia Day Cab Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Truck Class</strong></td>
<td>8</td>
</tr>
<tr>
<td><strong>GVWR</strong></td>
<td>80K lbs</td>
</tr>
<tr>
<td><strong>Battery Size</strong></td>
<td>Up to 475 kWh</td>
</tr>
<tr>
<td><strong>Horse Power</strong></td>
<td>525 hp (391 kW)</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>250 miles</td>
</tr>
</tbody>
</table>

*Vehicles pictured are not representative of final series-intent design

Alexander Voets / eMobility Sales and Marketing Manager / September 2020
Who is Using EVs?

CASE STUDY
Greg Holzmeyer
VP and General Manager
North Florida Sales
Who is Using EVs?

How many EVs are in your fleet?
How do you use them?
What made you decide to use electric vehicles?
How did you get started?
What were some of the challenges?
What do you think the benefits have been?
What are your plans going forward?
WHAT DO YOU NEED TO KNOW ABOUT ELECTRIC FLEETS?
Let us know what you think!

Webinar materials will be available at NorthFloridaCleanFuels.com

Next webinar planned for first week of October

Questions?

Ben Moore
ben.moore@rsandh.com
954-236-7379