Image Credit:evbox.com

Technology Assessment of Zero Emission Heavy-Duty Vehicles

Short version of the Report

The global hydrogen fuel cell vehicle market was estimated at $0.94 billion in 2022. Fast forward to 2040, and detailed analysis indicates an impressive growth trajectory, with the market anticipated to expand to a significant $80.4 billion. This journey will be marked by a steady Compound Annual Growth Rate (CAGR) of 28% from 2022 to 2040.

ACG Autobei Consulting Group

About US:

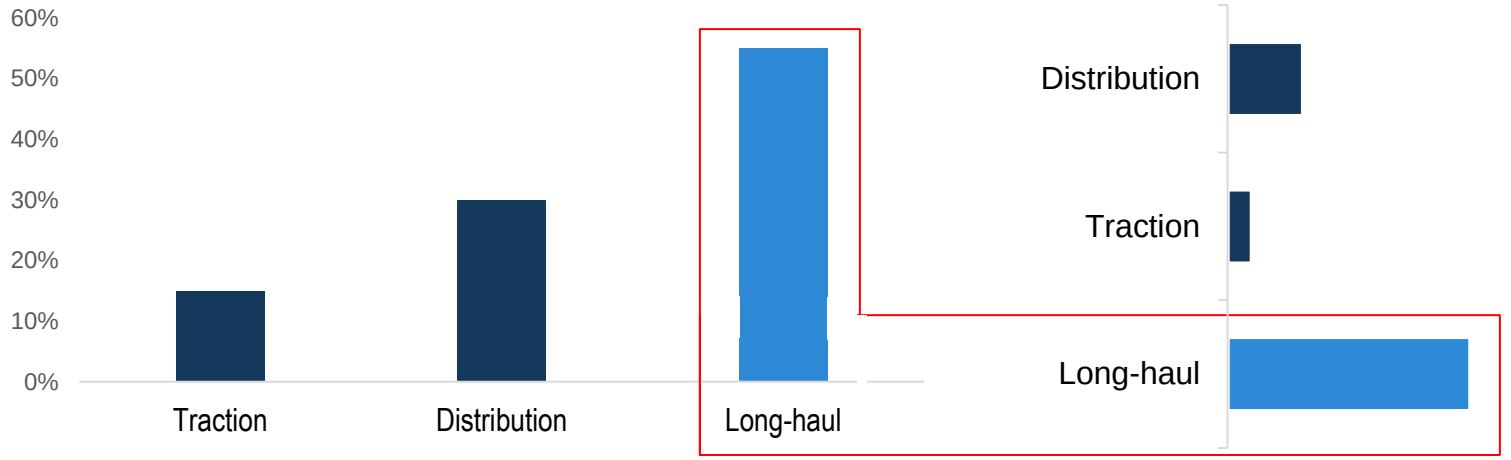
We are a Global market intelligence and analytics group specializing in the automotive sector. We empower organizations to make informed and strategic decisions at every level, leveraging an integrated suite of market models, essential industry data, and a network of Automotive industry experts.

We work with leading Automotive stakeholders like OEMs, Suppliers, Financial Institutes, Logistics companies, Branding agencies, Research and consulting firms, and Government organizations to help them minimize risk, and improve performance in various areas.

Semiconductor Procurement Strategy

Buying through Power Module Manufacturer

MHD Global Market Forecast 2030 – BEV and FC Powertrain



Emissions per Segment - EU

Source: ACG BEV and FC Truck Study Europe 2022

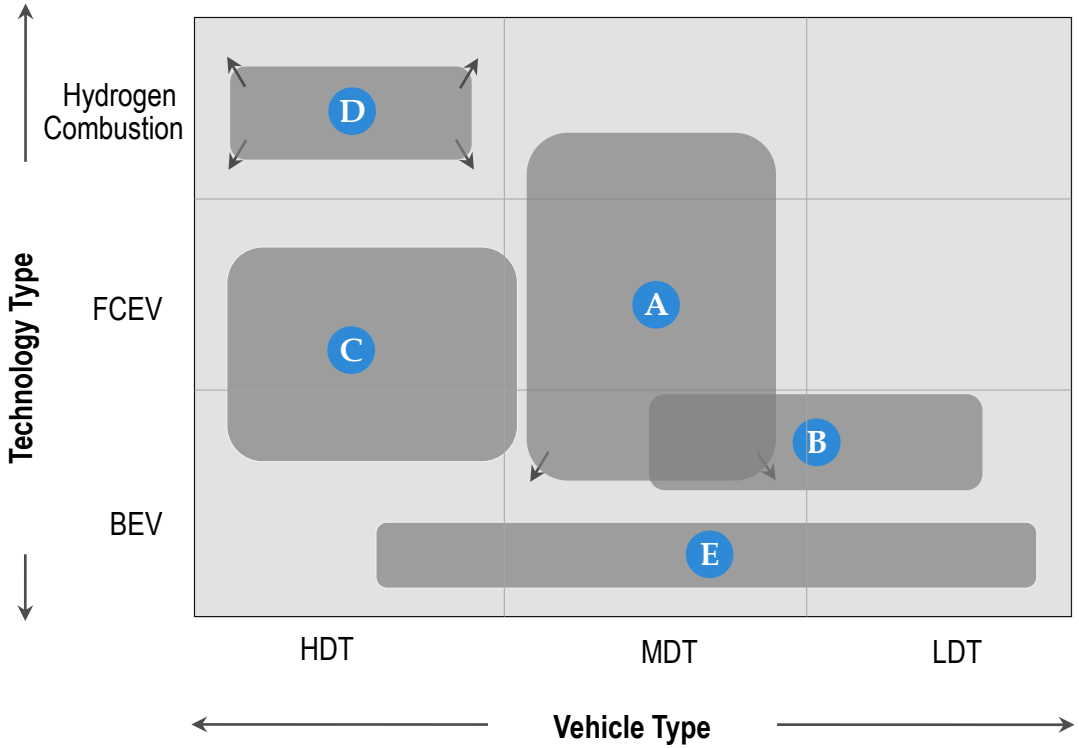
Insights

- The long-haul trucking segment stands out as the most appealing truck segment because of its compatibility with high-volume market size and its significant contribution to emissions reduction.
- Distribution BEV truck segment is also highly attractive due to its range, battery, and Initial cost suitability for around ~400km per day
- Volta Truck is focusing on the Distribution truck segment only

Semiconductor Procurement Strategy

Buying through Power Module Manufacturer

Technology, Application & Type



Source: Interviews; ACG analysis

	Application	Customer Requirement	Customer Acceptance
A	**City Logistic Operation** Increase market share due to availability of products and feasibility	70 - 120kW	◕
B	**Municipalities** The primary hurdle lies in the cost aspect	60 – 100kW	◔
C	**Long Haul Truck** Mix Portfolio of all 3 technologies	260 – 570kW	◑
D	**Distribution City Bus** Supportive policies	150 – 200kW	◕
E	**Multiple Mix Operation** Growing market penetration	80 – 400kW	◑

○ Not relevant
◑ Partly relevant
● Highly relevant

Note: The areas of the boxes show market potential

Source: ACG Analysis and Fleet owner Survey

Elevating the savings of the Electric Vehicle Manufacturers by incorporating a Systematic Approach in Semiconductor Procurement

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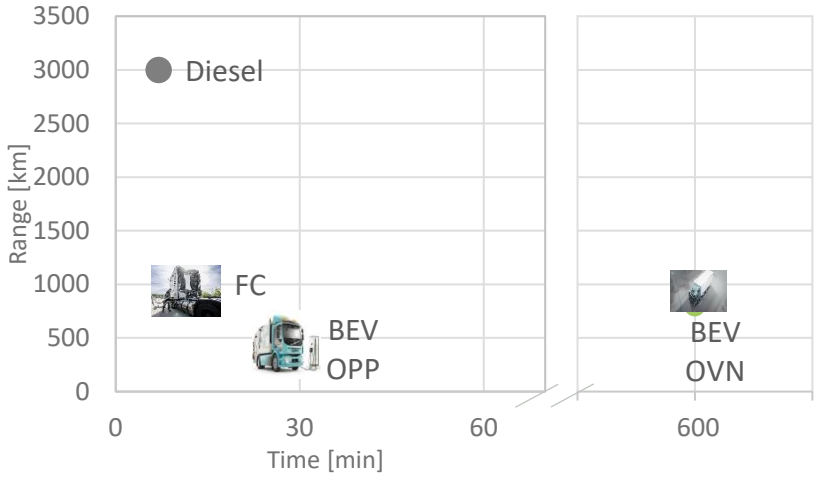
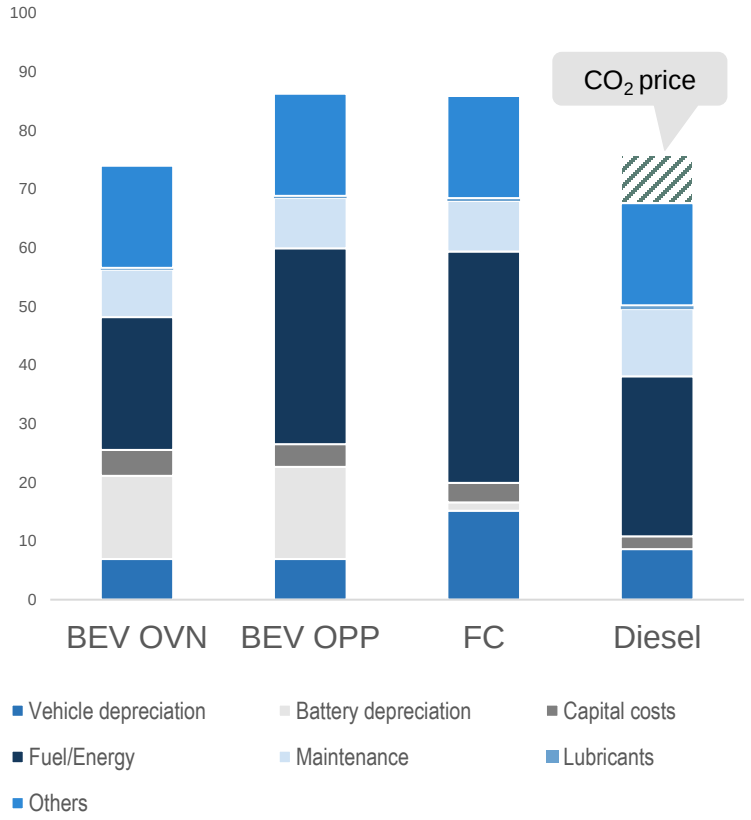
Refueling/Recharging time



Source: ACG Analysis

TCO Calculation in 2030 [ct/km]



Excluding personnel and toll expenses

TCO is the key purchase criteria

- Fuel consumption stands out as the primary driving factor for total cost of ownership (TCO)
- A fuel cell system with a substantial hydrogen cost results in the highest fuel expenses
- BEVs incur higher initial investment due to the expense of batteries, but this is counterbalanced by their lower operating cost.
- Slow charging is the best option during the night. It helps to keep battery health up to the mark and several other technical benefits

Image credit: Volvo, Daimler

Long-Haul Heavy Duty with Different Technology

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Tractor (4X2) 40t GCW, 330kW E-Motor

		Range	Battery Size	Power FC	Tank Size
	**Battery Electric** BEV_{OVN}[1] Overnight charging	800km	1100kWh	-	-
	**Battery Electric** BEV_{OPP}[2] Opportunity charging	400km	550kWh	-	-
	**Fuel Cell** Liquid Hydrogen	1000km	70kWh	300kW	80 kg

Long Range transport, sleeper cabs, typically no return to same depot at end of the day

Source: ACG Analysis EV Drivetrain Analysis

1. BEV Overnight Charging (BEV_{OVN} 2. BEV Opportunity Charging (BEV_{OPP})

Image credit: Volvo Trucks, Daimler, and Scania

Our Clients: OEMs, Consulting, Venture Capital, Auto Components Manufactures, Service provider and Others

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…and many more

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Our Expertise:

Our key expertise is in the Global Automotive Industry and currently, our key focus is on the E-mobility segment. Product Management & Strategy, Sales Analytics and strategy, Market Assessment and Forecast, Insurance providers, Software Development, Digital technology, Semiconductor and Power Module, Battery Technology, Customer Analytics, Go-To-Market, Branding Strategy, Autonomous vehicle technology and Market Forecasts.

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Thank you

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