Electric Light Commercial Vehicles

What's next?

Q4 2017

Introduction

After a century of meeting many of our mobility needs based on fossil fuels, the internal combustion engine (ICE) is now being challenged by the electric motor. Electric vehicles (EVs) are no longer a niche market; the number of EV registrations is rising rapidly, stimulated by tighter emissions regulations, an increase in the variety of EVs available, improved EV charging infrastructure and a more acceptable total cost of ownership (TCO). The governments in both the UK and France plan to end the sale of new diesel vehicles completely by 2040. Car manufacturers are reacting too; Volvo has announced that as of 2019 all its new cars will be available with an electric drivetrain and Mercedes-Benz in 2022.

While EVs currently account for just 1% of new car sales in Europe, UBS[1] forecasts that this figure will rise to 30% by 2025. LeasePlan believes that it should be possible to eliminate tailpipe emissions of CO_2 and NOx from the automotive sector by 2030. Almost all forecasts regarding the speed of maturity for EVs have recently been adjusted upwards. The world seems ready for this electric transformation.

So far, most of the focus in this EV transformation has been on passenger cars; many new models are being introduced, at lower cost and with an increasing range. But what is the impact on the market for light commercial vehicles (LCVs) such as vans? Is there already a business case for moving to full-electric LCVs (e-LCVs) and, if so, how should companies go about it? This white paper provides insights into the technological and economic developments of the e-LCV segment.

Market overview

The e-LCV segment first became an interesting niche following the introduction of the Renault Kangoo and the Mercedes-Benz Vito E-Cell in 2011, and the first edition of the Nissan e-NV200 in 2012. Users of these early vehicles had a specific business case, since the ranges and TCOs made them unsuitable for a broader public. Nowadays, companies can choose from a wider range of e-LCVs. With the (upcoming) introduction of the larger Renault Master and the SAIC Maxus EV 80, the first medium-sized electric LCVs will soon be available on the market. Table 1 provides an overview of the current mainstream models, including their segment and sales figures (if available).

Table 1: Overview of currently available e-LCVs.

Make	Model	Vehicle segment	Sales figures EU YTD[2] (per august 2017)
Citroen	Berlingo Electric	Small	494
Nissan	e-NV200	Small	1897
Peugeot	Partner Electric	Small	670
Renault	Kangoo Z.E.	Small	1609
Iveco	Daily Electric	Large	n/a
Renault	Master Z.E.	Large	n/a
SAIC EV-80	EV-80	Large	n/a

So the e-LCV is clearly entering the mainstream thanks to the currently available or soon-to-be-launched electric versions. Furthermore, Volkswagen and Mercedes-Benz have recently announced plans to electrify their LCV line-up[3], which will lead to an even wider choice of e-LCVs.

What's the business case?

As more and more different types of e-LCVs become available, the matter of the TCO becomes more relevant. What is the overall cost of running a full-electric light commercial vehicle, and is there a viable business case for including such vehicles in your fleet? To answer this question, LeasePlan analysed the current average TCO of an e-LCV. The breakdown of the TCO is provided below in Figure 1, with the data shown in percentages in order to visualise the relative cost per TCO component.

The depreciation and interest component accounts for the lion's share of the TCO. This is because of the relatively high catalogue price, due mainly to the expense of e-LCV batteries. Taxes account for just a small percentage, since electric vehicles are exempt from taxes in some countries. Likewise, the lower price of electricity compared to fossil fuel is reflected in the low percentage for fuel.

TCO breakdown for e-LCVs

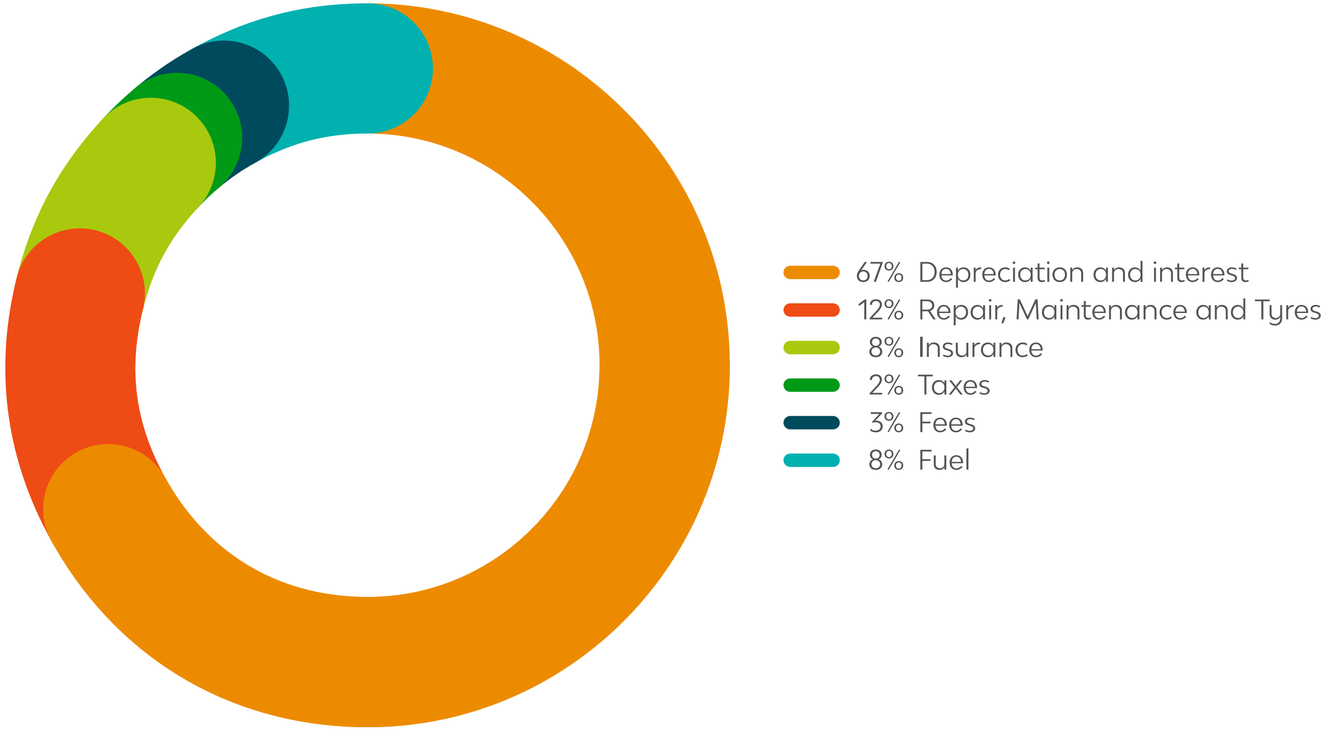
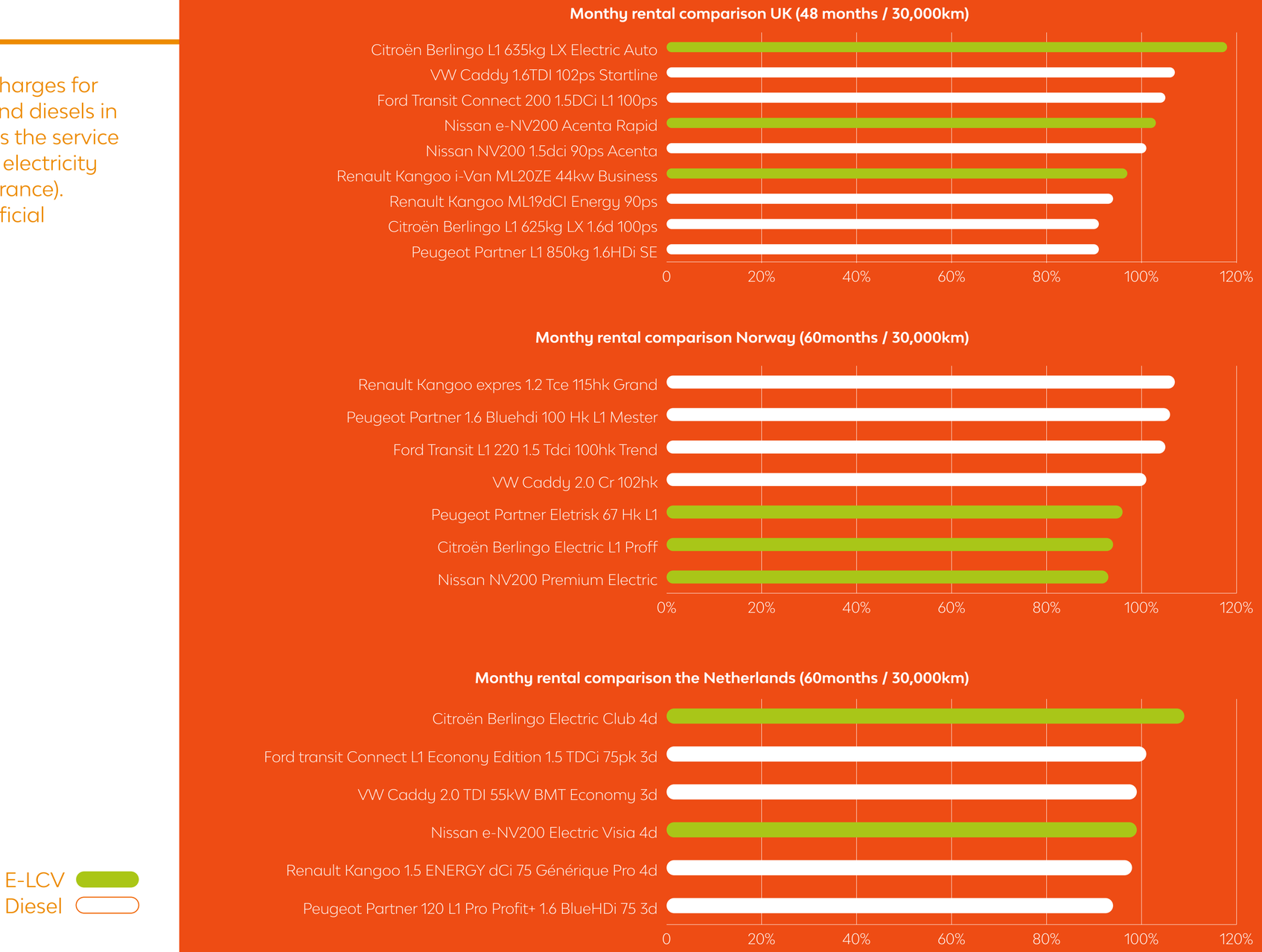


Figure 1: Breakdown of the average total cost of ownership of e-LCVs. The figure is based on a number of different e-LCVs with a term of 48 and 60 months and 30,000 kilometres per year in the Netherlands, Norway and the UK. It includes all service elements, such as maintenance, repair, tyres, insurance, replacement vehicle and roadside assistance.

But how does this TCO compare against the cost of a diesel LCV? This is vital for determining the business case. Therefore, LeasePlan compared the quotes for the currently available e-LCVs with comparable diesel-engine LCVs in the Netherlands, Norway and the United Kingdom. The comparison of the monthly rental charges can be seen in Figure 2.

The TCO of the e-LCV is already becoming competitive in this segment. In Norway, the TCO of the e-LCV is already lower than for a diesel vehicle because of the country’s taxation system. The UK and the Netherlands paint a mixed picture, with a competitive TCO for some but not all vehicles. In the Netherlands, the TCO of the e-LCV is relatively higher than for diesels, partly because the insurance costs are based on the weight of the vehicle (and the batteries make e-LCV's heavier by default). Nevertheless, the overall difference between e-LCV's and diesels is small.

Figure 2: Comparison of monthly rental charges for LCVs. Electric LCVs are shown in green, and diesels in white. The monthly rental charge includes the service components and a provision for diesel or electricity costs (exception in the UK: excluding insurance). Electricity costs per kWh are based on official government tariff figures[4].



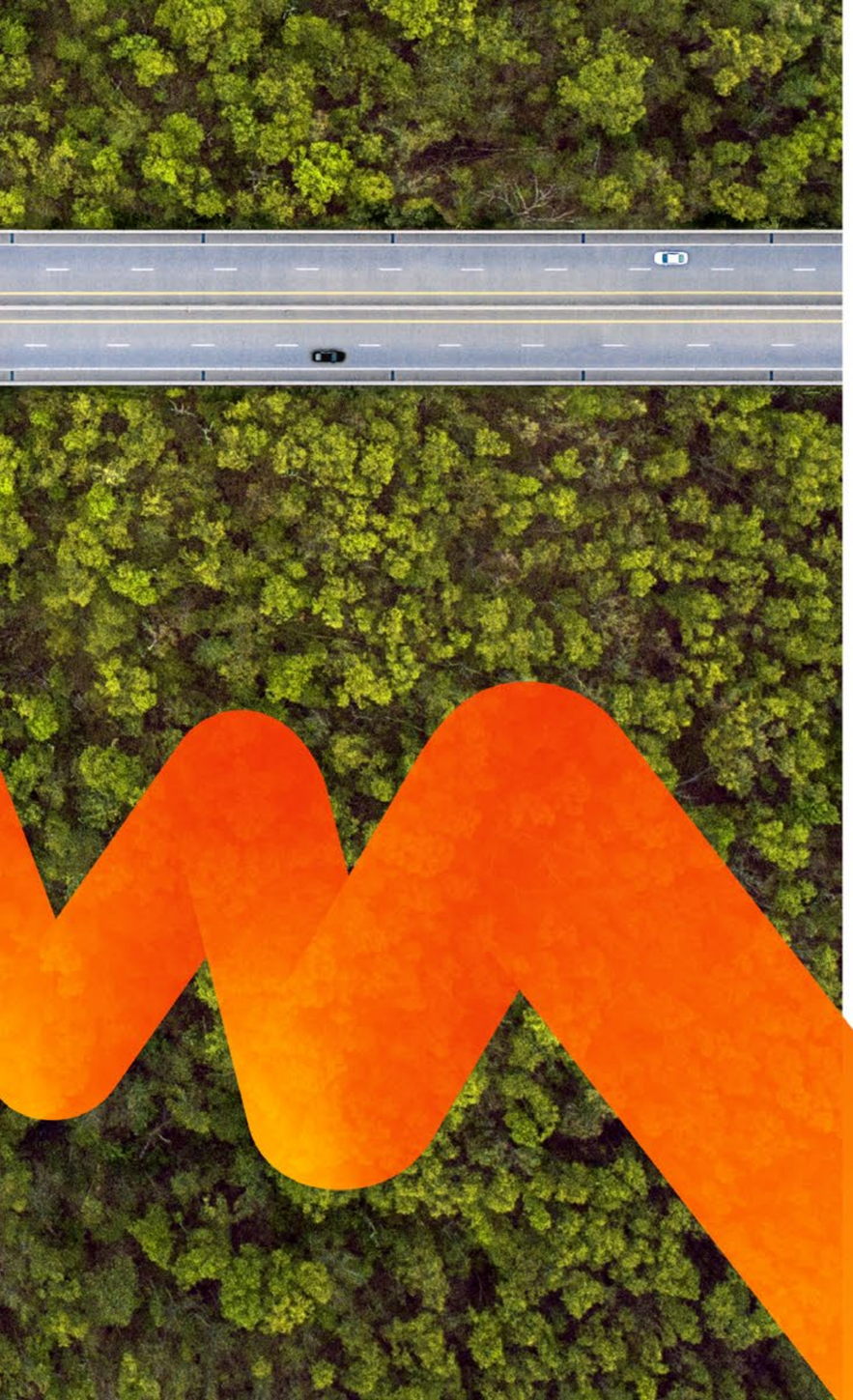
Understanding the TCO trend for e-LCVs

The TCO data shows that e-LCVs are already competitive in some markets. The TCO of e-LCVs is expected to continue to fall, while the TCO of diesels will remain stable or even increase. What are the main reasons for this?

1. **Battery costs** are currently responsible for a large part of the TCO of e-LCVs, but the price of batteries is already falling and will continue to do so. The cost per kWh has fallen from USD1000 in 2010 to between USD130 and USD200 today, according to the OEMs such as Tesla and GM, and it is expected to drop further in view of the mass production in gigafactories[5].

2. **Battery life** is showing a positive trend, as battery management systems seem to be performing well in the long term. After 200,000 kilometres, batteries still provide above 93% of their original range, according to real-life figures from Tesla vehicles[6]. OEMs are therefore willing to provide batteries with long warranty periods, which will greatly support the second-hand market.

3. The **maintenance and repair** costs are relatively low; an average e-LCV has around 50% fewer parts than diesel vehicles. Rather than having lots of moving parts, EVs are more like ‘computers on wheels’ and this has a positive impact on the maintenance costs.



4. The **insurance cost** for e-LCVs is slightly higher than for diesels because it is often based on the vehicle catalogue price (which is higher in the case of EVs). However, damage statistics – which strongly impact insurance premiums – are similar for both EVs and diesels. Premiums for EVs might ultimately fall because of their lower average repair cost (due to fewer moving parts).

5. **Electricity consumption** is much cheaper compared to the fuel costs for diesels. The current calculations are based on each country's standard kWh tariffs. Prices tend to fall when a higher volume is purchased, which will most likely be the case for large business premises where e-LCV fleets will be charged overnight.

6. The current **taxation** scheme in many European countries favours zero-consumption vehicles, offering high tax incentives and often exemption from road tax to encourage the purchase of e-LCVs. These subsidies might be phased out in the near future, but the extent to which is still unclear. The fact remains that governments will support EVs over ICEs.

Range anxiety: realistic or a thing of the past?

Besides the TCO, other important factors for fleet managers considering whether to include e-LCVs in their fleet are the vehicle range and the electric charging infrastructure. An LCV is a business tool, so the utilisation rate is key. In other words, an e-LCV should support organisational profitability but it will waste valuable time if it has to stand still to charge during business hours.

The experience with electric vehicles so far shows that users' charging behaviour is similar to the charging of a mobile phone: a full charge at night-time and topping up during business hours when the vehicle is parked at the company premises or on location. However, this requires a good (public) charging infrastructure.

The matter of the electric charging infrastructure is a typical chicken-and-egg situation: what must come first? Electric vehicles are useless without charging points, but a comprehensive charging infrastructure is not necessary as long as the market share of electric vehicles remains low. As sales of electric vehicles in the European Union have increased, the number of public charging points has risen to over 110,000. Figure 3 shows the current number of publicly available charging stations by EU country.

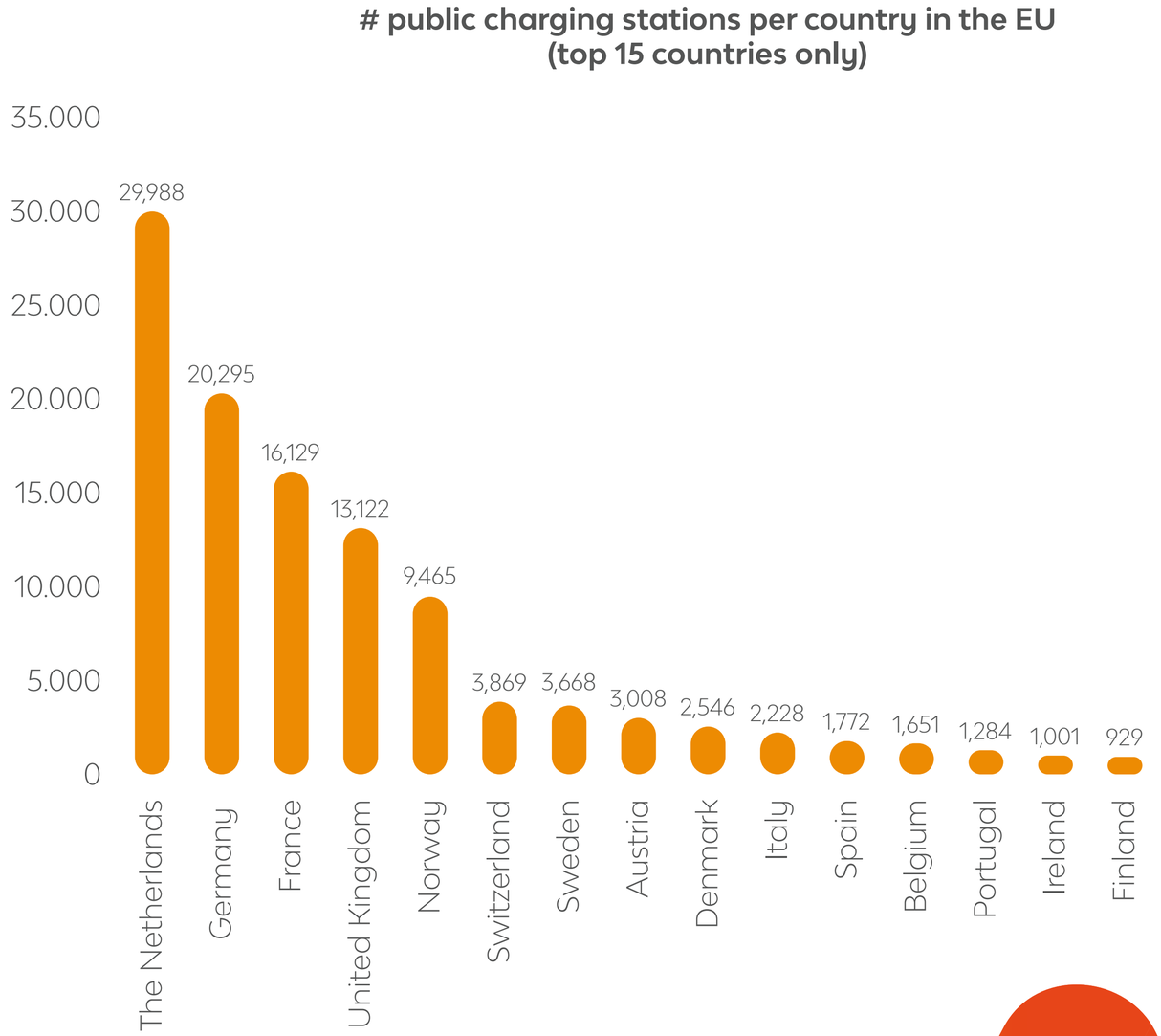


Figure 3, Overview of currently available public electric charging stations in the EU[7].

Table 2: Overview of ranges and battery sizes of e-LCVs.

Make	Model	Range in KM (NEDC)	Battery size (in kWh)
Citroen	Berlingo Electric	170 km	22.5 kWh
Iveco	Daily Electric	280 km	60 kWh
Nissan	e-NV200	170 km	24 kWh
Peugeot	Partner electric	170 km	22.5 kWh
Renault	Kangoo Z.E.	270 km	33 kWh
Renault	Master Z.E.	200 km	33 kWh
SAIC EV-80	EV-80	192 km	56 kWh

One important factor in the performance of the charging points is the maximum charging speed to ensure that the LCV battery is charged as quickly as possible (provided that the vehicle supports that charging speed). This can be split into standard power (up to 22 kW) and fast-speed charging power (>22 kW). 88% of today's public charging points offer standard-speed charging, while just 12% of them provide fast-speed charging[7].

The range of an electric vehicle is determined by the battery size and the engine technology. These factors are shown for the e-LCV in Table 2.

Table 2 shows the official OEM figures from the latest available models, based on the current NEDC method which was last updated in 1997. While this facilitates a good basic comparison of the vehicles, it has been found that the NEDC test conditions do not reflect real-life usage. These figures are therefore not a true representation of reality and it is advisable to make assumptions about the actual, real-life range. The actual figure will be strongly influenced by the vehicle load, the weather and road conditions and the driving style of the e-LCV driver.

The range figures will become more accurate with the upcoming introduction of the Worldwide Harmonized Light Vehicles Test Procedure (WLTP)[8]. This test procedure has been developed by a United Nations technical working group and will take effect at the end of 2017 throughout the EU plus in ten additional countries. Since the WLTP is a more accurate testing method, the official range figures are expected to become more realistic in the near future.

Conclusion: are e-LCVs a realistic option for my fleet?

In view of the upcoming launch of additional models, e-LCVs are no longer a niche segment. The lower maintenance, taxation and electricity costs of e-LCVs are swinging the TCO comparison with diesels in their favour, making them increasingly cost competitive. Meanwhile, the electric charging infrastructure is already at an acceptable level in some countries and others are catching up quickly. Therefore, the time is ripe to introduce an electric component to your LCV fleet, especially considering the expected further drop in battery prices and increased range of newer generations of e-LCVs.

However, e-LCVs are better suited to some usage scenarios than others. Suitable scenarios for e-LCVs are characterised by a need to be in dense urban areas with a relatively low mileage profile. Examples include vehicles for ‘last-mile’ distribution in city centres such as for parcel companies and delivery services, as well as use by airports and local government authorities. LCVs with a high mileage, mostly motorway usage and few to no activities in densely built-up areas are less suitable for an electric motor.

Next step: how to develop your e-LCV strategy

The introduction of e-LCVs into a fleet is not without its challenges. An e-LCV is not just simply an LCV with a different kind of engine; it involves a different approach in terms of vehicle charging, vehicle usage and fleet management. LeasePlan has defined this step-by-step process to help you introduce e-LCVs into your fleet:

1. **Alignment with your CSR goals and business strategy**
   For e-LCVs to be introduced into the fleet successfully, business alignment is key. For example, is managing the environmental impact an important pillar of your company's corporate social responsibility (CSR) objectives? It's easier to convince your stakeholders, such as Finance, HR and Operations, of the benefit of introducing e-LCVs when there is a clear link with the company strategy. Is your company working with CO_2 reduction targets? Cascading the corporate targets down towards the fleet category will support your business case for e-LCVs. Since LCVs usually account for a considerable part of a fleet's carbon footprint, introducing e-LCVs will have a strong impact on reducing it.

2. **Electric charging infrastructure**
   The electric charging infrastructure in business locations requires careful planning and investment. With smart charging technologies such as load balancing and vehicle-to-grid, the installation, maintenance and servicing of the charge point locations entail the necessary expertise. Although most e-LCVs will typically be charged at the business location overnight, a good public infrastructure is also necessary to enable e-LCVs to be topped up while out on the road. The countries with the best public infrastructure at present are Germany, France, the Netherlands, Norway and the UK. It is therefore advisable to first start rolling out e-LCVs in your fleet in one or more of these countries.

3. Usage and mileage profile of your LCVs

Low-mileage LCVs with urban usage are usually a good start for replacement by e-LCVs, especially in view of the increased risk that – due to the proliferation of Low Emission Zones – business continuity could come under pressure if diesels are no longer allowed in cities. While the range of e-LCVs is already acceptable and still improving as new models are launched, low mileage is still a preferred factor for smooth introduction. Reports of e-LCVs becoming 'stranded' have a very high impact on the acceptance of these vehicles and should therefore be avoided.

4. Build the business case

Once suitable locations and potential vehicles have been shortlisted, the financial business case needs to be supportive. It is advisable to compare vehicles in similar segments in order to calculate the financial impact, including all relevant cost elements. For reasons of completeness, keep track of the non-financial elements in the business as well – such as the risk of city bans and the potential environmental impact.

5. Driver communication

This will be the first electric vehicle for many drivers and, as with all change processes, the introduction of e-LCVs into the fleet requires good change management. This should include very clear communication and instructions to the drivers. An e-LCV must be used and handled differently by the driver, which is why it is recommended to organise a training course introducing the new vehicle. Clear instruction on braking is advised, for example, due to EVs having different braking power. Operational procedures related to charging and maintenance also need to be communicated to drivers. Showing employees that driving an electric vehicle can actually be fun will support a quick and smooth transition.

6. Monitor effects and share successes

Demonstrating the benefits of an e-LCV will help to win buy-in from drivers and stakeholders alike. Early success stories – e.g. actual range analysis, positive driver feedback about the vehicle handling or carbon footprint achievements – should be communicated towards the stakeholders in order to maintain momentum for further expanding the number of e-LCVs in your fleet. Once again, ensuring clear alignment of e-LCVs with the company strategy and setting and monitoring relevant KPIs will support a swift transition.

References

1 http://www.ubs.com/investmentresearch
2 http://www.eafo.eu/vehicle-statistics/m1 (august 2017)
3 http://insideevs.com/mercedes-benz-electrify-next-generation-sprinter-van/
4 http://www.energysavingtrust.org.uk/about-us/our-calculations
https://www.ssb.no/en/elkraftpris
http://statline.cbs.nl/Statweb/
5 https://www.economist.com/news/briefing/21726069-no-need-subsidies-higher-volumes-and-better-chemistry-are-causing-costs-plummet-after
6 https://electrek.co/2016/11/01/tesla-battery-degradation/
7 http://www.eafo.eu/electric-vehicle-charging-infrastructure
8 http://wltpfacts.eu/what-is-wltp-how-will-it-work/

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