

Deliver- E

Comparing costs of Petrol, electric and Battery Swappable electric scooters for logistic deliveries in urban environments (WP6)

Executive Summary



Under the DKT1 2021 Project Deliver-E: Development of Smart Modular Swappable Battery Packs for Commercial Urban Electric Scooters

Electric delivery scooters present a lot of advantages in terms of reducing both greenhouse gas emissions as well as air and pollution in urban environments. However, the limited range of electric scooters pose challenges to the widescale adoption of these scooters for delivery/ logistical purposes.

The Deliver-E project encompassed the development and testing of using swappable battery packs to tackle the limited range of e-scooters and enable widescale use of these scooters. The project group consisted of TNO Automotive (research organization, also the lead partner), an electric scooter company (GreenMo), a battery manufacturer (Eleo), a pizza-delivery company (Domino's Pizza) and FIER Automotive & Mobility to together develop and test a scooter with swappable battery packs. FIER Automotive & Mobility is responsible for carrying out the Assessment of the business case around swappable battery packs.

The Battery Swappable (BS) E-scooter was developed as per the requirements of the user and successfully piloted during the project. The Battery Swappable (BS) e-scooters had 3kW power and had a range of 60 km. To assess the business cases for pizza deliveries, the costs of petrol, electric and BS e-scooters were compared. Total Costs of Ownership (TCO) was used as the measure of comparing the costs. The results of the project show that:

- Petrol scooters need to be replaced much more frequently compared to the electric scooters (both e-scooters and BS e-scooters) and thus have higher depreciation costs.
- E-scooters are the cheapest alternative for pizza deliveries based on the kilometres driven by a typical pizza delivery store. Based on the typical use during the project, E-scooters are 38% cheaper than petrol scooters and 7% cheaper than BS e-scooters.

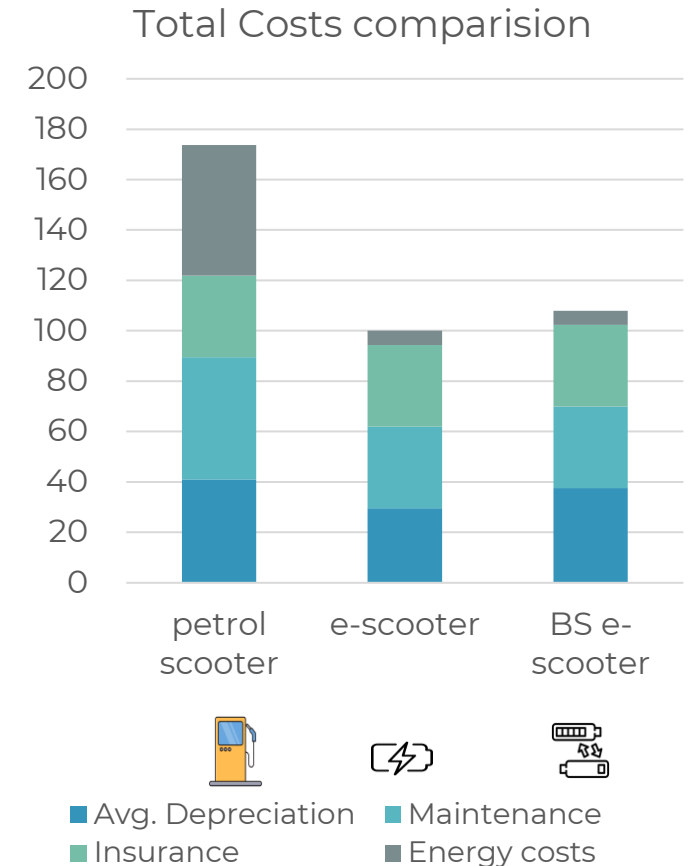


Figure 1 Cost comparison of Petrol, e-scooter and BS e-scooter taking e-scooter as the base (100), costs at 120 km use/day

- BS e-scooters have a definite advantage over e-scooters when the kilometres usage goes higher than 120 km per day, the typical range of e-scooters with a big battery. The swappable batteries enable the BS e-scooters to ride even above 200 km per day. When the usage is more than 120 km per day, BS e-scooters are cheaper.
- This opens the opportunity for scooter-sharing services among business users. Postal or parcel deliveries during the day and food deliveries (which typically peak during the evening and night hours) would be an ideal combination.
- Adoption of scooter-sharing services in the business segment with BS e-scooters will enable businesses to take advantage of the cheaper costs while reducing GHG and pollution in cities.

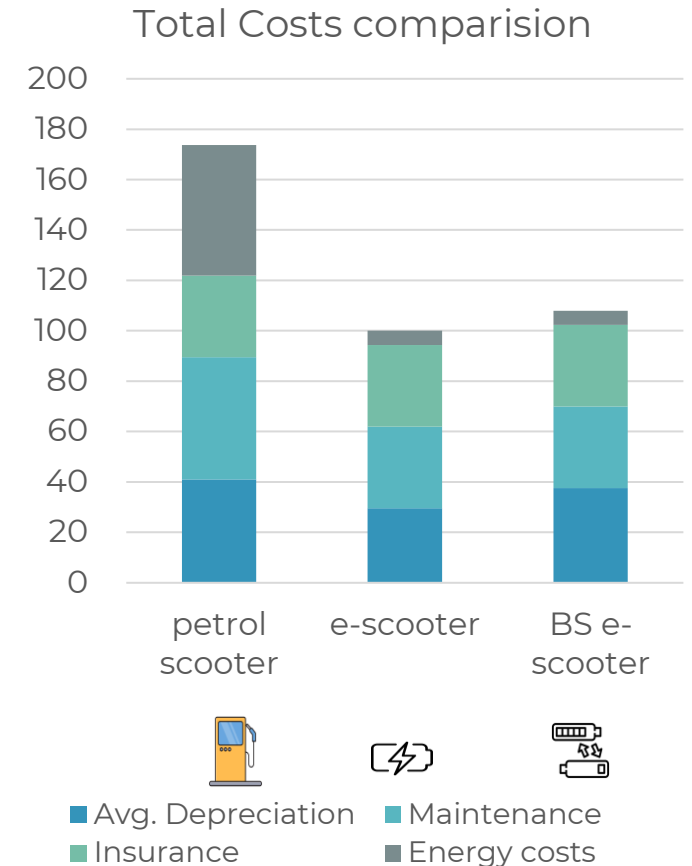


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