BEYOND DIESEL.

TURNING ELECTRIFICATION INTO A STRUCTURAL COMPETITIVE ADVANTAGE IN THE EUROPEAN ROAD HAULAGE INDUSTRY.

MAN STRATEGY REPORT

09/2026

#SimplifyingBusiness

AGENDA

THIS STRATEGY REPORT SHOWS HOW TRANSPORT OPERATORS CAN TURN ELECTRIFICATION INTO A COMPETITIVE ADVANTAGE BY INTEGRATING VEHICLES, CHARGING INFRASTRUCTURE AND ENERGY MANAGEMENT INTO ONE SCALABLE OPERATING MODEL.

ELECTRIC TRUCKS ARE ALREADY DELIVERING PROFITABLE OPERATIONS ACROSS EUROPE TODAY.

01

QUICK READ

EXECUTIVE BRIEF

01 BOTTOM LINE

Battery electric trucks are ready for daily transport work. The companies that start the transformation now can turn electrification into a cost, sustainability and customer advantage.

02 EVIDENCE

Two-thirds of freight forwarders expect battery electric trucks to be in use by 2030, while more than half have never compared diesel and battery electric operating costs. MAN customers already show measurable CO_2 and cost savings in real-world operations.

03 CONTEXT

European freight transport is entering a decisive decade. Regulation, customer expectations and energy economics are pushing fleets beyond diesel. Today, 5,000 pioneering customers are already setting the pace.

04 IMPLICATION

Electrification is becoming a strategic business decision. Operators that understand the total system early can build a structural advantage over diesel-only peers.

05 KEY INSIGHT

The winners will not simply buy electric trucks. They will combine vehicles, depot charging, energy management, photovoltaics and storage into one scalable operating model.

06 NEXT STEP

Start with a route-based TCO comparison and identify where battery electric trucks can already operate reliably and economically today.

CHAPTER 01 – ELECTRIC TRUCKS ARE ALREADY DELIVERING PROFITABLE OPERATIONS ACROSS EUROPE TODAY.

European commercial transport is reaching a tipping point. Battery electric trucks are no longer a technology of the future but an operational reality with more than 15,000 electric trucks already in daily use across Europe. A first wave of around 5,000 pioneering customers is leading the transition, setting the pace for a highly fragmented market of 500,000 transport companies and 100,000 municipalities.

For transport companies, this shift is bigger than a change of drivetrain. It changes how fleets are planned, how energy is purchased, how depots are designed and how customers evaluate logistics partners. The opportunity is tangible: operators that combine battery electric trucks with depot electrification, charging infrastructure, photovoltaics (PV) and battery storage can lower operating costs, reduce emissions and prepare their business for increasingly strict regulation.

Furthermore, sustainable transport is gaining importance and becoming a key decision criterion. When transport companies assess the transition from diesel to electric trucks, the distinction between Tank-to-Wheel (TTW), Well-to-Wheel (WTW) and Life Cycle Assessment (LCA) becomes highly relevant because each perspective highlights a different layer of impact and ultimately influences decision-making at operational, strategic and long-term levels.

From a short-term, operational perspective, TTW is the most directly visible metric, as it captures emissions generated during vehicle operation on the road. For transport operators, this is particularly relevant in the context of regulation and day-to-day competitiveness. Battery-electric trucks offer zero TTW emissions, which immediately translates into tangible advantages such as access to low-emission zones, reduced or exempted CO_2-based tolls and compliance with increasingly strict environmental regulations. In addition, many customers in logistics and retail are already demanding zero-emission transport solutions for their supply chains. As a result, TTW is an additional driver for near-term business benefits.

From a broader energy system perspective, Well-to-Wheel (WTW) extends the view beyond vehicle operation by including emissions from energy production, processing and distribution. This means that for electric trucks, the carbon intensity of the electricity mix becomes a decisive factor, while for diesel vehicles, upstream emissions from extraction, refining and transport of fossil fuels are taken into account. WTW

therefore provides a more comprehensive comparison of propulsion technologies and highlights that battery-electric trucks already achieve significantly lower total emissions in many European markets, especially as the electricity grid continues to decarbonize. As such, WTW is a critical metric for strategic decision-making, as it reflects the true environmental benefit of transitioning to electric mobility and its alignment with corporate sustainability targets.

Consequently, the market is ready to move. Evidence from MAN customer interactions shows that two-thirds of freight forwarders expect battery electric trucks to be in operation by 2030. Yet more than half of customers have never conducted a systematic comparison of the operating costs of diesel trucks and battery electric trucks. This disconnect between strategic intent and economic decision-making is the starting point of this paper.

This paper shows how transport operators can approach electrification in a structured way. It first outlines the market and regulatory forces that will be shaping the decade ahead. It then introduces four practical archetypes: BEV Evaluator, BEV Starter, BEV Scaler and BEV System Operator. These archetypes help companies understand where they stand today and which next step will create the strongest business impact.

The framework is grounded in real operations. Foppiani Transport in Italy, Betonwerk Bad Lausick in Germany and Schlager Transport Logistik in Austria show how different fleet profiles and application segments can use battery electric trucks successfully. Their cases demonstrate that the transition is not theoretical. It is already happening, and it can create measurable competitive advantage when vehicles, infrastructure and energy are planned together.

> **MORE THAN 15,000 ELECTRIC TRUCKS ARE ALREADY ON EUROPEAN ROADS. THE PILOT PHASE IS OVER.**

BENEFIT IN A NUTSHELL

WHY IT MATTERS

Customers and regulation are already changing the market. Companies that compare diesel and battery electric trucks now can make better investment decisions before pressure increases.

THE BENEFIT

Electrification becomes a practical growth opportunity, not an abstract technology debate. It becomes simple when vehicles, charging and energy are planned as one system.

WHAT TO DO NEXT

Start with a structured operating-cost comparison and identify the first routes where depot charging and predictable schedules create a credible business case.

THE NEXT DECADE OF TRUCKING WILL BE SHAPED BY ELECTRIFICATION.

02

QUICK READ

EXECUTIVE BRIEF

01 BOTTOM LINE

Battery electric trucks are becoming a central technology in European freight transport. Regulation, OEM investment and charging infrastructure are accelerating the shift.

02 EVIDENCE

Demand is already shifting, with logistics services increasingly tendered under explicit zero emission requirements. At the same time, the improving operational and economic viability of battery electric trucks is accelerating adoption, with battery electric trucks expected to account for 15 – 35 % of new truck sales by 2030 and 30 – 60 % by 2035.

03 CONTEXT

Decarbonization requirements are expanding beyond the transport sector and are increasingly embedded in corporate value chains.

04 IMPLICATION

Freight operators face a structural shift where access to customers and future growth depends on their ability to provide battery electric transport solutions, while late adopters risk exclusion from key tenders and value chains.

05 KEY INSIGHT

The transition is not only driven by technology availability, but by structural demands, as industries translate their CO_2 targets into shipping requirements and systematically push electrification into logistics networks.

06 NEXT STEP

Fleet operators should recognize electrification as a strategic necessity and begin integrating battery electric trucks into their long-term fleet and commercial planning, ensuring alignment with customer expectations and future tender requirements.

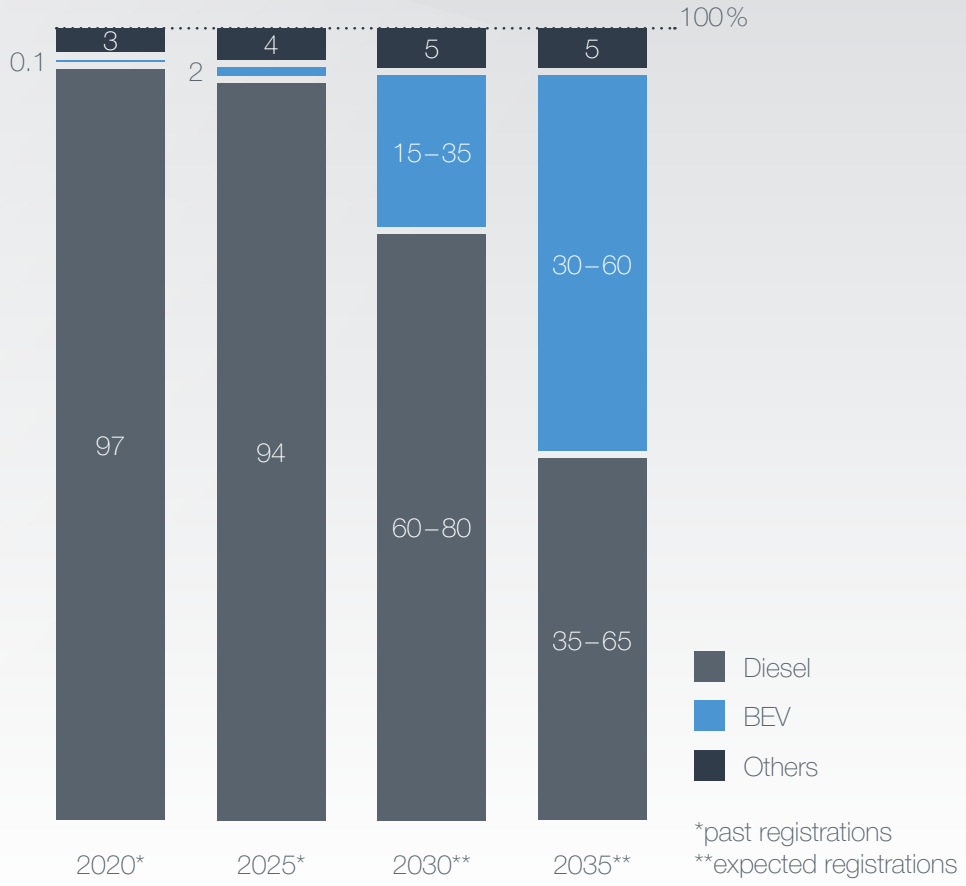
The European market for battery electric trucks is moving from early adoption to industrial scale. Electric truck adoption is accelerating rapidly, growing from near-zero today to around 15 – 35 % by 2030 and reaching a majority share of 30 – 60 % by 2035, while diesel is expected to decline to 35 – 65 %. Beyond 2035, battery electric trucks will dominate the new truck registrations. Three forces are pushing in that direction: regulation, infrastructure & technology readiness and the strategic response of leading manufacturers.

Regulation is a decisive driver of decarbonization across the European economy. The European Union has set binding CO_2 reduction targets for heavy-duty vehicles of 43 % by 2030, 65 % by 2035 and 90 % by 2040, but these requirements must be understood in a broader context in which all industries are expected to materially reduce their carbon footprint. However, the enabling conditions required to support this transition are still lagging behind regulatory ambition. Public heavy-duty charging infrastructure, grid connection capacity, permitting processes and depot electrification readiness are improving, but not yet at the pace required for mass-market adoption. Studies suggest that around 28,500 public truck chargers will be required across the EU by 2035, while current deployment has reached only around 6 % of that level. At the same time, high-capacity charging projects frequently face grid connection and permitting lead times of six to eighteen months, creating a growing risk that infrastructure deployment will become the bottleneck rather than vehicle availability.

As virtually every value chain depends on freight transport, decarbonizing logistics becomes a prerequisite for companies in all sectors to achieve their climate targets. In this context, battery electric trucks are not an isolated solution for transport operators, but a critical enabler of economy-wide decarbonization, allowing industrial and commercial players to secure low-carbon logistics capacity while maintaining resilient and efficient supply chains.

Large shippers are formalizing this through centralized procurement approaches. For example, retailers such as Carrefour are setting Science Based Targets initiative-aligned reduction pathways and coordinating aggregated commercial negotiations across a network of around 300 transport suppliers, thereby cascading CO_2 requirements throughout entire logistics ecosystems. This approach is comparable to leading industrial players such as Volkswagen, which leverage their procurement scale to systematically enforce emissions reductions across their supplier base. In parallel, logistics providers confirm that this pressure is increasingly transmitted upstream through the value chain. Third-party logistics companies such as DB Schenker and GEODIS report that customers across all major sectors are defining minimum shares of zero-emission transport within logistics tenders, effectively passing their own Scope 3 reduction targets on to transport providers. As a result, electrification is shifting from a differentiating factor to a basic qualification criterion. Transport operators without credible

CURRENT AND EXPECTED DEVELOPMENT OF NEW ELECTRIC TRUCK REGISTRATIONS EU27+3 > 6t [in %]



Source: MAN & McKinsey Center for Future Mobility

FIRST MOVERS BUILD ADVANTAGE. LATE MOVERS BUY COMPLIANCE.

battery electric truck strategies face exclusion from tenders and loss of core business, making access to demand directly dependent on the ability to provide low-emission transport capacity.

Public fast-charging networks for heavy-duty trucks remain limited, but they are expanding. At the same time, depot charging is expected to become the backbone of electric trucking, potentially accounting for up to 90 % of charging points by 2030.[1] For fleet operators, this is critical: charging at the depot can lower energy costs, improve operational control and create the basis for integrating photovoltaics, battery storage and smart charging.

From the leading European OEMs' perspective, the implication is clear: if regulation is to be taken seriously, infrastructure must be given the same priority as vehicle targets. In practical terms, this means treating charging infrastructure as critical infrastructure, accelerating permitting processes, prioritizing grid connections, and better aligning the timelines of different regulatory frameworks.

On a global comparison, China currently leads annual battery electric truck registrations and the total battery electric truck parc. However, Europe has established itself as the second most important global market, ahead of North America in deployment momentum, regulatory pressure and OEM commitment. Europe started later and remains smaller in absolute numbers, but its growth trajectory is steeper. Current projections indicate that the gap between China and Europe could narrow rapidly between 2025 and 2035 from a factor of 28 to just 4 with regard to the total number of battery electric trucks on the road.

Encouragingly, a growing number of transport operators are stepping up as early movers taking entrepreneurial initiatives to build up public truck charging stations, as seen with Dettendorfer Energy & Mobility Solutions in Bavaria as well as HOYER's recent announcement near Hamburg.

OEM readiness is another strong signal. Despite a recent slowdown in overall truck registrations, the battery electric truck segment is expanding quickly. According to McKinsey's Center for Future Mobility, every major European OEM has invested significantly in electrification. As of 2025, at least 46 zero-emission truck models are available in Europe, covering urban distribution, regional transport, long-haul and special applications.[2]

European OEMs are further set to accelerate the evolution of battery electric truck portfolios, driving step-change improvements in range by increasing battery capacity and aerodynamics, charging performance, portfolio breadth and integrated service offerings. At the same time, emerging Chinese entrants will intensify competitive pressure and force a faster pace of innovation across the market.

1, 2) McKinsey – Europe's zero-emission truck transition 11/2025

BENEFIT IN A NUTSHELL

WHY IT MATTERS

The road freight industry is the backbone of supply chains with increasing CO_2 reduction targets. This is an opportunity that freight forwarders can capitalize on as they transition.

THE BENEFIT

Early depot planning and development turn grid, charger, PV, storage and smart-charging needs into a long-term advantage allowing freight forwarders to meet the changing customer demands and the evolving transport landscape.

WHAT TO DO NEXT

Understand the demands of the surrounding supply chains and regulatory landscape, and recognize how these influence your business.

LEAD THE CHARGE TO MOVE YOUR FLEET INTO THE ELECTRIC FUTURE.

03

QUICK READ

EXECUTIVE BRIEF

01 BOTTOM LINE

Fleet electrification is a journey. The BEV Evaluator, BEV Starter, BEV Scaler and BEV System Operator framework makes that journey practical and measurable.

02 EVIDENCE

The framework draws on MAN consulting experience and real customer operations. In addition, each archetype with a BEV fleet is supported and operationalized with help from Foppiani Transport, Betonwerk Bad Lausick and Schlager Transport Logistik.

03 CONTEXT

Transport companies operate with very different routes, depot structures, customer contracts and investment horizons. They need a framework that reflects operational reality.

04 IMPLICATION

Companies can benchmark their current position against the archetypes and avoid treating electrification as a disconnected set of pilots.

05 KEY INSIGHT

The maturity stage of a company is defined not only by the number of electric trucks, but by the interaction between BEV fleet share and charging infrastructure. Reflecting this and real-world experiences, we propose four archetypes: the BEV Evaluator, the BEV Starter, the BEV Scaler and the BEV System Operator.

06 NEXT STEP

Identify your current archetype and define the next practical infrastructure, fleet and energy step.

Electrification can appear complex. The MAN framework simplifies the transition by structuring it into four clear and actionable stages, represented by four archetypes: the BEV Evaluator, the BEV Starter, the BEV Scaler and the BEV System Operator. These archetypes are not theoretical constructs. They are derived from extensive consulting experience, operational data and real MAN customer projects. In the following sections, the archetypes that already operate battery electric truck fleets are further illustrated and operationalized through the examples of Foppiani Transport, Betonwerk Bad Lausick and Schlager Transport Logistik.

The purpose is simple: to help transport companies understand where they stand today, define the next practical steps and benchmark progress against proven market practice. To achieve this, the framework distinguishes explicitly between depot electrification and battery electric truck fleet share.

MAN CUSTOMER ARCHETYPE FRAMEWORK

Build-up of a a robust & smart BEV business foundation as a base for BEV fleet scaling

Smart Charging Maturity Level

Full leverage of invest & build competitive advantage by driving the shift to zero-emission transport

BEV Truck Fleet Transformation

[BEV fleet share in %]

BEV EVALUATOR		Potential BEV routes, implications on business, fleet and depot transformation, investment demands	**0 %**
BEV STARTER	**Level 1** Basic Depot Charging	Charge point installation and basic controls Monitoring, diagnosis, reporting Load management Charging scheduling/planning Advanced analytics	**1 – 10 %**
BEV SCALER	**Level 2** Smart Depot Charging	Photovoltaics/battery energy storage system optimized charging Price-optimized charging Peak shaving Demand-charge/grid-fee optimization (V1G)	**11 – 50 %**
BEV SYSTEM OPERATOR	**Level 3** Advanced Energy Systems	Charge point monetization Charge point Energy market participation (V2G)	**51 – 100 %**

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Betonwerk Bad Lausick

SCHLAGER

Source: MAN

SMART CHARGING MATURITY LEVELS IN DETAIL

	Smart charging building blocks		TCO Potential
Level 1 Basic Depot Charging	Charge point controls	Integration, configuration and manual control of charge points,	Enabler
	Monitoring, diagnosis, reporting	Tracking operational status, e.g., site maps, alerts, historical data	Enabler
	Load management	Optimized distribution of available power across all vehicles (static, dynamic)	Enabler
	Charging scheduling/planning	Creation and execution of charging plans in line with operational requirements	Enabler
	Advanced analytics	Data logs & analytics to predict and optimize utilization, fault detection, maintenance or other KPIs	Enabler
Level 2 Smart Depot Charging	PV/BESS optimized charging	Integration of photovoltaic systems and energy storage systems to use self-generated solar energy for charging	TCO Lever
	Price-optimized charging	Charging at the lowest-cost times when using dynamic tariffs	TCO Lever
	Peak shaving	Reduction of peak loads to lower grid costs	TCO Lever
	Demand-charge/grid-fee optimization (V1G)	Optimized capacity management to reduce grid fees, e.g., atypical grid usage or variable/individual grid fees	TCO Lever
Level 3 Advanced Energy Systems	Charge point monetization	Monetization of the charge point as a semi-public charging solution including authentication & payment	TCO Lever
	Charge point reservation	Option to reserve the charge point in a semi-public usage scenario	Enabler
	Energy market participation (V2G)	Enabling a vehicle fleet to participate in energy markets (trading, reserve provision, redispatch)	TCO Lever

Source: MAN

This differentiation is critical, as real-world implementations consistently show that infrastructure maturity often develops ahead of fleet electrification. Operators typically invest early in depot preparation, grid connections and energy systems, thereby building the technical and operational foundation required to scale the use of battery electric trucks at a later stage with significantly lower complexity and disruption.

BEV Evaluator companies currently operate fleets without battery electric trucks. However, they are beginning to assess their operations and transport practices to identify the most promising opportunities for initial investments in battery electric trucks and charging infrastructure.

The BEV Starter marks the starting point. Companies in this stage operate a small number of battery electric trucks, often on pilot routes or specific use cases. Charging infrastructure is basic, and photovoltaics and battery storage are not yet integrated. The focus is on learning, testing and proving feasibility in daily operations.

The BEV Scaler has moved beyond pilots. These companies scale their electric fleets while simultaneously building more robust charging infrastructure. Smart charging is introduced, solar power contributes to meeting energy demand, and battery storage is deployed in operation. Depots adapt to support a growing share of battery electric trucks, and both TCO and sustainability benefits become increasingly visible.

The BEV System Operator represents the leading stage of the transition. These companies operate highly electrified fleets supported by fully integrated depot infrastructure that is accessible to third-party transport customers. High capacity charging, advanced energy management, photovoltaics and battery storage systems are deployed at scale, and vehicle-to-grid solutions are implemented where operational conditions allow. At this stage, electrification evolves into a core strategic lever for cost optimization and long-term competitiveness.[3]

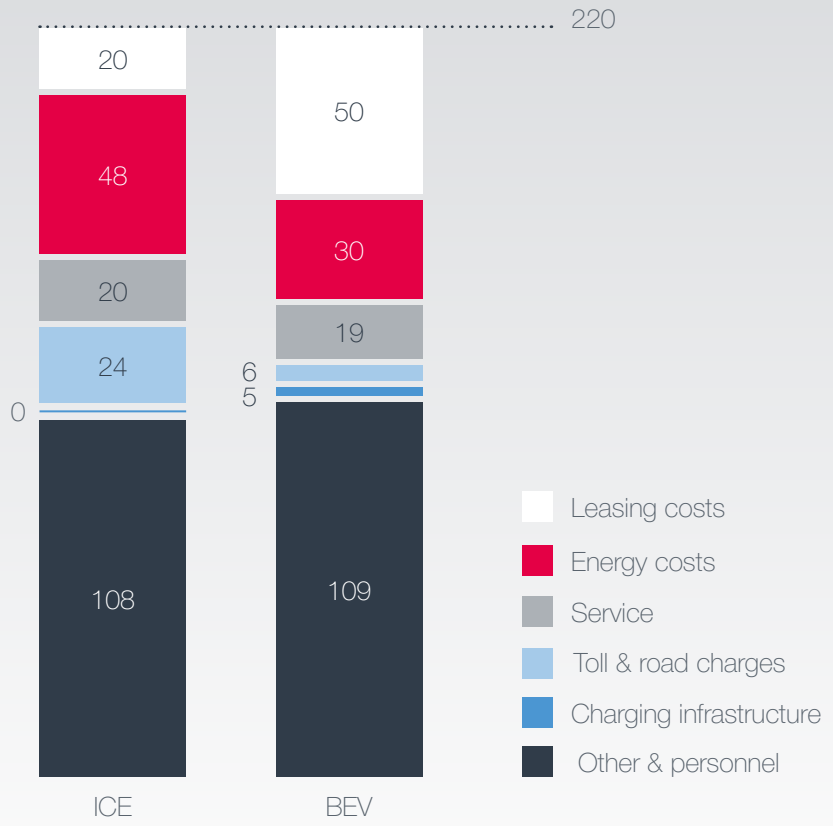
To identify what drives this economic performance and define the conditions under which battery electric trucks outperform diesel, the focus is placed on total cost of ownership as the decisive metric. This highlights the core levers of competitiveness, most notably energy prices, CO_2 pricing mechanisms such as the forthcoming ETS2 emissions trading system and toll regulations. Taken together, these factors determine the relative cost position of battery electric trucks and provide the economic rationale for the transition towards fully integrated, large-scale electrified operations.

While CO_2 pricing mechanisms such as ETS2 increase the cost base of diesel operations, the comparison in the table on the next page shows that this effect is structurally smaller than the cost impact of differentiated toll schemes. In practice, toll advantages represent a major share of the cost differential, with battery electric trucks benefiting from significantly lower road charges compared to diesel vehicles. As a result, even with higher diesel costs driven by CO_2 pricing, the removal of toll differentiation would reopen a material cost gap in favor of diesel. This makes clear that ETS2 alone cannot compensate for the loss of toll advantages.

3) McKinsey - Europe's zero-emission truck transition 11/2025

TCO COMPARISON BETWEEN ICE AND BEV TRUCKS

European baseline customer [In ct/km]



Source: MAN
Assumption: operating 5 trucks; Annual mileage: 100,000 km per truck; Leasing period: 5 years; Toll road share: 70%; Energy consumption: 30 L/100 km (diesel), 100 kWh/100 km (BEV); Charging mix: 70% depot/30% external; Energy price: depot charging: €0.26/kWh, external charging: €0.40/kWh, Diesel: €1.50/L; Toll costs: diesel: €0.34/km, BEV: €0.09/km; Infrastructure & operational costs: depot charging and energy infrastructure €1,700/month, depot planning: €30,000.

IMPACT OF RELEVANT LEVERS ON BEV TCO UNDER BASELINE EUROPEAN CUSTOMER ASSUMPTIONS

Clusters		Base Value	Change	BEV TCO Impact [change in percentage points (pp)]
Political Levers	Introduction of ETS2 with impact on diesel price	€1.50/L	+10% (€1.65/L)	+2.0pp
	Increase of toll difference between ICE and BEV	€0.25/km	+10% (€0.275/km)	+0.8pp
	Removal of toll difference between ICE and BEV	€0.25/km	-100% (€0.00/km)	-7.5pp
	Subsidy per new vehicle purchase	€0	+€10,000 (per vehicle)	+1.8pp
	Subsidy for depot infrastructure planning	€0	+€30,000 (per fleet)	+0.6pp
Depot Trans-formation	Depot charging price	€0.26/kWh	-10% (€0.234/kWh)	+1.2pp
	Reducing public charging share	30%	-10pp (20%)	+0.6pp
	Charging infrastructure cost allocation on fleet	€1,700/month	-10% (€1,530/month)	+0.2pp
Customer Operation	Fleet size (number of trucks)	5	+100% (10 trucks)	+1.3pp
	Annual mileage	100,000km	+10% (110,000km)	+1.6pp
	Toll road share of annual mileage	70%	+10pp (80%)	+1.1pp

At the same time, the strong sensitivity of total cost of ownership to toll regulation creates a direct requirement for regulatory certainty. Without a clear and long-term commitment to differentiated toll frameworks, operators lack the basis to assess investment cases and confidently allocate capital. This directly impacts adoption, as fleet decisions are made over multi-year horizons and depend on predictable cost structures. Regulators therefore need to provide stable, credible and long-term policy trajectories for toll differentiation that the industry can rely on, as short-term or uncertain frameworks materially slow down the transition despite existing economic viability of battery electric trucks.

The TCO comparison shows why electrification cannot be assessed through vehicle costs alone. For a baseline European customer, battery electric trucks and diesel trucks operate with different cost structures, and the economic outcome depends strongly on the operating environment. Leasing, service, tires, personnel and preparation remain relevant for both powertrains, but the decisive difference is created by energy costs, charging infrastructure, toll regulation and CO_2-related cost mechanisms.

The sensitivity analysis makes this visible. Higher diesel costs through ETS2 improve the BEV position, but only to a limited extent. Differentiated toll schemes have a much stronger impact on the overall business case, as battery electric trucks can benefit from significantly lower road charges. At the same time, depot electricity prices, public charging exposure, infrastructure costs, fleet size and annual mileage all influence the TCO advantage. This means that electrification becomes most competitive when operators actively manage the system around the truck.

For transport companies, the conclusion is clear: the BEV business case is built through routes, depot charging, energy management and predictable regulation. Operators that understand these levers can identify where battery electric trucks already outperform diesel today and where further depot development, lower energy costs or stable toll frameworks can unlock the next level of competitiveness.

> **THE FLEET COUNT IS NOT THE BENCHMARK. THE SYSTEM IS.**

BENEFIT IN A NUTSHELL

WHY IT MATTERS

Fleet electrification is easier to manage when it is broken down into clear distinct maturity stages.

THE BENEFIT

The BEV Evaluator, Starter, Scaler and System Operator framework gives companies a simple way to understand their position and plan the next move, by understanding their specific TCO levers.

WHAT TO DO NEXT

Benchmark your fleet, depot infrastructure, energy setup and operating processes against the archetypes, use this to plan and make progress on on your electrification journey.

BEV STARTER.

Enabling a structured start into electrification

03

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QUICK READ

EXECUTIVE BRIEF

01 BOTTOM LINE

Foppiani shows how a medium-sized family business can turn carefully selected routes into a strong starting point for electrification.

02 EVIDENCE

Under the operational reality of Foppiani and BEV Starter assumptions, diesel still shows a 2 % TCO advantage, but with further depot energy integration, which is already underway at Foppiani's depots, the picture changes and BEV emerges as the cheaper option.

03 CONTEXT

Domestic freight operations with regular depot returns create favorable conditions for battery electric trucks, especially when public charging remains limited.

04 IMPLICATION

A disciplined first deployment can create customer momentum, driver acceptance and a platform for scaling.

05 KEY INSIGHT

Electrification works best when the first routes are predictable, customers are involved early on and depot charging is built around real operating patterns.

06 NEXT STEP

Use stable depot-return routes to build confidence, then combine electric trucks with PV and storage to lower the effective energy price.

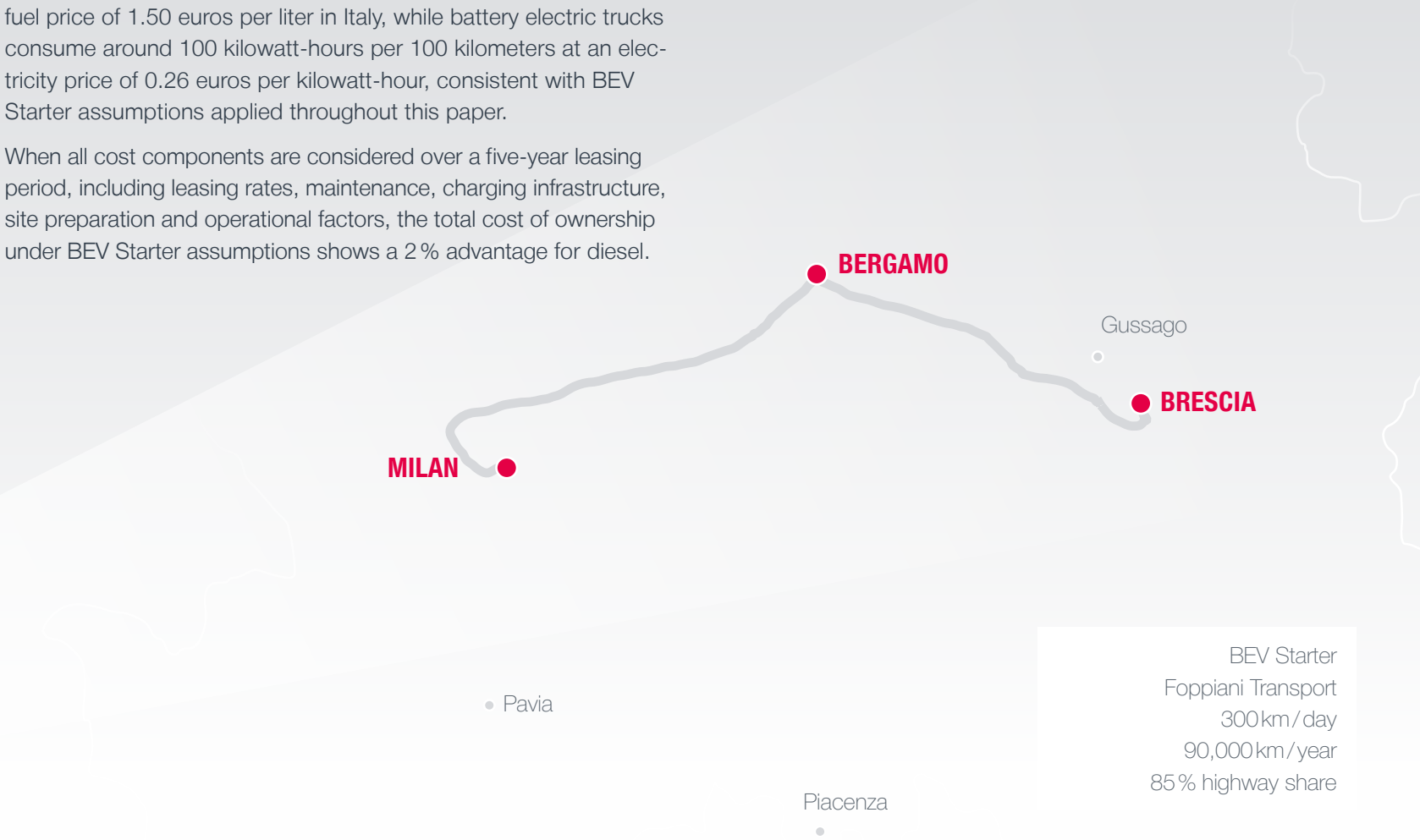
Foppiani Transport illustrates the BEV Starter stage in action. The company was founded in Milan in the 1960s and remains family-owned in its third generation. It operates line transport, non-line transport and out-of-gauge services exclusively within Italy. Activities are coordinated from Milan and Florence, supported by an in-house workshop and a fully MAN-based fleet.

This operating profile creates a practical starting point for electrification. Foppiani runs regular domestic routes, returns to depot and manages a demanding portfolio that includes standard tractor-trailer operations as well as specialized vehicles equipped with cranes. Electrification therefore has to work in real business, not only in a controlled pilot environment.

Foppiani already operates one battery electric articulated truck and one battery electric chassis, both MAN eTGX vehicles, with an additional articulated truck on order. The Milan and Florence depots are equipped with Kempower charging infrastructure, enabling fully depot-based charging. The company has also started to integrate renewable energy. A 350 kWp photovoltaic system has recently been commissioned in Milan, with a comparable installation under development in Florence.

The Milan–Brescia–Bergamo–Milan line service provides a concrete illustration of total cost of ownership dynamics at the BEV Starter stage for Foppiani. Three trucks are assumed to operate the route, each covering around 90,000 kilometers per year and charging exclusively at the depot. Diesel consumption is assumed at 30 liters per 100 kilometers with a fuel price of 1.50 euros per liter in Italy, while battery electric trucks consume around 100 kilowatt-hours per 100 kilometers at an electricity price of 0.26 euros per kilowatt-hour, consistent with BEV Starter assumptions applied throughout this paper.

When all cost components are considered over a five-year leasing period, including leasing rates, maintenance, charging infrastructure, site preparation and operational factors, the total cost of ownership under BEV Starter assumptions shows a 2 % advantage for diesel.



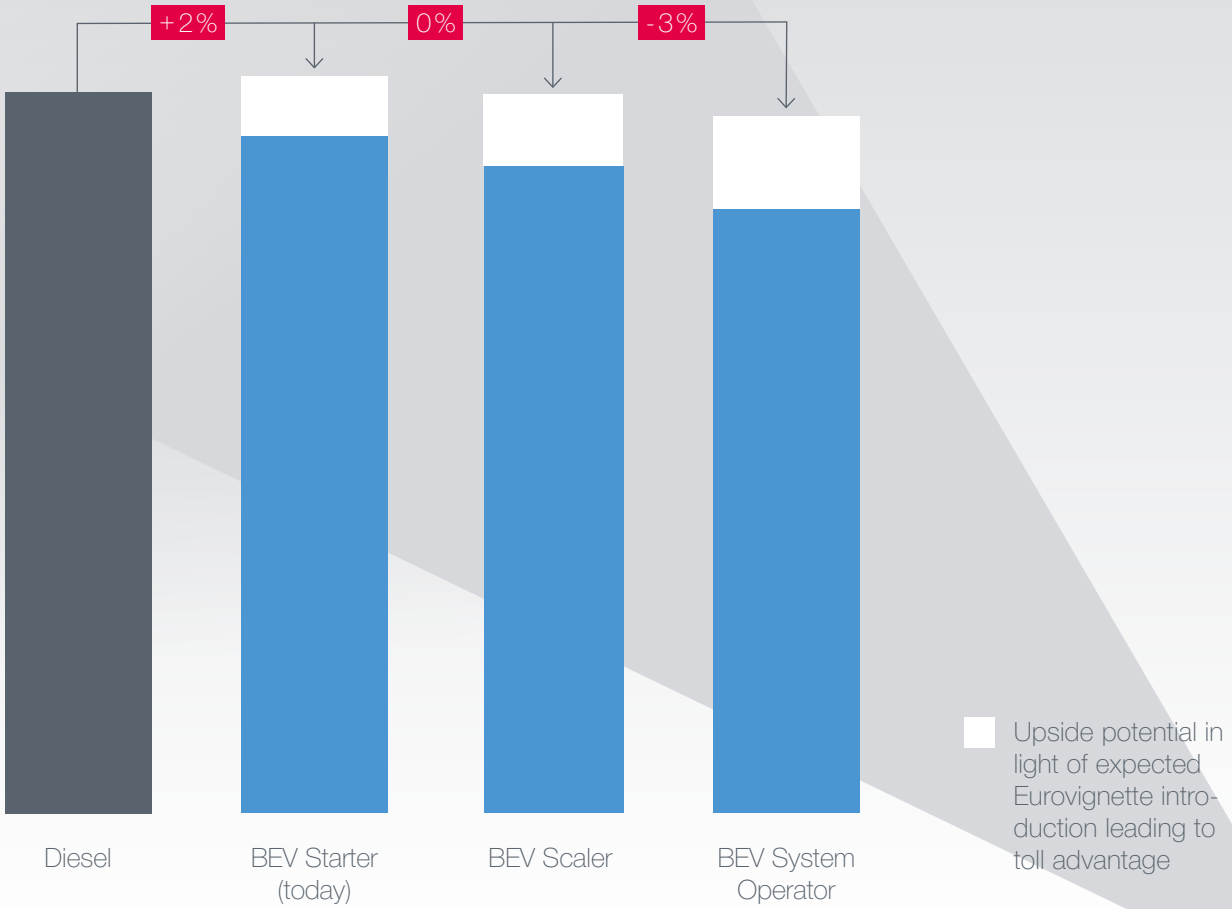
This presents an edge case, where additional considerations need to be made. Foppiani handles this by renegotiating the transport prices with its customers, reflecting the added benefit of an electrified supply chain, benefiting both Foppiani and its customers.

As Foppiani progresses toward BEV System Operator characteristics, the economics shift. With photovoltaic generation already in operation and further depot energy integration under evaluation, effective electricity costs decline and charging infrastructure is assumed to become cost neutral through public accessibility and offsetting revenues once the BEV System Operator stage is fully reached. Under these conditions, total cost of ownership moves to a 3.3 % advantage for battery electric trucks.

Assuming the very likely introduction of a CO_2 differentiated Eurovignette system in Italy over the coming years comparable to the Austrian model, the BEV Starter case becomes around 7.5 % cheaper than diesel, while the BEV System Operator case achieves a total TCO advantage of 12.7 %. Across the current fleet of three trucks, cumulative energy savings over the five-year leasing period amount to roughly 300,000 euros under BEV Starter assumptions and exceed 400,000 euros at BEV System Operator maturity, highlighting the economic leverage of electrification combined with integrated depot energy systems

TOTAL COST OF OWNERSHIP COMPARISON

TCO delta over 5 yrs [in %]



Source: MAN

Foppiani's transition has been shaped by cautious analysis and growing confidence through hands-on experience. Initial skepticism decreased after MAN demonstrations, seminars and route-specific feasibility assessments. Customers played an important role: several actively supported the deployment of battery electric trucks and showed willingness to renegotiate transport rates to reflect the added value of low-emission services.

Beyond depot infrastructure, Foppiani has also begun exploring opportunities for charging beyond its own sites. In selected cases, the company has engaged directly with delivery locations to assess whether charging during loading or unloading windows could be integrated in the future. While these discussions remain exploratory, they reflect a gradual shift from pure depot dependence toward a more network-oriented view of charging, aligned with operational realities rather than theoretical corridor coverage.

Driver acceptance followed the same pattern. After short familiarization and targeted MAN training, initial concerns about acceleration and handling disappeared. Many drivers now prefer battery electric trucks because they are quieter, smoother and more comfortable. For Foppiani, training was the turning point that made electric trucks feel like a normal part of the fleet rather than an exception.

Foppiani shows how electrification can be simple. By starting with structured routes and depot charging, complexity is reduced from day one to create the conditions for profitable scale.

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BENEFIT IN A NUTSHELL

WHY IT MATTERS

The first electric routes do not have to solve the entire transformation. They need to prove that the model works in daily operations.

THE BENEFIT

With disciplined route selection, depot charging and customer alignment, even early deployments can create measurable cost and market advantages.

WHAT TO DO NEXT

Select predictable depot-return routes, train drivers early and use real operating data to prepare the move from Starter to Scaler.

BEV SCALER.

Scaling electrification through smart charging and energy systems.

QUICK READ

EXECUTIVE BRIEF

01 BOTTOM LINE

Betonwerk Bad Lausick shows how electric trucks, depot charging, photovoltaics and battery storage can work together as one economic system.

02 EVIDENCE

Three of the BBL sites use dual-point 400 kW chargers, a PV portfolio of 1.8 MW with another 0.4 MW planned and 430 kWh battery storage at each site. With BEV Scaler assumptions and the operational reality of BBL, the savings with BEV amount to 500,000 euros.

03 CONTEXT

Concrete and building-material logistics require strict timing, high reliability and disciplined cost control. Fresh concrete must be delivered and processed within ninety minutes of mixing.

04 IMPLICATION

Medium-sized operators can become technology leaders when they combine stable routes with strong energy control.

05 KEY INSIGHT

The stronger the integration of depot energy systems, the stronger the battery electric truck business case becomes.

06 NEXT STEP

Build a scalable charging and energy concept aligned with BEV fleet share targets, and use the low and controllable energy cost to improve TCO.

The concrete and building materials sector is unforgiving. Logistics must be reliable, routes must run on time and costs must stay under control. Fresh concrete must be delivered and processed within ninety minutes of mixing, making dependable transport essential for product quality and waste avoidance.

Betonwerk Bad Lausick shows how a medium-sized company can lead in this demanding environment and demonstrates how integrated energy systems simplify operations and create a clear cost advantage. One of its electrified daily routes is the Otterwisch-Bernburg-Bad Lausick-Otterwisch cycle.

The roundtrip covers 500 kilometers with an average payload of 14 tons of cement and more than 1,150 meters of total elevation gain. It runs across 220 working days per year and follows a consistent pattern that enables accurate range and energy planning.

Under these conditions, the MAN eTGX with six battery packs achieves approximately 400 kilometers in winter and up to 500 kilometers in summer. The complete roundtrip can be operated without intermediate charging, supported by high-power depot charging in Otterwisch and Bad Lausick during loading and unloading.

Betonwerk Bad Lausick has built a comprehensive depot energy system and has firmly reached the BEV Scaler stage. Three of the company's six sites are equipped with dual-point 400 kW chargers. These are supported by a photovoltaic portfolio of 1.8 MW, soon to be expanded by another 0.4 MW. Each site also operates a 430 kWh battery storage unit, enabling price optimization, peak shaving and a high level of self-consumption of around 70 %.

For Betonwerk Bad Lausick, the total cost of ownership assessment reflects a more demanding operational profile than the Foppiani case. Five trucks are assumed to operate the high-load, energy-intensive Otterwisch-Bernburg-Bad Lausick-Otterwisch cycle, each covering around 110,000 kilometers per year under a five-year leasing framework. Diesel consumption is assumed at 31 liters per 100 kilometers with a fuel price of 1.60 euros per liter, in line with German market conditions, while battery electric trucks consume around 114 kilowatt-hours per 100 kilometers at an electricity price of 0.20 euros per kilowatt-hour, consistent with BEV Scaler assumptions. As in the Foppiani case, the calculation fully includes charging infrastructure, site preparation and operational integration.

Over the five-year leasing period, the BEV Scaler case already shows a significant economic benefit, with total costs around 500,000 euros lower than the diesel reference across the five-truck fleet, resulting in a 9.4 % TCO advantage compared to diesel. With additional depot energy integration and optimization characteristic of the BEV System Operator stage, the TCO advantage increases to 13.3 % for Betonwerk Bad Lausick. This progression highlights that even in demanding, energy

-intensive applications, battery electric trucks can deliver a measurable and scalable economic advantage when combined with an integrated depot energy ecosystem.

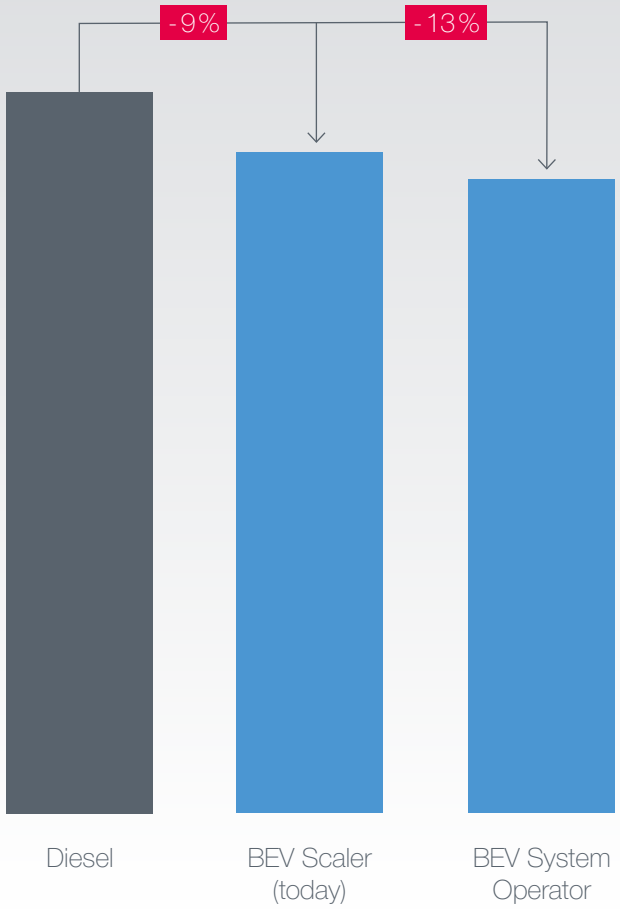
The transition has also changed driver behavior. After initial training, drivers quickly adapted to the new vehicles and appreciate the smooth, quiet driving, strong acceleration and low noise levels. Even previously skeptical drivers now prefer the battery electric trucks. A new internal culture has emerged, with drivers competing to achieve the lowest energy consumption and using regenerative braking strategically.

Customer and industry feedback has been positive. Betonwerk Bad Lausick was the first operator to request 42-ton weighbridge adjustments at major cement plants for heavy BEVs, an unfamiliar requirement for many facility operators. The company also uses one of its five battery electric MAN trucks for less predictable long-distance operations, including routes beyond Berlin, supported by curated lists of compatible public charging locations.

Looking ahead, Betonwerk Bad Lausick plans to expand its electric fleet every year, aligned with suitable configurations for specialized applications such as concrete mixers and vehicles requiring auxiliary power. In all, Betonwerk Bad Lausick proves that BEV Scalers are not simply adding more electric trucks. They are building an energy and cost advantage around the fleet.

TOTAL COST OF OWNERSHIP COMPARISON

TCO delta over 5 yrs [in %]



Source: MAN

BENEFIT IN A NUTSHELL

WHY IT MATTERS

Once electric truck fleets scale, the energy system around the depot becomes a decisive performance factor.

THE BENEFIT

Smart charging, PV and battery storage can turn charging from an uncontrollable cost item into a structural advantage in total cost of ownership.

WHAT TO DO NEXT

Connect fleet planning with energy planning and evaluate how much charging demand can be covered through self-generated or optimized electricity.

BEV SYSTEM OPERATOR.

Realizing the full value of electrification across operations.

053

QUICK READ

EXECUTIVE BRIEF

01 BOTTOM LINE

Schlager Transport Logistik shows what happens when electrification becomes a core business strategy.

02 EVIDENCE

Schlager already operates a fleet that is 50 % battery electric and aims to run an exclusively electric fleet from 2030 onwards. Based on a representative fleet of 15 battery electric trucks over 5 years, MAN TCO calculations show an impressive TCO advantage, with energy savings alone of more than two million euros.

03 CONTEXT

Austrian long-distance national road freight transport combines predictable night routes with more variable daytime assignments, making planning discipline essential.

04 IMPLICATION

BEV System Operators can use electrification to lead on cost, resilience, sustainability and customer differentiation.

05 KEY INSIGHT

A highly electrified fleet supported by PV, battery storage and smart energy management can create a major operating cost advantage.

06 NEXT STEP

Move from single-route optimization to a full depot and energy strategy that maximizes depot charging and reduces exposure to public charging prices.

Schlager Transport Logistik operates in Austrian long-distance national road freight transport, with routes typically ranging between 300 and 500 kilometers.

Its operations combine predictable nighttime line hauls with more irregular daytime assignments. For Schlager, electrification is not only a sustainability measure. It is a deliberate business strategy.

Owner Hubert Schlager initially built his own Excel-based business case to test where battery electric trucks could create an economic advantage. By analyzing the company's route structure, he determined that approximately half of operations could already be profitably electrified. This analytical approach, combined with a strong belief in the long-term profitability of battery electric trucks, explains why Schlager moved faster than many other operators.

Today, Schlager is a practical example of the BEV System Operator archetype. The fleet already consists of 50 % battery electric trucks, including three MAN eTGX 6×2 chassis configurations. The company aims to operate an exclusively electric fleet from 2030 onwards.

The economic core of this transformation is the depot energy system at the Saxen site. Schlager operates approximately 765 kWp of photovoltaic capacity, supplying roughly 55 – 60 % of the electricity consumed on site. This is complemented by a battery energy storage system of around 1.6 MWh, managed by an energy management system that keeps average grid draw close to 300 kW, allowing for more than 95 % depot-based charging.

The system uses peak shaving and active charging and discharging of the storage unit to reduce peak loads and keep network fees low. This shows how essential battery storage can be, in many cases even more so than the PV system itself. Schlager is also exploring vehicle-to-grid as a future option if truck usage patterns and operational requirements provide the right use case.

For Schlager, the total cost of ownership comparison reflects a scaled BEV System Operator operation with a fully integrated depot energy ecosystem. The fleet comprises fifteen battery electric trucks, each covering around 100,000 kilometers per year under a five-year leasing framework. Diesel consumption is assumed at 30 liters per 100 kilometers with a diesel price of 1.50 euros per liter, consistent with Austrian fuel market conditions, while battery electric trucks consume around 100 kilowatt-hours per 100 kilometers. Electricity costs are assumed at 0.16 euros per kilowatt-hour for depot charging, in line with BEV System Operator assumptions and Schlager's use of optimized depot energy systems. Charging infrastructure is assumed to be cost neutral, as the depot charging facilities are publicly accessible and generate revenues that offset infrastructure investments, consistent with Schlager's operating model and experience.

Under these conditions, the BEV System Operator case achieves a total cost of ownership advantage of 7.4 % compared with diesel across the five-year period. Energy cost savings alone exceed 2 million euros over the leasing horizon, reflecting both the scale of the fleet and the structurally lower and more controllable electricity costs achieved through depot charging. In addition, toll advantages exceed 1.3 million euros over the same period, underlining the growing impact of CO_2 differentiated toll regimes once fleets electrify at scale. The Schlager case demonstrates that once infrastructure is in place and fleet size increases, battery electric trucks deliver not only incremental improvements but a structurally superior cost position compared with diesel operations.

BEV System Operator
Schlager Transport Logistik
400 km / day
100,000 km / year
80 % highway share

Operationally, Schlager did not have to reinvent logistics. The main difference compared with diesel is more precise dispatch planning. Electric tours are assessed for range, charging opportunities and weather-related consumption effects to avoid costly public charging and maximize depot charging. The company has also reached agreements with key customers to install charging infrastructure at customer sites, allowing short high-power charging stops that open up additional routes.

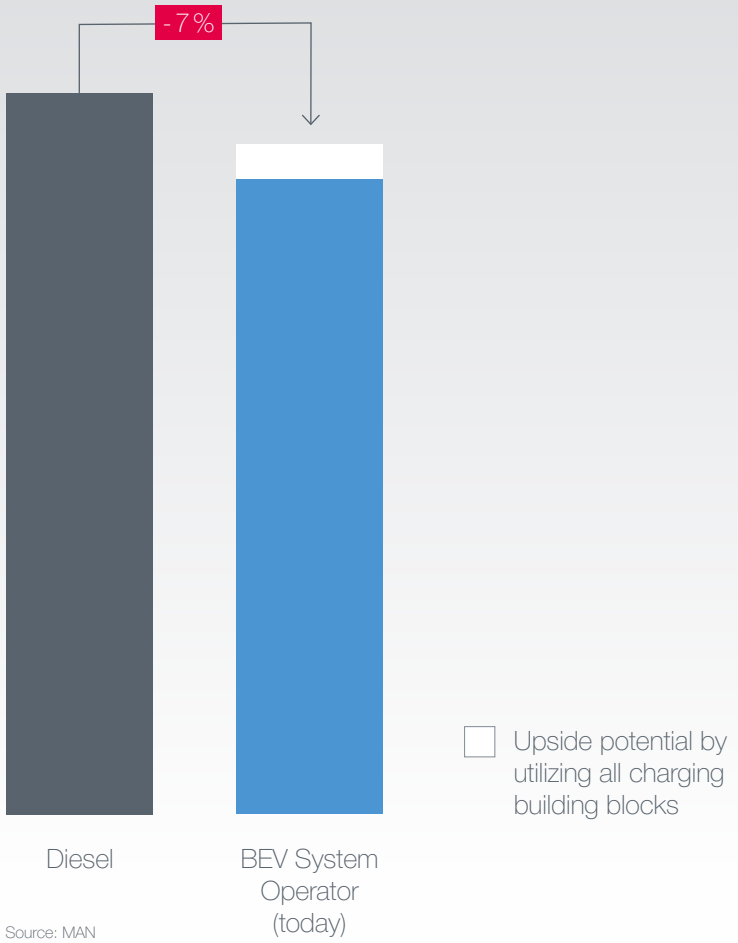
Drivers have become important supporters of the transition. Initial skepticism has largely disappeared, and many drivers now actively support battery electric trucks because of the superior driving experience. As at Betonwerk Bad Lausick, drivers compare consumption figures and compete for efficient driving.

Schlager also adds a distinctive cultural dimension. All Schlager trucks and trailers feature hand-painted artworks created by artists from Lebenshilfe Oberösterreich , an organization in Upper Austria supporting persons with intellectual disabilities. When vehicles are retired, the painted trailer tarpaulins are upcycled into unique bags. This connects economic transformation, social engagement and a visible sustainability narrative in everyday operations.

Schlager shows the full potential of the BEV System Operator stage: electrification becomes an integrated business system that delivers cost advantages, operational control, brand differentiation and a credible sustainability story.

TOTAL COST OF OWNERSHIP COMPARISON

TCO delta over 5 yrs [in %]



Source: MAN

SCHLAGER
WIR SIND ANDERS TRANSPORTE

MAN

BENEFIT IN A NUTSHELL

WHY IT MATTERS

At the System Operator stage, electrification is no longer a vehicle project. It becomes an integrated business system.

THE BENEFIT

Advanced depot energy management, high depot-charging shares and precise dispatch planning can unlock major savings and strengthen the customer proposition. It proves that electrification at scale simplifies business by turning energy into a controllable and predictable cost factor.

WHAT TO DO NEXT

Use route economics, customer charging opportunities and energy-market options to expand electrification where it creates the strongest competitive advantage.

DRIVING TRANSFORMATION THROUGH CURIOSITY AND ENTREPRENEURIAL EXECUTION.

QUICK READ

EXECUTIVE BRIEF

01 BOTTOM LINE

The transition to battery electric trucks is complex, but the challenges are manageable when operators plan vehicles, infrastructure, grid and operations together.

02 EVIDENCE

Battery electric 4×2 truck tractors typically cost around 250,000 – 300,000 euros versus roughly 100,000 – 120,000 euros for diesel equivalents. Europe currently has more than 1,700 truck-verified public fast-charging points and 800 dedicated truck charge points, while approximately 7,800 public heavy-duty fast-charging points will be required by 2030 and nearly 28,500 by 2035.

03 CONTEXT

High acquisition costs, residual value uncertainty, gaps in the public charging network, grid lead times and route-planning complexity still slow adoption.

04 IMPLICATION

Companies need financing, infrastructure and planning models that match the economic lifetime of vehicles and depots.

05 KEY INSIGHT

Electrification is less a technology experiment than a professional operations challenge. The companies that build planning capability early reduce risk fastest.

06 NEXT STEP

Move from isolated investment decisions to an integrated electrification roadmap covering financing, charging, grid connection, dispatch and customer contracts.

The transition from diesel to battery electric trucks is one of the most profound changes in European freight transport. The opportunity is evident, but so are the challenges. Successful operators will be those that approach the transition with curiosity, entrepreneurial discipline and a willingness to plan the full system.

Acquisition cost remains a major barrier. A typical battery electric 4×2 truck tractor from European OEMs typically costs around 250,000 – 300,000 euros compared with roughly 100,000 – 120,000 euros for a diesel equivalent. Residual value uncertainty also remains, because the secondary market is still young and battery technology continues to advance. Many operators therefore hesitate without stable long-term contracts or flexible financing models that reflect these uncertainties and match the economic lifetime of the assets. Another way that many fleet operators combat this is through leasing, effectively making the OEM carry the risk.

Charging infrastructure is equally critical. Europe currently operates more than 1,700 truck-verified public fast-charging points and 800 dedicated truck charge points, predominantly based on CCS technology.[4] Demand will scale sharply. By 2030, approximately 7,800 public heavy-duty fast-charging points will be required, rising to nearly 28,500 by 2035, driven by projected battery electric truck fleets of 370,000 and 1.2 million units respectively. Today's public network is almost entirely CCS-based, while future demand will increasingly rely on Megawatt Charging System (MCS) technology. More than 4,000 MCS chargers have already been announced across Europe, including large-scale deployments under the German truck-charging tender and AFIF[5]-funded programs.

The economics of charging infrastructure are changing as well. The focus is moving away from a simple "price per outlet" view toward integrated payback and service models. Charging-as-a-service solutions can bundle hardware, software, maintenance and replacements into a single package. Models may include pay-per-use pricing per kWh, capacity-based contracts with a fixed monthly fee for guaranteed power and availability, or revenue-sharing arrangements in which the charge-point operator recovers investment through a share of the charging fee.

Long-term maintenance contracts with uptime guarantees can further stabilize operating costs and convert infrastructure costs into predictable operating expenditure. For fleet operators, this can simplify access to high-power infrastructure, reduce the pressure to optimize purely for lowest hardware price and lower perceived technology obsolescence risk.

The AFIR provides a baseline for EU-wide coverage with mandatory targets for 2025, 2027 and 2030. However, structural gaps remain. AFIR does not mandate MCS corridors, focuses on TEN-T[6] coverage rather than

4) EY – HDV infrastructure monitoring 03/2026
5) The Alternative Fuels Infrastructure Facility (AFIF) is intended to support the development of alternative fuels supply infrastructure, contributing to decarbonizing transport along the TEN-T network.
6) The Trans-European Transport Network (TEN-T) addresses the development of a Europe-wide network of railway lines, roads, inland waterways, maritime shipping routes, ports, airports and railroad terminals.

AFIR TARGETS IN PERSPECTIVE

Source: TRATON

actual battery electric fleet density and lacks binding 2035 targets. Countries with short TEN-T networks but rapidly growing BEV fleets may therefore face local shortages unless national programs close the gap. Current initiatives, including Germany's Truck Charging Tender, Denmark's heavy-duty corridor funding and the Netherlands' SPULA subsidy scheme, are already accelerating deployment with more than 500 million euros committed across Europe.

Grid readiness remains a central bottleneck. High-capacity depot and corridor charging installations generally require grid-connection upgrades that often take six to eighteen months, with major differences in permitting efficiency and grid-planning practices between markets. Long lead times for transformers and switchgear add further uncertainty. At the same time, utilities and distribution system operators are beginning to standardize planning pathways and introduce fast-track procedures for commercial vehicle charging. Additionally, modular solutions enable scalable depot charging within existing grid constraints.

The key implication is that infrastructure will increasingly define the pace of fleet electrification. Vehicle availability, customer demand and regulatory pressure are all moving forward, but the practical speed of adoption will depend on whether charging capacity can be developed in step with fleet growth. For operators, infrastructure therefore becomes more than an enabling condition. It becomes the factor that determines how quickly electric trucks can move from selected use cases into irregular fleet operation. For policymakers, the message is equally clear: ambitious CO_2 targets must be matched by equally ambitious infrastructure conditions, including faster approval processes, reliable grid planning and coordinated public funding frameworks. Companies that treat charging capacity as part of their growth strategy can scale with confidence, while policy environments that remove infrastructure bottlenecks will determine how quickly the wider market can follow.

Operational integration is the final challenge. Battery electric trucks require precise planning of range, charging windows, energy consumption and weather-related variability. MAN's internal logistics electrification projects have generated detailed insights into consumption peaks, winter range reductions, topographical effects and scheduling constraints. These insights have been translated into conservative range assumptions, explicit charging buffers and systematic integration of charging events into route and shift planning. At the same time, the higher transport prices initially charged for battery electric operations to compensate for perceived operational risk are already declining and, in early mover corridors, beginning to disappear as freight forwarders gain operational experience. This dynamic increasingly favors those who move first.

The lesson is clear: where routes are well understood and operational discipline is high, significant portions of logistics networks can be electrified without increasing fleet size, even under demanding utilization profiles. Electrification is not a leap into the unknown. It is a planning discipline.

> **RANGE IS NOT THE RISK. BAD PLANNING IS.**

BENEFIT IN A NUTSHELL

WHY IT MATTERS

High acquisition costs, charging gaps, grid constraints and operational complexity can slow down decisions.

THE BENEFIT

Companies that treat these issues as planning tasks rather than roadblocks can reduce risk and move faster than competitors.

WHAT TO DO NEXT

Build a realistic roadmap covering vehicles, financing, charging, grid connection, routing and operational planning.

DEPOT ELECTRIFICATION WILL BE THE BACKBONE OF FUTURE SUCCESS IN SCALING TRUCK OPERATIONS.

05

QUICK READ

EXECUTIVE BRIEF

01 BOTTOM LINE

Depot electrification is the backbone of scalable electric trucking. It turns charging from a constraint into a controllable cost advantage.

02 EVIDENCE

MAN project experience indicates energy cost reductions versus a public fast-charging reference price of 40 ct/kWh: around 26 ct/kWh in the BEV Starter stage, 20 ct/kWh in the BEV Scaler stage and 16 ct/kWh in the BEV System Operator stage.

03 CONTEXT

Most operators cannot rely on public charging alone. They need reliable energy access where vehicles start, return and stand.

04 IMPLICATION

The depot becomes a strategic asset that integrates grid connection, transformer capacity, charging hardware, energy management, PV, storage and potentially access to energy markets.

05 KEY INSIGHT

Depot charging matures in three steps: basic depot charging, smart depot charging and advanced energy systems. Each step lowers effective energy cost and improves operational control.

06 NEXT STEP

Plan the depot from the target future backwards: define the 2030/2035 fleet picture, then build today's civil works, grid connection and software foundation accordingly.

Battery electric trucks fleets scale through the depot. A well-planned charging setup reduces energy costs, protects operational reliability and creates the flexibility needed to grow electric fleets over time.

CHARGING BUILDINGS BLOCKS AND DEPOT TRANSFORMATION

Public Charging
at ~40 ct/kWh[1]

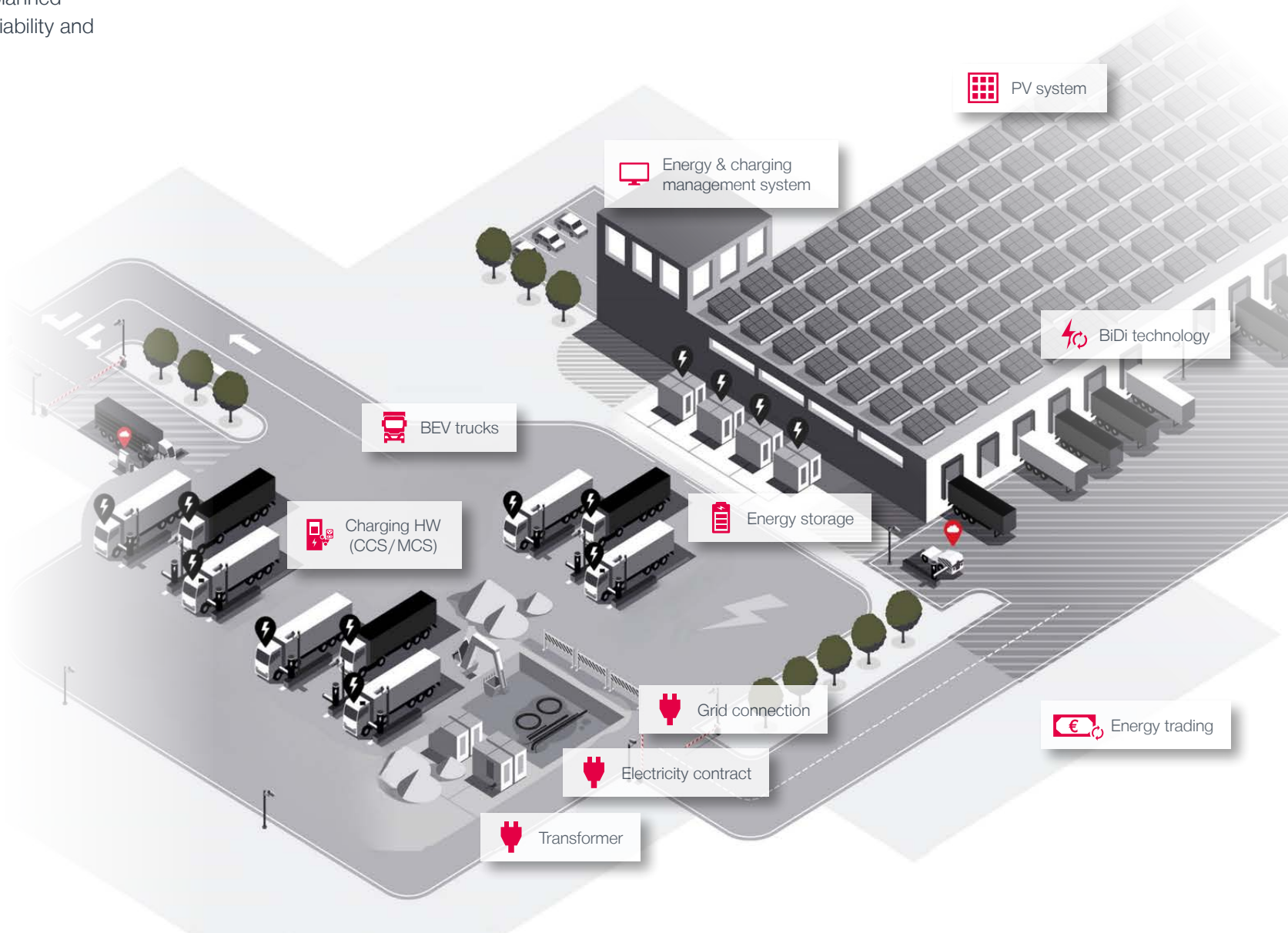
Level 1: Basic Depot Charging
Energy costs
~20 – 26 ct/kWh[2]

-20 – 35 %

Level 2: Smart Depot Charging
Energy costs
~16 – 20 ct/kWh[3]

-10 – 20 %

Level 3: Advanced Energy Systems
Energy costs
~14 – 16 ct/kWh[4,5]



1) Based on public charging prices of TRATON Charging Solutions MSPs w/o VAT
2) Based on industry electricity prices w/o VAT – can differ along markets
3) Based on demand-side management incl. peak shaving and load shifting with dynamic tariff
4) Based on BiDi charging incl. day-ahead arbitrage
5) Monetization of charging infrastructure via 3rd party customers not reflected in energy costs, but will have TCO impact in terms of reduced infrastructure allocation to transport costs

Depot charging is built around four technical elements: grid connection, transformer, charging hardware, and a smart energy and charging management system. Depending on fleet size and operating patterns, charging power per vehicle ranges from overnight charging at 150 kW to high-capacity CCS or MCS solutions for fast turnaround.

MAN consulting projects show that even small fleets can often operate with existing grid capacity. Medium and large depots usually require additional transformer capacity, load management or both to balance simultaneous charging demand.

A stepwise approach has proven most effective. Operators begin with basic overnight charging for the first electric trucks. This secures reliable operations with limited complexity. As the fleet grows, smart charging becomes essential to distribute available power, avoid peak loads and align charging with low-tariff periods.

Many operators then integrate photovoltaics to cover part of the electricity demand at production costs well below market rates. In MAN projects, PV-supported sites can reduce annual energy costs by tens or even hundreds of thousands of euros and strengthen the overall TCO advantage. Battery storage becomes relevant when companies want to limit grid peaks, optimize peak shaving and use self-generated solar energy throughout the day and night.

While the truck itself is zero-emission from a TTW perspective, the full WTW advantage is maximized through the stated intelligent integration of renewable electricity, optimized charging windows and depot-level energy systems such as photovoltaics, storage and load management. This reinforces the understanding that the real value of electrification is unlocked not only by the vehicle itself, but by a strategically designed depot ecosystem that turns energy into a controllable lever for both cost and decarbonization.[7]

A central economic lever is the reduction of energy costs versus an assumed public fast-charging price of 40 ct/kWh. MAN project experience shows three charging maturity levels aligned with the BEV archetypes. In the BEV Starter stage, basic depot charging reduces effective energy costs to around 26 ct/kWh, a 35 % saving through controlled overnight charging and foundational load management.

In the BEV Scaler stage, smart depot charging lowers the effective price to roughly 20 ct/kWh, a 50 % saving through PV- and storage-optimized charging, peak shaving and price-aligned load shifting. In the

7) MAN - Sustainability Report 06/2026

MARGINS ARE NOW MEASURED IN CT/KWH.

BEV System Operator stage, advanced energz systems reduces costs further to about 16 ct/kWh, a 60 % saving enabled by charge-point monetization, dynamic reservation and participation in energy markets.

The most important planning principle is to start with the future and work backwards. Instead of dimensioning infrastructure only for the first one or two trucks, operators should define the target picture: how many electric trucks will be operating in 2030 or 2035? What charging patterns will exist once the fleet has grown? What grid capacity, civil works and software capabilities will be required then?

This prevents expensive redesigns. Trenches, conduits and space allocation should follow the maximum expected build-out, even if only a few chargers are installed at first. The same logic applies to transformer sizing and energy or charging management systems, which should be compatible with future hardware generations and higher charging capacity.

The MAN 360° eMobility assessment gives operators a structured method for this backward planning. It evaluates routes, operating patterns, climatic conditions and energy needs to define the most efficient charging concept from the first pilot vehicle to a fully electrified depot. The result is scalable infrastructure that supports operational reality while unlocking long-term cost advantages through optimized energy use and renewable integration.

BENEFIT IN A NUTSHELL

WHY IT MATTERS

Depot charging is the foundation for reliable and cost-efficient battery electric truck operations.

THE BENEFIT

Smart depot infrastructure can lower electricity costs, protect uptime and keep the system scalable as the fleet grows.

WHAT TO DO NEXT

Plan from the 2030 or 2035 target picture backwards and dimension civil works, grid capacity and energy management for future scale.

COMPETE ELECTRIC
OR COMPETE FROM BEHIND.

06

QUICK READ

EXECUTIVE BRIEF

01 BOTTOM LINE

Electric trucking is becoming a competitive lever. Companies that master it early can lead on cost, compliance, customer value and sustainability.

02 EVIDENCE

Battery electric truck adoption is expected to rise from around 400 customers in 2020 and 5,000 in 2025 up to 300,000 by 2035. Lifecycle analysis shows a 71 % reduction in total greenhouse gas emissions under today's EU electricity mix, increasing to 81 % as the energy system decarbonizes toward 2030.

03 CONTEXT

The transformation of European freight transport is accelerating through regulation, customer demand, charging infrastructure and mature vehicle offerings.

04 IMPLICATION

Diesel-intensive operations will become more exposed to regulatory pressure, toll systems and customer expectations, while electrified operators can build cost leadership.

05 KEY INSIGHT

The industry is moving from isolated electric pilots to scalable electrification strategies built around depot ecosystems and energy management.

06 NEXT STEP

Treat electrification as a strategic transformation program, not a vehicle replacement project.

THE TRUCK MOVES THE LOAD. THE SYSTEM MOVES THE BUSINESS.

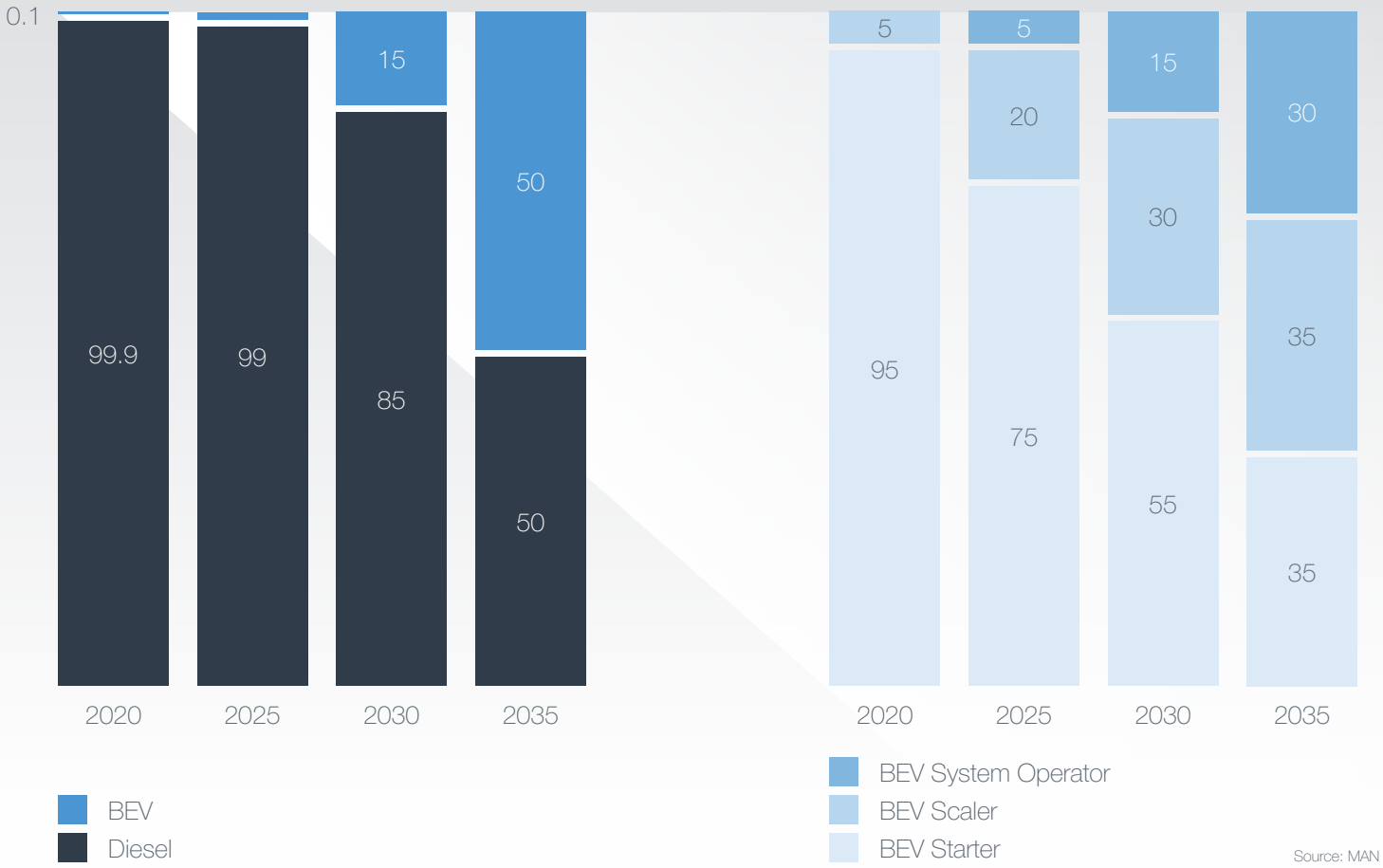
As stated in the first chapter, the European trucking market is highly fragmented with around 500,000 transport companies and 100,000 municipalities. Adoption of BEV trucks is accelerating rapidly, from roughly 400 customers in 2020 and 5,000 in 2025, a factor of 12. From 2025 to 2030 we expect a broadening of the battery electric truck customer base to 90,000, a factor of 18. By 2035, we expect up to 300,000 European customers to electrify their fleets and depots, marking a fundamental transformation of the industry. In a nutshell, the transformation of European freight transport is accelerating. Battery electric trucks are emerging as the defining technology of the coming decade.

On the one hand, the market still shows a certain level of skepticism towards electric trucks, particularly given the perceived environmental downsides related to battery production, the electricity mix, lifecycle break-even and the comparison with alternative fuels.

This is exactly where Life Cycle Assessment (LCA) becomes highly relevant, as it provides a comprehensive and fact-

DEVELOPMENT OF EUROPEAN CUSTOMERS SHARE WITH AT LEAST ONE BEV TRUCK AND CUSTOMER ARCHETYPES

[in %]



Source: MAN

GOING ELECTRIC IS NOT A NICE TO HAVE – IT'S ABOUT STAYING RELEVANT IN THE FUTURE.

based way to address these concerns. While it is true that battery-electric trucks have higher emissions in the production phase, a full lifecycle perspective clearly shows that the use phase dominates total emissions, where electric trucks offer significant advantages. Over the full lifecycle, battery electric trucks reduce total greenhouse gas emissions by 71 % under today's EU electricity mix and up to 81 % as the energy system further decarbonizes by 2030.[8]

At the end of the day, current early adopters already demonstrate that battery electric operations can deliver substantial CO_2 reductions and measurable cost advantages across energy, maintenance and toll expenses. As market barriers continue to decline, the competitive landscape will shift. Diesel-only operations will face rising pressure, while operators that electrify in a structured way can strengthen their market position.

Across Europe, transport operators are moving along a defined electrification maturity curve from early adoption to full business transformation. Deeper integration of trucks, charging and energy systems is unlocking step-change improvements in cost and performance. By 2035, at least 30 % of operators are expected to emerge as BEV System Operators, having built advanced capabilities in fleet electrification, energy management and infrastructure.

For freight forwarders, the implication is unmistakable: the transition from diesel to electric is no longer optional in strategic terms. CO_2 fleet targets, toll systems and customer expectations will increasingly penalize diesel-intensive operations. At the same time, the economic upside of electrification continues to grow.

Companies that act now can secure cost leadership, prepare for regulation and position themselves as credible partners in zero-emission supply chains. The transition requires investment, operational adaptation and a forward-looking mindset. But the companies that master this change will lead the industry into a more efficient, profitable and sustainable future.

7) MAN - Sustainability Report 06/2026

BENEFIT IN A NUTSHELL

WHY IT MATTERS

Electrification is becoming a strategic differentiator for cost leadership, compliance and customer relevance.

THE BENEFIT

Companies that act now can build a stronger position in zero-emission supply chains while diesel-only competitors face growing pressure.

WHAT TO DO NEXT

Turn the maturity assessment into an action plan with priority routes, infrastructure milestones and robust business-case assumptions.

WINNING ELECTRIC TRUCKING MEANS ALIGNING THE WHOLE SYSTEM.

07

THE TRUCK STARTS THE TRANSITION. THE ECOSYSTEM SCALES IT.

The transition to battery electric trucking is no longer a question of if. It is a question of how fast, how effectively and how profitably it can be scaled. Across Europe, adoption trajectories will differ, as variations in road toll schemes, subsidy frameworks and the availability of charging infrastructure translate directly into materially different TCO profiles. Importantly, these adoption dynamics are not static. Country-level adoption rates can shift materially within short time horizons as a result of regulatory decisions, such as changes in toll differentiation or exemptions for zero emission vehicles, which directly alter operating cost structures and investment cases.

At the same time, national averages mask significant intra-country disparities. Differences in infrastructure rollout, grid capacity and industrial activity lead to diverging adoption environments, with certain regions emerging as early viability clusters while others lag behind. This is particularly evident in markets such as Italy, where the economic and infrastructural gap between northern and southern regions results in materially different readiness levels for battery electric trucks, reflecting the broader importance of local ecosystem conditions for electrification success. However, even in markets with slower or more fragmented uptake, BEV Starter operators secure a first mover advantage, enabling them to capture premium demand for low emission transport services, build a competitive advantage and differentiate themselves from diesel based competitors. The direction is set, and the transformation is already moving.

The key lesson of this paper is that electrification does not depend on one single breakthrough. It depends on the coordinated progress of an entire system. Vehicles, charging infrastructure, energy supply, software, fleet operations, customer demand and regulation all have to move together. Only then can battery electric trucking become more than a vehicle replacement and turn into a structural competitive advantage.

Vehicle manufacturers are expanding portfolios, improving range and charging performance, and integrating hardware, software and services into more capable operating systems. Energy providers, grid operators and charging infrastructure players are building the conditions for scale: reliable power, faster connections, depot solutions and corridor charging from CCS today to MCS tomorrow. At the same time, software and energy management turn charging, load balancing and energy flows into controllable operations.

Transport companies translate this ecosystem into daily business. They select suitable routes, invest in depots, train drivers, adapt dispatch and prove the business case with customers. Shippers are creating demand for zero-emission transport, while policymakers provide planning confidence through regulation, CO_2 pricing, incentives and faster permitting. Each player matters. But the benefit emerges only when their efforts align.

The future of European trucking will not be won by the best truck alone. It will be won by the fastest, best-aligned ecosystem. For operators, the next step is to stop treating vehicles, charging and energy as separate decisions and build one scalable roadmap for fleet, depot and customer demand.

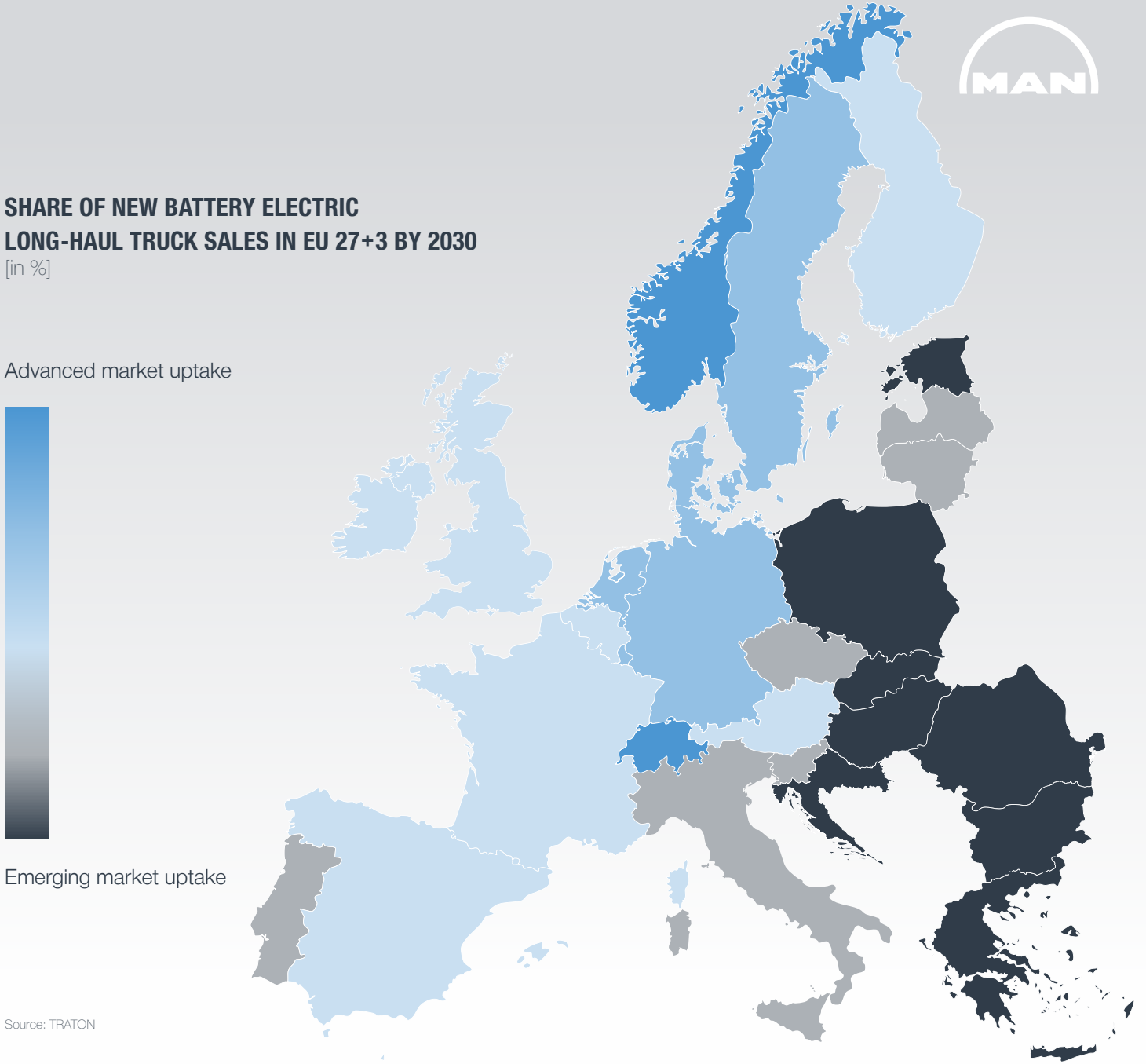
A more efficient, resilient and cost-effective transport system is within reach. But it will not appear by itself. It will be built route by route, depot by depot and partnership by partnership. There is still a long road ahead. But across the ecosystem, the willingness to act, invest and collaborate is increasingly visible.

As this alignment continues to strengthen, the outcome will go far beyond decarbonization. It will lead to a fundamentally more efficient, more resilient and ultimately more cost-effective transport system for Europe.

START SIMPLE.
SCALE SMART.
STAY AHEAD.

SHARE OF NEW BATTERY ELECTRIC LONG-HAUL TRUCK SALES IN EU 27+3 BY 2030

[in %]



Source: TRATON

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