

QUANTRON AG

EUROPEAN HEAVY-DUTY
FUEL-CELL TRUCKING INDUSTRY

Best Practices Criteria for World-Class Performance

Frost & Sullivan applies a rigorous analytical process to evaluate multiple nominees for each Award category before determining the final Award recipient. The process involves a detailed evaluation of best practices criteria across two dimensions for each nominated company. Quantron AG excels in many of the criteria in the heavy-duty fuel-cell trucking space.

AWARD CRITERIA	
<i>New Product Attributes</i>	<i>Customer Impact</i>
Match to Needs	Price/Performance Value
Reliability	Customer Purchase Experience
Quality	Customer Ownership Experience
Positioning	Customer Service Experience
Design	Brand Equity

Match to Needs

With the intensifying climate change crisis, the accelerated push toward decarbonization and global targets, such as the European Union’s 2050 target for carbon neutrality, highlight the need for urgent change in the commercial vehicle industry. Commercial vehicles, including diesel-powered, heavy-duty vehicles, have long been known for their large carbon footprint linked to their high per-unit emission rates. Against this background, participants in the global heavy-duty vehicle market are revisiting their highly polluting diesel truck portfolios and are stepping up the pace to achieve zero emissions per truck

by adopting clean energy alternatives.

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Industry Analyst**

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Frost & Sullivan analysts monitor how a flood of new market entrants is set to transform the electrification and fuel-cell trucking space, with the agenda to design and position fuel-cell trucks as the go-to zero-emission

solution for heavy-duty, long-haul trucks and for a wide range of use cases. Simultaneously, these market entrants will need to focus on effectively addressing customer demands related to refueling times, range, and payload capacity. Moreover, Frost & Sullivan points out that companies will need to look at economics and profitability since these factors determine technology and purchase preferences, and the gamechanger will be the competitive total cost of ownership, compared to conventional fuel-powered trucks.

Quantron AG, founded in 2019 and headquartered in Augsburg, Germany, is the eMobility spin-off company of Haller GmbH & Co KG. To address the varied application requirements of the European mobility industry, Quantron AG plans to introduce in four commercial vehicle segments fuel-cell vehicles over the next 12 months. The company's pioneering 44t 4x2 fuel-cell truck dedicated to heavy-duty applications checks the boxes on range, with the ability to cover a distance of nearly 600 to 700 kilometers (km) on a single fill with a fully chassis integrated 54 kg H2 tank while operating at maximum payload capacity. At IAA Transportation 2022 QUANTRON presented as latest release the QUANTRON QHM FCEV 44-2000 as best-in-class hydrogen range champion. The truck stands out from the competition through the exceptionally large tank capacities of up to 116 kg, which are fully integrated in the chassis and positioned behind the cab. This will enable ranges of up to 1500 km with a single H2 tank filling. This truck platform can refuel at 350 bar or at 700 bar pressure and has a tractor unit and chassis capable of different configurations based on its 3600mm+ wheelbase. Other products in development include both BEV and FCEV 4.2t and 7.2t trucks, and 6x2 tractor units, and a garbage collection truck; as such, Quantron AG effectively matches key market needs.

Positioning

Quantron AG initially started as an electrification company that converts used and existing trucks and vans to run on battery electric power, but has now been slowly transitioning into a full vehicle developer. The company offers battery electric solutions that have already been tested and deployed for commercial operations, in addition to offering fuel-cell solutions that are being prepared for launch. The company is positioned as a versatile solutions provider for customers looking to electrify their vehicle portfolios with the following two business operations: Q-Retrofit for the used and existing vehicles retro fitment market and Q-Mobility for in-house-built zero-emission Quantron vehicles.

Frost & Sullivan notes that another one of Quantron AG's unique offerings is its Quantron-as-a-service (QaaS) platform that is designed as a 360-degree, open-ended partner ecosystem that supports and accelerates zero-emission transportation. The platform seamlessly brings together financial partners, investors, and customers in a global hydrogen alliance.

QaaS is rooted in the following three pillars:

- Quantron Energy and Power Station cover the production and distribution of green energy and hydrogen and the hydrogen refilling and electricity charging infrastructure network and supply.
- Quantron Inside focuses on fuel-cell and battery electric vehicles (BEVs) and components.
- Quantron Customer Care promotes physical and digital solutions for sales, aftersales, and second-life services.

Furthermore, Quantron AG implements batteries and integrated customized electrification packages to its own commercial vehicles, with possible solutions through its partner network for third party machinery, and intralogistics vehicle solutions.

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Design

Quantron AG offers light-, medium-, and heavy-duty vehicles in the 3.49t and 44t segments up to max. 60t for Scandinavian versions, traditionally converting vehicles from original equipment manufacturers (OEMs), such as MAN, Mercedes-Benz, IVECO, DAF Trucks, among others. To develop its powertrain, Quantron AG partners with various industry stakeholders and leading commercial vehicle suppliers.

The company has already established a robust supply chain with various participants, such as CATL, NPROXX,

MAHLE GmbH, Alison, Ballard Power Systems, and many more. The company is jointly developing fuel-cell trucks with Ballard Power Systems, with Ballard’s high-efficiency fuel cells built of different vehicle models. Quantron AG developed its QUANTRON QLI FCEV Light Transporter on the IVECO Daily light commercial van, with close cooperation with fuel-cell expert AE Driven Solutions, whereas the company developed its bus model CIZARIS in collaboration with EV Dynamics.

Price/Performance Value

The cost of hydrogen at the pump will significantly influence the adoption rate of fuel-cell trucks. Such costs will be determined by production, delivery, and distribution methods. Technological advances and mass commercialization will catalyze the availability of low-cost hydrogen at the pump, motivating the uptake of fuel-cell vehicles in the market. Simultaneously, the total cost of ownership will play a central role in vehicle adoption, since the demonstration of cost-effective ownership will accelerate the switch to fuel-cell vehicles.

BEVs face the challenges of limited charging stations, high cost of battery cells, and the current low uptake of volumes, resulting in high vehicle costs. Similarly, in the early stages of EV adoption, fleets deploying fuel-cell trucks will require government support in the form of subsidies or incentives to offset high capital and operating costs.

Quantron AG sells its vehicles on the online sales platform called TruckScout24. In June 2022, as part of the strategic partnership with TruckScout24, Quantron offered the first 50 buyers an online discount of €4,000 off the official retail price of €62,900 plus VAT for its QARGO 4 EV model. For its fuel-cell vehicle portfolio, the company estimates that the total cost of operation for fuel-cell trucks will reach parity with diesel powertrain trucks in 2024/2025. The company plans to leverage this parity scenario and drive the market uptake of fuel-cell trucks through its QaaS model at a competitive price for fleets so that they can manage their entire product lifecycle requirements.

Customer Ownership Experience

Quantron AG's customers can clearly benefit from the QaaS model; it offers a wide range of electrification solutions, including electricity and green hydrogen supply, infrastructure and equipment installation, components, hardware, powertrain, vehicle products, financial services, aftersales, and second-lifecycle services. The company plans to expand its partner network to promote the adoption of fuel-cell trucks across the commercial vehicle industry. Moreover, in order to provide customers with solutions during vehicle ownership, the company has a network of 700 service partners and qualified experts.

Quantron offers an extended warranty on its products, such as a 5-year full warranty on selected models of its electric refuse collection vehicles. This warranty ensures customers of truck ownership, without the hassle of breakdowns and with a service/replacement guarantee, allowing customers to focus instead on their businesses and to worry less about vehicle condition and performance. In addition, the company has established a hydrogen alliance partnership with hydrogen supply and infrastructure participants, such as NEUMAN & ESSER GROUP, Tamoil, and HEM, to develop H2 infrastructure over the next few years, thereby supporting the commercial operation of fuel-cell vehicle operators.

Brand Equity

Quantron AG is a tech spin-off company of Haller GmbH & Co. KG, which has 140 years of expertise in commercial vehicles. The company's core values include being reliable, energetic, and brave. The German company has attracted investments from notable participants, such as Ballard Power System and NEUMAN & ESSER GROUP; has a growing production footprint in Europe; and plans to enter the North American market to sell both its battery electric and fuel-cell solutions.

The mass commercialization and widespread uptake of fuel-cell trucks are still some time away and will depend on the pace at which technology and infrastructure develop. A concerted focus on cost management and targeted strategies will be critical to the development of a hydrogen ecosystem. Equally, the creation of a robust, sustainable hydrogen ecosystem will be facilitated by greater collaboration between governments and the private sector and, indeed, among all stakeholders across the value chain.

Frost & Sullivan appreciates the way that Quantron AG's investments and activities are truly in line with the fuel-cell vehicle development requirements in the industry, and the company aims to be a leading promoter of zero-emission vehicles for a sustainable and carbon-neutral society. To achieve this, the company considers engaging first with industry participants to create a suitable environment before becoming competitive.

Conclusion

The European heavy-duty fuel-cell trucking market is highly active and competitive, with leading OEMs further developing and innovating fuel-cell trucks.

Quantron AG is one of the few early-stage native participants to introduce fuel-cell trucks for commercial operation and is working on various fronts to ensure the profitable and sustainable operation of fuel-cell vehicles. The company offers a first-of-its-kind open partnership platform to promote jointly the adoption of zero-emission vehicles and offer vehicle conversion solutions. In addition, the company is developing a wide range of zero-emission vehicles that suit targeted market needs.

With its strong overall performance, Quantron AG earns the 2022 Frost & Sullivan European New Product Innovation Award in the heavy-duty fuel-cell trucking industry.

What You Need to Know about the New Product Innovation Recognition

Frost & Sullivan's New Product Innovation Award recognizes the company that offers a new product or solution that uniquely addresses key customer challenges.

Best Practices Award Analysis

For the New Product Innovation Award, Frost & Sullivan analysts independently evaluated the criteria listed below.

New Product Attributes

Match to Needs: Customer needs directly influence and inspire product design and positioning

Reliability: Product consistently meets or exceeds customer performance expectations

Quality: Product offers best-in-class quality with a full complement of features and functionality

Positioning: Product serves a unique, unmet need that competitors cannot easily replicate

Design: Product features an innovative design that enhances both visual appeal and ease of use

Customer Impact

Price/Performance Value: Products or services provide the best value for the price compared to similar market offerings

Customer Purchase Experience: Quality of the purchase experience assures customers that they are buying the optimal solution for addressing their unique needs and constraints

Customer Ownership Experience: Customers proudly own the company's product or service and have a positive experience throughout the life of the product or service

Customer Service Experience: Customer service is accessible, fast, stress-free, and high quality

Brand Equity: Customers perceive the brand positively and exhibit high brand loyalty

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- Business Model (BM)
- Technology (TE)
- Industries (IN)
- Customer (CU)
- Geographies (GE)

