Arval Mobility Observatory

10 QUESTIONS ON ELCVS

Navigating the energy transition in commercial fleet management

November 2024

ARVAL
BNP PARIBAS GROUP

For the many journeys in life

10 QUESTIONS ON ELCVS

Navigating the energy transition in commercial fleet management

INTRODUCTION P.05

01. WHAT ARE ELCVS AND WHY ARE THEY GAINING TRACTION? P.06
- What are eLCVs? p.07
- What does the market for eLCVs in Europe look like? p.07

02. WHY ARE ELCVS IMPORTANT IN THE ENERGY TRANSITION OF FLEETS? P.10
- A brief overview of the energy transition of the transportation sector p.11
- eLCVs are a lever to achieve sustainability goals for commercial fleets p.13

03. HOW TO CHOOSE THE CORRECT MODEL? P.15
- Key factors to consider p.16

04. HOW CRUCIAL IS CHARGING INFRASTRUCTURE FOR SUCCESSFUL ELCV INTEGRATION? P.18
- What do fleet managers expect and need? p.19
- Charging infrastructure: Challenges and solutions p.19

05. WHAT ARE THE PRACTICAL CONSIDERATIONS REGARDING RANGE AND PERFORMANCE OF ELCVS? P.21
- What are the factors that impact eLCVs range? p.22

06. WHAT ARE THE FINANCIAL IMPLICATIONS OF ADOPTING ELCVS? P.25
- Differences in purchase prices p.27
- Total cost of ownership (TCO) of diesel LCVs vs. eLCVs p.28
- Financial incentives and subsidies for eLCV adoption in Europe p.29

07. IS MAINTENANCE OF ELCVS DIFFERENT AND HOW DOES IT IMPACT THE DOWNTIME? P.31
- Maintenance fo eLCVs vs ICE LCVs: Comparison and key considerations p.32
- Availability of servicing options p.33

08. WHAT REGULATIONS AND STANDARDS ARE IN PLACE FOR ELCVS? P.34
- Bans on the sale of new petrol and diesel cars and vans p.35
- Emission standards for eLCVs p.36
- Impact of low emission zones (LEZs) p.36
- Weight regulations p.36

09. HOW CAN FLEET MANAGERS DRIVE THE ENERGY TRANSITION OF COMMERCIAL FLEETS EFFECTIVELY? P.37

- 1. Evaluate your operational needs and requirements p.38
- 2. Assess available options and analyze total cost of ownership p.38
- 3. Use a phased approach to implement eLCVs p.39
- 4. Leverage telematics as a tool to drive change p.39
- The takeaway: adapt your approach to your organization's needs and goals p.39

10. WHAT DOES THE FUTURE HOLD FOR ELCVS? P.40

- Future regulations p.41
- Emerging technologies and innovations on eLCV market p.42
- Market growth and diversification p.43

INTRODUCTION

As the European transportation sector seeks to reduce its carbon footprint and dependence on fossil fuels, electric light commercial vehicles (eLCVs) have emerged as a more sustainable alternative to diesel and petrol-fueled LCVs.

The urgency of addressing environmental concerns, combined with quickly evolving and increasingly stricter regulatory requirements and rapid technological advancements, is driving this shift. As of now, the EU is set to further tighten emission restrictions and phase out the sale of internal combustion engines by 2035; in parallel, some organizations are setting ambitious environmental goals.

In the light of this, the adoption of eLCVs is a key opportunity for commercial fleet managers to contribute to their organizations' sustainability and CSR objectives and respond to increasingly stricter government regulations.

By examining the specific opportunities and challenges of the European eLCV market, this paper aims to equip commercial fleet stakeholders with the knowledge and guidance needed to embrace eLCVs as an integral component of their operating models.

In the past few years, the European market has seen consistent growth in eLCV adoption, with various models now available to suit different operational needs, providing fleet managers with more options to decarbonize their operations.

Improvements in electric range, existing government incentives, and decreasing total costs of ownership (TCO) help mitigate concerns about range and financial viability, making eLCVs an increasingly attractive choice for fleet operators.

By exploring these aspects, fleet managers can better navigate the energy transition and harness the benefits of eLCVs for a more sustainable and efficient fleet management.

By examining the specific opportunities and challenges of the European eLCV market, this paper aims to equip commercial fleet stakeholders with the knowledge and guidance needed to embrace eLCVs as an integral component of their operating models.

In order to do this, we'll examine key market dynamics, practical considerations, and the financial implications of eLCVs, look into existing and future vehicle models, discuss the importance of charging infrastructure, and provide our recommendations to stakeholders looking to electrify their fleets in a sensible and practical manner.

01/ WHAT ARE ELCVS AND WHY ARE THEY GAINING TRACTION?

LCVs (light commercial vehicles, also commonly referred as vans) are crucial for companies' mobility across various sectors, from logistics to field services, and are considered productive tools that enhance operational efficiency by facilitating timely deliveries and on-site services. Each usage profile, whether for delivery, maintenance, transport of goods, or construction, presents unique challenges in terms of cost efficiency, load capacity and urban accessibility.

In this context, eLCVs are gaining importance: On top of their traditional operational role, they also play a key role in organizations' efforts to reduce the carbon footprint of their commercial fleets and meet their sustainability goals.

In this chapter, we'll look into the definition, market trends, and future outlook of eLCVs, with a focus on Europe.

WHAT ARE ELCVS?

In the EU, electric LCVs, or eLCVs, fall under the category of N1, i.e. vehicles used for the transportation of goods with a maximum mass not exceeding 3.5 tonnes. In 2018, the European Commission amended the weight of eLCVs to 4.25 tonnes, to accommodate the weight of batteries – with EU member states currently in the process of modifying local regulations.

eLCVs use electric motors and batteries instead of internal combustion engines (ICE), resulting in zero tailpipe emissions and, potentially, lower operational costs and total costs of ownership (TCO) – topics that we'll discuss later.

WHAT DOES THE MARKET FOR ELCVS IN EUROPE LOOK LIKE?

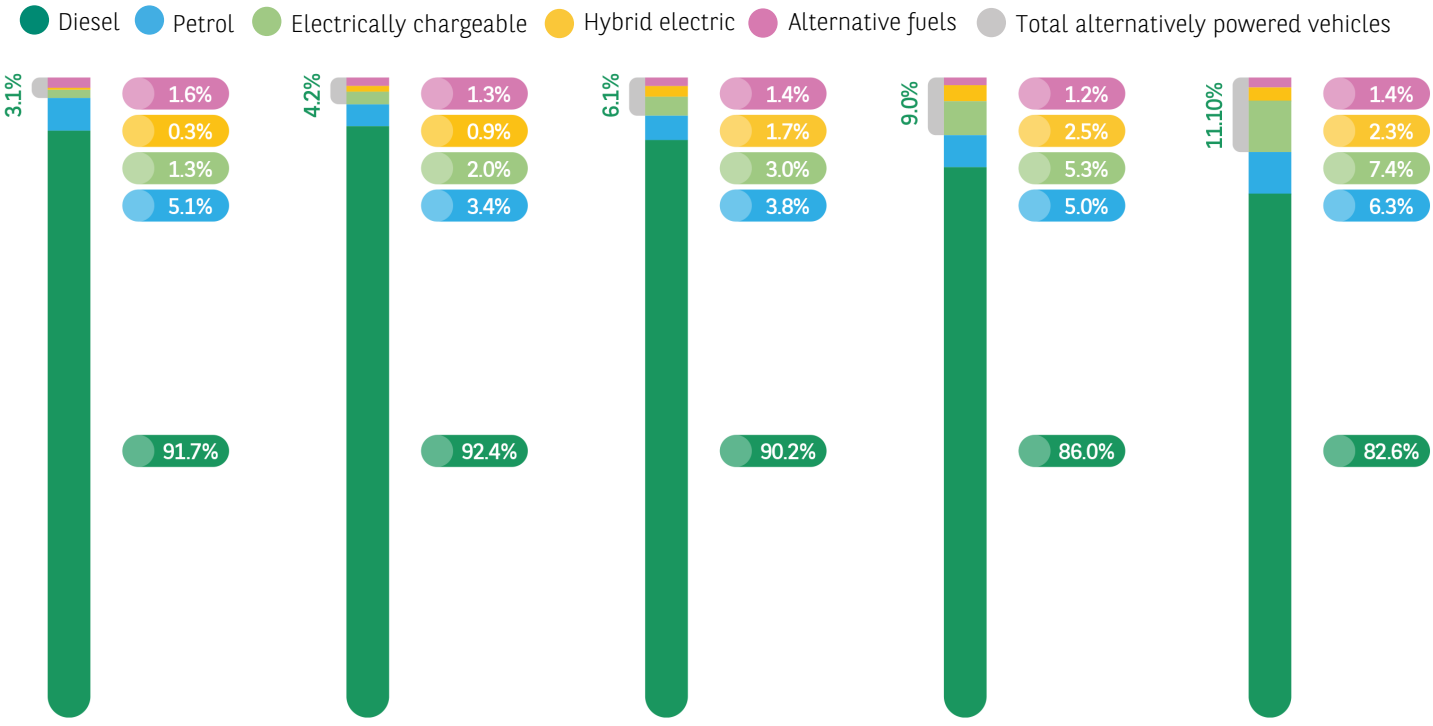
In the past decade, the market for eLCVs in the EU and the rest of Europe has been growing considerably. Over the next five years, this growth is expected to continue.

Historical performance in Europe

Electric LCVs started selling in Europe in 2010, with a mere 798 new eLCV registrations and 8 models available in the market, and arriving at 20,313 new registrations in 2018. Nonetheless, during this period, they remained less than 1% of the new registrations of vans on a yearly basis. With the increase in available models, extended ranges, and a focus on fleet electrification, we have seen a new level of development since 2019.

According to the European Automobile Manufacturers' Association (ACEA), in the period from 2019 to 2023, sales of new eLCVs have seen a significant increase (from 1.3% in 2019 to 7.4% in 2023). While this growth is strong (especially compared to 2010-2018), there is still clear potential for growth of electrified commercial fleets.

NEW EU(2) VAN(3) SALES BY POWER SOURCE - MARKET SHARE / 2019-2023



(1) This limit is now being amended due to the added weight of batteries.

Source: ACEA – The automobile industry pocket guide 2023/2024 / ACEA

"Currently, commercial electrification lags behind passenger vehicle electrification, which is unexpected.

There are many potential reasons – the economics and costs of eLCVs, the potential anxiety and incertitude around leasing electric vans, or also the complex transactional relationships in the entire industry."

Meir Dardashti, Partner at Maniv

Growth forecast

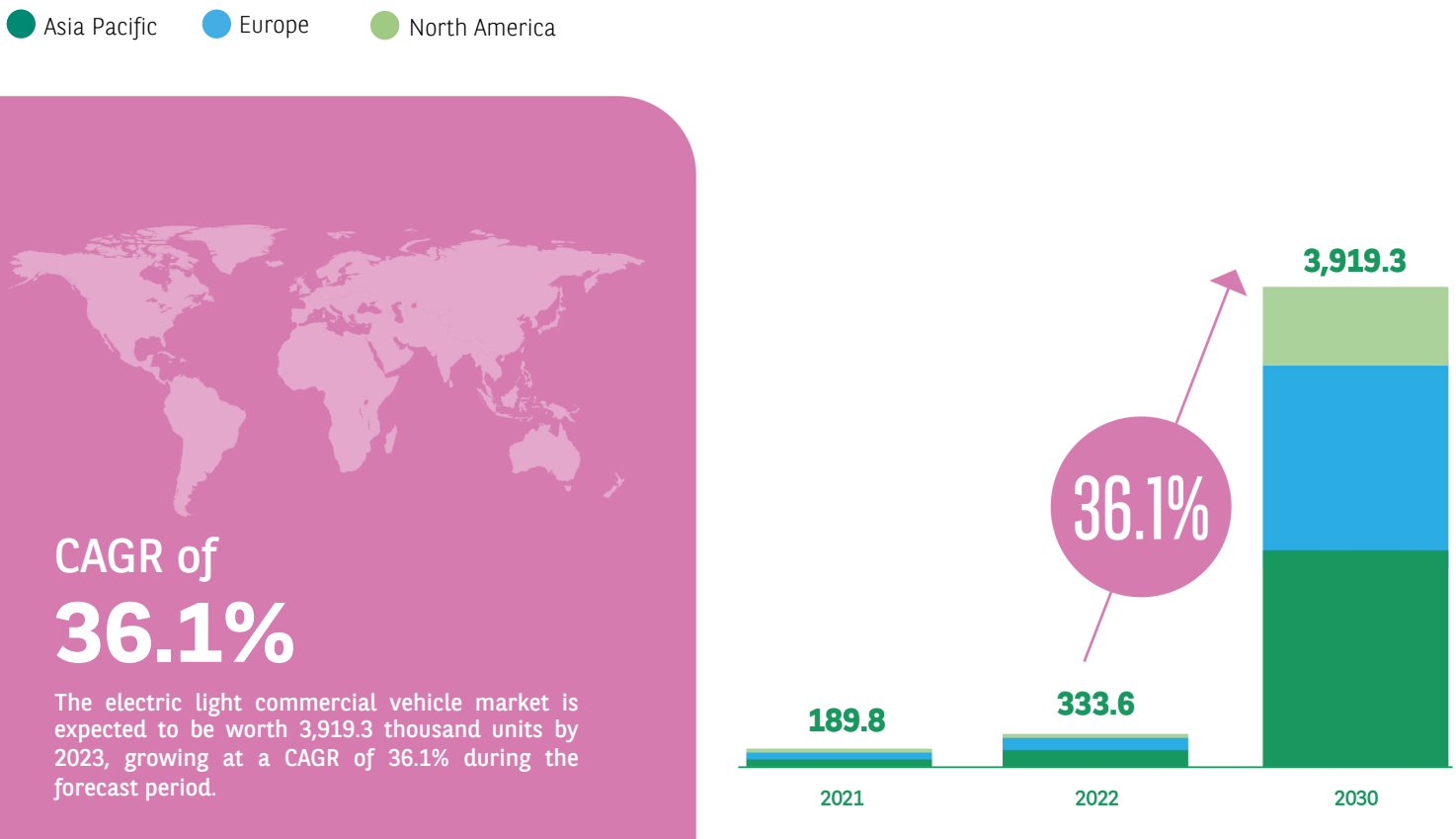
So, in this context, what are the growth predictions for the eLCV market in Europe?

First, let's look at global trends. According to data from the International Energy Agency (IEA), in 2022, global sales of electric light commercial vehicles (eLCVs) increased nearly twofold compared to 2021, surpassing 310,000 units, despite a decline of more than 10% in overall LCV sales.

On a global scale, electric LCVs account for 3.6% of total sales of LCVs; this is about four times lower than the share of electric passenger cars from total car sales, according to previous mentioned source.

According to some analysts, the global market share of eLCVs is expected to reach 22.8% by 2030, or nearly 4 million units by 2030, with a compound annual growth rate (CAGR) of 36.1% by the beginning of the next decade, with Europe expected to experience a major growth.

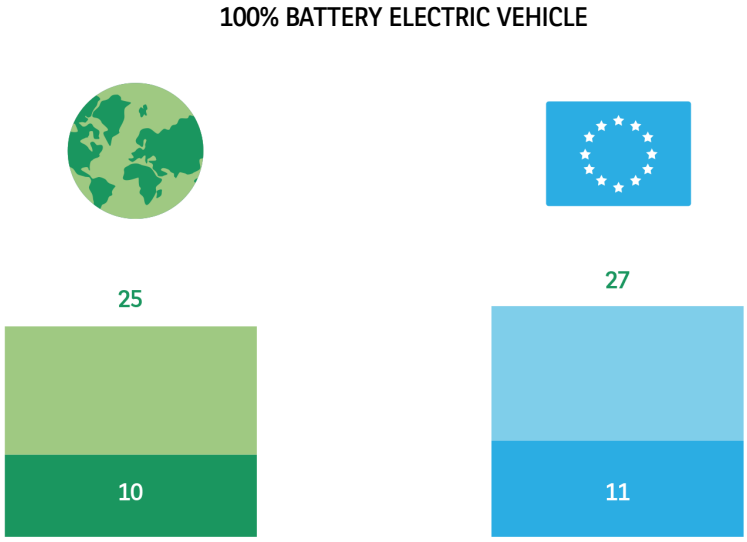
ELECTRIC LIGHT COMMERCIAL VEHICLE MARKET GLOBAL FORECAST TO 2030 (THOUSAND UNITS)



Source: MarketsAndMarkets

01. What are eLCVs and why are they gaining traction?

In Europe, interest in eLCVs is growing. According to data from the Arval Mobility Observatory Fleet and Mobility Barometer 2024, 27% of fleet stakeholders already use eLCVs or are considering implementing them into their fleets within the next three years.



Source: Arval Mobility Observatory Barometer 2024
According to fleet managers that havee at least one eLCV in their fleet.

In conclusion, the electrification of LCVs in Europe is gaining momentum thanks to:

- The wider available range of models, sizes, and payload capacities
- Improved electric ranges, which reduce range anxiety
- Government incentives and emission restrictions

02/ WHY ARE ELCVS IMPORTANT IN THE ENERGY TRANSITION OF FLEETS?

Electric light commercial vehicles (eLCVs) provide cost-effective solutions for urban logistics, reducing emissions and operating costs, while ensuring the primary goal of improving the operational efficiency of the companies they serve. They have also become one of the levers organizations can use to reduce their fleets' greenhouse gas (GHG) emissions and lower their carbon footprint, achieve their sustainability goals, and comply with increasingly strict environmental regulations.

A BRIEF OVERVIEW OF THE ENERGY TRANSITION OF THE TRANSPORTATION SECTOR

The transportation sector encompasses all modes of transport that move goods and people from one location to another. It has a critical role both economically, by enabling trade, commuting, travel, and supply chain logistics, and environmentally, as it consumes a significant amount of energy.
Transportation accounts for about 22% of greenhouse gas (GHG) emissions globally and about 21% in Europe, with freight and shipping accounting for 29.4% and 10.6% of transport emissions. And, despite a slight decrease of 3.5 percentage points since the early 1970s, oil products still account for nearly 91% of the final energy used in transport.

Therefore, the energy transition of the transportation sector is an increasingly important goal for both governments and organizations that are a part of this ecosystem; it involves shifting from fossil fuels to alternative energy sources such as electricity and hydrogen.

There are a few factors shaping this transition.

Incentives and regulatory pressures support governments' goals

Many governments and cities have set strict emission regulations and ambitious targets for EV adoption.

Regulatory pressures have created a market environment in which vehicle manufacturers must innovate and expand their EV offerings to comply with emissions limits.

The European Union has set stringent CO_2 emission standards for light commercial vehicles. New LCVs must not emit more than:

- 153,9 g CO_2/km from 2025 to 2029
- 90,6 g CO_2/km from 2030 to 2034
- 0 g CO_2/km after 2035, i.e. become fully electrified

The UK, Norway, and Iceland have set similarly ambitious targets for new LCVs, phasing out the sales of new vehicles with internal combustion engines between 2025 and 2035, similarly to Canada, Chile, Singapore, and some US states.

Additionally, with the introduction of low-emission zones (LEZs) in many European cities (whose number is expected to reach 507 in 2025), eLCVs are emerging as a swift solution to traffic-related emissions and help companies comply with regulations, avoid penalties, and continue to operate.

To support their goals and help citizens and organizations adopt less emitting vehicles, many governments are offering incentives, such as:

•Subsidies for EV purchases
•Tax breaks
•Investments in public charging infrastructure

Technological advancements enable the transition

"Ideal use cases include urban parcel delivery for larger Panel Vans and facility management, because vans are small to medium in size.

Electrifying large vans is still a challenge, because their payloads are usually quite heavy. If the van is full, the range drops significantly, and if they're towing, it's further reduced by 30%."

Simon Cook, LCV Leader at Arval

Advancements in battery technology and charging infrastructure mean that EVs and eLCVs are becoming more affordable and efficient.

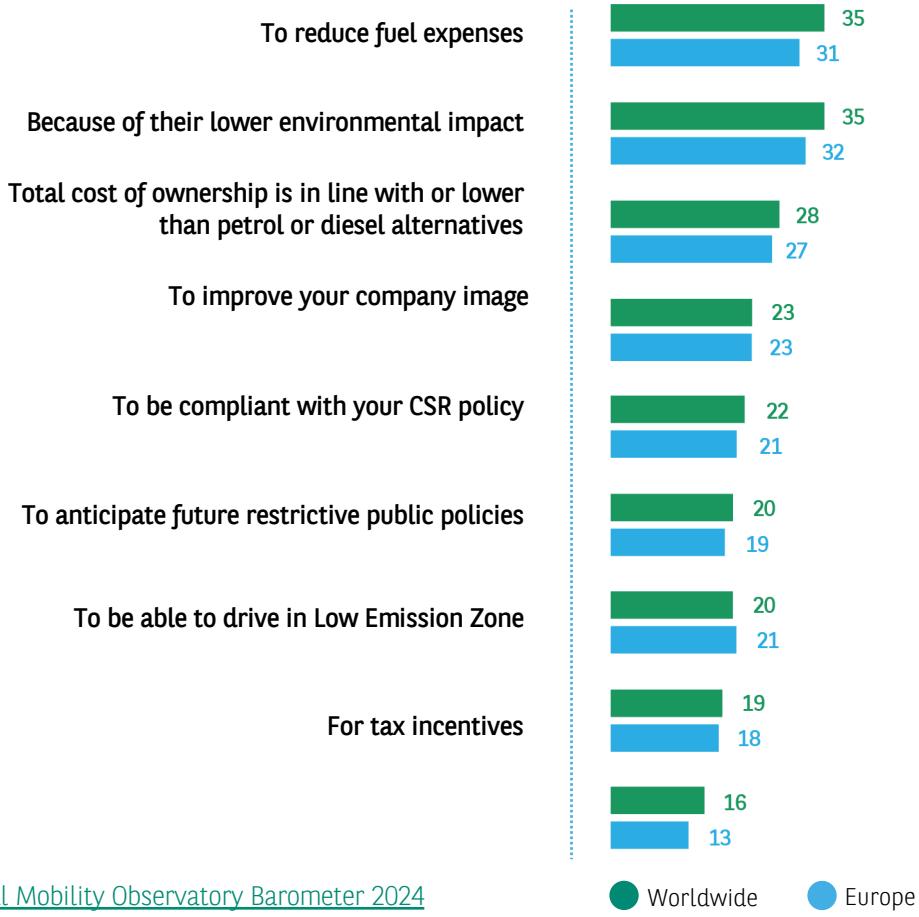
Previously, most electric vehicles on the market were small to medium-sized passenger cars, making them suitable only for some organizations' fleets. Businesses operating commercial fleets, for example in the logistics, distribution, or construction sectors, need larger vehicles, such as LCVs, not only to meet their transportation needs, but also to be able to provide the core services they offer.

As technology evolves, we see the emergence of more electric models that align with the demands of fleet managers, offering sufficient payload capacities to support many different use cases.

ELCVS ARE A LEVER TO ACHIEVE SUSTAINABILITY GOALS FOR COMMERCIAL FLEETS

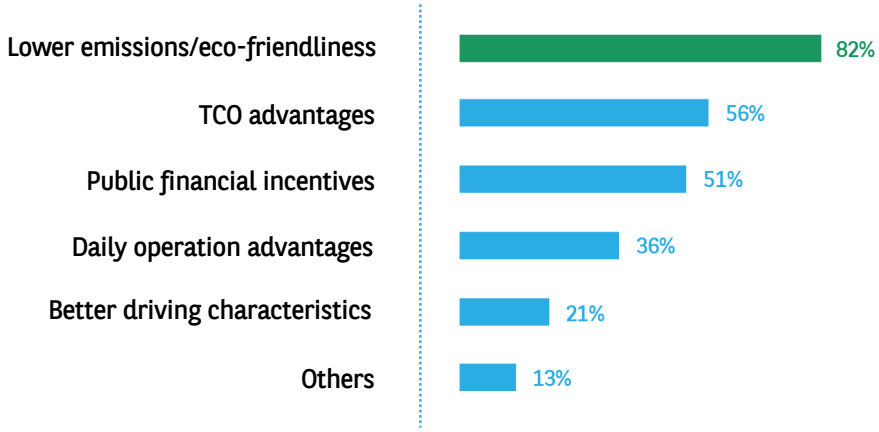
Electric Light Commercial Vehicles (eLCVs) play a crucial role in helping organizations achieve their sustainability goals for their commercial fleets.

According to research by Arval Mobility Observatory, the leading reasons for implementing or considering alternative fuel technologies are to reduce fuel expenses and because of their lower environmental impact.



Source: Arval Mobility Observatory Barometer 2024

According to additional research focusing on Germany, done by Arthur D. Little, the most important motivating factors for adopting eLCVs are their lower emissions (for 82% of surveyed organizations), followed by advantages in terms of total cost of ownership (TCO) and public financial incentives:



Source: ADL

CSR and sustainability goals

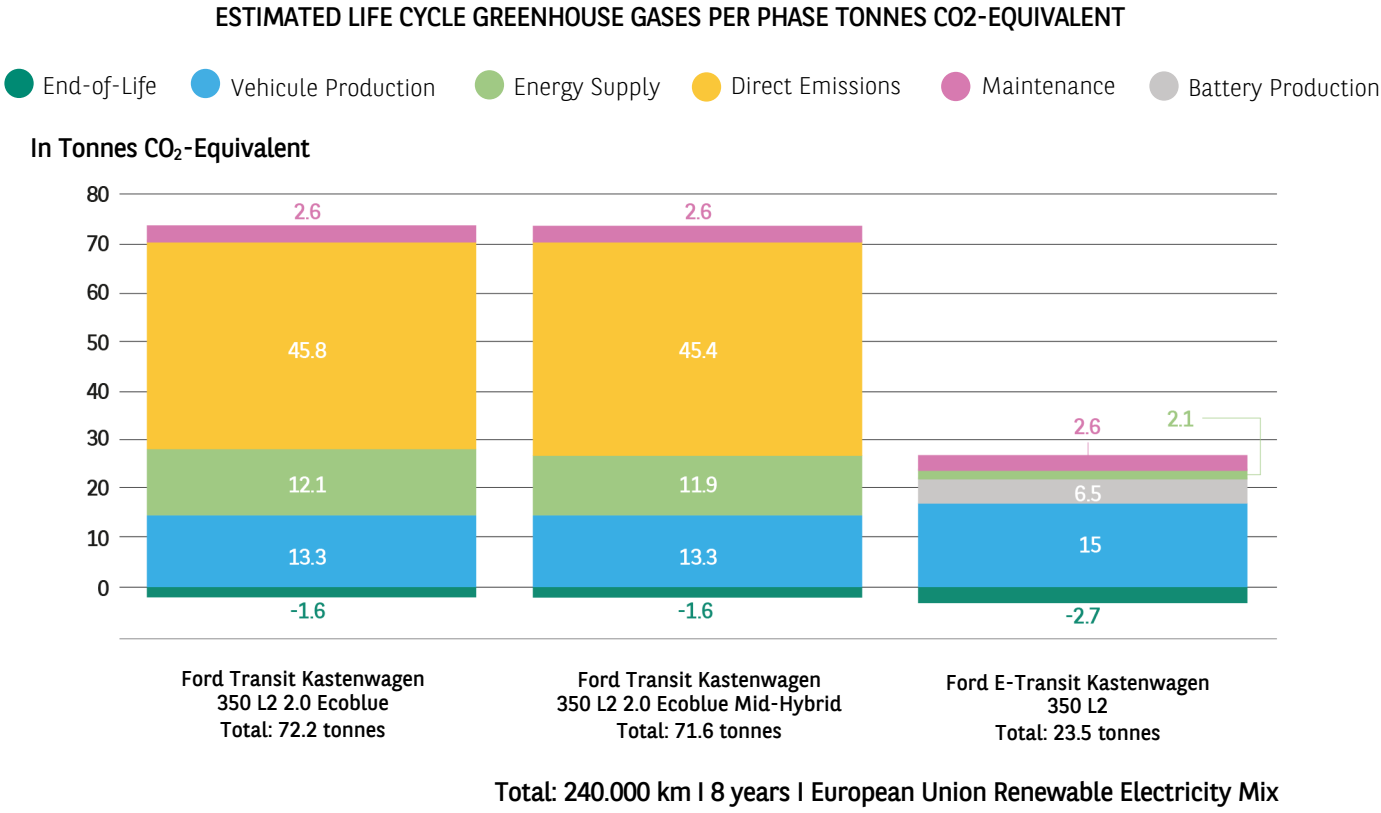
By adopting eLCVs, companies can align their commercial fleets with their CSR objectives, which can appeal to environmentally conscious consumers and business partners.

Reduced carbon footprint

eLCVs produce zero tailpipe emissions, meaning that they help significantly reduce the operational carbon footprint of commercial fleets. This is crucial in sectors like logistics and delivery, where vehicles are in constant operation.

Still, it's important to consider the upstream impact of eLCVs and greenhouse gas (GHG) emissions over their entire life cycle, including the extraction and processing of raw materials, manufacturing, transportation, and end-of-life disposal or recycling.

Even when we consider all those factors, however, studies show that over the lifetime of the vehicle, electric vehicles' greenhouse gas emissions are lower than those of internal combustion engine (ICE) vehicles.



Source: GreenCap, Life Cycle Assessment (LCA) Interactive Tool, Ford Transit Kastenwagen 350 vs Ford E-Transit Kastenwagen 350

Major corporations like Amazon, UPS, DHL, and DB Schenker have already committed to integrating eLCVs into their fleets as part of their broader sustainability initiatives, reflecting their dedication to reducing their environmental impact.

03/ HOW TO CHOOSE THE CORRECT MODEL?

There are a number of eLCVs available on the market at the moment, with different ranges and payload capacities, and with different price tags, so fleet managers need to carefully weigh up requirements, costs, and features to pick the right eLCV.

For a successful transition to electric vehicles, fleet managers can use a strategic approach when defining what percentage of their LCV fleet to electrify, which models are most suitable for replacement, and more.

HERE ARE SOME KEY FACTORS TO CONSIDER:

Range requirements

Assess the typical daily mileage of each vehicle in your fleet and make sure the selected eLCV comfortably exceeds it. For this, you need to look into the average daily mileage of your LCVs and maximum ranges to determine their distance and frequency.

Total cost of ownership (TCO)

Next, analyze the total cost of ownership for the selected eLCV, including:

- Purchase price
- Government incentives, such as tax breaks and subsidies
- Operational and charging costs
- Maintenance costs
- Resale value
- Mileage of the vehicle, as having a correct estimation of the daily mileage would impact the charging, distances and total life duration of the van

Payload, cargo space, and fitting options

Ensure the eLCV can handle the weight and volume of your fleet's typical cargo, looking at maximum and average payload.

Keep in mind that eLCVs are heavier compared to their diesel or petrol counterparts due to battery weight. This, in turn, leads to a reduced payload capacity.

If diverse load types are common, consider models with flexible configurations.

Charging infrastructure and functionalities

Next, you need to evaluate the type of charging infrastructure that you'll use to charge eLCVs – and, potentially, have to install.

Consider the following:

- Are there any available public charging options that are suitable for eLCVs?[2]
- Is a depot charging solution feasible at your current location?
- What are the lead times and costs for building the suitable charging infrastructure?
- If you operate a return-to-home fleet, what home charging infrastructure will you need to implement for employees?
- Does the selected eLCV offer fast charging?

We'll discuss those points in detail in the next chapter.

Technology and connectivity

Consider models' telematics and fleet management systems.

These enable you to:

- Monitor accurately the real usage of each asset
- Optimize routes
- Monitor vehicle performance
- Improve security with geolocalisation options
- Manage charging schedules

Brand support and service network

Select brands with an adequate support network and readily available service centers to minimize downtime during maintenance.

(2) Public charging points are often desiggned for personal vehicles and cannot be used by LCVs.

04/ HOW CRUCIAL IS CHARGING INFRASTRUCTURE FOR SUCCESSFUL ELCV INTEGRATION?

An important factor that fleet managers need to consider when adopting eLCVs is the charging infrastructure they'll have to build, including lead times for its implementation and its scalability for future needs.

Clearly, they need to plan and execute their eLCV charging strategy in parallel with their overall electrification strategy – or else they risk not being able to meet the charging demands of growing electric fleets.

Additionally, a thorough review of current routes could reveal potential opportunities for route optimization, which could help build more efficient operations. This way, fleet managers would be able to identify the routes that are best suited for eLCVs and the ones for which they might need to use existing ICE LCVs.

WHAT DO FLEET MANAGERS EXPECT AND NEED?

Fleet stakeholders have high expectations in terms of eLCVs' range and charging options:

• **Sufficient range for daily operations:** Fleet managers expect their eLCVs to be operational for a full day of work on a single charge. With ranges upwards of 200 km, the latest eLCV models can cover more and more use cases.

• **Efficient charging infrastructure and features:** Access to a fast and reliable charging infrastructure, or the possibility of deploying it quickly, is crucial. DC fast charging is key in helping reduce downtime during charging sessions. Most recent models come with a DC fast charging option.

The transition to eLCVs requires a careful analysis of needs and viable use cases. A strong contender for electrification would be a LCV that has the following usage profile:

• Daily driving ranges of up to 200 km (short to medium daily mileage)
• Predictable routes in urban or suburban areas
• Predictable payloads in terms of size and volume
• Access to charging infrastructure (e.g. overnight charging at a depot or at home)

CHARGING INFRASTRUCTURE: CHALLENGES AND SOLUTIONS

Charging infrastructure is a critical component for the successful adoption of eLCVs. The ability to efficiently charge vehicles impacts operational efficiency, cost management, and the overall feasibility of fleet electrification.

There are several solutions for charging, each with its challenges and potential solutions.

Depot charging

Depot charging requires installing dedicated charging stations at a fleet's central hub (depot), enabling vehicles to recharge overnight or during scheduled downtime.

In Europe, providers of depot charging solutions and infrastructure include Shell (US), ABB (Switzerland), Siemens (Germany), BP Pulse (UK), and Bosch (Germany), among others.

Challenges
Setting up depot charging stations:

• Might require a significant upfront investment in electrical infrastructure, including transformers, charging units, and grid connections
• Requires careful management of available space and power demand

Possible solutions
Starting with a few charging stations, retrofitting existing spaces, and gradually expanding can help reduce initial costs. Smart scheduling during off-peak hours or the installation of solar panels might also help.

Public charging

Fleets in which vehicles need to frequently travel long distances might benefit from the growing availability of public charging stations.

Challenges
Public charging presents a few challenges, because it:

• May not always be available when needed, leading to downtime and operational inefficiencies
• May be slower compared to DC fast chargers, which makes it unsuitable for operations that require quick turnaround times
• May vary significantly in terms of cost
• May not be designed to host LCVs

Solutions
Mapping out available public charging stations in the area of operations enables managers to optimize fleet efficiency. The EU has set an ambitious Green Deal target of one million charging points by 2025.

05/ WHAT ARE THE PRACTICAL CONSIDERATIONS REGARDING RANGE AND PERFORMANCE OF ELCVS?

05. What are the practical considerations regarding range and performance of eLCVs?

When considering the implementation of eLCVs into their fleets, managers need to consider several aspects related to the performance of their vehicles – and OEMs need to work with their customers closely to understand their needs and help them choose the best models for their usage.

Range anxiety has historically been an obstacle to eLCV adoption, but improvements in battery technology are now leading to increased ranges.

"We're starting to see ranges going up as battery technology improves. Standard ranges have gone up from approximately 110 km to 240 km in one generation, which is a major change. In the next few years, I expect this trend to continue, meaning that more industries and more market segments will be able to move to an electric option."

Simon Cook, LCV Leader at Arval

As of 2024, many eLCV models have an official (WLTP) range of more than 250 km. Obviously, payload, towing, and temperatures impact ranges, as do other factors, so in this section we will analyze the practical considerations that fleet managers need to make.

The Worldwide Harmonized Light Vehicles Test Procedure (WLTP) provides standardized metrics that help determine the range of eLCVs. However, WLTP figures, which are calculated based on tests in specific conditions, tend to be optimistic compared to real-world figures based on actual driving conditions.

WHAT ARE THE FACTORS THAT IMPACT ELCVS RANGES?

Key factors that impact the range of eLCVs, bringing it lower than WLTP figures, are:

- **Payload and towing:** Heavier loads or towing require more energy and thus reduce range.
- **Temperature:** Extreme temperatures can reduce battery efficiency and vehile range. Hot temperatures require more intensive cooling, while cold temperatures decrease battery performance.
- **Battery capacity:** Larger battery capacities generally provide longer ranges, but they also increase the vehicl's weight and cost.
- **Driving conditions and terrain:** Regenerating braking allows for lower energy consumption in urban conditions, as compared to highway drivving. Hilly terrain requires more energy.
- **Driving habits:** Rapid acceleration and high speeds may reduce range, while efficient driving practices can extend it.
- **Maintenance:** The proactive mantenance of vehicles makes them more reliable and might also positively impact range

However, manufacturer WLTP figures do not accurately reflect real-world electric vehicle efficiency.

In real-use testing carried out for Arval by UTAC at its test center in Millbrook:

- The full-size electric light commercial vehicle (eLCV) achieved only 57% of its WLTP range
- The mid-size eLCV reached 55% of its WLTP range
- The car hit 50% of its WLTP range

> "If you're a fleet manager, it's very important to look at your worst case scenario and base your decisions on it. You cannot take a manufacturer's stated range and then apply this to your fleet; instead, you have to take into account real-world data, which is typically 60% of the WLTP range."
>
> **Simon Cook, LCV Leader at Arval**

Temperature

Low temperatures impact battery performance in terms of capacity and braking regeneration. A comfortable warm temperature in the driver's cabin also needs to be maintained by the vehicle's battery, while for ICE vehicles some energy is drawn from waste heat escaping the engine.

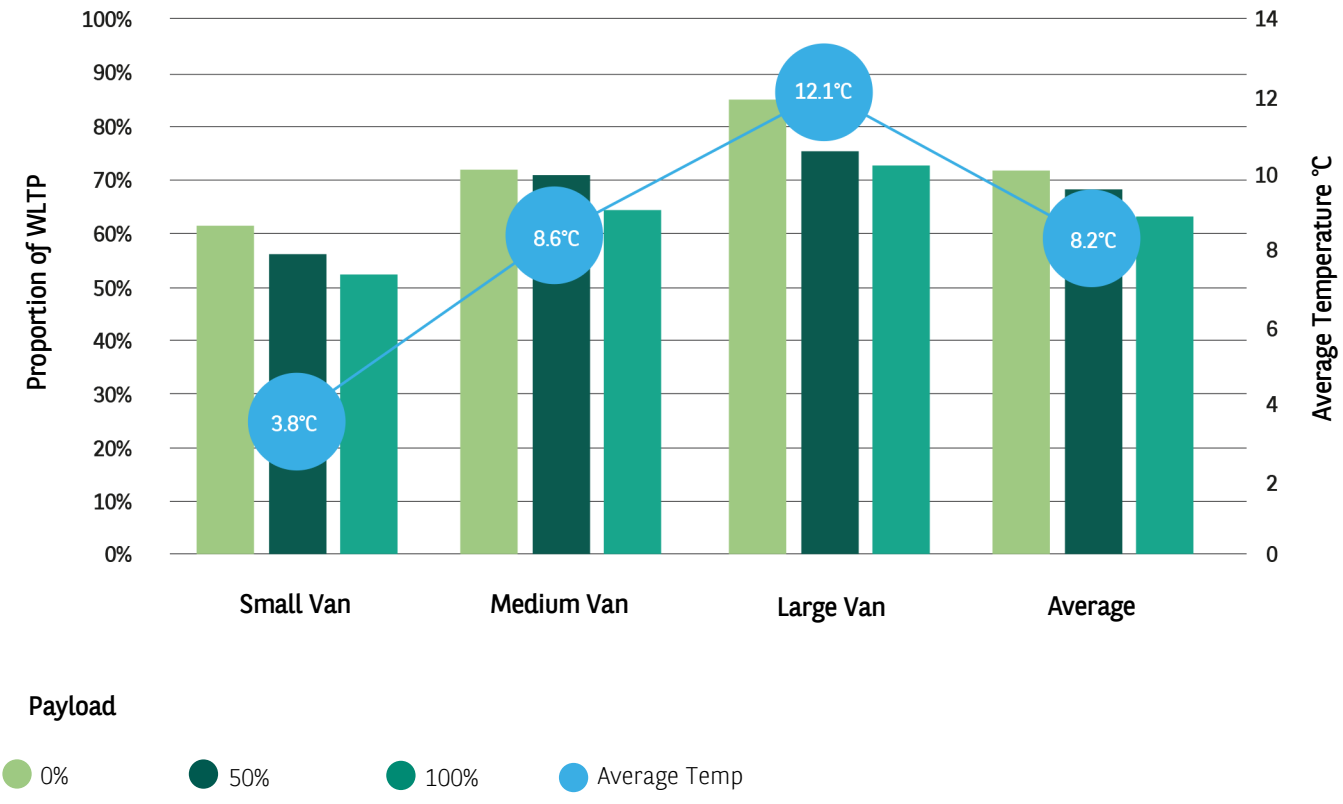
Fleet managers can expect real-world ranges in winter conditions to be around 60-70% of stated WLTP figures.

Payload

Payload also affects an eLCV's real-use range, however, with an average reduction of 8%, the impact is lower than the effect of cooler ambient temperatures.

The combined impact of cold weather and a full payload sets a crucial baseline for worst-case scenarios, bringing the real-use range down to 50% of the official WLTP range.

PAYLOAD IMPACT OF REAL-LIFE RANGE AGAINST WLTP RANGE (COMBINED CYCLE)

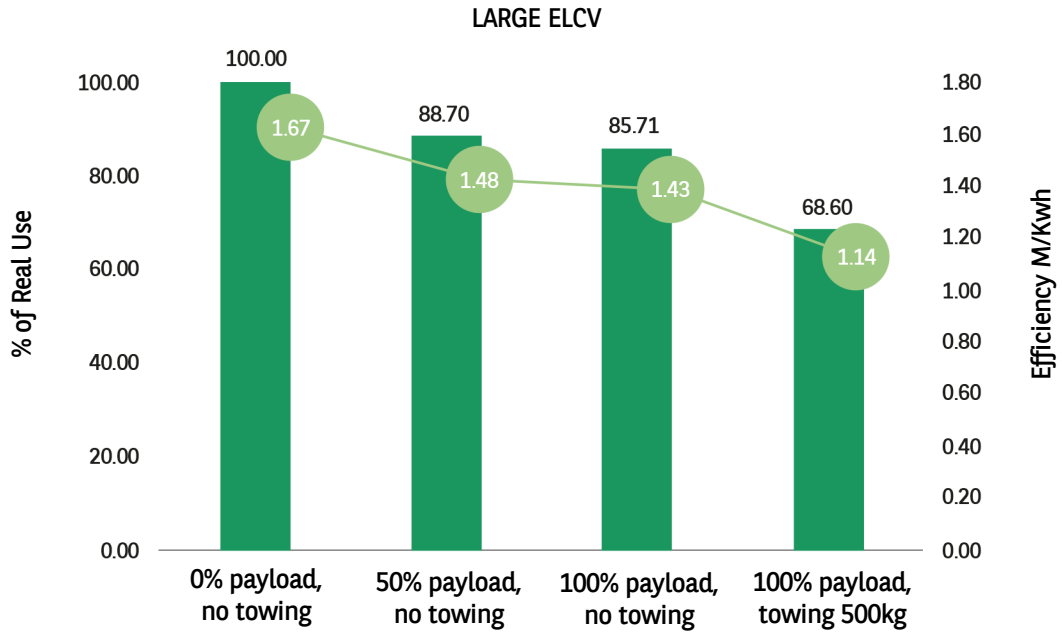


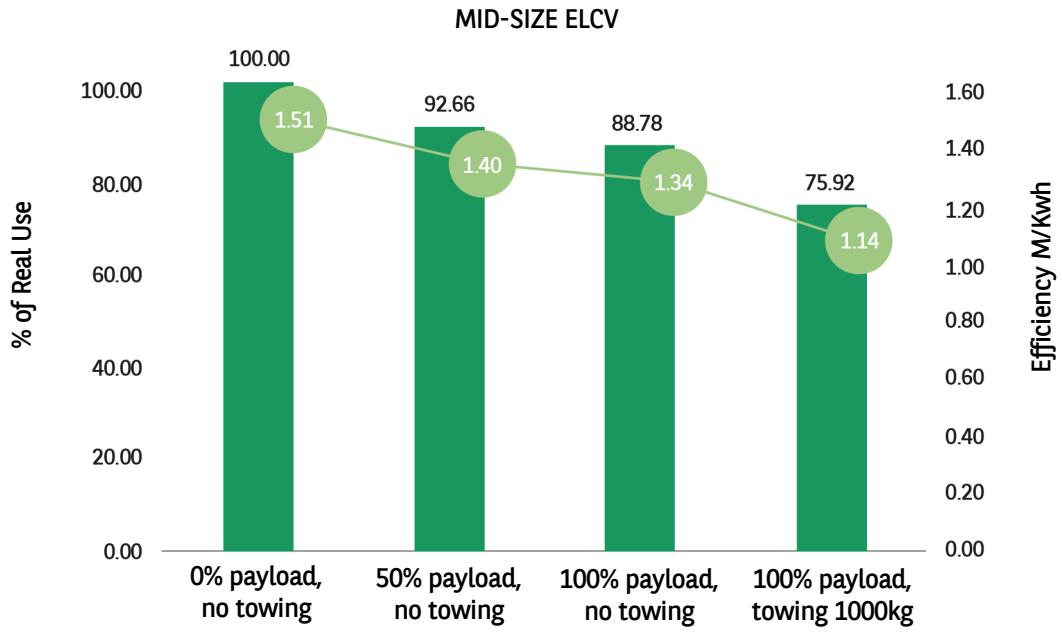
Source: Arval

Towing

Towing has a bigger impact on vehicle range than payload. The effect of towing on top of maximum payload for LCVs is between 13 to 17%.

Here are some scenarios that were tested:





Source: Arval – Electric vehicles revealed

In short, towing an additional 500 kg payload (on top of a 100% payload in the vehicle) led to a:

- 17% reduction in range for large eLCVs
- 13% reduction in range for mid-sized eLCVs

In comparison, for electric vehicles, towing a 500 payload leads to a 23% reduction in range.

06/ WHAT ARE THE FINANCIAL IMPLICATIONS OF ADOPTING ELCVS?

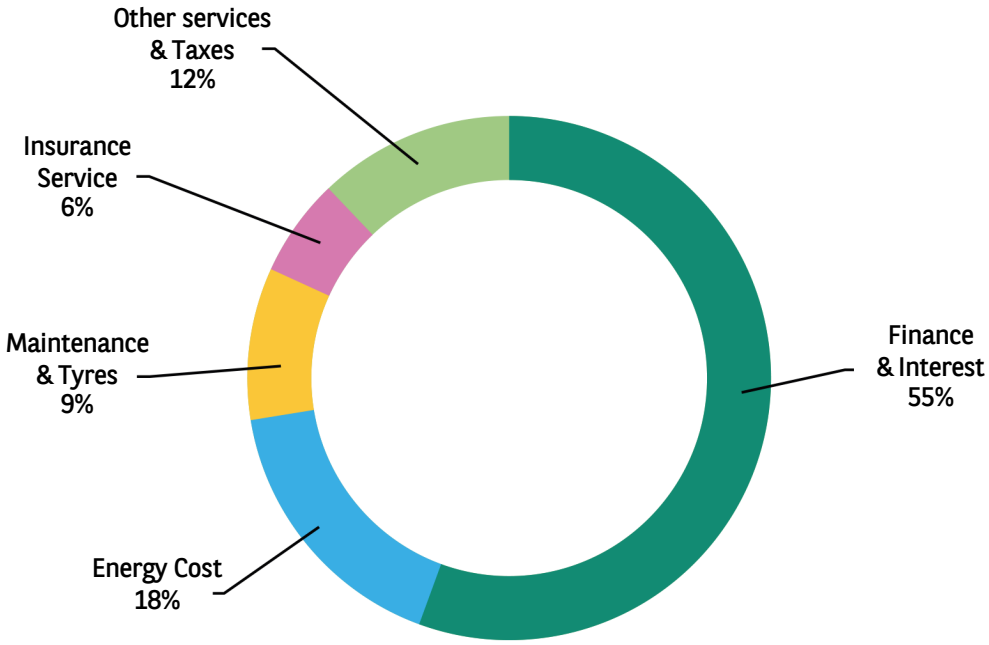
06. What are the practical considerations regarding range and performance of eLCVs?

Adopting electric light commercial vehicles (eLCVs) over traditional internal combustion engine (ICE) LCVs has significant financial implications for fleet stakeholders, who need to consider not only purchase prices, but also, energy costs, insurance, maintenance, and subsidies, among others, i.e. each commercial vehicle's total cost of ownership (TCO).

On average, a vehicle's TCO is comprised of:

- 50% to 70% financing cost
- 15% to 30% energy cost (fuel or electricity consumption)
- 10% maintenance
- 5% to 10% insurance
- 10% additional taxes (ownership or usage taxes)

TCO DISTRIBUTION LCVs (all powertrains)



Source: Arval Consulting, based on Arval TCO Index Q3 2024

DISTRIBUTION OF COSTS IN THE LCVs TCO (COMPARATIVE SUMMARY OF ICE AND BEV)

	FINANCE & INTEREST	ENERGY COST	MAINTENANCE & TYRES	INSURANCE SERVICE	OTHER SERVICES AND TAXES
ICES	53%	19%	9%	6%	13%
BEVs	65%	11%	7%	6%	11%

Source: Arval Consulting, based on Arval TCO Index Q3 2024

In this chapter, we'll see how eLCV purchase prices and TCOs compare to their diesel counterparts.

DIFFERENCES IN PURCHASE PRICES

If we compare purchase prices of internal combustion engine LCVs and electric LCVs that have similar features and characteristics, eLCVs tend to have higher purchase prices. Below you fill find the comparison of average prices per type of LCVs, based on the Arval database.

	List Price	% vs ICEs
LCV/VAN		
LARGE VAN		
BEVs	66 183 €	+36%
ICEs	48 564 €	
MEDIUM VAN		
BEVs	51 223 €	+26%
ICEs	40 812 €	
SMALL VAN		
BEVs	38 369 €	+48%
ICEs	25 887 €	

Research from Arthur D. Little shows that eLCVs are approximately 67% more expensive than their diesel counterparts.

Source: Arthur D. Little

TOTAL COST OF OWNERSHIP (TCO) OF DIESEL LCVS VS. ELCVS

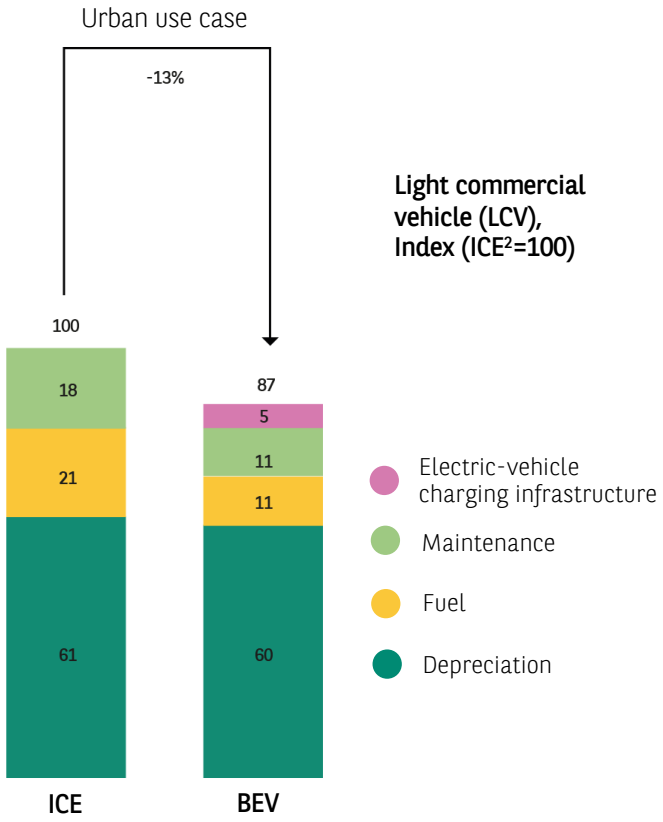
Fleet managers are mindful of the differences in initial costs, however, this is only a part of the picture. Electric vehicles often have lower operating costs compared to internal combustion engine vehicles. Savings come from:

- Reduced energy costs
- Lower maintenance requirements (fewer moving parts)
- Potential operational incentives, such as lower ownership taxes

These cost savings can be substantial over the vehicle's lifespan, making eLCVs an economically viable option for fleet operators. So, basing decisions on total cost of ownership (TCO), rather than on initial costs, is essential for realizing long-term financial benefits.

According to research by the McKinsey Center for Future Mobility, TCO for eLCVs is 13% lower than for LCVs in a standard urban use case of 24,000 km per year (15,000 miles) for vehicles owned during a period of 6 years; the main contributors to the lower cost are the reduced maintenance and fuel expenses.

TOTAL COST OF OWNERSHIP ANALYSIS, $ per mile



Source: McKinsey & Company

Indeed, **reducing fuel expenses** is a primary objective for companies globally and in Europe.

"The electrification of commercial fleets started making sense at the moment when fleet managers were able to actually start saving money. With the right data, it's possible to figure out which vehicles you should replace with electric models, and for which ones it's technically feasible but you wouldn't save money."

Silvester Pullman, Chief Commercial Officer at Voltia

FINANCIAL INCENTIVES AND SUBSIDIES FOR ELCV ADOPTION IN EUROPE

European countries offer a variety of financial incentives to encourage the adoption of eLCVs, which help reduce the total cost of ownership and make electric vehicles more attractive to fleet operators.

Here's an overview of some of the types of incentives offered in different countries:

	Tax benefits		Incentives	
	Acquisition tax benefits	Ownership tax benefits	Purchase incentives	Infrastructure incentives
Austria	✅	✅	✅	✅
Denmark	✅	✅	❌	❌
France	✅	❌	✅	❌
Germany	❌	✅	❌	❌
Ireland	✅	✅	✅	❌
Netherlands	❌	❌	✅	❌
Spain	✅	✅	❌ (ended in July 2024)	❌ (ended in July 2024)
UK	❌	❌	✅	❌

Source: ACEA

1. Purchase incentives

Acquisition subsidies are provided at the point of purchase to lower the initial cost of eLCVs.

Countries offering such incentives for eLCVs include France, Germany, Italy, Belgium, Croatia, Estonia, Finland, Poland, and Portugal, among others. Examples:

- **France:** Bonus of €3,000 for legal persons if vehicle ≤ €45,000 for a new N1 BEVs or FCEVs
- **Germany:** KsNI programme (until the end of 2026) for the purchase of new N1, N2, and N3 BEVs/FCEVs and for retrofitting N2 and N3 vehicles into BEVs/FCEVs
- **Croatia:** Yearly incentive scheme of up to €5,309 for PHEVs and up to €9,291 for BEVs or FCEVs
- **Estonia**: €4,000 per vehicle for legal persons for the purchase and leasing of new N1 BEVs and FCEVs

(Source: ACEA)

2. Tax benefits

Tax benefits include:

• **Registration tax benefits:** Deductions or exemptions from registration taxes for electric vehicles
• **Ownership tax benefits:** Deductions or exemptions from ownership taxes for electric vehicles

Countries offering tax benefits for electric LCVs include France, Germany, Ireland, Italy, Poland, Slovakia, Portugal, and more.

Examples:

• **France:** Regions provide an exemption (either total or 50%) for alternatively powered vehicles (BEVs, HEVs, CNG, LPG, and E85).
• **Germany:** A 10-year exemption for BEVs and FCEVs registered until 31 December 2025. Exemption from the annual circulation tax for vehicles emitting ≤ 95g CO2/km.
• **Ireland:** €5,000 relief for acquisition taxes on BEVs up to €40,000. Minimum rate of ownership taxes (€120 per year) for BEVs.

Source: ACEA

3. Infrastructure support

Some governments offer subsidies for installing private and commercial charging points.

Countries that provide financial infrastructure support include Germany, Sweden, and Switzerland.

Examples:

• **Germany:** KsNI programme (until the end of 2026) for electric charging and hydrogen tank infrastructure.
• **Sweden:** Grants for various types of charging infrastructure (for residents, businesses, and organizations) from the Swedish Environmental Protection Agency.
• **Switzerland:** Various cantons and municipalities contribute to the installation costs for electromobility.

Source: ACEA

4. Other incentives

Other less common incentives include:

1. Low-interest loans for the purchase of electric vehicles
2. Subsidies for leasing electric vehicles
3. Additional local incentives and subsidies in different regions and cities
4. Trade-in bonuses for trading in old diesel vehicles when purchasing new electric vehicles

07/ IS THE MAINTENANCE OF ELCVS DIFFERENT AND HOW DOES IT IMPACT DOWTIME?

Maintenance requirements and costs are among the key considerations that fleet operators need to make when electrifying fleets.

The maintenance needs of electric light commercial vehicles (eLCVs) are indeed different from those of equivalent internal combustion engine (ICE) LCV models.

MAINTENANCE FOR ELCVS VS ICE LCVS: COMPARISON AND KEY CONSIDERATIONS

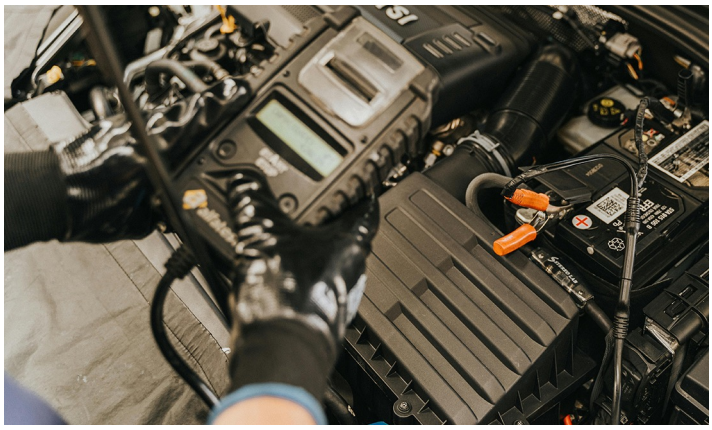
The maintenance of eLCVs is typically less costly and requires less downtime than that of internal combustion engine LCVs.

The ICCT, quoting a study by Burnham et al., estimates maintenance costs of EVs to be about 49% lower than of ICE vehicles. According to research by McKinsey & Company, maintenance costs for eLCVs compared to LCVs are estimated to be about 39% lower (according to the diagram shown in the previous chapter).

This is primarily due to the following factors:

- Fewer mechanical parts lead to reduced wear and tear
- Electric motors and their associated components are simpler and therefore require less frequent maintenance
- EVs require no oil or engine coolant changes
- Regenerative braking reduces brake wear

At the same time, however, eLCVs require different maintenance tasks, including battery management and software updates. Although less frequent, they might require specialized knowledge and equipment, and fewer servicing options might be available for eLCVs.



Here are the key considerations in terms of maintenance that fleet managers need to make when implementing eLCVs into their fleet:

Fewer moving parts

Electric vehicles have fewer moving parts compared to their ICE counterparts. They do not have components like oil filters, spark plugs, and exhaust systems, which require periodic servicing in ICE vehicles.

Impact: The relative simplicity of BEV's motors means that they also have fewer parts that can wear out or fail. This results in simpler maintenance.

Brake wear

eLCVs use regenerative braking systems that help to recharge the battery while braking. This reduces the wear on traditional brake components, extending the lifespan of brake pads and rotors.

Impact: Brake components last longer, reducing the frequency of replacements and associated downtime.

Fluid changes

eLCVs do not require oil changes, fuel filter replacements, or engine coolant changes. They use brake fluid and battery coolants, but the overall frequency of fluid changes is lower.

Impact: This eliminates routine maintenance associated with oil changes and reduces the servicing frequency of other fluids.

Battery, electric components, and software

The primary maintenance tasks for eLCVs involve checking the health and performance of batteries (for which battery management systems are used), assessing the condition of the electrical systems and installing software updates.

Impact: While these tasks can require specialized knowledge, they are generally less frequent than maintenance required for internal combustion engines. Software updates are usually done remotely or during charging.

Tyres

The tyres of electric vehicles wear out faster than those of diesel or petrol cars due to increased wheel torque and battery weight.

With the increase of electric vehicles on the market, most of the tyres producers have introduced EV-ready tires – which are specifically designed for electric vehicles (EVs), are optimized for higher torque and weight, offering improved efficiency and durability. Currently, these tires are increasingly used in electric vehicles to enhance performance and range, and they will support with the eLCVs operational routes in long term.

Impact: eLCVs might require more frequent tyre changes than similar ICE models.

AVAILABILITY OF SERVICING OPTIONS

Onboard sensors help detect and mitigate many minor issues in EVs. However, for more extensive repairs, fleet operators would need to turn to specialized repair shops.

And while ICE vehicles benefit from a vast and well-developed network of service centers, many of these might lack the specialized tools and equipment necessary to service electric vehicles or their batteries.

Additionally, mechanics need specialized training and both mechanical and IT skills for effectively repairing electric vehicles and eLCVs.

As BEVs become more common, the availability of service centers is expected to improve, mitigating this issue over time. In the meantime, however, fleet managers might need to evaluate the availability of service centers in their area when implementing eLCVs in their fleet.

08/ WHAT REGULATIONS AND STANDARDS ARE IN PLACE FOR ELCVS?

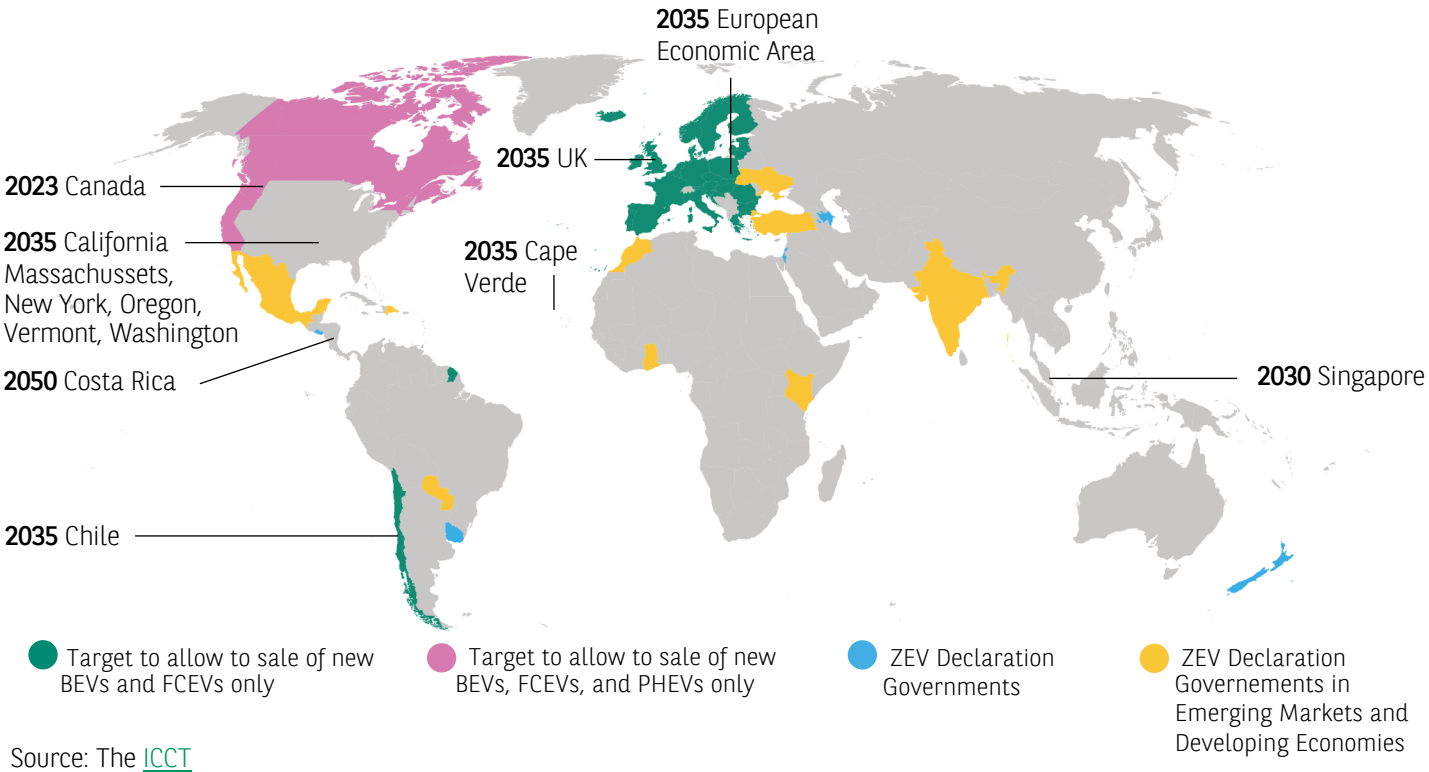
Regulations and standards – and especially their timelines – are an important factor to consider when transitioning your fleet from internal combustion engine LCVs to eLCVs.

In this chapter, we'll discuss the key legislative requirements fleet managers and stakeholders in Europe need to be aware of.

BANS ON THE SALE OF NEW PETROL AND DIESEL CARS AND VANS

Several countries in Europe and in the world have announced plans to ban the sale of new petrol and diesel cars and vans in 2035 as part of their efforts to reduce greenhouse gas emissions.

GOVERNMENTS WITH OFFICIAL TARGETS TO 100% PHASE IN SALES OF NEW ZERO CO2 EMISSION CARS AND VANS/ LIGHT TRUCKS BY A CERTAIN DATE (STATUS: THROUGH FEBRUARY 2024)



Source: The ICCT

The EU ban on the sale of new petrol and diesel cars from 2035

The European Commission's Green Deal has set a goal of making the European Union climate neutral by 2050, and, therefore, achieving a zero-emission road transport within the same timeframe.

The Fit for 55 policy package outlines the specific actions needed to achieve these goals and aims to reduce EU greenhouse gas emissions by 55% by 2030.

It proposes a de facto ban on the sale of new petrol and diesel cars by 2035, by requiring all new cars and vans sold from that date to be zero-emission.

Additionally, emissions reduction targets for 2030 are set at 55% for cars and 50% for vans.

Whether these goals are maintained with the new European Parliament remains to be seen.

EMISSION STANDARDS FOR ELCVS

The European Union's landmark decision to mandate a 100% CO2 emission reduction for all newly registered cars and vans starting in 2035 makes it the first major region in the world to introduce a similar ambitious goal. This is the next step of a line of emission-limiting regulations and standards in the EU, such as the Regulation (EU) 2019/631 and Euro 5 and 6 standards.

In 2024, the European Council adopted the Euro 7 regulation, which defines additional rules on vehicles' emission limits and battery durability that:

- Introduce stricter emission limits on NOx, PM, and other pollutants.
- Cover a wider range of driving conditions, including real-driving emissions (RDE) tests.
- Ensure vehicles meet emission standards throughout their lifespan.
- Address additional pollutants like ammonia and brake and tire wear particles.
- Include provisions for hybrid and electric vehicles to comply with emission limits.

Other countries, such as the UK, have implemented regulations around the ban of sales of ICE vehicles.

IMPACT OF LOW EMISSION ZONES (LEZS)

Low emission zones (LEZs) are designated areas (usually in urban centers) where only vehicles that meet specific emission standards can enter. In Europe, since their introduction in the late 1990s, LEZs have been consistently growing in number and scope.

In 2022, there were over 320 LEZs in the EU and their number is expected to reach 507 by 2025. Zero-emission zones (ZEZs) are also on the horizon.

LEZs create a strong incentive for businesses to switch to eLCVs, which generally have unrestricted access to those zones, allowing businesses to operate without concern for fines or access restrictions.

For some businesses, access to city centers is not just important, it's vital for their operations. Examples include, among others:

- Last-mile delivery services, including those providing food and grocery delivery
- Companies that provide maintenance and repair services, e.g. elevator maintenance, plumbing, and more
- Catering services
- Equipment rental agencies

For them, transitioning to eLCVs should be a key priority to ensuring operational continuity.

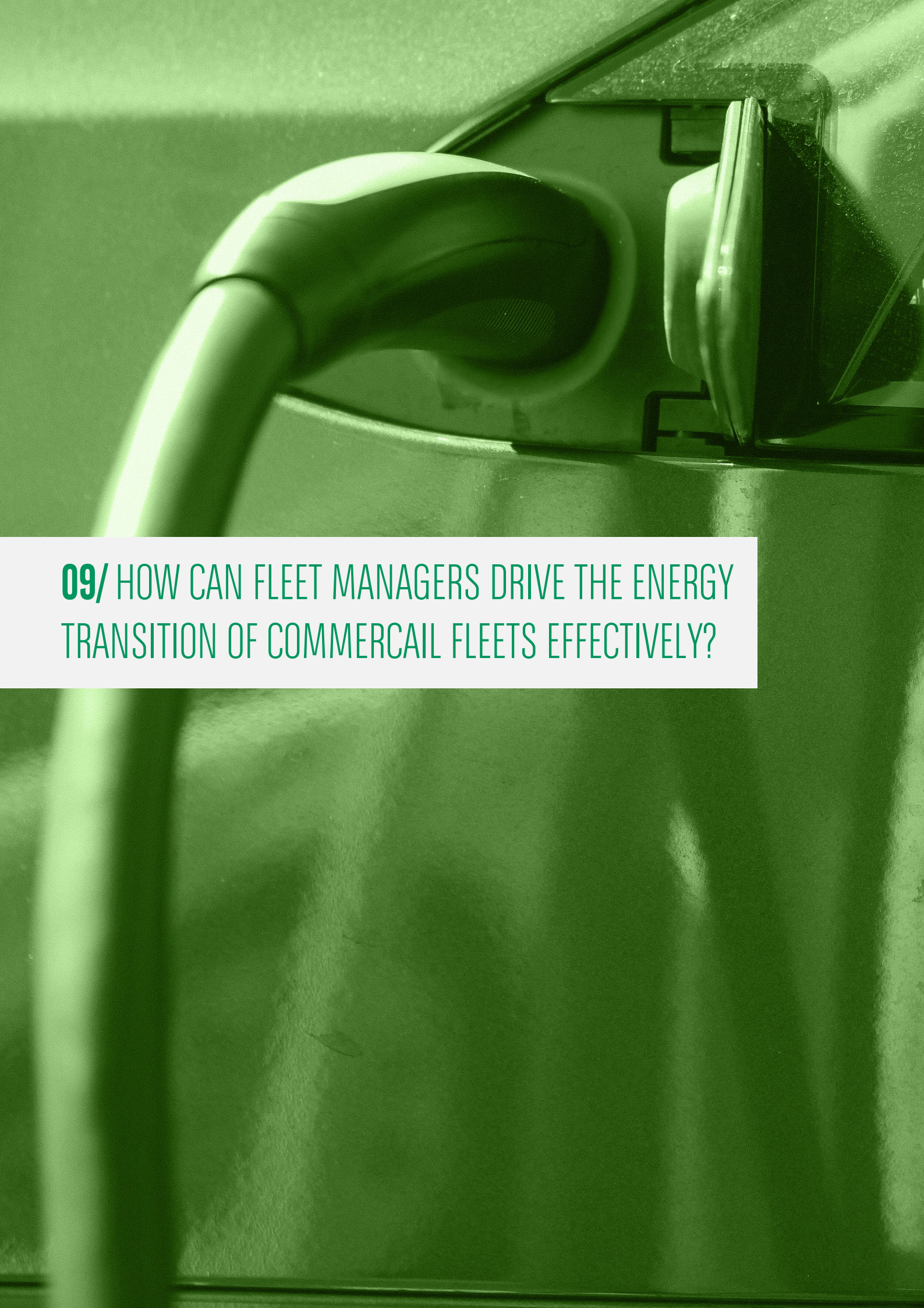
WEIGHT REGULATIONS

Current regulations set N1 vehicles' maximum weight at 3.5 tonnes. However, change is underway.

In 2018, the European Commission allowed EU member states to let B license holders drive zero-emission vehicles up to 4.25 tonnes, due to the extra weight of the battery. Some countries modified national regulations in that sense. The European Parliament has now adopted a proposal to increase the maximum weight of eLCVs to 4.25 tonnes, currently pending final approval.

Similarly, the UK has adopted changes allowing B license holders to drive eLCVs weighing up to 4.25 tonnes.

This adjustment accommodates the heavier weight of electric powertrains and batteries, making it easier for businesses to transition to electric fleets without facing licensing hurdles.



09/ HOW CAN FLEET MANAGERS DRIVE THE ENERGY TRANSITION OF COMMERCAIL FLEETS EFFECTIVELY?

Fleet managers are tasked with the challenge of shifting their commercial fleets from fossil fuels to alternative energy sources.

To manage this transition successfully, we advise a phased approach that would enable you to:

- Carefully evaluate usage patterns, operational needs, and requirements
- Implement eLCVs for the specific use cases that make the most sense for your organization, based on your actual needs
- Minimize operational disruptions and maintain full capacity at all times
- Spread implementation costs more evenly and reduce the risk of budget overruns

In this chapter, you'll find our advice for implementing eLCVs into commercial fleets successfully, without compromising service availability.

1. EVALUATE YOUR OPERATIONAL NEEDS AND REQUIREMENTS

The first step is to conduct a thorough assessment of your organization's operational needs. For this, you need to:

- Analyze fleet usage patterns, including daily mileage, routes, mileage peaks, stops, and standard payloads
- Evaluate vehicle performance, including fuel consumption, downtime and maintenance needs
- Assess operational areas, taking into account any low-emission zones

This will enable you to identify which vehicles are suitable for electrification based on their usage patterns and technical feasibility.

Sometimes, you might actually need to rethink and challenge requirements. Do you actually need LCVs (electric or not) for all your current use cases?

In fact, eLCVs are not the only available solution when transitioning to alternative fuels and looking to reduce greenhouse gas emissions. There are other alternatives that should be on your radar:

- Cargo bikes
- Electric scooters
- Last-mile autonomous robots

2. ASSESS AVAILABLE OPTIONS AND ANALYZE TOTAL COST OF OWNERSHIP

Next, you need to assess available options by looking at each vehicle's:

- Range
- Payload capacity, cargo space, and fitting options
- Charging functionalities
- Technology and connectivity options

Perform a total cost of ownership (TCO) analysis of available eLCVs models that meet your requirements by factoring in:

- Purchase prices
- Available subsidies, tax benefits and incentives
- Expenses related to the implementation of charging infrastructure
- Maintenance costs
- Fuel costs
- Depreciation

This will enable you to compare available models and see which ones meet your needs both in terms of operational requirements and budget restrictions.

3. USE A PHASED APPROACH TO IMPLEMENT ELCVS

A phased implementation helps you manage costs, train staff, and ensure infrastructure readiness.

You can start with a few smaller or medium-sized vehicles that have a more limited range and predictable usage patterns. Install necessary charging infrastructure, including fast chargers, at depots and offices.

This will enable you to test performance, optimize use, and see what challenges come up and how fast you're able to address them.

Once you're able to confirm whether the first eLCVs meet your needs, you can progressively replace more diesel or petrol vehicles with electric ones.

Engage all key stakeholders during the transition process and keep them updated on your goals and progress.

4. LEVERAGE TELEMATICS AS A TOOL TO DRIVE CHANGE

Telematics, or the use of technology to monitor and manage vehicle data in real time, enables fleet managers to improve operational efficiency in a number of ways:

- **Real-time monitoring:** Telematics systems provide real-time data on vehicle location, performance, battery status, and driver behavior, which helps ensure the security of your fleet, promote safe driving, and maintain battery health.
- **Route optimization:** Based on the collected data, you can optimize routes, reduce energy consumption, and make sure you're making full use of your vehicles' capacities and range.
- **Predictive maintenance:** Telematics can help you tackle maintenance needs proactively, which helps reduce downtime and ensure that eLCVs are always in optimal condition.

> "Collecting data can significantly improve fuel and route efficiency and, therefore, reduce costs. Drivers usually know their routes very well, but even they are sometimes surprised by the improvements possible with just a few adjustments."
>
> **Silvester Pullman, Chief Commercial Officer at Voltia**

THE TAKEWAY : ADAPT YOUR APPROACH TO YOUR ORGANIZATION'S NEEDS AND GOALS

Although common challenges persist, such as the lack of sufficient charging infrastructure, higher purchase prices, and a limited range of models, in the European Union 27% of fleet stakeholders are using or planning to use eLCVs in their fleet within the next three years.

When implementing eLCVs into your fleet, it's key to adapt your approach to your organization's goals, needs, and actual use cases. There isn't a "one size fits all" course of action for all fleets and fleet stakeholders in Europe. This is why it's essential to analyze your operational needs and consider your specific usage patterns, payload and range requirements, and budget constraints to drive the energy transition of your fleet.

10/ WHAT DOES THE FUTURE HOLD FOR ELCVS?

The future of electric light commercial vehicles (eLCVs) will be shaped by emerging technologies and innovations, evolving market dynamics, new government regulations, and organizations' sustainability goals, leading to a progressive and phased replacement of ICE vehicles with BEVs.

FUTURE REGULATIONS

There are different types of regulatory levers that governments are likely to implement to further stimulate the transition towards electric fleets.

Regulation cannot be predicted with any certainty, however, especially over the long term, so organizations should build solid operational plans adapted to different scenarios.

Fiscality (new taxes and exemptions)

Governments may introduce new taxes on internal combustion engine LCVs to encourage the use of electric vehicles. New tax exemptions or reductions could be offered for electric hybrid LCVs to help businesses in their transition efforts – although it's important to mention that some exemptions are now being phased out in Europe.

Public incentives

Governments might offer additional public incentives such as grants, subsidies or rebates to further encourage the adoption of low-emission or electric LCVs and make them more attractive to businesses.

Stricter emission regulations and progressive bans of internal combustion vehicles

One of the key drivers of the shift towards the electrification of commercial fleets is the implementation of stricter state-mandated emissions regulations worldwide.

Governments are also likely to continue phasing out internal combustion engine vehicles, pushing more businesses to consider electric alternatives.

Corporate targets

Regulations could establish specific emission reduction targets for companies using LCVs. These corporate targets may be part of broader sustainability mandates, requiring companies to report and progressively reduce their carbon footprints.

LEZs and ZEZs

The introduction and expansion of new low emission zones (LEZs) and zero emission zones (ZEZs) in urban areas (discussed in chapter 8) will play a crucial role in the adoption of eLCVs by businesses in Europe and globally.

EMERGING TECHNOLOGIES AND INNOVATIONS ON ELCV MARKET

Technological advancements help further increase ranges and make vehicles more dependable and less expensive. This means they're key for the development of the eLCV market.

"In 10 years, I have no doubt that most light commercial vehicles will be electric.

That doesn't mean that 100% of all fleets will be electric, however. For 10 to 30% of all commercial vans, based on specific use cases and daily usage patterns, it would likely still make sense to stick to diesel. But for the majority of use cases, EV OEMs will be able to deliver the right vehicles at the right price point."

Meir Dardashti, Partner at Maniv

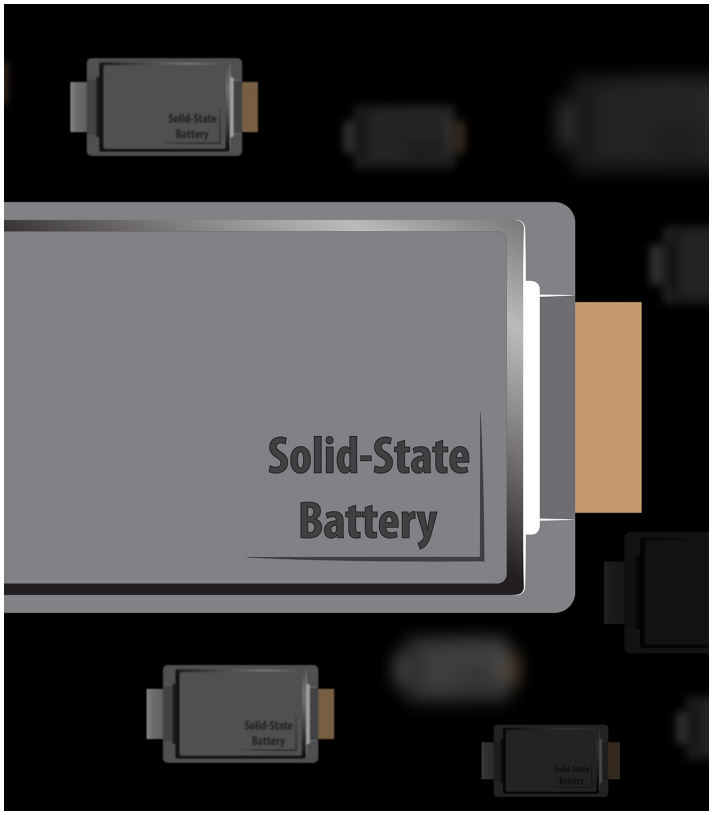
Innovations in battery technologies

Innovations in battery technology hold promise for the expansion of eLCVs. Improvements in energy density, cost reduction, safety enhancements, and end-of-life recycling are critical areas of focus, according to the International Energy Agency (IEA), in addition to reducing the reliance on critical metals like nickel and lithium, which already face supply challenges.

In 2023, the first electric car with a sodium-ion battery became commercially available, proving the viability of a technology that was in its early stages of development just a few years ago. This advancement is expected to ease some challenges related to cost and critical mineral supplies in the next decade.

Solid-state batteries also hold promise for the future of eLCVs, because they offer higher energy density and improved safety compared to traditional lithium-ion batteries. This could potentially revolutionize the electric vehicle market, offering better ranges and improving the safety of BEVs.

According to the IEA, solid-state batteries are on track to being commercially available in the 2030s.



Innovations in charging Infrastructure

The expansion of fast and ultra-fast charging networks is expected to significantly reduce downtime, making eLCVs more practical for long-distance and high-frequency use. Emerging technologies like wireless (inductive) charging could further simplify and speed up the charging process, enhancing the convenience of operating large fleets of eLCVs.

In Europe, there were over 118.000 fast and ultra-fast charging points as of September 2024, and increase of 30% compared to end of 2023, and 87% more compared to end 2020. Fast chargers are those with a power rating ranging from 22 kW to 50 kW. Ultra-fast chargers can go up to 350 kW.

Retrofitting petrol and diesel LCVs to eLCVs

Retrofitting involves converting existing internal combustion engine light commercial vehicles (ICE LCVs) to electric powertrains, by replacing the initial ICE engine and fuel tank with an electric motor and battery. Presented as a transitional solution, retrofitting aims to be a cost-effective solution with a reduced carbon impact compared to purchasing new eLCVs, especially for businesses with fleets of heavily transformed vans looking to transition to electric vehicles. To date, the business case of retrofit appears difficult to demonstrate despite existing subsidies. Combined with the impact on payload and questions on performance and reliability, retrofitting currently appears to be hardly scalable.

Battery swapping

Integrating battery swapping into the loading process could increase the daily operational range and decrease downtime of vehicles that return to the depot during the day.
This method involves quickly replacing the depleted battery of an eLCV with a fully charged one and helps minimize downtime compared to traditional charging, allowing vehicles to resume operations almost immediately.
However, this comes with some disadvantages and extra costs. For most models, it would require fitting an additional battery after the purchase of the eLCV, which would also reduce its payload capacity. Plus, charging infrastructure for swappable batteries needs to be installed.

Hydrogen LCVs

Hydrogen fuel cell technology is another promising avenue for the future of light commercial vehicles. Hydrogen LCVs could offer longer ranges and quicker refueling times compared to battery-electric vehicles, however the technology is not there yet.

> "If we look at how EV and battery technology is advancing, batteries are a more likely solution than hydrogen for light-duty commercial vehicles, at least in the next 5 to 10 years."
>
> **Meir Dardashti, Partner at Maniv**

MARKET GROWTH AND DIVERSIFICATION

As the demand for eLCVs grows, manufacturers will likely expand their offerings to include a broader range of sizes and configurations to meet diverse commercial needs. This diversification will likely make eLCVs more accessible to small and medium-sized businesses, which may have been previously deterred by the limited options available, as well as by costs.

Over time, the cost of eLCVs is expected to decrease, making them an increasingly attractive option for a wider range of users.

CONCLUSION

The implementation of electric light commercial vehicles (eLCVs) in corporate fleets is an important step towards the decarbonization of the European transportation sector – and forward-looking organizations are making the first steps in this direction.

Electrifying commercial fleets is a crucial step towards decarbonization – but it's one of the many levers that organizations can use to meet their sustainability goals, along with adopting renewable energy sources for their operations and improving the energy efficiency of their facilities.

As technological advancements and battery innovations continue their upward momentum, eLCVs have become a viable solution for fleet managers to reduce greenhouse gas emissions, meet organizational environmental goals and comply with regulatory pressures.

Electrifying commercial fleets requires careful analysis of each organization's operational needs, the available models that could meet them, TCO and other financial considerations, along with potential challenges such as the availability of charging stations and eLCVs real-world performance.

Strategic planning and phased implementation can help mitigate those issues. At the same time, emerging technologies, battery innovations, and an increasingly diverse range of market offerings make the transition simpler.

Ultimately, there is no one-size-fits-all solution; each fleet decision-maker must evaluate their unique requirements and operational constraints. By making the shift to electric mobility via a careful consideration of all factors, fleet managers can drive the energy transition forward, contributing to a more sustainable transport sector.

CONTACTS

LinkedIn

Oana Duma
Head of Arval Mobility Observatory
email : oana.duma@arval.com

LinkedIn

Ronan Perrier
International Arval Consulting & Arval Mobility Observatory Director
email : ronan.perrier@arval.com

mobility-observatory.arval.com