

Information pack

Zero emission powered light vehicles for businesses and public services

Small, lightweight and energy efficient
alternatives to traditional vehicles





Zero emission powered light vehicles (zePLVs) are a smart choice for businesses or public services looking to save on travel costs, speed up deliveries and reduce their carbon emissions.

This guide will show you the different zePLVs out there and why you should join the other businesses and public services already using them.



ELECTRIC SCOOTERS (CATEGORY L1E)

These are most commonly electric mopeds or scooters used for delivery or commuting and are split into two categories:

- L1e-A powered cycles have two, three or four wheels, a power output up to 1kW and pedals. Their power assist cuts off at 15.5 mph (25km/h). It's recommended that rider wears a helmet.
- L1e-B powered two wheelers (PTWs) have up to 4kW of power and a top speed of 28mph (45km/h). The rider must wear a helmet by law.

**note that electric bikes with pedals of 250w or less are not L-category.*



ELECTRIC THREE WHEEL MOPED (CATEGORY L2E)

These are usually small delivery vehicles that have three wheels and one or two seats. They can hold a maximum weight of up to 270kg. Power is limited to 4kW, and the maximum speed is 28mph (45km/h).



ELECTRIC MOTORCYCLES (CATEGORY L3E)

Electric motorcycles are the most common zePLV. They are split into three categories (A1, A2 and A3) that are defined by power output. Riders must wear a helmet by law.

- A1 – Low performance motorcycle or scooter up to 125cc and 11kW power.
- A2 – Medium performance motorcycle or scooter up to 35kW power.
- A3 – High performance motorcycle above 35kW power.



ELECTRIC MOTORCYCLES WITH SIDECAR (CATEGORY L4E)

These are L3e electric motorcycles that are fitted with a sidecar.



ELECTRIC POWERED THREE WHEELED (CATEGORY L5E)

These are usually small delivery vehicles that have three wheels and are similar to L2e vehicles, but they have power in excess of 4kW and top speeds exceeding 28mph (45km/h). They can have a maximum of five seats and a running mass of 1000kg.



ELECTRIC LIGHT FOUR WHEELED (CATEGORY L6E)

These micro cars (or quadricycles) have four wheels and no more than two seats, so they're a good alternative for commuting or small cargo delivery. Their power is capped at 6kW, and they have a top speed of 28 mph (45km/h). Their running mass is limited to 425kg.



ELECTRIC HEAVY FOUR WHEELED (CATEGORY L7E)

These micro cars and micro vans (or heavy quadricycles) have four wheels and an enclosed passenger area. Great for commuting and delivery. They have a maximum power of 15kW. They can have up to four seats or two seats plus a cargo area. Their top speed is limited to 56mph (90km/h).

What are zePLVs?



zePLVs are two, three and lightweight four-wheeled vehicles that don't produce harmful emissions at the exhaust. They include electric mopeds, motorbikes, micro cars and ultra-light delivery vehicles.

The benefits of a zePLV

These small electric vehicles have a lot of benefits when compared to diesel and petrol vans and cars, and even some other electric vehicles (EVs). They are:

Cheaper

EVs are already cheaper to run day-to-day than vehicles with an internal combustion engine (ICE). Using a zePLV cuts costs even more.

Charging costs

Not only are zePLVs cheaper to charge than refuelling an ICE car or motorbike, but they're also cheaper to charge than an electric car. And you can charge zePLV batteries in around 2–5 hours. Since they're very energy efficient, they also travel further on each penny of charge when compared to electric cars and vans.

You also don't have to install chargepoints to charge zePLVs, so you'll save on costs there as well. Instead, you can usually use a three-pin plug and socket, which is what you'll find at home or at work, to charge the batteries.

A lot of lower-powered zePLVs also have removable batteries, so you can take them out and charge them wherever you want.

The table below shows you some of cost comparisons between charging and fuelling.

Vehicle	Cost of charging/ fuelling at home ¹
Electric motorbike	£1.16
Electric microcar (heavy quadricycle)	£2.99
Petrol motorbike	£17.52
Electric car	£23.24
Petrol car	£80.30

¹ In calculating these costs, we assumed that the electric motorbike has a 3.5kWh battery, the quadricycle a 9kWh battery and the electric car a 70kWh battery. We used electricity costs of 33.2p/kWh (accurate as of April 2023, energysavingtrust.org.uk/about-us/our-data). As of April 2023, in Great Britain, the average standard rate unit cost for gas is currently capped at 10.3p per kilowatt hour (kWh) and 33.2p per kWh for electricity. The exact unit rate you pay varies slightly depending on where you live, and it will always depend on how much energy you use. We also assumed a 12-litre petrol fuel tank for the petrol motorbike and 55-litre tank for the petrol car, with a petrol pump cost of 146p/l (accurate as of April 2023, [Weekly road fuel prices – GOV.UK \(www.gov.uk\)](https://www.gov.uk/weekly-road-fuel-prices)). The scenario assumes 0 to 100% charging or refuelling. It's unlikely batteries or tanks would be drained to zero, so the prices should be used for comparative purposes only.



Maintenance

It'll be cheaper for you to maintain a zePLV than an ICE vehicle. This is because zePLVs have electric powertrains, so there are fewer parts to look after or replace.

Travel charges

ZePLVs don't produce harmful emissions at the exhaust, so you won't be charged for driving through clean air zones and ultra-low emission zones.

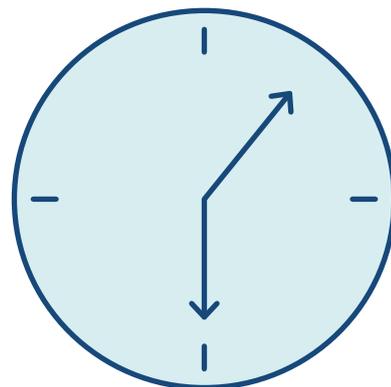
Greener

zePLVs don't add to local air pollution since they have zero tailpipe emissions. They also have much lower lifetime carbon footprints than ICE vehicles or larger EVs. Their small size also means that they produce fewer emissions when they're manufactured and recycled when compared with larger EVs.¹

With sustainability becoming more important to consumers and clients, having smaller, more environmentally friendly zero emission vehicles can be good for your organisation's brand reputation.

Quicker

Some smaller zePLVs can easily move through traffic when it's safe to do so, which makes them a good choice if you need to make journeys quickly. They also help to reduce congestion because of their size. In urban areas, replacing 20% of light goods vehicles with zePLVs would reduce journey time delays by 4.3%, while replacing 50% would reduce delays by 10%.²



Replacing light goods vehicles with zePLVs would reduce delays by 10%

² Local Transport Projects, 2019, *L-Category Vehicles Congestion Impact Study*, p. 26.

What services can a zePLV be used for?

Last mile delivery

zePLVs could be a great option for your business's last mile delivery.³

In urban areas where there's a lot of traffic and high demand for deliveries, zePLVs can make last mile delivery faster and cheaper. They're designed to travel efficiently at slower speeds, and relative to their heavier van alternatives, they can carry more weight.⁴

L6 or L7e quadricycles are best suited for last mile delivery because they have the highest payloads, which is the maximum amount of weight a vehicle can carry. L6 or L7e quadricycles typically have a payload between 200kg and 1,000kg.

The carbon impact of manufacturing an L7e is similar to that of a diesel van. However, the L7e offers significant carbon savings day to day and over its lifetime. This is because an L7e is more efficient and will use less energy compared to its diesel equivalent.

ENVIRONMENTAL IMPACT: When used for last mile delivery, battery electric L7e quadricycles have lifetime emissions equivalent to 60g of carbon dioxide (CO₂) being emitted per kilometre travelled. For a small electric van, this would be around 100g of CO₂ per kilometre. Diesel vans have much higher lifetime emissions of around 220g of CO₂ per kilometre.⁵



L7e zePLV

60G

lifetime emissions equivalent of CO₂ emissions CO₂ per kilometre



Electric van

100G

lifetime emissions equivalent of CO₂ emissions CO₂ per kilometre



Diesel van

220G

lifetime emissions equivalent of CO₂ emissions CO₂ per kilometre

³ Energy Saving Trust, 2020 Electrifying Last Mile Deliveries: A Guide for Businesses <https://energysavingtrust.org.uk/sites/default/files/EST007-01-EST%2BDFT-Electrifying%20last%20mile%20deliveries%20guide-WEB.pdf>

⁴ MCIA, 2019 [The Route to Tomorrow's Journeys](#)

⁵ Zemo Partnership, 2021, https://www.zemo.org.uk/news-events/news-powered-light-vehicles-can-enable-transport-decarbonisationlifecycle-analys_4329.htm

Food delivery

A lot of food delivery drivers use mopeds or motorbikes.

By switching to the electric versions, you can cut costs and reduce the environmental impact of deliveries.

The UK Government's plug-in vehicles grant could help you make the switch to zePLVs. It offers a discount of up to £500 for certain motorbikes and £150 for certain mopeds.⁶

Electric mopeds (L1e) have top speeds of 28mph, which is ideal for delivery drivers in urban areas

where speed limits are 20mph or 30mph. Electric motorbikes (L3e) can travel at speeds of over 60mph.

A lot of new vehicles in these categories are being made with replaceable battery packs. This means that drivers can make longer journeys because they can swap between battery packs while they're on the road. They also won't have to wait for their vehicle to charge, so they can carry on making deliveries. They can either carry both batteries or leave one on charge and come back and swap it out when they need to. Batteries take 2–5 hours to charge from the mains, which is quicker than the average time it takes to drain a battery.

ENVIRONMENTAL IMPACT: A small electric motorbike used for local deliveries has a lifetime carbon footprint that's equivalent to emitting 45g of CO₂ per kilometre travelled. Using a petrol motorbike for the same deliveries would generate lifetime carbon emissions equivalent to emitting 90g of CO₂ per kilometre travelled.⁷



Electric motorbike

45G

lifetime emissions equivalent of
CO₂ emissions CO₂ per kilometre



Petrol motorbike

90G

lifetime emissions equivalent of
CO₂ emissions CO₂ per kilometre



6 Gov.uk, <https://www.gov.uk/plug-in-vehicle-grants/motorcycles-and-mopeds> [data accurate as of December 2022]

7 Zemo Partnership, 2021, https://www.zemo.org.uk/news-events/news-powered-light-vehicles-can-enable-transport-decarbonisationlifecycle-analys_4329.htm

Maintenance services

Many L6e and L7e quadricycles have been designed for carrying out park maintenance, transporting people around large sites and collecting rubbish and litter.

You can fit the chassis cabs with different attachments such as trays, boxes and seats. This means you can use quadricycles for a lot of different jobs.

Their light weight makes them ideal for travelling off-road or over uneven ground. And because they're small, they can access narrow streets or areas that large trucks or maintenance vehicles can't get to.



Emergency services

zePLVs don't have as much space for equipment and people like larger emergency service vehicles, such as ambulances, do. However, because zePLVs are smaller, it's easier for them to travel off-road. Their size also means that they can get first responders to a scene quickly, especially in hard-to-reach areas such as a busy seafront.

Blood Bikes Scotland uses electric motorbikes to deliver blood. And specialised zero emission L6e vehicles have been designed for the UK ambulance service and Parisian firefighters.

Find out more about zePLVs at energysavingtrust.org.uk/service/powering-light-vehicles