

Medium/Heavy Duty (M/HD) Vehicle Electrification – Key to Reducing Urban Air Pollution

Medium and Heavy Duty (M/HD) vehicles, those in the US Department of Transportation (DoT) Class 3-8 only represent 4.6% of the US vehicle fleet but consume 22.7% of all transportation sector energy and produce 39% of the transportation sector greenhouse gas emissions. As the percentage of M/HD vehicles in the US vehicle fleet continues to grow and the number of miles that these vehicles drive daily increases, the pollution produced by these vehicles will continue to increase. These trends have spurred a movement to electrify M/HD vehicles, both to reduce air pollution to meet government regulatory mandates and to reduce energy costs.

High-Power DC Chargers – Critical to M/HD EV Fleet Availability

Charging systems for M/HD electric vehicle (EV) fleets are fundamentally different from chargers for electric automobiles, SUVs, and light trucks. While passenger vehicles typically drive less than 30 miles per day (consuming only 10%-12% of their battery capacity), M/HD EVs typically drive 50-150 miles per day, consuming 40%-80% of their battery capacity. This means that, even with high-power DC chargers, M/HD EVs must charge for several hours each day at power levels that can reach hundreds of kilowatts. M/HD EV chargers must be capable of continuous operation at full power output with a high reliability; failure to do so critically impacts the ability of the M/HD EV fleet to meet its availability commitments.

As the gateway between the M/HD EVs and the outside world, these chargers must be capable of collecting information from the vehicles and passing it to vehicle scheduling systems and vehicle maintenance systems. M/HD EV fleet charging infrastructure must also be ready for integration with renewable resources such as photovoltaic (PV) solar power and stationary energy storage systems. Finally, M/HD EV charging systems must be bidirectional to support vehicle-to-grid (V2G) operation, which reduces energy costs and allows M/HD EVs to provide backup power during emergencies.



Rhombus Energy Solutions – The Technology Leader in High-Power M/HD EV Fleet Charging

Rhombus Energy Solutions (Rhombus), based in San Diego, CA & Dearborn, MI is a leading innovator in the development and production of **Made in the USA** high-power charging infrastructure for M/HD EV fleets. Rhombus bi-directional chargers are specifically designed to meet the requirements of M/HD EV fleets – they are designed for extremely high reliability, ease of maintenance, and the ability to operate continuously at full rated power output. Just as importantly, Rhombus M/HD EV chargers are designed not only for today, but to meet the needs of tomorrow as well. All our chargers are capable of bi-directional operation, making Rhombus one of the only companies that offers vehicle-to-grid (V2G) capabilities in high-power M/HD EV chargers. Rhombus chargers have the intelligence to interface and provide vehicle data to a variety of other systems in the charger ecosystem and can run third-part applications and services. This ensures that the Rhombus chargers that your purchase today will still meet your needs five or ten years from now, and help you meet air quality requirements, while simultaneously reducing power consumption and fleet operating costs.

The Rhombus M/HD EV Charging Product Lineup

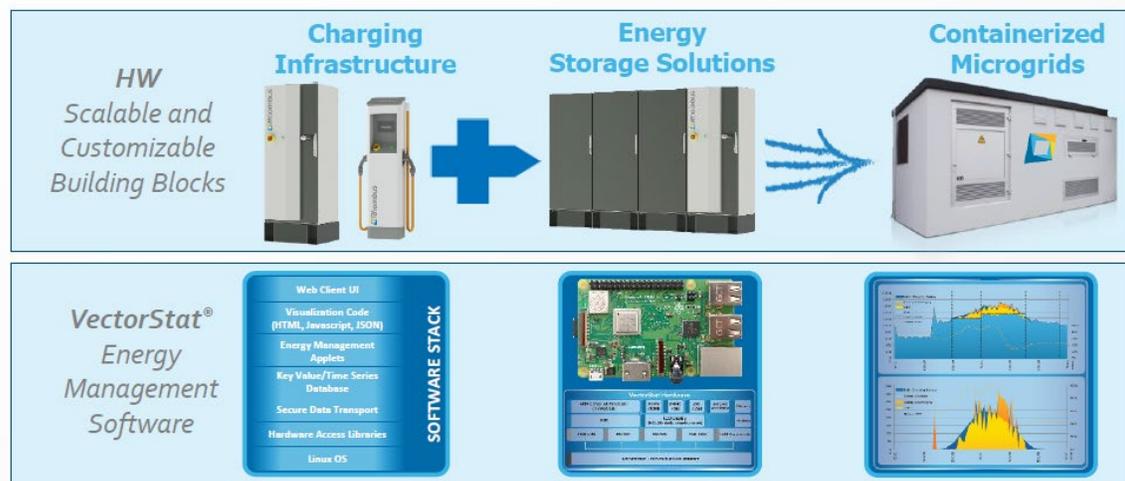
The Rhombus product family is built specifically to meet the needs of M/HD EV fleets. Our portfolio of next-generation M/HD EV fleet chargers are recognized as best-in-class by customers seeking to reduce operating costs and increase vehicle availability. Rhombus offers a complete line of charging solutions for M/HD EV fleets from 60 kW to 500



kW including custom dispensers and multiple power conditioning systems (PCSs), all with V2G capability. All of our charging solutions are NEMA 3R rated and UL 2202/2231/1741SA rated. Rhombus offers the most efficient, reliable DC charging infrastructure for M/HD EV Fleets.

Rhombus compliments its M/HD EV charging solutions with a variety of options to build complete solutions. We have teamed with several battery technology and renewable energy providers to integrate these capabilities into the Rhombus M/HD EV fleet charging infrastructure. Our VectorStat® energy management system (EMS) software and single-board computer (SBC) controllers form an open-source platform that enables commercial/industrial EV charging and energy storage system (ESS) integrators to reduce their total cost of ownerships and speed the time to market for their products. All these capabilities are built upon a technology foundation which includes

21 patents, significant proprietary technology, and decades of experience in high-power energy systems. Rhombus also important to note that the company has a high-power development and testing lab certified by UL, which allows it to expedite its product development process.



Rhombus Energy Solution – The Right Partner for Electrifying Your M/HD EV Fleet

M/HD vehicle electrification represents an excellent means to reduce energy and maintenance costs, while significantly improving air quality in our cities. Having the right EV charging infrastructure is critical to delivering on that promise and achieving high availability for M/HD EV fleets. Our customers include leading M/HD vehicle and powertrain original equipment manufacturers (OEMs), charging systems operators, and fleet operators. Our systems are easily customized to meet specific customer deployment situations and needs, and offer reliability, maintainability, and availability second to none in our industry. These are only some of the reasons that Rhombus Energy Solutions has delivered and deployed nearly one thousand systems into the most demanding M/HD EV charging environments. Find out more at www.RhombusEnergy.com and at info@rhombusenergy.com.

