Fleet Electrification

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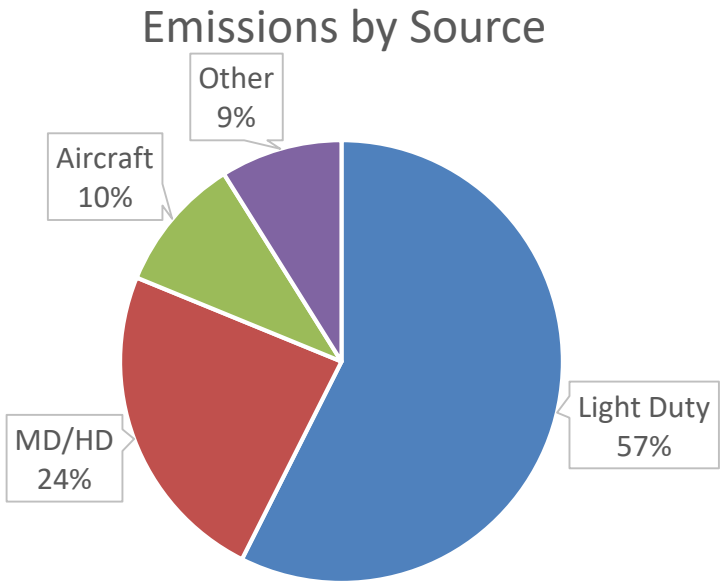
Electrification Market



Market Limiters	Market Drivers
Purchase Price and Payback	Fleet Electrification Initiatives
Limited Charging Infrastructure	GHG Emissions Avoidance
MD/HD Technology Availability	Public Interest
Limited Range/Usage and Applications	Economic Development
Reliability and Service	Environmental and Public Health
Supply Chain	Utility consumption

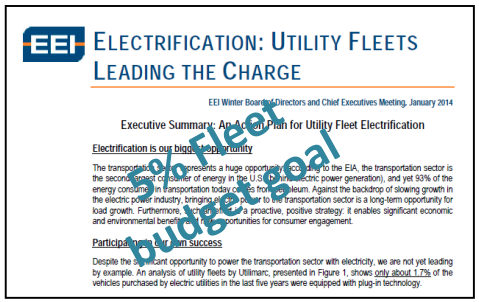
Source: 2019 U.S. Transportation Sector GHG Emissions by Source (https://www.epa.gov)

Idling Laws by State*

29 States and most major metropolitan areas have idling laws

*https://cdllife.com/2014/idling-laws-state/

Sustainability Initiatives



EEI ELECTRIFICATION: UTILITY FLEETS LEADING THE CHARGE

EEI Winter Board of Directors and Chief Executives Meeting, January 2014

Executive Summary: An Action Plan for Utility Fleet Electrification

Electrification is our biggest opportunity

The transportation sector presents a huge opportunity. According to the EIA, the transportation sector is the second largest consumer of energy in the U.S. (behind electric power generation), and yet 93% of the energy consumed in transportation today comes from petroleum. Against the backdrop of slowing growth in the electric power industry, bringing electric power to the transportation sector is a long-term opportunity for load growth. Furthermore, electrification is a proactive, positive strategy: it enables significant economic and environmental benefits and opportunities for consumer engagement.

Participation is Program Success

Despite the significant opportunity to power the transportation sector with electricity, we are not yet leading by example. An analysis of utility fleets by Utilimarc, presented in Figure 1, shows only about 1.7% of the vehicles purchased by electric utilities in the last five years were equipped with plug-in technology.

5% Fleet budget goal

2014

"lead by example"

"set new, individual company goals that are ambitious and achievable"*

- Fleet managers help develop goals with support at the executive level
- Vehicle must be "electric" or "electrified with a plug" - such as electric power take-off (ePTO)
- Goal is based on % of vehicles that are electrified instead of % of budget

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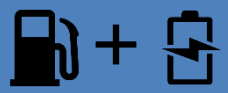
MD/HD Electrification Options

	Hybrid EV (HEV) 	Plug-in Hybrid EV (PHEV) 	Battery EV (BEV) 
Charging Method	Engine and/or Regen Braking	Engine and/or Regen Braking Plug-in (Level I and II)	Engine and/or Regen Braking Plug-in (Level II and III)
Charging Infra. Cost	None	$	$$$
Vehicle Capex Cost	$	$$	$$$
Range/Usage	No Range/Usage limitations	No Range/Usage limitations	Limited Range/Usage
Payload Impact	Minimal	Minimal to Moderate	Significant
Fuel Savings	$	$$	$$$
Maint. Savings	$	$$	$$$
Emissions Avoided	Moderate	Moderate to Significant	Significant
Technology	Proven	Proven	Development (Testing)

Electrification solution needs to meet performance and FI expectations for the specific application

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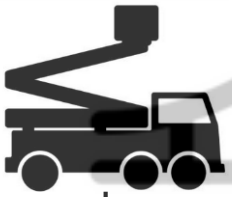
BEV – “Future is Electric”

Present
2020

Unproven Technology

Unknowns & Challenges



Gas/Diesel HEV/PHEV 1st Gen BEV

Crossing the Bridge
2030

Tested Technology

Expanding Charging Infrastructure

Additional BEV applications

Gas/Diesel HEV/PHEV Next Gen BEV

Mature BEV

Beyond
2040

Advanced Battery Technology

Widespread Charging Infrastructure

Fast Charging

BEV ???

JEMS JOBSITE ENERGY MANAGEMENT SYSTEM

JEMS JOBSITE ENERGY MANAGEMENT SYSTEM

Transformation Technology (JEMS)

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Jobsite Energy Management System (JEMS)

- Plug-in/Electrification solution
- Zero emissions jobsite
- Safe, quiet, and comfortable for operators
- Operating expense savings

Commitment to Electrification

10+ Years History

Development * Support * Innovation

JEMS®

JOBSITE ENERGY MANAGEMENT SYSTEM

1.9M Fuel Gallons

Fuel Gallons Saved to Date*

$6.1M Fuel Savings

Fuel Savings to Date*

2.4M Anti-Idle Hours

Idling Hours Eliminated to Date*

76.8M "Idling" Miles

Idling Miles Eliminated to Date*

53.8M CO2 lbs.

Saved to Date*

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*Through 03/31/21

JEMS S/SE and LE

JEMS S

Jobsite Anti-Idle
4.4 kWh Lithium-ion Battery
Applications: pickups, service bodies, aerials, digger derricks, and more

JEMS SE

Jobsite Anti-Idle with ePTO
4.4 kWh Lithium-ion Battery
Small Aerial ePTO (SE)
Applications: AT-G, AT-ME/PE, and LR7 aerials

JEMS LE

Jobsite Anti-Idle with ePTO
8.8 kWh Lithium-ion Battery
Large Aerial ePTO (LE)
Applications: AA, AM, AN, LR, and TA aerials

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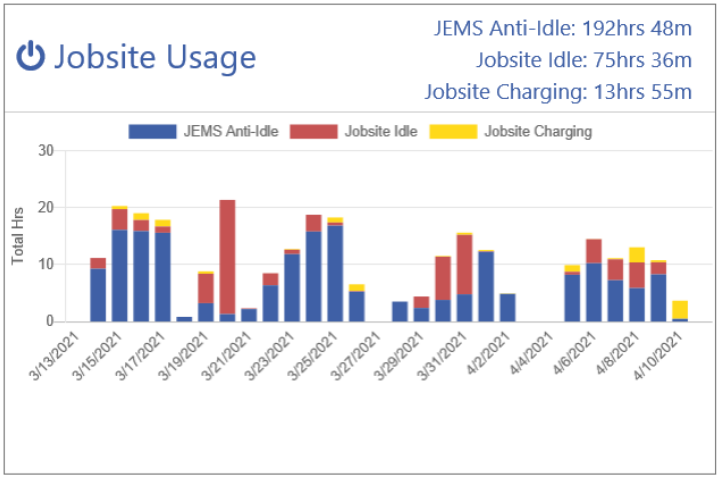
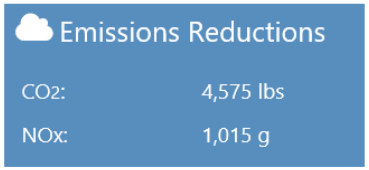
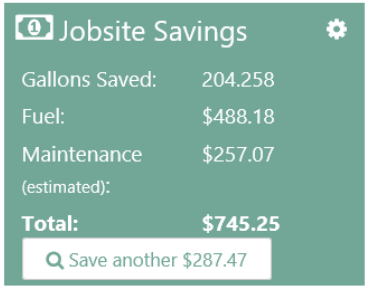
JEMS
JOBSITE ENERGY MANAGEMENT SYSTEM

JEMS Connect

Easily monitor JEMS performance







Receive proactive Alerts

JEMS Alerts

Customer Vehicle #	Unit Serial #	Recommendation
None	0520EY5866	Use plug-in charging to maximize JEMS Jobsite Anti-Idle (plug-in charging has been used less than four times in the past 30 days)
None	0520EY5868	Ensure JEMS is activated to improve anti-idle utilization at the jobsite (JEMS Anti-Idle has been below 20% for 30 days)

Identify top/bottom performing assets

Top Performing JEMS Equipment

Customer Vehicle #	Model	Jobsite Anti-Idle %
None	GB5-108D-S	0%
None	AT40G	100%
None	AT40G	100%

Lowest Performing JEMS Equipment

Customer Vehicle #	Model	Jobsite Anti-Idle %
None	AT40G	8%
None	AT40G	11%
None	TA60	26%

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Altec – Electrification Solutions

	Zero Emission Jobsite with Plug-in Technology JEMS JOBSITE ENERGY MANAGEMENT SYSTEM				All Electric Medium/Heavy Duty
Segment	**JEMS S**	**JEMS SE**	**JEMS LE**	**JEMS DC**	**KW370E Cabover**
Service Aerials	✓	✓			✓
Distribution	✓		✓		
Telecom	✓	✓		✓	
Service Bodies	✓				
Transmission	✓		✓		
Vehicle Weight					
Light Duty <10k lbs.	✓				
Medium Duty 10,001-26,000 lbs.	✓	✓	✓	✓	
Heavy Duty >26,001 lbs.	✓		✓		✓

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Active Electrification Roadmap

Launch of JEMS S/SE/LE and JEMS Connect

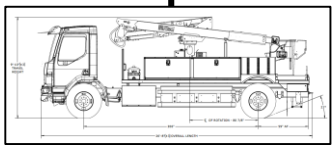
Extend JEMS technology to additional applications and chassis configurations

2020 - 2021

2022 - 2023

2025 - 2027

Collaboration with major OEMs on development of "All Electric Bucket Truck" for our industry



Introduction of K370E AT40G

International/Navistar TA60 eMV

Freightliner eM2 AA55E

Additional OEM chassis options and Altec models

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Part of the Solution

Technology is only part of the Solution. Multiple stakeholders must deliver to enable an "electric" future

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