



Hybrid Systems for Medium and Heavy Duty Trucks

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Odyne



About ODYNE

- A clean technology company founded in 2001, focused on development of plug-in hybrid propulsion systems for trucks over 14,000 pounds.
- To date, 25 units produced, 30 planned by Q4 2009, testing since October, 2007.
- Utilities across country receiving units, expanding production in 2010.





About DUECO, Inc.

- One of the largest final stage manufacturers of trucks for the utility industry, government and other entities with over 50 years of experience.
- January 2009, affiliate of DUECO acquired most assets of Odyne Corp.
- Manufacturing and development of *plug-in hybrid drive systems* continues under “Odyne” name.



Headquartered in Waukesha, WI



35 Series Plug-in hybrid heavy duty truck



New Applications



35 Series 4x4 Digger Derrick

Digger Derrick

- 35kW of Stored Energy
- On demand system for extended all electric mode , provides one hour continuous all electric operation
- Launch Assist/ Regenerative Braking
- Radio Remote Controls
- Top Controls and Bucket
- IHC 7400 4x4 37,000lb GVWR Chassis

New Applications

Compressor Truck



35 Series Underground Utility Vehicle

- 35 kW of Stored Energy
- Provides one hour continuous all electric operation of the air compressor
- Launch Assist/
Regenerative Braking
- On Demand Compressor for extended all electric mode
- 9000W exportable power
Plastic Pipe Fusing
Welding
Eliminates Generator

New Products



18 Series

- 18 kW of Stored Energy
- Provides 90 minutes continuous all electric operation of an aerial device
- 1200lb lighter system to mount on non-FET chassis
- IHC 4300 33,000lb GVWR
- Allison 3000 Transmission

18 Series Class 7 Chassis

New Products

10 Series

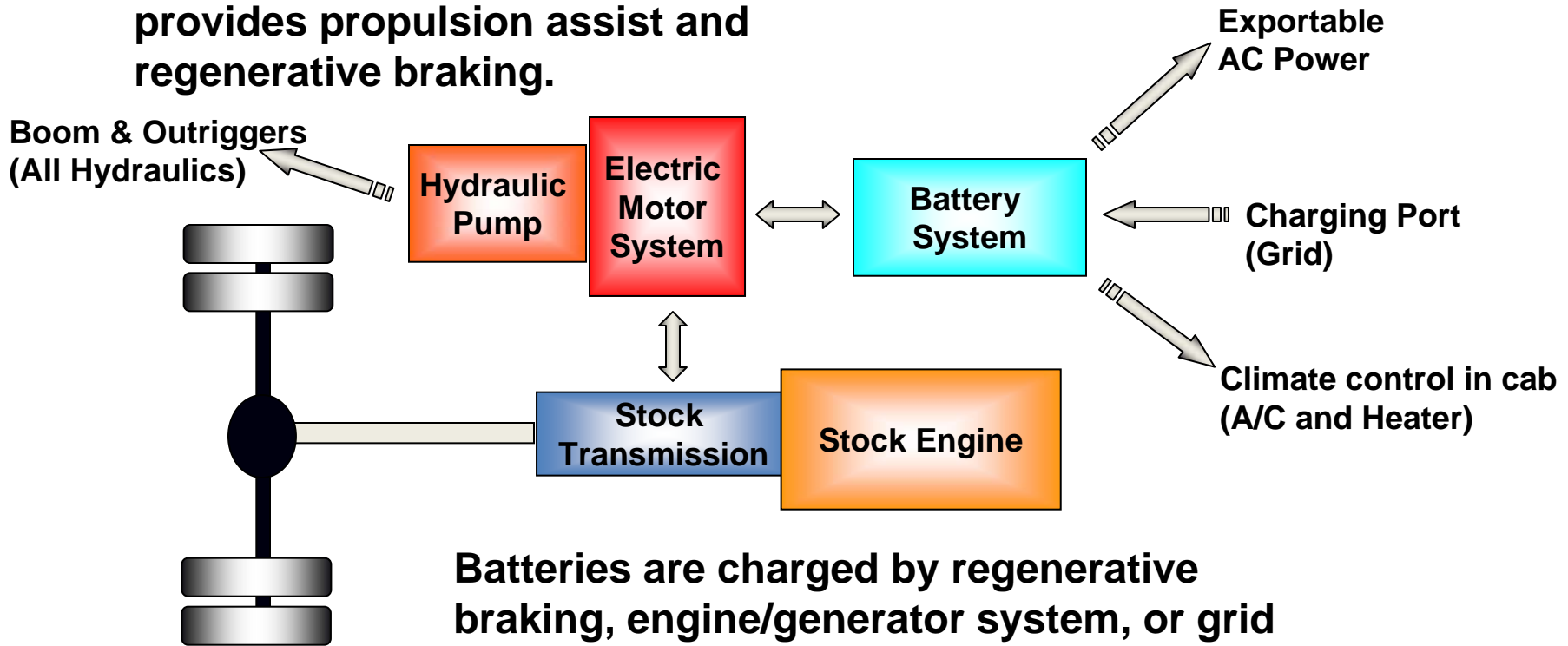
- 10 kW of Stored Energy
- Provides 90 minutes continuous all electric operation of an aerial device
- Half the weight of 35 series system to mount on non-CDL chassis
- GMC 5500 Gas Engine
- Allison 1000 Transmission
- 22,500lb GVWR



10 Series Class 5 Chassis

Odyne Parallel Hybrid System

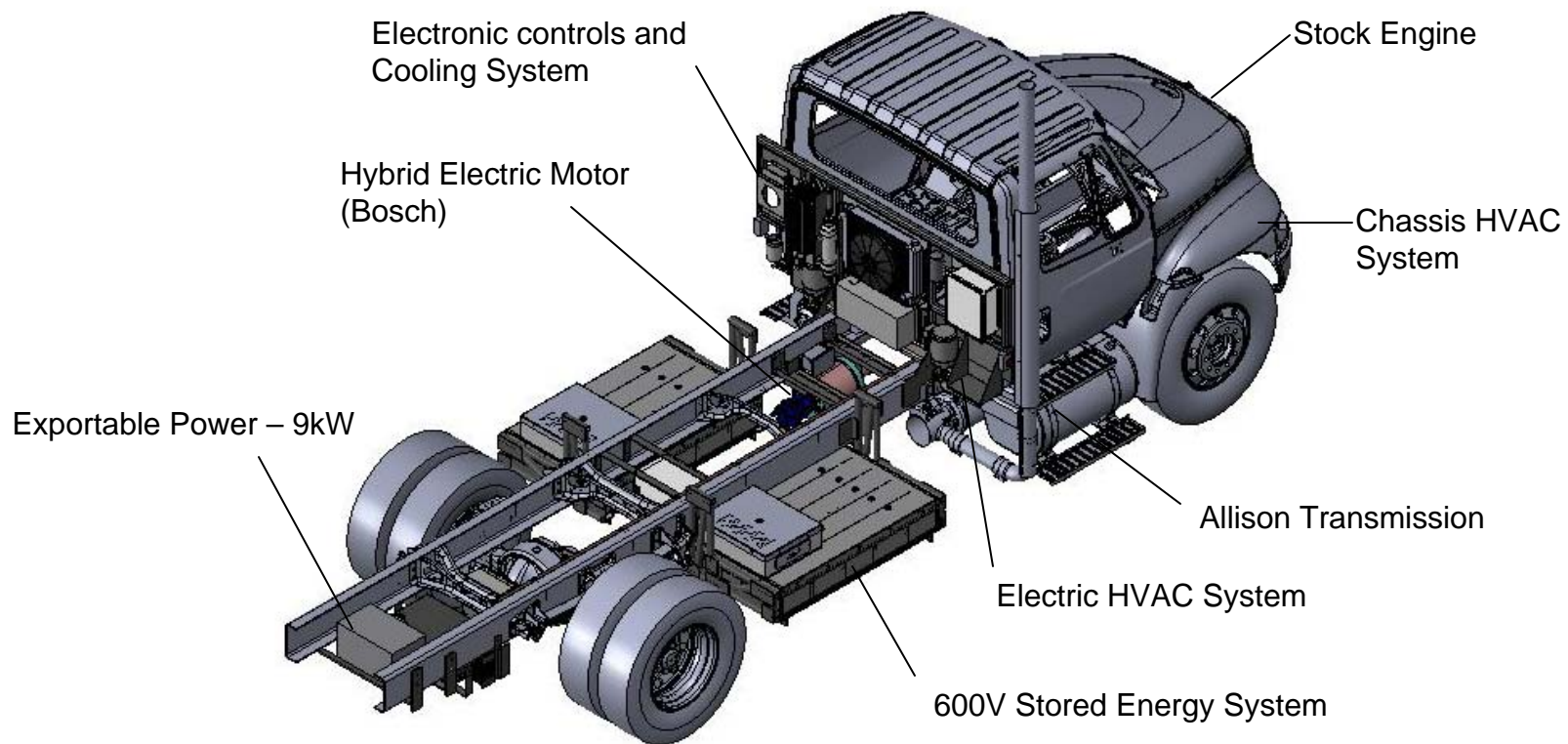
Permanent Magnet Motor/Generator provides propulsion assist and regenerative braking.



Batteries are charged by regenerative braking, engine/generator system, or grid power through a charging station.

No change to OEM Transmission or Engine parameters CARB Compliant

Odyne Parallel Hybrid System



Multiple Chassis Manufacturers, Multiple weight classes, Retro-fit capable
Shipped to Final Stage Manufacture



Charging Station

- Designed to SAE 1772
- Communicates with vehicle for safe charging
- Eight hour charge cycle
- 240 single phase 40 amp service
- Prevents vehicle from starting while cord is attached





Technical Specifications

Description	Odyne Plug-in Hybrid Electric Vehicle Class 5-8
Launch Assist/ Regenerative Braking	Yes
Electric Motor	Bosch Permanent Magnet, 26kW cont., 45kW / 60HP peak, 200 ft-lbs of Torque
Battery Storage Capacity	35, 18, 10 kWh Stored Energy Systems
Battery Type	Energys - Lead Acid Absorbed Glass Mat
Recyclable Batteries	Yes
Continuous Operation Time	240 min (Aerial Device); 60 min (Digger Derrick & Air Compressor)
Recharge time in field	15 to 20 minutes
Plug-in Capability	Yes : 220V single phase 40 amp service
Exportable Power	Yes : 9kW, 120V & 208V outlets
Aux HVAC for Cab while in Electric PTO Mode	Yes : 13,500 BTU A/C; 7,500 BTU Heat



Benefits of Odyne Plug-in Hybrid

Reduced fuel consumption & emissions:

- Eliminates or reduces fuel consumption and emissions at the jobsite
- Increased efficiency when driving
- Savings of 50% per year are possible, depending upon the duty cycle.

Quiet jobsite operation

Interfaces with Allison Transmission

Larger battery system than conventional hybrid

- 35kWh vs. 2Kwh – recharge using grid (or vehicle)
- Operates longer in all-electric mode at jobsite.
- Electric air conditioning and heat in cab, reduces idle time at jobsite.
- Exportable power, eliminates diesel generator.

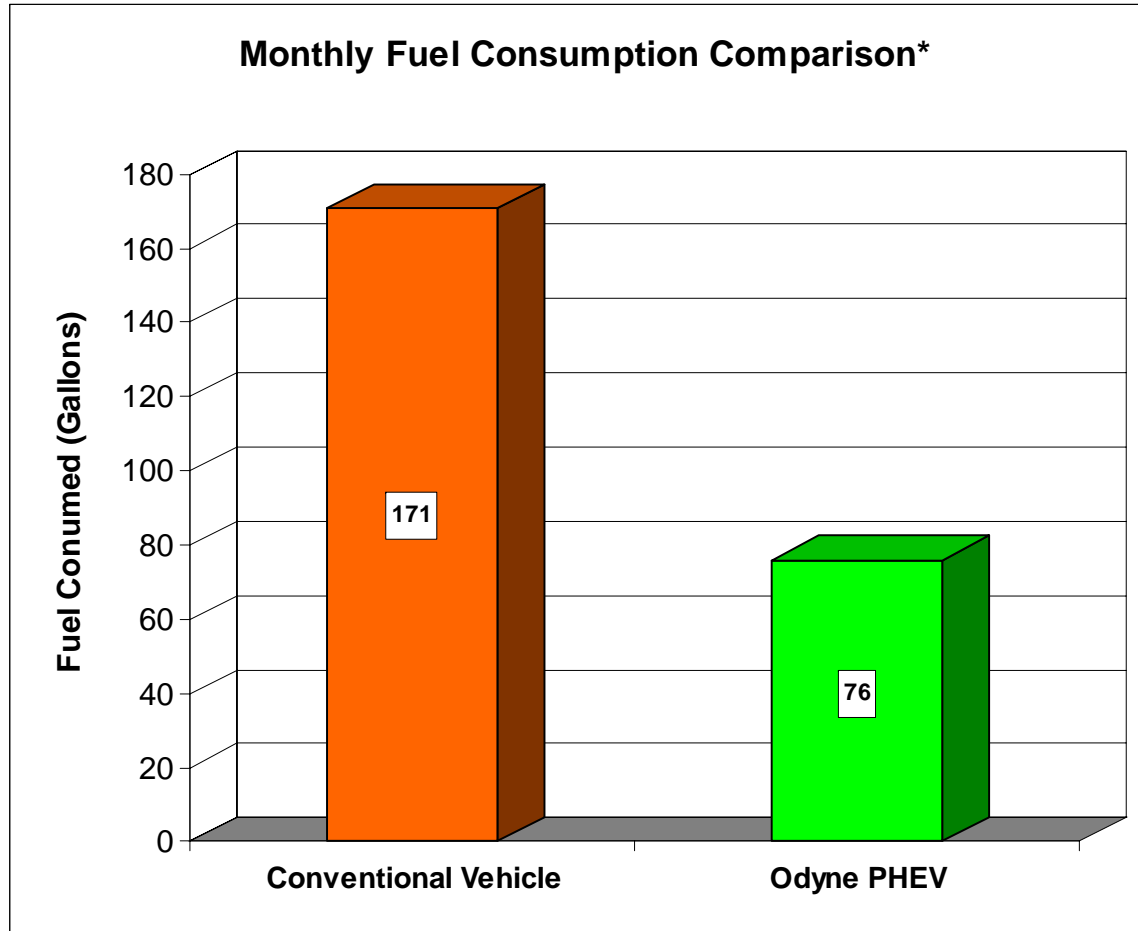


Early Adopters



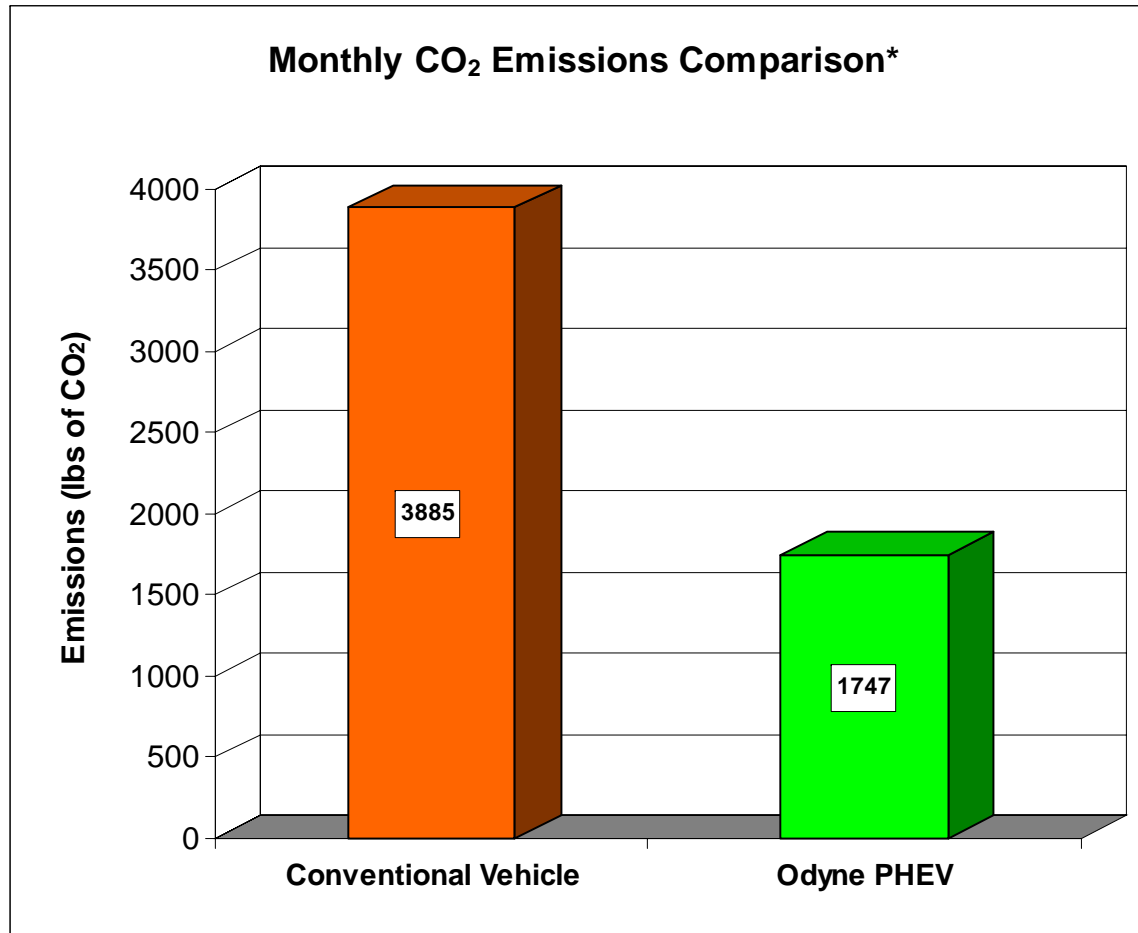
- PG&E, Xcel, AEP, DPL, Progress Energy, FP&L, PSE&G, Cox, UELC and others

Fuel Consumption



***Based on Third Party Testing Utility Duty Cycle –
55.5% Fuel Savings***

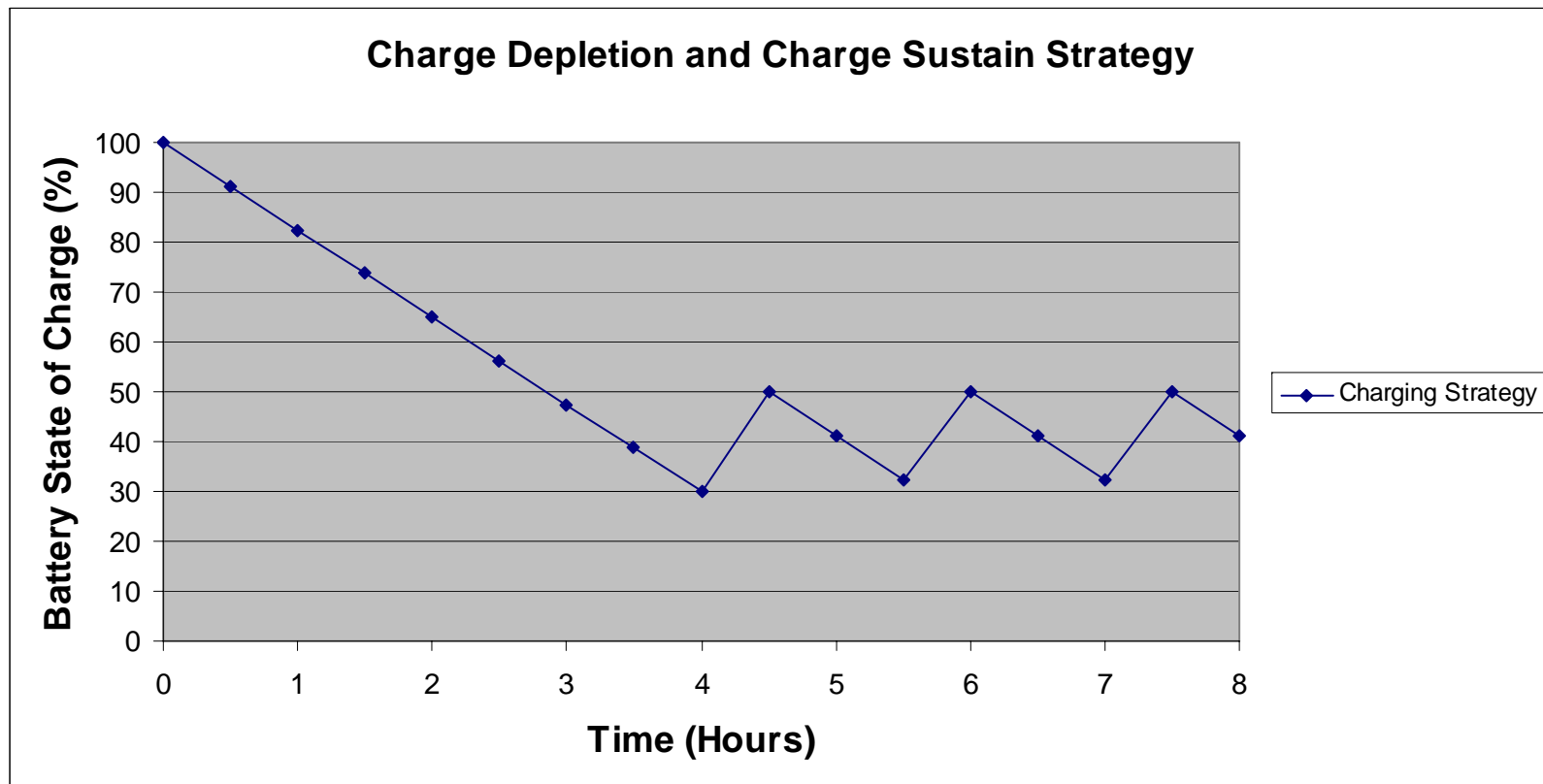
Emissions



***Based on Third Party Testing Utility Duty Cycle –
55.5% Emissions Savings***

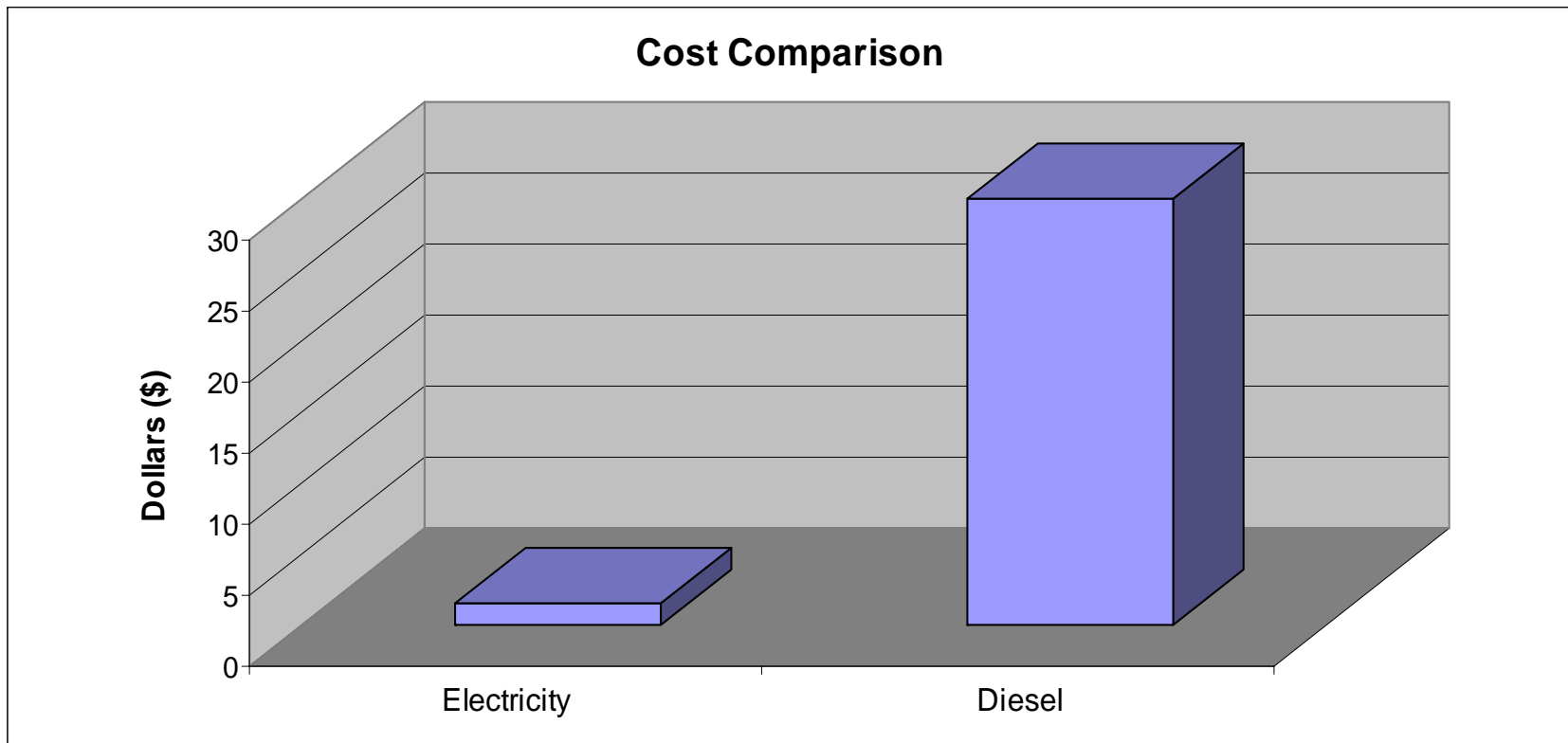
Plug-in Hybrid Battery Management Strategy

- Charge depletion and charge sustain



Electricity cost versus Diesel fuel cost

- Electricity cost of \$2.50 (25kWhr at \$.10 per kWhr)
- Diesel cost of \$21.00 (7 gallons at \$3.00 per gallon)





Current Activity

Received IRS approval for maximum \$12,000 Tax Credit (Notice 2007-46 and IRC 30B(a)(3) and 30B(d))

Expanding production in 2010

- DOE Clean Cities projects

Awarded DOE Congressionally Directed Project

\$1.9 million DOE funding for plug-in hybrid medium duty truck

- Develop and demonstrate next generation plug-in hybrid medium duty trucks



Patent Pending © 2009, Odyne





Thank You



Please stop by our Booth V7