

# Electric Trucks

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# Proposed Projects For Heavy Duty Electric Trucks

- Fuel Cell Heavy-Duty Truck
- Battery Electric Heavy-Duty Truck
- Upgrade Electric Yard Truck With Lithium Batteries
- Catenary Power System for Electric Trucks
- Quick-Charging For Electric Heavy-Duty Vehicles

# Target Market - Port Drayage

- Electric Trucks For Regional Transportation Of Port Containers
  - Ideal, short-range for electric propulsion
  - Large enough market to jump-start electric drive business
  - Market aggressively seeking cleaner alternatives to diesel trucks
  
- Focus on Ports of Los Angeles and Long Beach and Intermodal Facilities
  - Ideal location for demonstration
  - Motivated customers
  - Numerous regional incentives



# Fuel Cell Heavy-Duty Class 8 Truck

- Vision Motors proposes a hydrogen fuel cell electric powered class 8 truck
- Plug in Capability
- Battery dominant design with fuel cell range extender



# Fuel Cell Heavy-Duty Class 8 Truck

- Fuel capacity 20-40 kg hydrogen
- Range – 200 miles at full load
- Speed – 65 mph
- Target Market – Ports of Long Beach & Los Angeles
- Total project cost - \$1M, AQMD share \$500K



# Upgrade Electric Yard Truck With Lithium Batteries

- Electric yard trucks supported with AQMD funding use lead acid batteries
- Balqon proposes to upgrade an electric yard truck with lithium batteries & a develop faster charging system
- Improved range from 60 to 180 miles
- Increase battery capacity with same weight as lead acid
- Total cost - \$940K, Port of LA share \$400K
- Balqon is also developing Class 8 truck for port pilot project



# Electric Heavy-Duty Class 8 Truck

- Transpower is proposing to conduct a study and performance tests relating to the “Feasibility of a Vertically-Integrated Facility for Electric Truck Manufacturing.”
- Goal is to establish a new facility for manufacturing Class 8 electric trucks in California by January 2013



# Electric Heavy-Duty Class 8 Short Haul Truck

- **Phase 1: Prototype Demonstration (2010-11)**
  - Demonstrate two electric drayage trucks in service in 2011
  - Secure ~\$2 million in grant funding to augment private investment
  - Received \$1M grant from CEC for electric truck manufacturing
- **Phase 2: Commercialization (2012-)**
  - Use successful demonstration to stimulate demand
  - Transition from after-market retrofits to selling kits to OEMs
- **Team Members**
  - Navistar: Support perfection of a commercial-ready product and provide path to market
  - EPC: Develop silicon-carbide power converter
  - Evaira: Develop lithium battery modules
  - ISE/Siemens: Supply motors, accessories, controls architecture
  - TTSI: Demonstration partner and key early adopter customer

# Catenary Power System for Electric Trucks

- Daimler Trucks North America has begun development on heavy duty electric trucks powered from overhead lines
- Using their advanced hybrid electric drive system developed for CNG and electric operation
- Electric operation will be used when catenaries are available at ports or urban areas and CNG operation over the road
- Daimler was awarded \$2.1M from the CEC for this project

# Quick-Charging For Electric Heavy-Duty Vehicles

- Battery electric heavy duty trucks will address criteria pollutants and green house gases
- Challenges for battery electric trucks are the cost, weight and volume of the battery and the amount of time to recharge
- **Quick Charging:**
  - Enables the transfer of energy storage from the vehicle to the infrastructure reducing cost, weight and volume of the battery pack
  - Decreases refueling time from 8-12 hours to 10-30 minutes to be more competitive with liquid or gaseous fuels

# Foothill Transit Quick Charge Electric Bus Project

- Funding from AQMD will support the charging technology & charging station
- The 250 kW charging system will recharge batteries from 10% to 90% in 10 minutes
- Charging technology being developed by Aerovironment is transferable to heavy duty trucks
- Total project cost \$5.1M, AQMD contribution \$290K

