



## Market Trends in Light and Medium E-Truck Energy Management Systems

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- In the global E-truck market, battery capacities are dominated by the 100-200 kW range. 50-100 kW ranges are also heavily present in the market worldwide.
- Most of the global MDV market is using a DC-DC Converter with power ratings of 3-5 kW; in fact, a significant number of models are also utilizing 5-10 kW ratings
- In order to maximize the number of benefits of deploying an E-truck, manufacturers are trying to introduce trucks with high efficiencies and greater ranges.

As of late, several countries and E-truck manufacturing OEMs have introduced ambitious plans and targets to attain high levels of electrification in the heavy-duty vehicle category. This category includes the following:

### **Light Duty Vehicles (LDVs):**

Motor vehicles with at least four wheels, used for carrying goods with a minimum weight of 3.5 metric tons and a maximum weight of 7.5 metric tons.

**Medium Duty Vehicles (MDVs):** Defined as non-passenger vehicles over 7.5 tons and up to 16 tons.

**E-trucks:** These consist of both battery electric trucks and plug-in hybrid electric trucks in the BEV and PHEV categories, respectively. BEVs draw all their power from battery packs and, therefore, require no internal combustion engine, fuel cell, or fuel tank. A PHEV, on the other hand, shares characteristics with both conventional hybrid electric vehicles, thanks to having an electric motor, as well as traditional internal combustion engines (ICEs) and electric vehicles, because of being able to connect to the electric grid.

**Energy Management System (EMS):** EMS is defined as the control over the optimal flow between a vehicle's battery, converter, and other parts.

## Key Trends

### LDVs

In the global E-truck market, battery capacities are dominated by the 100-200 kW range. 50-100 kW ranges are also heavily present in the market worldwide. Moving forward, E-truck battery capacities are primarily expected to remain in the 100-200 kW rating. The EMS Voltage for global LDVs is concentrated in between 400-800 V, with the majority of the LDVs utilizing voltage ratings between 400-600 V. By 2030, the EMS voltages in the LDV market are expected to increase into the 600-800 V category.

The majority of the global LDV market is using DC-DC converters at present, with power ratings of 3-5 kW, an industry standard with regards to the auxiliary components present within LDVs. In the near future, the LDV market is expected to increase its usage of 5-10 kW DC-DC converter systems.

### MDVs

The current landscape is such that most of the global MDV market is using a DC-DC Converter with power ratings of 3-5 kW; in fact, a significant number of models are also utilizing 5-10 kW ratings. However, the 3-5 kW rating still remains superior when it comes to demand. By 2030, DC-DC converter ratings are expected to increase, with the market increasingly utilizing systems greater than 5 kW. The majority of the MDV market is currently using Battery Capacities within the 100-200 kW range. E-truck markets in the EMEA and APAC regions as well as China have a 50-100 kW and 200-300 kW rating market presence as well. Meanwhile, the E-truck market in the Americas has negligible models within the 50-100 kW range.

At present, the global E-truck EMS Voltages for MDVs are present within the 400-800 V range, with the majority of the models being concentrated on 600-800 V ratings. The EMS voltages in the MDV market are expected to increase into the greater than 800 V category, effectively reducing the number of models utilizing the 400-600 V systems.

## Looking Ahead

In order to maximize the number of benefits of deploying an E-truck, manufacturers are trying to introduce trucks with high efficiencies and greater ranges. Moving forward, we can observe a coherent trend in the global E-truck

energy management system market. E-trucks with greater DC-DC power ratings, higher battery capacities, and increased EMS voltages are expected to replace the current E-truck technology in the next 5-10 years.

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