



Odyne Systems, LLC

**Medium- and Heavy- Duty Electric Vehicle
Technology**

About Odyne Systems, LLC



Odyne develops and manufactures plug-in hybrid systems
Focused on trucks over 14,000 pounds.



PHEV system integrated with wide variety of equipment and chassis makes.

Goal: Be the primary source for hybrid solutions that improve the productivity, performance and sustainability of commercial trucks.



Allison Transmission



Allison Transmission is the world's largest manufacturer of fully automatic transmissions for medium- and heavy-duty commercial vehicles

- Allison partially owns Odyne through a non-controlling equity investment
- Odyne hybrid integrates with the existing powertrain through the transmission using a minimally invasive design
- Engineering and marketing collaboration.

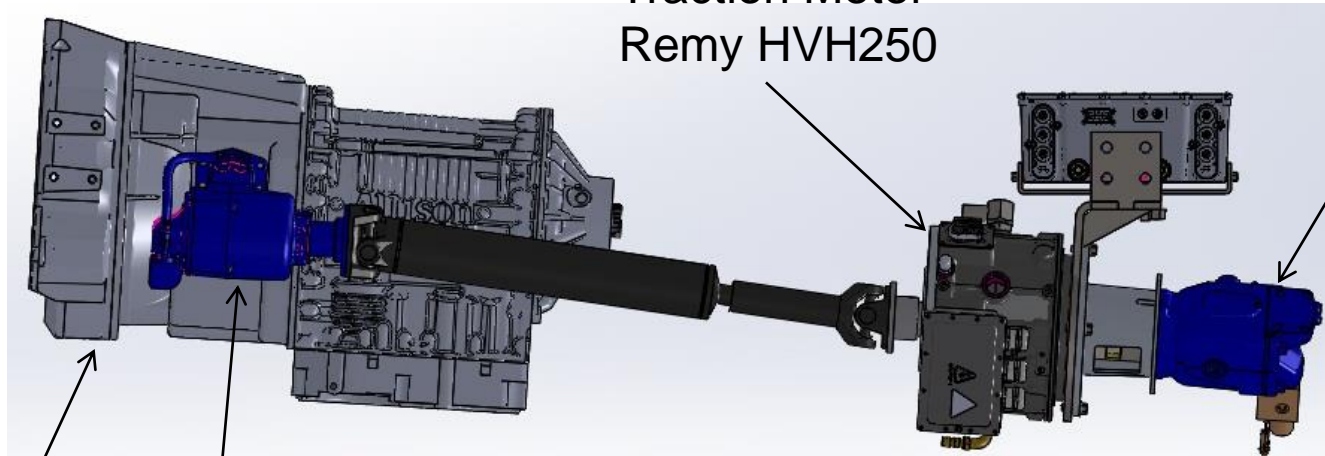


Exclusively approved: Allison Transmission has globally endorsed the use of its 1000, 2000, 3000, and 4000 Series™ transmissions with the Odyne hybrid system as the exclusively-approved PTO-based hybrid system.

Minimally Intrusive Design



Unique design allows installation of numerous accessories, such as hydraulic pumps or compressors



Traction Motor
Remy HVH250

Power Take Off

- Optional 17,000 BTU air conditioning and low emissions fuel fired heater
- Std. Remote diagnostics w/ telematics
- Extended warranty available

Allison Transmission

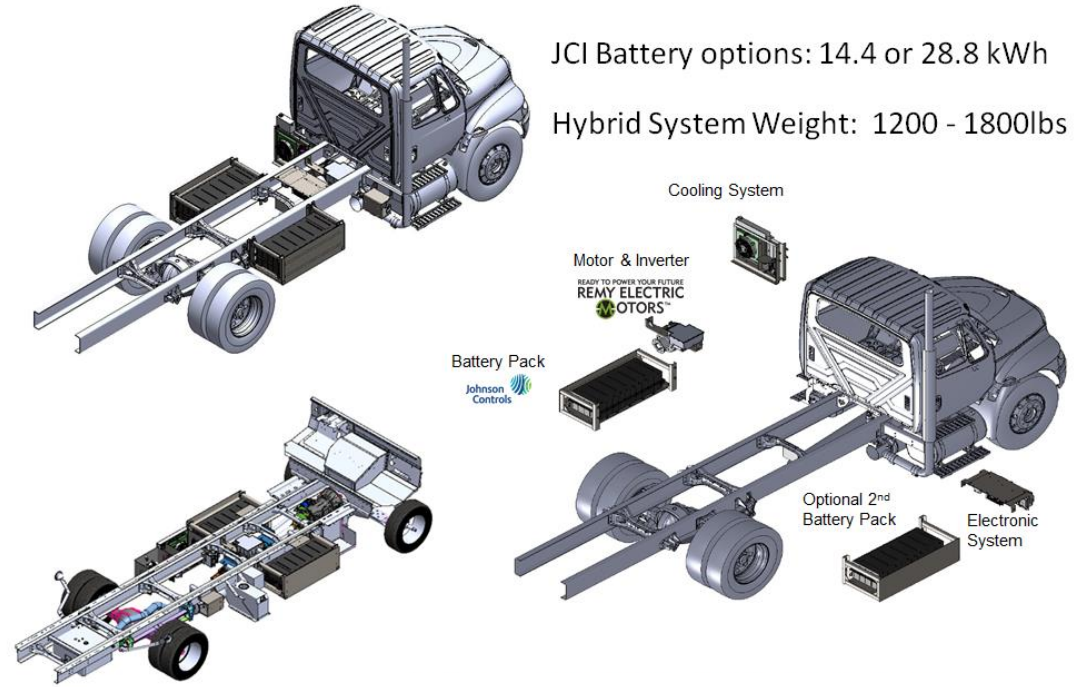
U.S. Patents 7,323,272 7,427,156 7,471,066 7,830,117 8,115,450
8,408,341 8,818,588 8,905,166

Other Patents Pending, including in Europe and Asia

Product Layout and Manufacturing



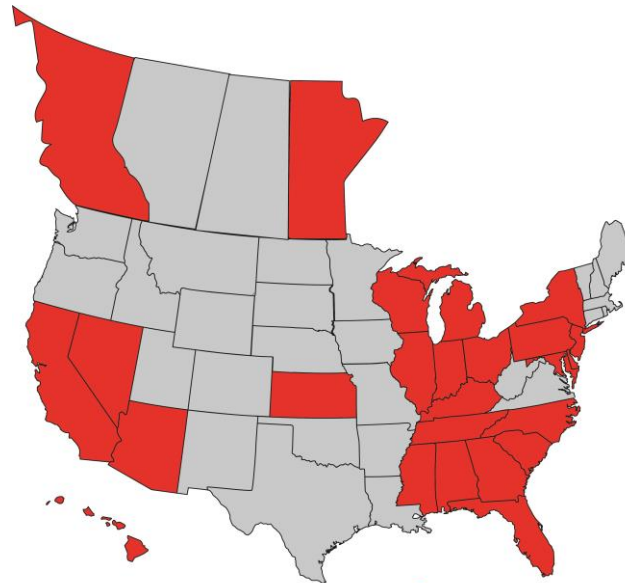
- Scalable manufacturing
- Over 120 systems completed in 2014



- Wide choice of chassis and engines
Chassis: Ford, Freightliner, FCCC, Kenworth, International
Engines: Cummins, Navistar, MaxxForce, Detroit Diesel

Leader in Plug-in Hybrid Systems

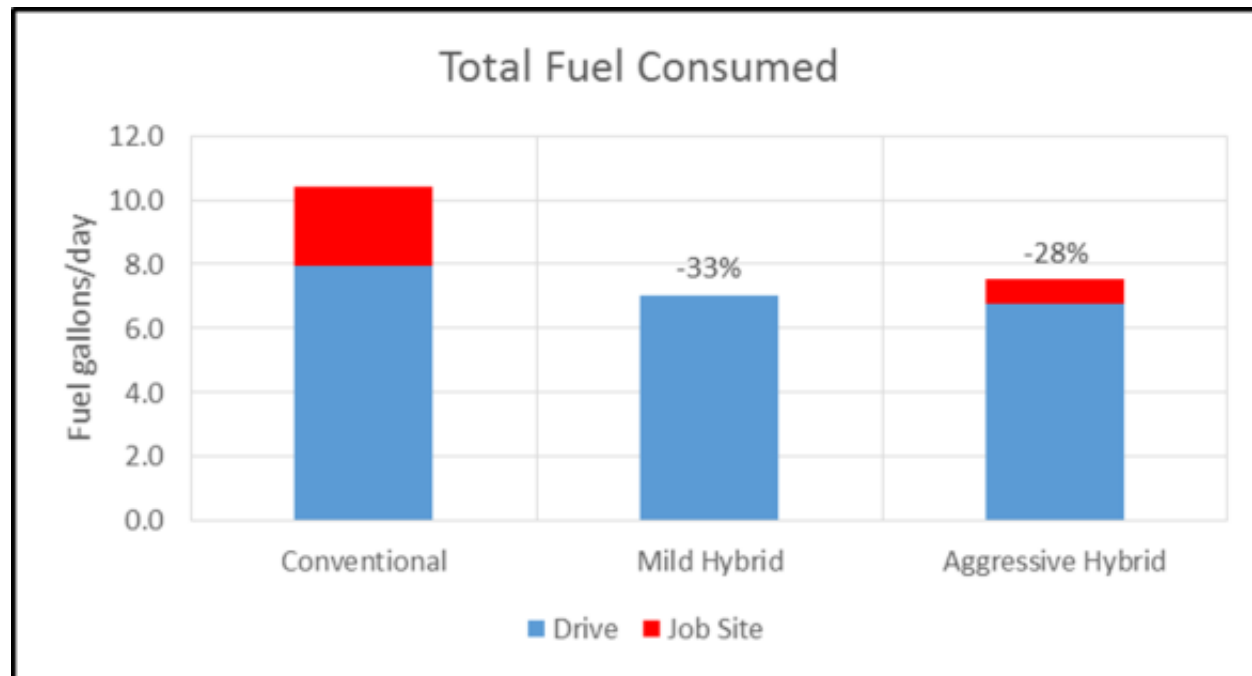
- **DOE & EPRI:** selected to participate in a \$45.4 million program, only supplier of PHEV systems for large trucks
- **California Energy Commission:** Plug-in Hybrid Deployment, 2 Programs awarded
- **South Coast Air Quality Management District:** PHEV systems for large trucks near Los Angeles
- **DOD** deployment of plug-in hybrid technology in Hawaii



■ Odyne vehicle currently operating in territory

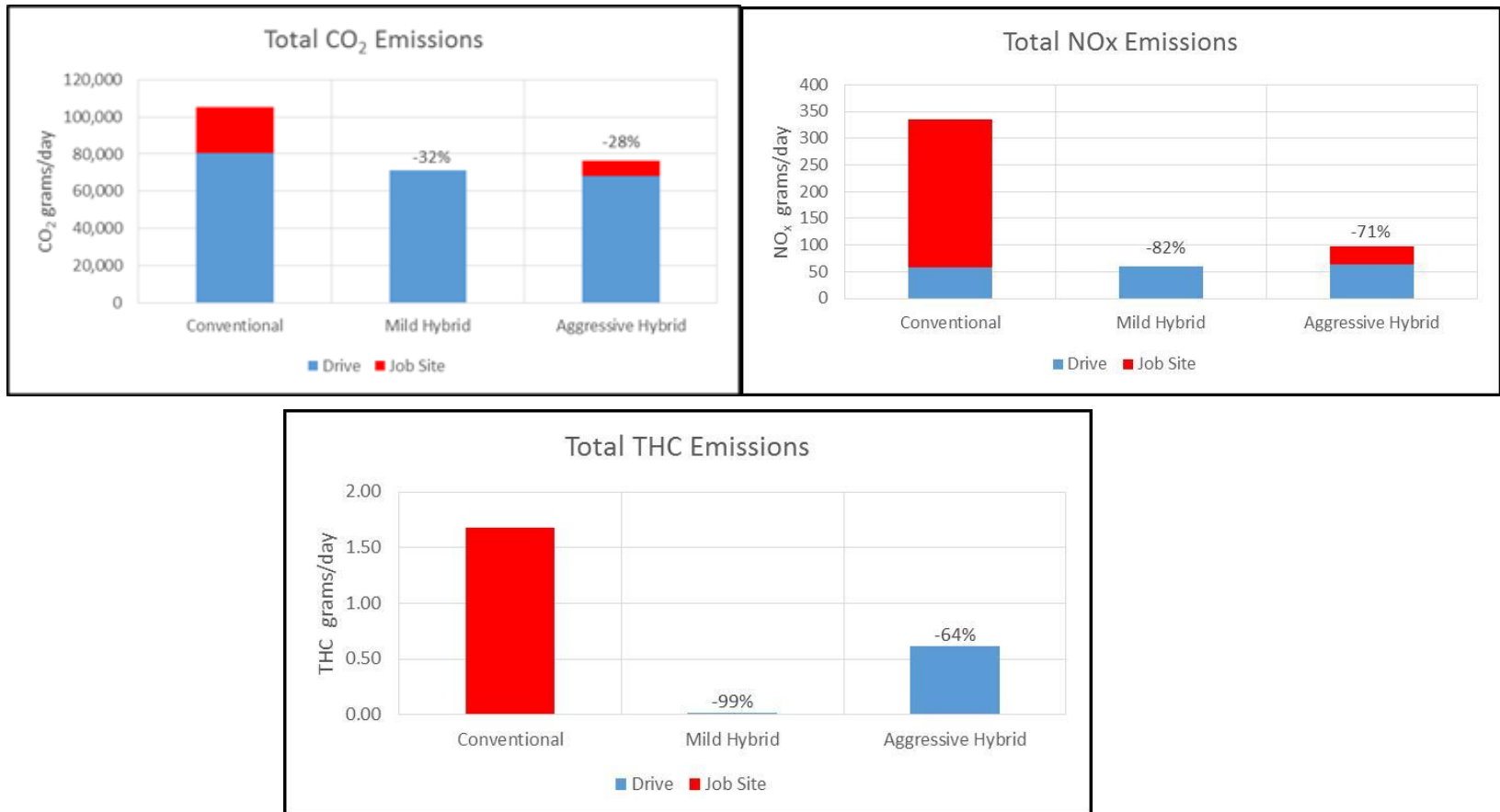
Features and Benefits of Odyne PHEV systems

- **Plug-in Hybrid:** Power from batteries for jobsite AND hybrid propulsion
 - Reduces fuel consumption at jobsite AND while driving
 - Save up to 50% or greater (1600 gallons/year depending upon duty cycle and vehicle). Two calibration options.
 - Eligible for EPA credits



Features and Benefits of Odyne PHEV systems

- Significantly lower emissions/GHG: CO₂, THC, and NOx



Features and Benefits of Odyne PHEV systems

- **Largest battery system:** Over 25 kWh available
 - Quieter work site, Keeps engine off longer
 - Reduces engine maintenance due to lower idle time
 - Built for extreme conditions, thermally managed & IP67
 - 4+ year warranty (parts only) from JCI



- **Largest electric motor:** 42 kW (56 hp) continuous, 70 kW (95 hp) peak
 - Better acceleration and more power for equipment



- **Largest exportable power using battery:** capable of supporting up to 6 to 18 kW
 - Replace separate engine driven generators
 - Handles high loads like pipe fusing, air handling for manhole



Work Trucks

Wide Variety of Applications

Aerial Device (bucket truck): Altec, Terex, Versalift

- Maintenance and construction of electric lines

Cranes/Digger Derricks: Altec, Terex, Fassi, IMT

- Installation of electric poles and transformers

Underground Utility Vehicle: Vanair, Boss, Team Fenex

- Construction and maintenance of underground natural gas and electrical lines

Liquid Tank Trucks: Amthor

- Refined fuel, waste oil, water



Hybrid Bucket Truck



Hybrid Digger Derrick



Hybrid Walk-in Van



Hybrid Compressor Truck

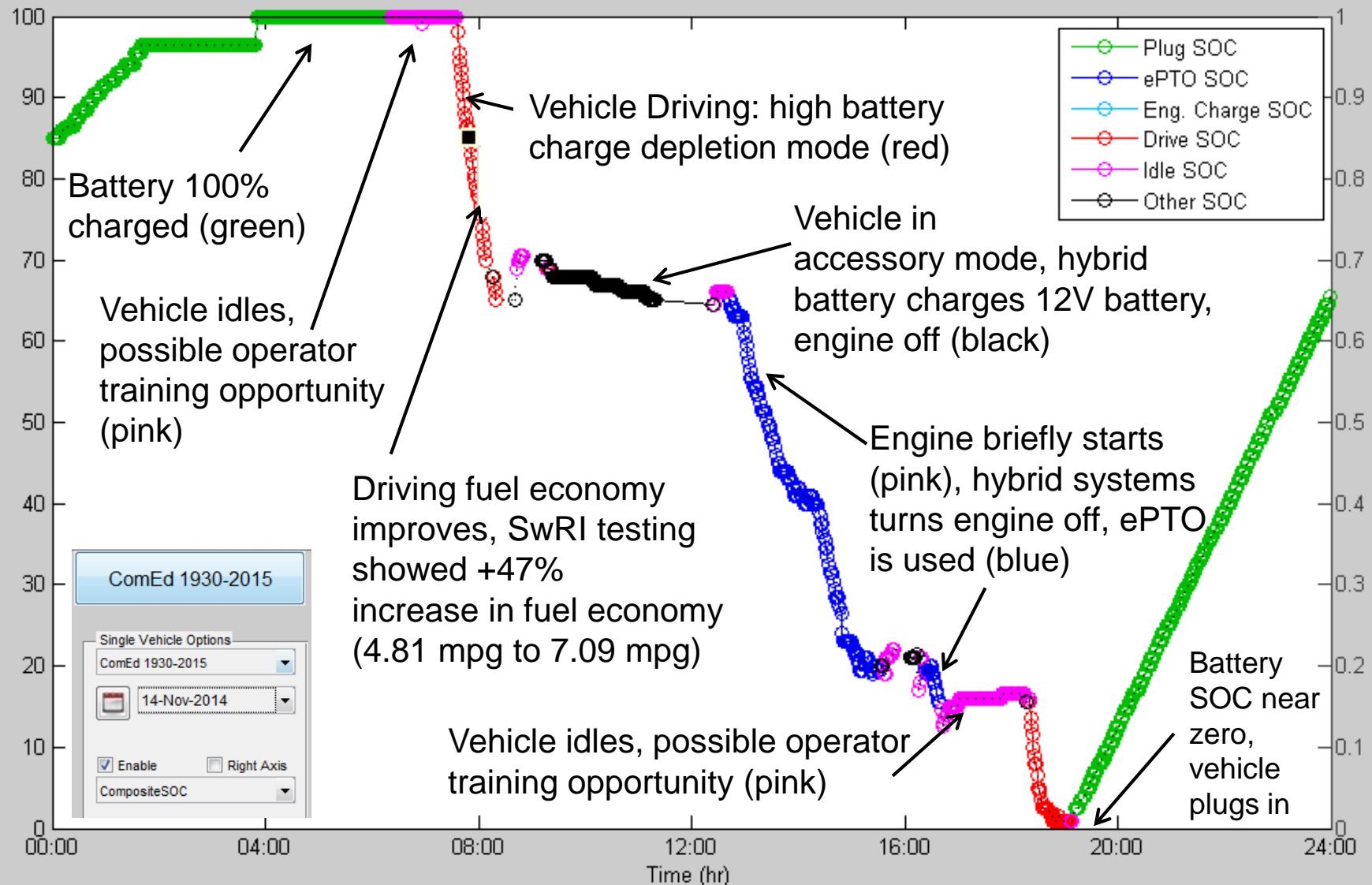


Fuel Tank Truck



Hybrid Crane Truck

Case Study: International 4300 with Altec TA50 Aerial Com Ed

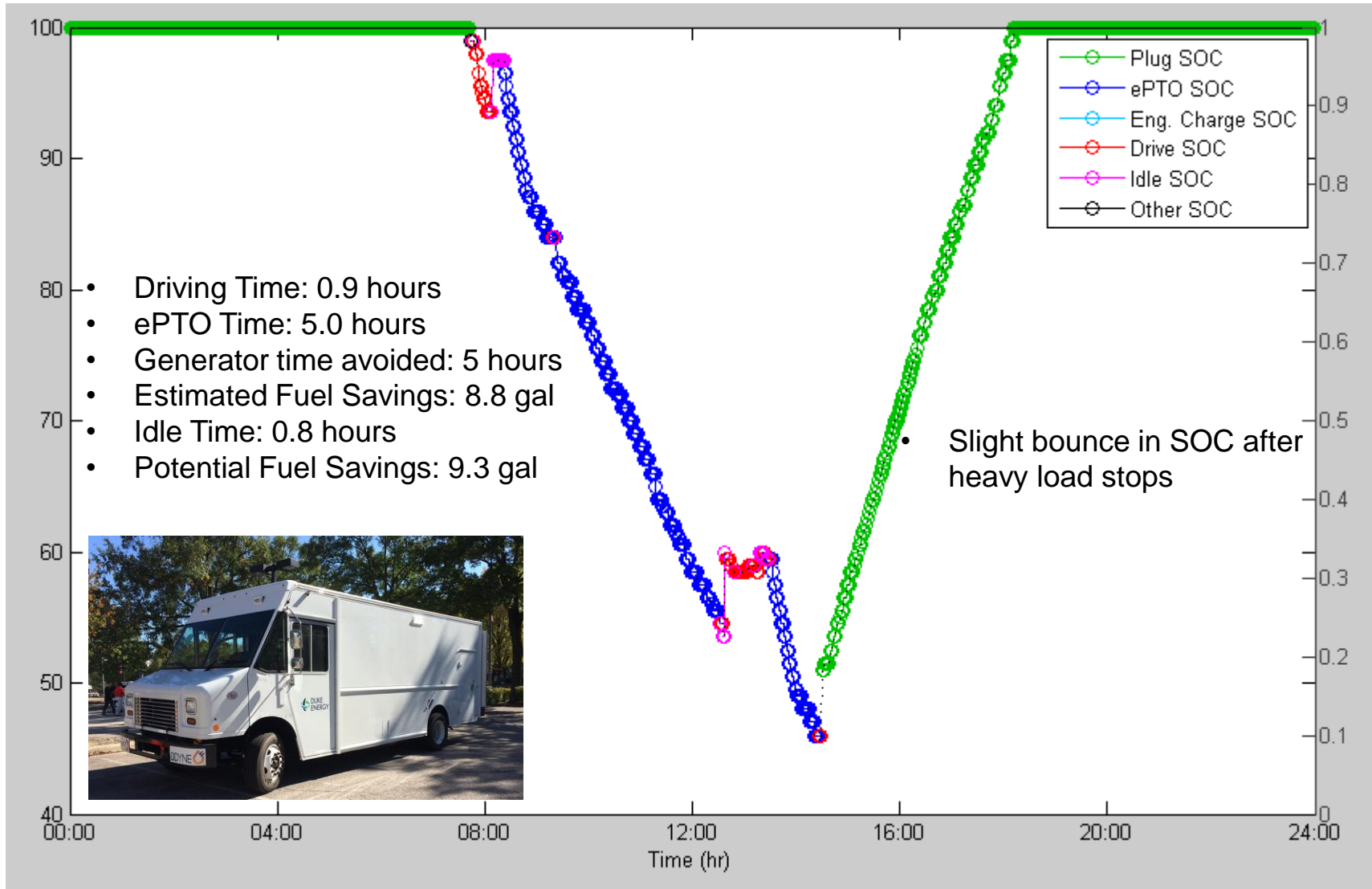


Case Study: International 4300 with Altec TA50 Aerial Com Ed

Time	Activity	Conventional (gallons)	Odyne PHEV (gallons)
6:20 AM	Un-plug 100% SOC		
6:20 – 7:40	Engine idle	1.17	1.17
7:40 – 8:20	Driving	1.25	0.85
8:20 – 12:40	Accessory 12V on	3.87	0
12:40 – 3:40	Use of Aerial device	4.2	0
3:40 – 4:00	Engine idle	0.36	0.36
4:00 – 4:40	Use of Aerial device	0.84	0
4:40 – 6:20	Engine idle	1.44	1.44
6:20 – 7:10	Driving	1.25	0.85
7:10 PM	Plug-in charging 0% SOC		
Summary		14.4	4.7

Case study estimated savings: 9.7 gallons, 8 hours avoided idle time

Freightliner MT55 – Walk-In Van Application Truck #2081; Charlotte, NC



Summary

The primary source for hybrid solutions that improve the productivity, performance and public image of truck fleets.

Benefits: Reduce fuel consumption, lower emissions, improved vehicle performance, quieter job site operation along with lower operating and engine maintenance costs.



Important considerations:

Plug-in Hybrid	Odyne PHEV System
Plug-in Hybrid as defined by U.S. government	Yes
Eligible for EPA credits	Yes
Safety	
SAE J1772 compliant: plug-in charging safety	Yes
High Voltage Interlock Loop	Yes
Warranty	
Acknowledged to fully retain Allison transmission warranty by transmission manufacturer.	Yes
Standard Battery warranty greater than 4 years	Yes

Contact Information

For additional information, please contact

Matt Jarmuz

262-442-8401

Matt.jarmuz@odyne.com

www.odyne.com

Stop by booth 1245

