



DUECO, Inc.: Proposal Concepts

California Energy Commission American Recovery and Reinvestment Act of 2009 Cost Share Grant Solicitation

Alternative and Renewable Fuel and Vehicle Technology Program
April 27, 2009



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Plug-in Hybrid Heavy Duty Trucks

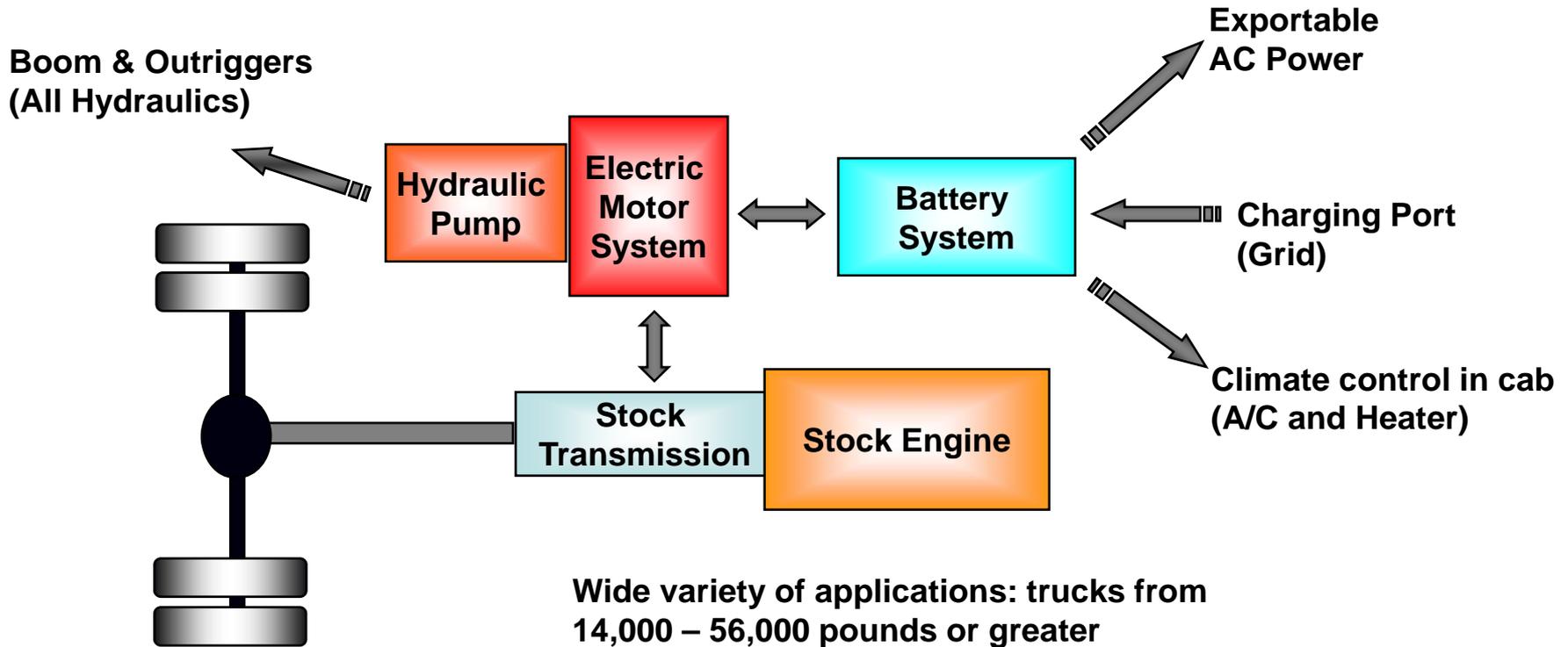
Applications:

Aerial Devices
Digger Derricks
Underground Maintenance

New and Retro-fit



Odyne Parallel Hybrid System



No change to OEM Transmission or Engine parameters CARB Compliant



DUECO Plug-in Hybrid Heavy Duty Truck

Uses low cost, domestically produced energy from electric grid, while re-charging at off-peak hours

Off-sets diesel fuel consumption 6 - 8 gallons per day, depends upon duty cycle, could be more



Reduces particulate and greenhouse gas emissions

Battery system powers all necessary equipment, including aerial lift, air conditioning, and heating ... while the engine is off

Lower noise levels in operation

Standby power capability

Powers a wide variety of truck mounted equipment:

Aerial Devices, Digger Derricks, Cranes, Gas Crew trucks

Overview: Federally-Funded Project Proposals



- 1) Retro-fit Kit for Plug-in Hybrid Electric Heavy duty trucks over 14,000 pounds
 - DUECO/Odyne Power Train Drive Kit
 - Install and test on existing vehicles
 - **Requesting: \$2M**

Reduce fossil fuel
consumption and emissions
from existing fleet vehicles!



Overview: Federally-Funded Project Proposals



2) Advanced Technology Plug-in Hybrid Electric Heavy Trucks

- New Trucks over 14,000 pounds with advanced batteries (Li-ion and other adv. Technology)
- Various applications and truck sizes
 - Class 4-5 trucks for Telecommunications
 - Class 6-8 trucks for Underground Maintenance, Aerial lifts, Digger Derricks
- **Requesting \$3M**

Reduce fuel consumption and emissions. Reduce system cost, and improve performance.



Anticipated Project Partners



- California Customers: Verizon, PG&E, UELC (for both new and retro-fit conversions; others forthcoming)
- Electric Power Research Institute (EPRI)
- CALSTART
- Coulomb Technologies & Clean Fuel Connection: Charging Infrastructure
- Grid Point: Smart Grid technologies
- National Renewable Energy Laboratory, Colorado (NREL)
- California installation labor 9 possible locations:
 - Utility Equipment Leasing Corporation
 - PTO Sales (ITW - Crane Carrier)



Cost Sharing

Project 1: Retro-fit Kit for Hybrid Electric heavy-duty trucks

Project Tasks:

Develop, test and validate initial concepts for Retro - fit Kit. Product design and prototype development. Produce Retro-fit kits. Install retro-fits on trucks; train customers on-site, with training manual. Perform Field monitoring, Develop Emergency assistance training and Warranty service. Charging station integration, installation, Smart Grid interface. Administrative, reporting, other general. Estimated costs and sharing shown below:

<u>Total Cost</u>	<u>DOE Transp. Electr. Funds</u>	<u>CEC Funds</u>	<u>DUECO / Customer Contribution</u>
\$ 4.6M	\$2.3M 49%	\$2M 43%	\$0.35M 8%

Number of Units Deployed in California: 10 -20

Number of Units Nation-wide: 10 - 20



Cost Sharing

Project 2: Plug-in Hybrid Electric trucks for Telecom and other markets

Project Tasks: Develop new vehicle, test and validate initial concepts. Design product and complete prototype development. Produce new plug-in hybrid vehicles. Deploy trucks; train customers on-site, with training manual, Monitor performance in the field, develop Emergency assistance training and Warranty service procedures. Charging stations integration, installation, Smart Grid interface, Administrative, reporting, other general. Estimated costs and sharing shown below:

<u>Total Cost</u>	<u>DOE Transp. Electr. Funds</u>	<u>CEC Funds</u>	<u>DUECO / Customer Contribution</u>
- \$22M	\$10.6M 48%	\$3M 14%	\$8.4M 38%

Number of Units Deployed in California: 20

Number of Units Nation-wide: 70



Project Benefits

- Deployment of Advanced Technology plug-in hybrid heavy-duty trucks for multiple market applications
- Job creation in California
- Reduced particulate and greenhouse gas emissions
- Reduced diesel fuel consumption
- Interface with smart-grid, with new technologies and utility coordination
- Lower noise at job site, improved safety
- Ability to scale to high volume, meets growing market demand – new and existing fleets



Questions?



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