

DESIGN ISSUES, RANGE ANXIETY

Why electric mobility is riding a scooter, not a motorcycle

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New Delhi, October 18

HERO MOTOCORP RECENTLY made its debut in the electric vehicle space with the launch of its new electric scooter — V1 — under the Vida brand name.

In 2020, TVS Motor had launched the iQube electric — a scooter, and in 2019, Bajaj Auto had launched the Chetak electric — also a scooter.

Most EV startups — from Ola Electric and Ather Energy to Okinawa and Hero Electric — have all taken the scooter route to electric mobility. There are currently only a few electric motorcycle models, including Revolt RV400 and Tork Kratos. Experts say this is due to a variety of reasons.

The design advantage

Automotive experts point out that scooters have a design that can easily incorporate electric propulsion systems. Karthick Athmanathan, coordinator of the Interdisciplinary Dual Degree on EVs at IIT Madras, said that in motorcycles, finding a place to fit batteries can be challenging. In the RV400, for example, batteries are placed where con-

PREFERRED RIDE

■ A scooter's design can easily take the battery pack under the seat, as its wheels are small and there is ample space



■ The EV ecosystem was buoyed by startups, which focused more on fine-tuning software, rather than design a new body shape

■ Scooters are used in a closed loop where charging points can be easily installed

■ Motorcycles are also used for long-distance rides, where there is limited charging infrastructure



■ New architecture will be needed to drive the electric motorcycle market

ventionally the fuel tank is located — between the seat and the handlebars.

“A motorcycle has bigger wheels and so there isn't much space under the seat. A scooter's design can easily take the battery pack under the seat, as its wheels are smaller and there is more space,” he said. “A scooter's seat is also wider, so it can take

a wider battery pack under the cowl.”

There are safety concerns as well — batteries are heavy, and if these are placed farther from the ground, it will raise the centre of gravity, making the vehicle unstable.

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"In a scooter form factor, it's easier to fit the battery as close as possible to the ground, unlike a motorcycle," Athmanathan, also a senior vice-president at Ashok Leyland and on a sabbatical as a professor of practice at IIT Madras, said. "Of course, even in motorcycles, batteries can be fitted at the conventional place of an engine — under the fuel tank — but the process can be cumbersome," he added.

Gajendra Singh, assistant professor, School of Engineering, IIT Mandi, said that a battery placed 'lower' on a motorcycle may be exposed to elements. "In a scooter, there is already a covered space (the cowl)," he explained. "Theoretically, finding a place for a battery is simpler in a scooter than in a motorcycle."

Low-hanging fruit

Saket Mehra, partner, Grant Thornton Bharat, said that the EV ecosystem in India was initially buoyed by startups, which focused more on investing into fine-tuning the software and developing efficient battery motors to alleviate range anxiety, rather than branching towards

resolving the limitations faced in designing e-motorcycles. "Electric scooters are designed to be more compact, with lower battery weight and lower centre of gravity, which helps with an improved vehicle performance," Mehra said. "Electric motorcycles tend to use bigger motors that add to the weight as well as produce more heat, reducing the overall vehicle performance."

Range anxiety

Athmanathan said that scooters, even petrol ones, aren't traditionally used for long-distance travel. "Motorcycles have large wheels and long suspension stroke, making them comfortable on long rides and on broken roads. Scooters, which have smaller wheels, are best used in a closed loop (like a 20-km radius of the owner)," he said. "In a closed loop, a web of charging points can be easily and cost-effectively installed, unlike on a straight highway. That web will leave no room for range anxiety." Then there is a business case for electric scooters. More buyers are in cities where scooters are more popular than motorcycles, and EV companies are going where the market is.

Usage patterns

Arpan Gupta, associate professor, School of Engineering, IIT Mandi, said that electric motors