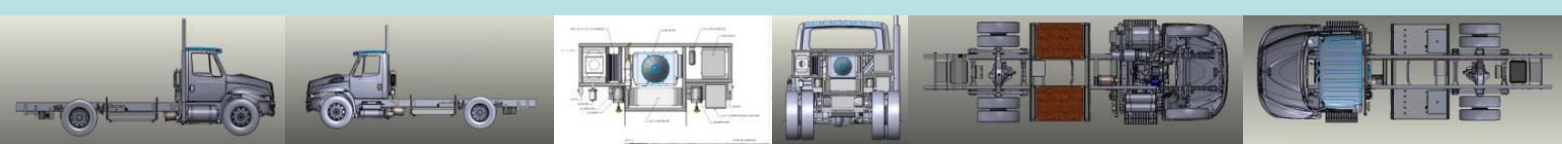




ODYNE

Presentation for GLICC October 26, 2011

Proprietary and Confidential



ODYNE | N4 W22610 Bluemound Rd. Waukesha, WI 53186 | Phone: (262) 544-8405 | Fax: (262) 544-8421

About Odyne

- A clean technology company, focused on development and sales of plug-in hybrid propulsion systems for trucks over 14,000 pounds.
- Large trucks have high fuel consumption, can save 50% or greater, 1000+ gallons/year depending upon duty cycle.
- Odyne technology primarily used with Utility, Telecommunication, and Municipal markets.

Customers include:



Work Truck Applications



Hybrid Bucket Truck



Hybrid Digger Derrick

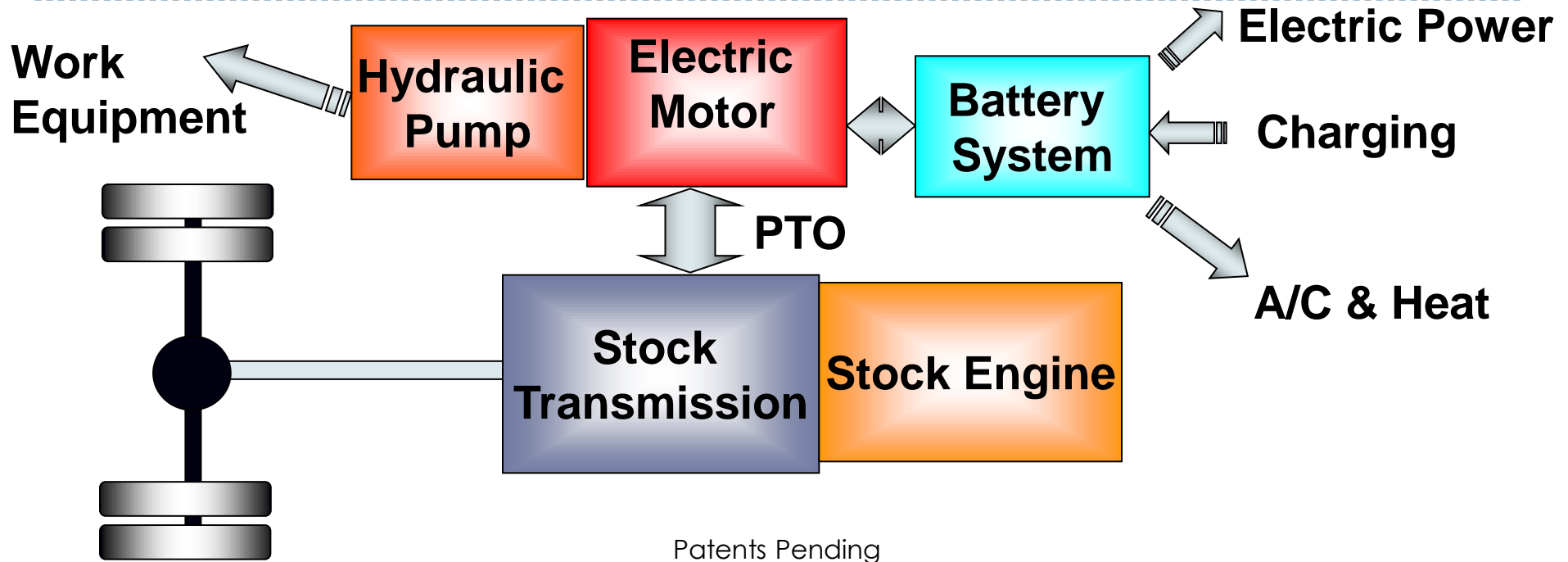


Hybrid Compressor Truck



Hybrid Crane Truck

Hybrid Architecture



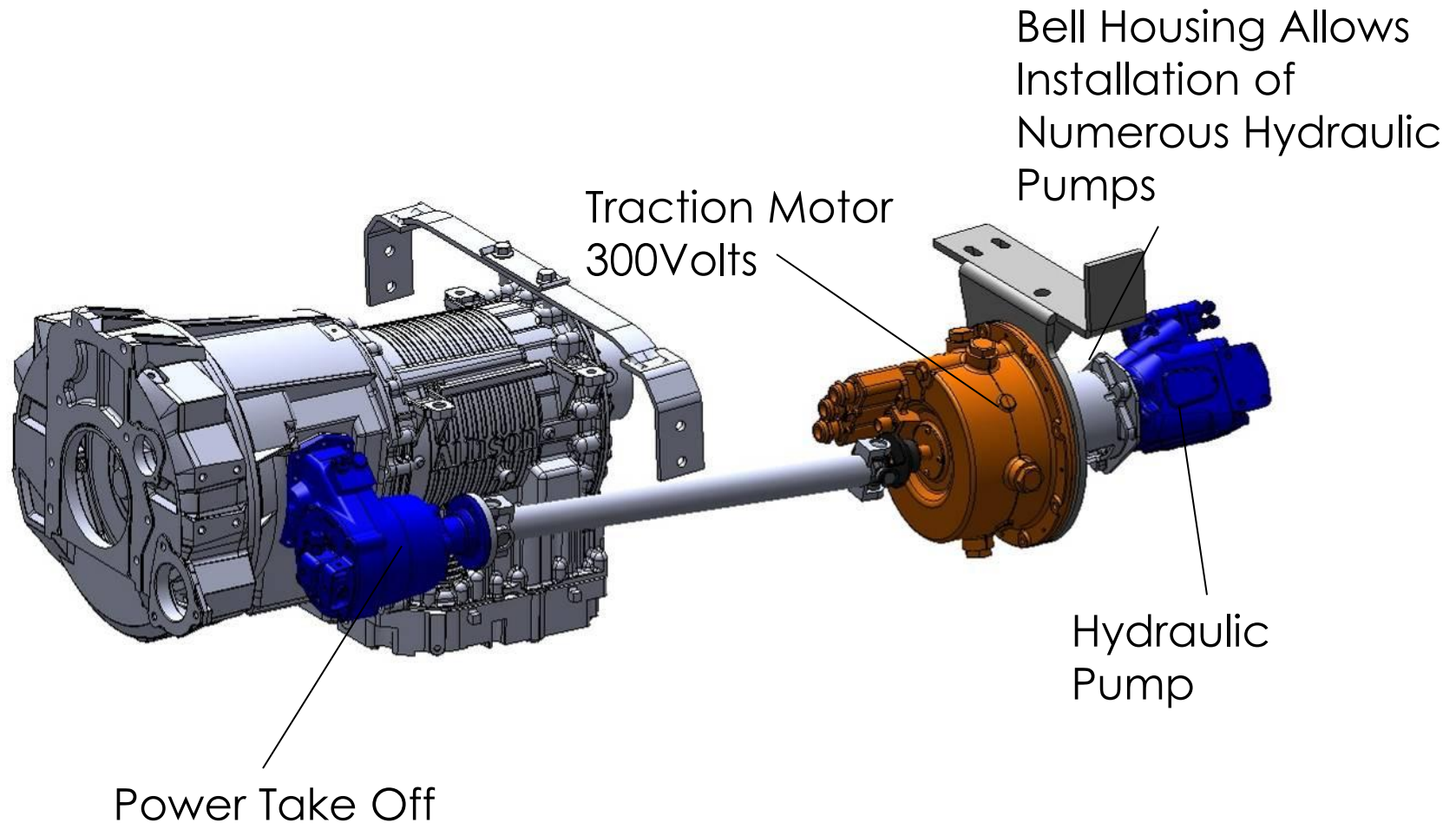
Parallel Hybrid Solution

- ▶ Provides redundant system to operator to minimize downtime
- ▶ Low validation and capital equipment costs
- ▶ Ability to retrofit to existing vehicles

OEM Compatible

- ▶ No modifications required to drive train
- ▶ Simplified integration through power take-off (PTO)
- ▶ EPA & CARB compliant

Minimally Invasive Design



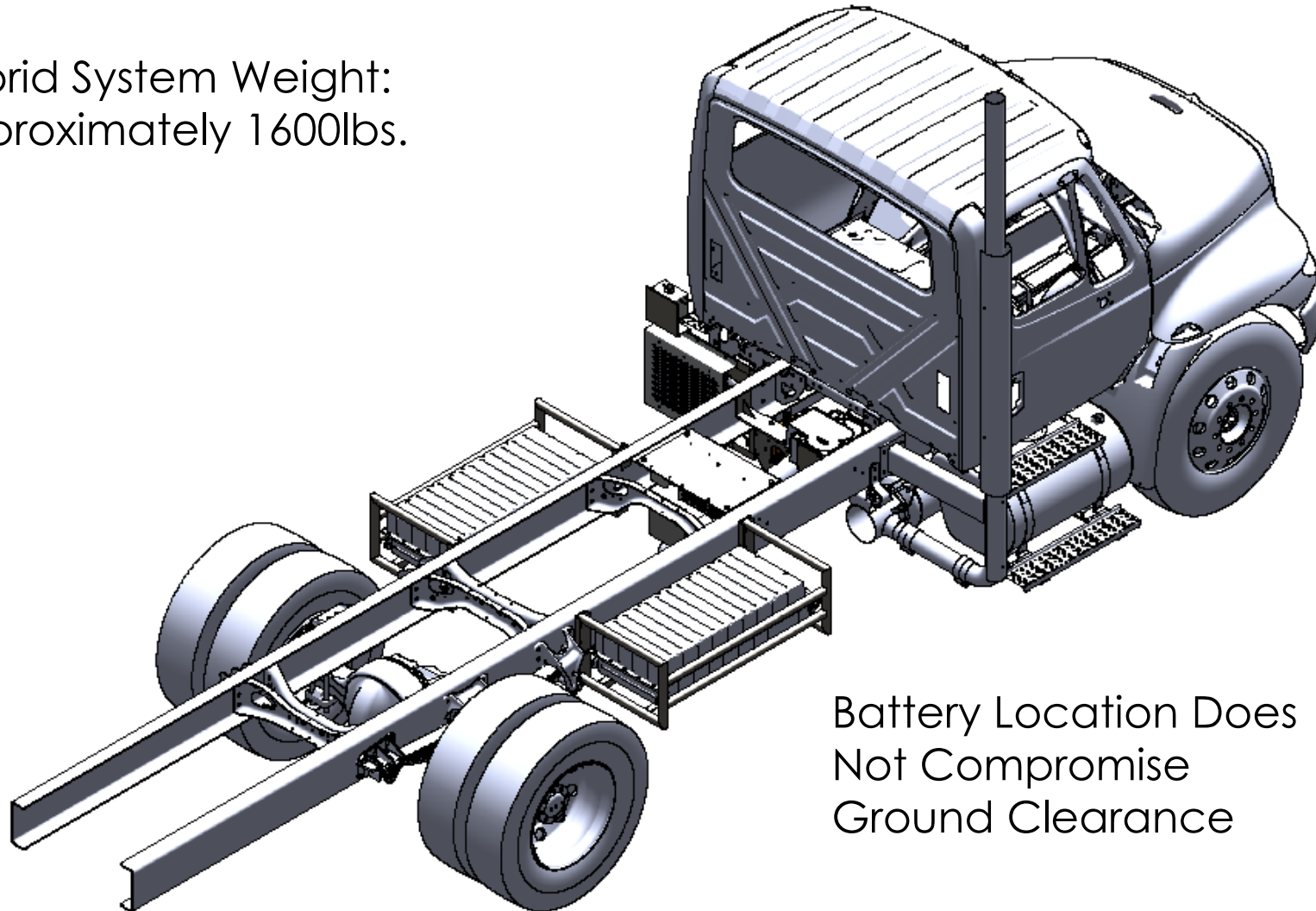
Patents Pending

Product Features

- ▶ Hybrid Drive Benefits
- ▶ Launch Assist and Regenerative braking for improved fuel economy while driving
- ▶ All Electric Stationary Operation for reduced idling
- ▶ Ability to power high horsepower demand applications (large bucket trucks, digger derricks, cranes, and air compressors)
- ▶ 14kWh or 28kWh Lithium Ion Battery Pack (sized to the application)
- ▶ Plug-in recharge via level 1 or level 2, SAE J1772 Compliant
- ▶ Redundant system that can be disabled and return to conventional driving and PTO modes

Product Layout

Hybrid System Weight:
approximately 1600lbs.



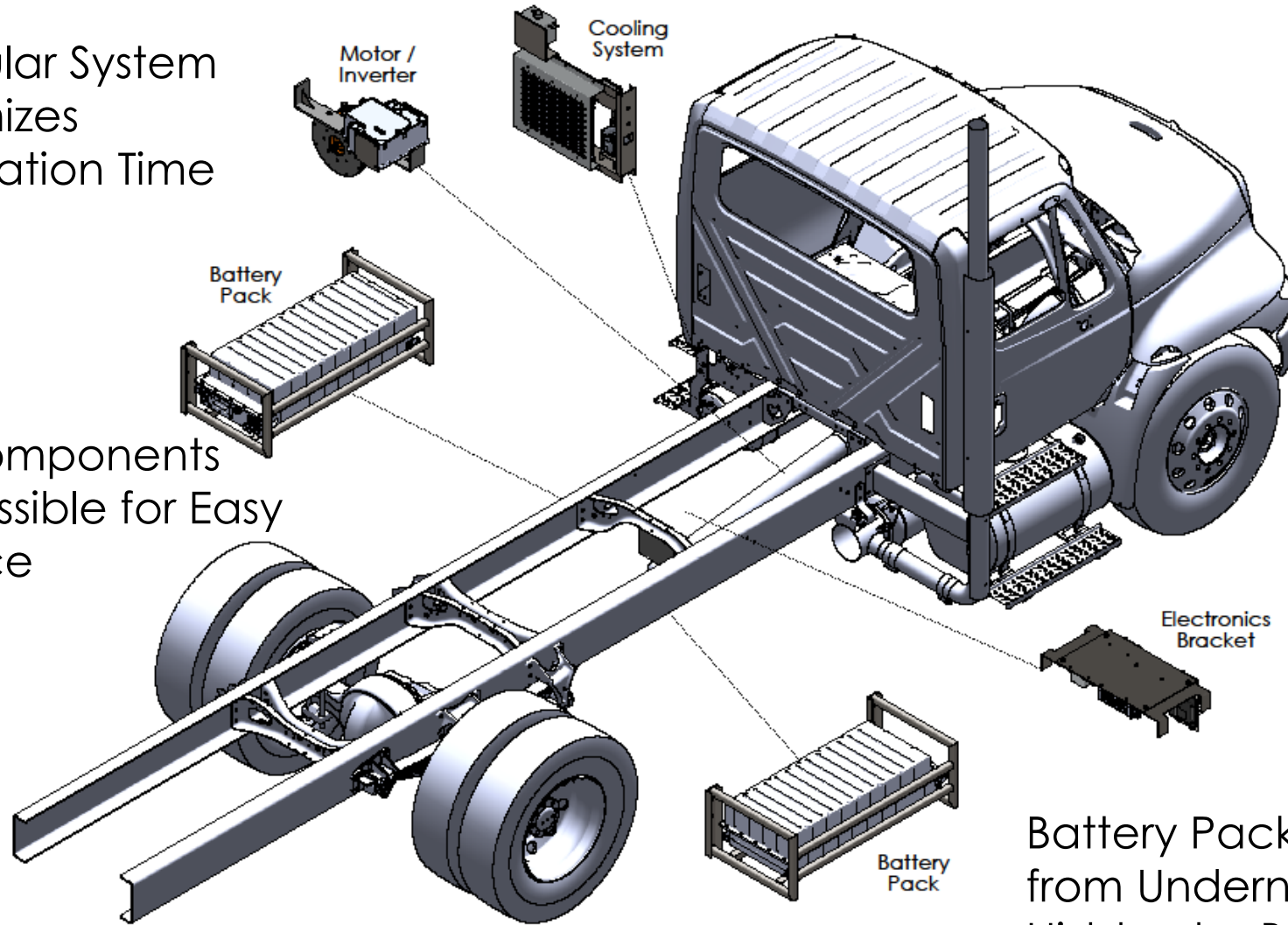
Battery Location Does
Not Compromise
Ground Clearance

Patents Pending

Core Components

Modular System
Minimizes
Installation Time

All Components
Accessible for Easy
Service



Battery Packs Mount
from Underneath –
Hidden by Body

Patents Pending

Product Options

Battery Powered electric air conditioning to cool cab at the jobsite with the engine off

- ▶ Approximately 15,000 BTU/hr

Hydronic heater to warm cab at the jobsite with the engine off

- ▶ Approximately 17,100 BTU/hr fuel fired hydronic heating system
- ▶ Integrated into the chassis heat system and uses the existing dash climate controls

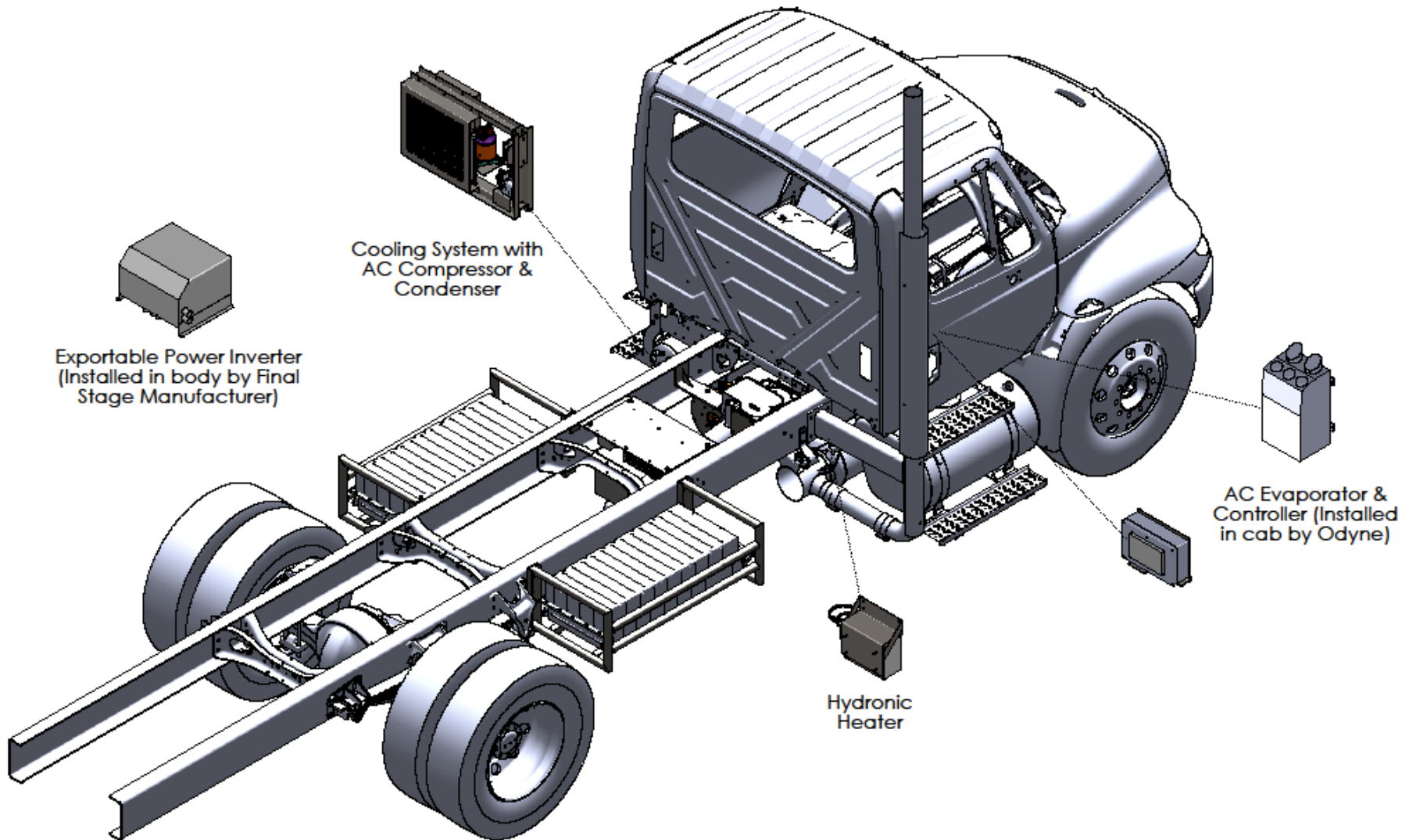
Exportable power to provide 120/240V alternating current for electrical tools at the jobsite

- ▶ 3000W, 5000W or 7000W depending on customer requirements

Advanced telematics

- ▶ Provides detailed data of truck operation and hybrid system
- ▶ Event driven data logger
- ▶ Remote Programming

Ancillary Components

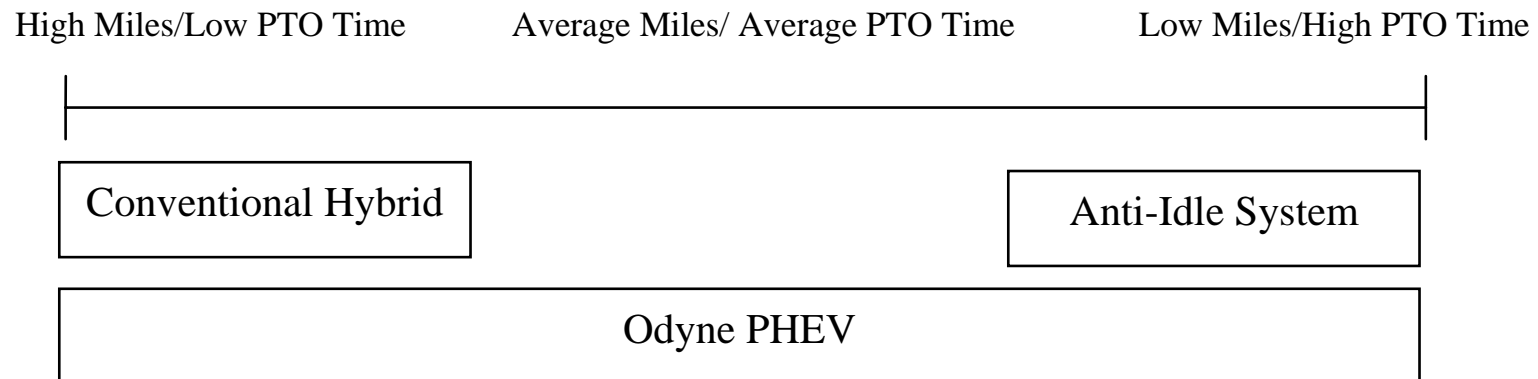


Patents Pending

Flexible Operation Range

Flexible Operation Range – Charge Deplete or Charge Sustain Driving Mode

- ▶ Adjust the variability of launch assist and regenerative braking dependent on application
- ▶ Single or dual battery pack dependent on application



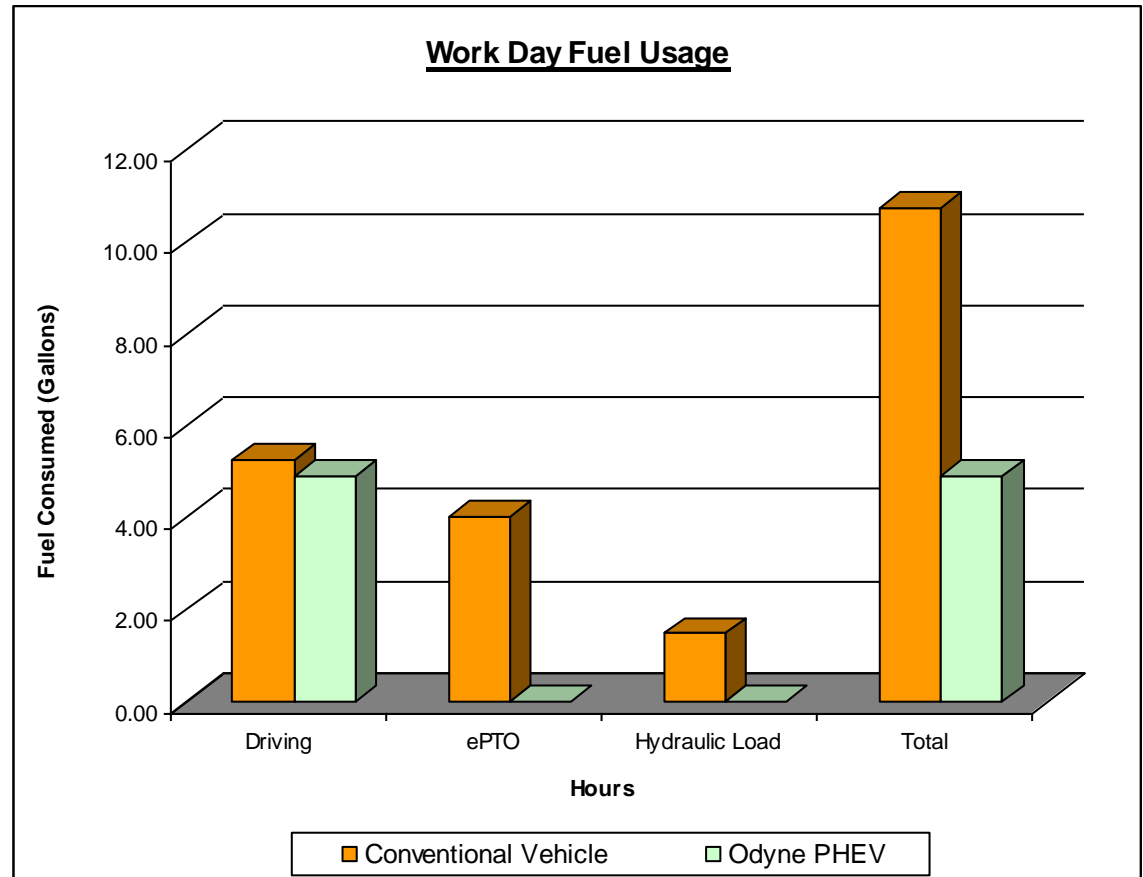
Patents Pending

Fuel Savings – Utility Bucket Truck


Fuel Consumption (Gallons) Conventional Vehicle vs. Odyne PHEV

	<u>Baseline Vehicle</u>	<u>Odyne PHEV</u>
Driving (32 miles/day)	5.26	4.89
ePTO at job site (4.2 hours/day)	4.02	0.00
Hydraulic Load (1.0 hours/day)	1.47	0.00
Work Day Total	10.74	4.89

Total Savings 54.5%

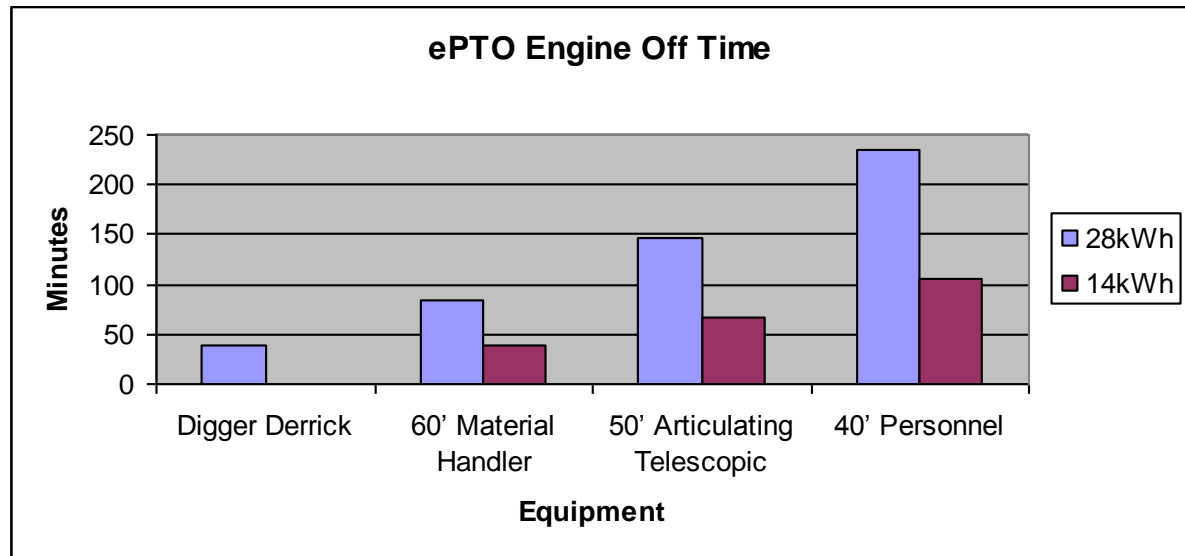


Assumptions:






-  Estimated results based upon SWRI testing of 1st generation system and actual duty cycle measurements.

ePTO Engine Off Time

Equipment	HP	28kWh Time (min)	14kWh Time (min)
Digger Derrick	54	39	---
60' Material Handler	25	85	38
50' Articulating Telescopic	14	147	66
40' Personnel	9	235	106



Assumptions:

-  Vehicle starts with 100% SOC
-  Continuous high speed boom operation
-  No auxiliary loads (i.e. air conditioning, exportable power, etc.)
-  Estimates based upon testing of 1st generation system
-  Actual results may differ; intermittent operation of equipment can significantly extend engine off time

Charge Time

Battery Pack Recharge Time Via Grid*

	Level 1 (110V)	Level 2 (220V)
14kWh Single Pack	11 hours Max	3 Hours Max
28kWh Dual Pack	22 hours Max	5 Hours Max

- ▶ SAE J1772 Compliant
- ▶ Disables Cranking Circuit while Cord Attached
- ▶ If vehicle is unable to be charged the engine will recharge the batteries in the field (storm damage)

* Approximate times shown

About Odyne Systems, LLC

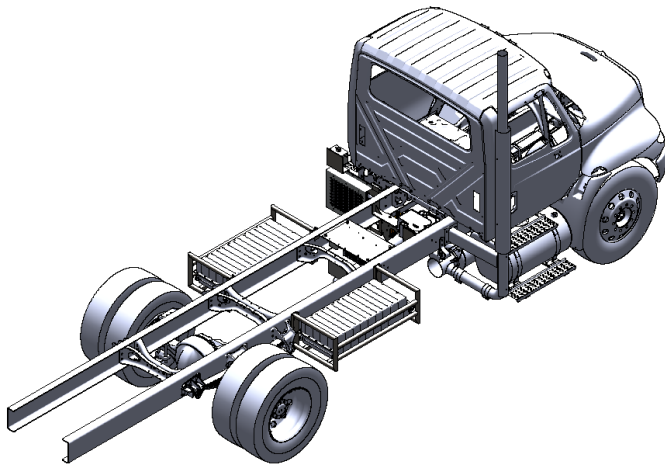
- ▶ Systems installed by Odyne, sold to final stage truck manufacturers
- ▶ Supply Agreements
 - ▶ Remy: electric motors
 - ▶ Johnson Controls: lithium ion batteries
- ▶ Johnson Controls made a strategic investment in Odyne to accelerate the commercialization of the plug-in hybrid system
- ▶ Awards and Funding:
 - ▶ Received SCAQMD award to deploy plug-in hybrids in California
 - ▶ DOE award to develop and deploy advanced plug-in hybrid trucks
 - ▶ DOE Clean Cities: customers eligible for up to \$100,000 per vehicle



Manufacturing

Manufacturing Location

- ▶ Chassis Drop shipped from OEM to Odyne
- ▶ 3D Solid Model provided to Final Stage Manufacturer to verify clearances
- ▶ Odyne installs and tests completed hybrid system in Waukesha WI
- ▶ Odyne ships hybrid chassis to Final Stage Manufacturer for Body and Equipment Up fit specified by customer



Warranty and Service

- ▶ Targeting 5 year warranty on selected major components (battery, motor)
- ▶ Service through existing Dueco/UELC/Terex locations Nationwide



Contact Information

For additional information
please contact Odyne

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