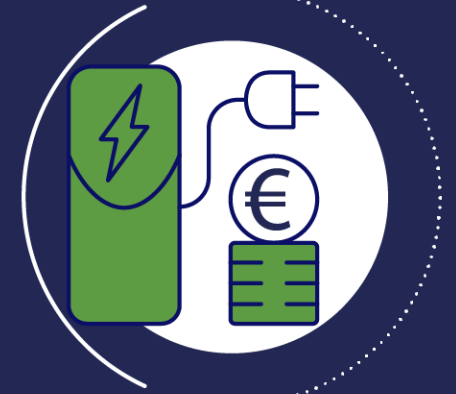


# On Costs For Electric Trucks:

The realities of going green for Europe's FVL trucks



## Chapter 1: What Costs?

Slide 03

- High Upfront Costs vs Low Total Cost of Ownership
- Costs incurred when going electric
- Charging infrastructure: charge points & electric highways
- Charging solutions from OEM partnerships

## Chapter 2: Lure to electric

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- What's included when buying electric HDVs
- Example of grants available
- What's on offer from major OEMs in Europe
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## Chapter 3: Who's buying electric trucks?

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- Examples of HDV electric truck orders in Europe

## Chapter 4: In Discussion

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- In Discussion with Kässbohrer Transport
- In Discussion with MAN
- In Discussion with Mercedes-Benz Trucks

## Chapter 5: Overview of emission standards

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- Regulation EU 2019/1242
- Incentives & Credits for ZEV

## Chapter 6: In Conclusion

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- Lure of electric outweighs cost

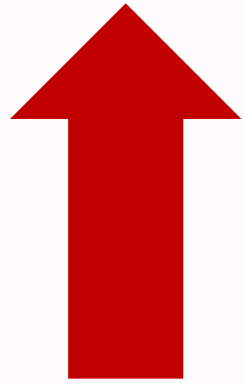
## Contacts

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# What Costs?

Understanding the costs associated with going electric

# High Upfront Costs & Low Total Cost of Ownership



## Upfront Costs

- Price of Electric Truck
- 3 times price of diesel equivalent (2021)
- Installation of charging infrastructure at base depot

## Total Cost of Ownership (TCO)

Price of running an electric truck vs diesel truck cheaper due to:

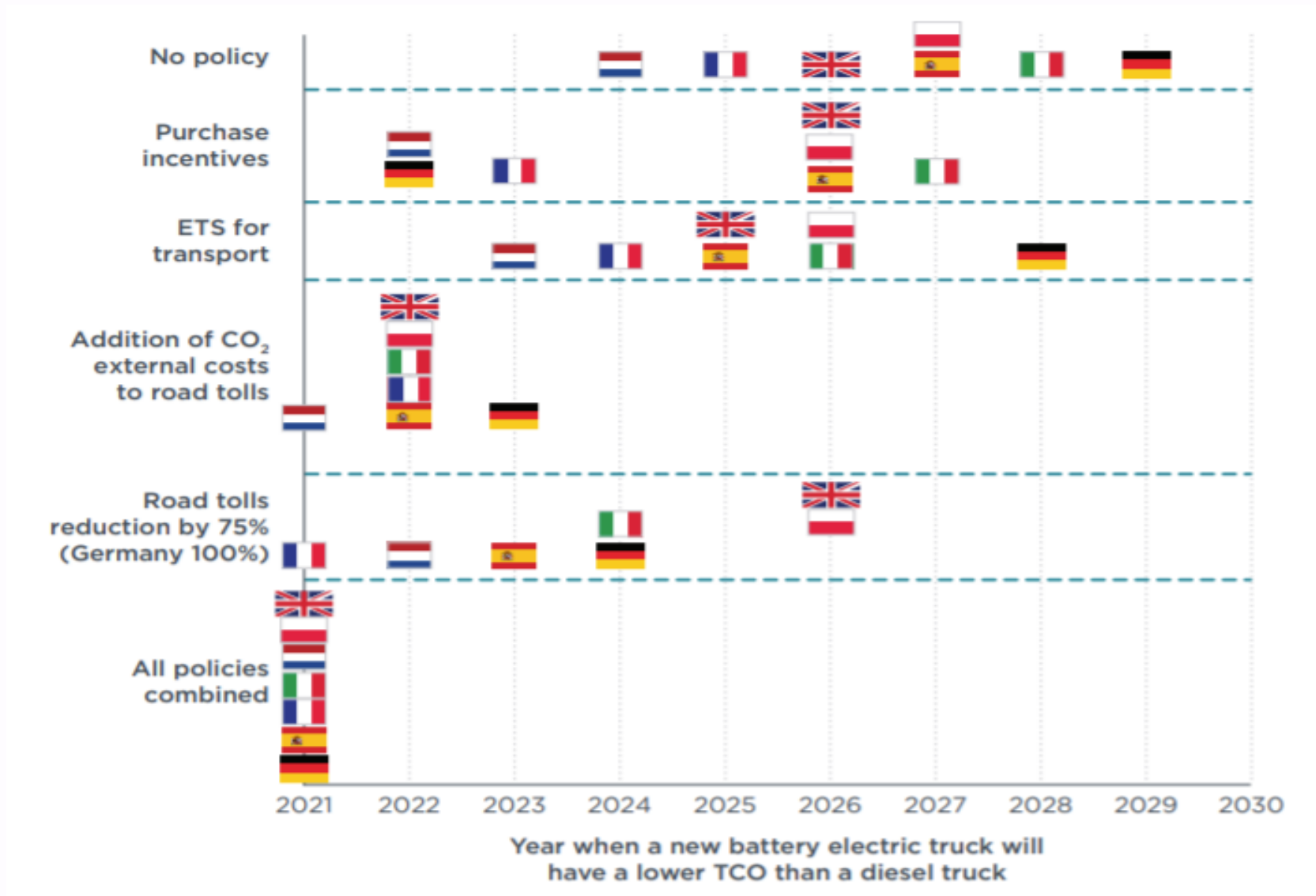
- Lower electricity costs
- Fewer parts, i.e. due to no ICE, so less maintenance, lower maintenance costs
- Subsidies

How many miles must a heavy duty electric truck run before it reaches cost parity with a conventional diesel truck?

Total Cost of Ownership(TCO) includes purchase price, running costs, repairs, taxes, maintenance, depreciation and resale value.

Simplified Total Cost of Ownership (TCO) example	Diesel HDV Truck-1 year (80,000km)	Electric HDV Truck - 1 year (80,000km)	Diesel HDV Truck-3 year (240,000km)	Electric HDV Truck - 3 year (240,000km)	Diesel HDV Truck-5 year (400,000km)	Electric HDV Truck - 5 year (400,000km)	Comment
Acquisition Cost (MSRP)	€ 116,230.00	€ 272,800.00	€ 116,230.00	€ 272,800.00	€ 116,230.00	€ 272,800.00	Price of electric HDV truck is high, upto double or even triple cost of diesel HDV truck, but as volumes increase this is expected to decline. Taxes ie VAT and Registration tax differ per MS, see ACEA. We assume acquisition taxes incl in Acquisition Cost example.
Purchase Subsidy (Member States subsidies differ)	€ 0.00	€ 125,256.00	€ 0.00	€ 125,256.00	€ 0.00	€ 125,256.00	Example: Germany offers upto 80% of the difference in cost of an electric truck versus diesel as purchase incentive.
New Acquisition Cost (after subsidy)	€ 116,230.00	€ 147,544.00	€ 116,230.00	€ 147,544.00	€ 116,230.00	€ 147,544.00	Note after subsidy, acquisition cost falls sharply for e-trucks.
Fuel Cost	€ 36,400.00	€ 0.00	€ 109,200.00	€ 0.00	€ 182,000.00	€ 0.00	Assume Euro 1.3 per liter diesel and 35 liters per 100km.
Electricity Cost	€ 0.00	€ 28,800.00	€ 0.00	€ 86,400.00	€ 0.00	€ 144,000.00	Assume Euro 0.3 per kWh, assume battery 300kWh for 250km.
Maintenance	€ 14,800.00	€ 4,440.00	€ 44,400.00	€ 13,320.00	€ 74,000.00	€ 22,200.00	Electric trucks expected to have around 25-40% of diesel truck annual maintenance costs, diesel trucks maintenance costs about Euro 18.5 per 100km.
Vehicle Taxes	€ 4,660.00	€ 0.00	€ 13,980.00	€ 0.00	€ 23,300.00	€ 0.00	Vehicles taxed by weight. Lorry 4,000GVW tax is Euro 466, so 40 tonne lorry is Euro 4660 per year. But zero emission trucks exempt from annual vehicle tax.
Road Tolls	€ 11,960.00	€ 5,980.00	€ 35,880.00	€ 8,970.00	€ 59,800.00	€ 14,950.00	Zero emission trucks will get 50% off road tolls in EU from 2023, and avoid planned CO <sub>2</sub> charges expected to be levied on ICE trucks. See Eurovignette Directive. After 2025, ZET expect up to 75% off tolls. Example Germany 0.081 to 0.218 Euro per km.
Sub TCO	€ 184,050.00	€ 186,764.00	€ 319,690.00	€ 256,234.00	€ 455,330.00	€ 328,694.00	Regulations such as emission taxes, which are added on to fuel prices and vehicle taxes, allow the TCO of electric trucks to reduce. Overall parity is achieved faster in markets where there is strong regulatory pressure. Countries where high regulatory pressure reach TCO parity earlier for electric trucks.
Depreciation	€ 23,246.00	€ 34,062.50	€ 48,351.68	€ 68,233.00	€ 68,473.42	€ 102,333.00	Assumption: residual value of ICE diesel truck drops around 20% a year. Residual value of electric truck, excluding battery, drops the same, but battery depreciates just 5% per annum, bringing overall annual rate of depreciation lower for electric truck.
Residual Value	€ 92,984.00	€ 238,737.50	€ 67,878.32	€ 204,567.00	€ 47,756.58	€ 170,467.00	Electric truck retains higher resale value than ICE truck. As low residual value is a negative, this adds to total TCO costs, while high residual is a benefit this is subtracted.

# TCO parity reached faster if regulatory policies enforced



Impact of policy measures on bringing forward the year of TCO parity between battery-electric and diesel tractor-trailers during the first 5-year ownership period.

# Charging issues to consider when going electric

- **Workplace Charging:** Workplace charging infrastructure needs to be resolved such that there is adequate charge point power to meet the business needs, and the speed of recharging needs to be considered.
- **Choosing where you charge:** Charging infrastructure enroute needs to be in place for the required journey to be mapped.
- **'Point to Point' long haul**—where truck routes are planned around & with necessary infrastructure in place
  - **Motorway Charging:** More expensive, consider the costs involved and speed of charging
  - **Charging infrastructure:** Knowledge of where the heavy vehicle truck charging sites are
  - **Public Charging:** Not all 'public charging' sites are freely accessible, some are very expensive with 'membership' charges
  - **Seasons:** Winter driving Vs Summer driving has different implications on cost per mile
  - **Annual Service Charge:** Electric trucks still need an annual service, check price
  - **Residual Vehicle Value:** Does an electric truck depreciate as fast as an ICE truck?
  - **Range:** Factors affecting range, how to maximize range, range anxiety
  - **Electric Vehicle knowledge:** educate drivers on how to run electric vehicles, best practices, issues, charging etc.

**Depot (base) Charging + Opportunity (on-route) Charging**

# What's needed to charge an electric HDV?

HDVs need more charge than light vehicles, but infrastructure is scarce

- Medium & Heavy duty vehicles use two primary charging models:
  - Depot Charging
    - Fleets with medium, heavy duty electric vehicles opt for Level 2 chargers –those up to 19kW for overnight charging
    - Heavy duty electric vehicles also require fast DC chargers (over 350kW) at depots
  - On-Route Charging (Enroute)
    - Opportunity Charging so called due to availability of charging infrastructure on-route , which for heavy duty electric trucks need 350kW or higher fast DC chargers

**Heavy duty intercity transports require a blend of enroute and depot charging**

Technology companies, suppliers and automakers join forces to increase charging infrastructure solutions for the HDV sector in Europe.



# Truck Charging Infrastructure: Daimler, Traton, Volvo

- December 2021: Traton Group, Daimler Truck & Volvo Group form a joint venture to install and operate high performance public charging for battery electric heavy duty trucks across Europe.
- Total investment of EURO 500 million
- Plan to install 1,700 high performance charging points on and close to highways



Martin Daum (left), Christian Levin (center) and Martin Lundstedt (right)

Christian Levin, CEO TRATON GROUP: “We have the strong opinion that we as the TRATON GROUP together with our brands Scania and MAN as well as the commercial vehicle industry as a whole will be part of the solution when it comes to a CO<sub>2</sub>-neutral world. A collaboration with strong competitors like Daimler Truck and Volvo Group might seem unusual. However, the topic is of crucial importance and this unique co-operation will make us faster and more successful in delivering the transformational action needed to tackle climate change. Our joint venture will be a strong push for the rapid breakthrough of battery electric trucks and coaches, the most efficient and sustainable transport solutions.”

**Europe needs up to 15,000 high-performance public and destination charging points by no later than 2025 for heavy duty trucks, and up to 50,000 high-performance charging points by no later than 2030 - ACEA**

# Truck Charging Infrastructure: DAF & ABB

April 2021: DAF Trucks offers

- 20kW to 50kW chargers for truck overnight charging
- 120kW to 180kW chargers for shift charging for multiple vehicles
- 350kW ultra fast charger, to charge one vehicle in 2 hours or simultaneously charge 2 vehicles.

“The application of fully electric trucks requires a specific way of planning and operations”, states Richard Zink, Director Marketing & Sales of DAF Trucks.

February 2022: PACCAR Parts to provide ABB charging solutions up to 350kW service across Europe & N. America

“Like PACCAR, ABB sees tremendous opportunity in electrifying the trucking industry and is committed to delivering safe, smart and sustainable electrification solutions for fleet charging,” said Frank Muehlon, President of ABB’s E-mobility division.



# SIEMENS Pantograph Technology-could this be a solution?

- **Siemens Mobility** and Continental Engineering Services (CES) co-operate on the development and manufacture of pantographs for trucks. (July 2021)
- The co-operation aims to electrify key stretches of highway-networks in Germany's autobahn network
- eHighway system on the B 462 federal highway in Germany between Kuppenheim and Gaggenau opened by consortium of Siemens Mobility and SPL Powerlines Germany. Via OCL directly powers truck and charges battery.
- Overhead contact line (OCL) trucks are equipped with a battery for additional electric range outside of the OCL infrastructure.
- As trucks using the overhead contact lines (OCL) need less batteries, their acquisition cost is also comparatively low.
  - Total Cost of Ownership (TCO) is reduced



# 02

## Luring Customers to Electric Trucks

How truck OEMs are enticing customers

# What's included when purchasing an electric HDV?

- Electric HDV truck manufacturers offer 'integrated solutions' also referred to as 'transport optimisation solutions'
  - These include feasibility studies on customer use cases, thereby creating realistic 'user profiles' and finding the best fit solution
  - E-truck manufacturers can then help customers choose the electric truck best suited in terms of
    - Range, Load capacity
    - Best grants/funding to apply for;
      - New Alternative Fuel Vehicle Purchase grants at national level, EU level
      - Infrastructure Development grants at national level, EU level
- Alternative fuel heavy duty vehicle OEMs are therefore offering customized consultancy like services to enhance diesel HDV fleet owners to switch to electric
  - Mercedes Integrated eActros Solution
  - Volvo Transport Solutions
- To assist with transition to electric trucks, OEMs offer packages which include route planning, servicing, maintenance
  - Volvo Dynafleet Range & Route Service & Volvo Gold Service Contract
  - Volta Truck as a Service (TAS)

# Grants available for alternative fuel heavy duty vehicles (AFHDV)



## Alternatively Fuelled Heavy Duty Vehicle Purchase Scheme:

(Example Ireland)

- Grant amounts calculated as percentage difference between price of AFHDV and diesel equivalent
  - Applicable for fuel types such as: Compressed Natural Gas, Liquefied Natural Gas, Battery Electric ...
  - Small enterprises eligible for higher levels of aid than medium or large enterprises
  - Maximum aid per undertaking is EURO 500,000.



## Gesamtkonzepts klimafreundliche Nutzfahrzeuge:

(Example Germany)

- German government has pledged Euro 1.6 billion to boost climate friendly commercial vehicle fleet, and Euro 5 billion for refuelling and recharging infrastructure
  - Grant up to 80% of additional cost associated with electric HDV compared to diesel equivalent
  - Funding for refuelling and charging infrastructure, up to 80% of expenditure
  - Funding for feasibility studies, construction or expansion of infrastructure, up to 50% of costs



# Mercedes-Benz eTrucks

October 2021: eActros rolled off the line at the plant in Wörth am Rhein. Ideal for heavy-duty distribution haulage in urban areas. series model of the eActros is available in Germany, Austria, Switzerland, Italy, Spain, France, the Netherlands, Belgium, Great Britain, Denmark, Norway and Sweden. Other markets will follow.

- eActros 300 –three battery packs, with 112kWh capacity each resulting in total capacity of 336kWh, and range of 300km.
- eActros 400—four battery packs, with 112kWh capacity each resulting in total capacity of 448kWh, with range of 400km.

Mid-2022: eEconic, which has been developed for municipal use, is due to start in the second half of 2022

2024: eActros LongHaul for long-distance road haulage is scheduled to be ready for series production

Mercedes integrated eActros solution: Mercedes helps customers set out a realistic usage profile for the trucks using route plans, also helps them apply for grants and plan charging infrastructure



# Volvo Electric Trucks

Volvo offers support to assist clients in switching to electric:

- Optimise Routes & Range: Dynafleet Range and Route service supports planning of routes, modelling the energy consumption throughout the route, suggesting additional charging if needed
- Guidance to best charging setup based on client conditions

- **Volvo Electric Truck Offerings:**

- **Volvo FH Electric:** optimal for city to city routes; 44 tonnes GCW, 490 kW power(666hp), 300km range, 560kWh (6 battery packs)
- **Volvo FM Electric:** optimal for container transportation; 44 tonnes GCW, 490 kW power, 380 km range
- **Volvo FMX Electric:** optimal for urban construction; 44 tonnes GCW, 490 kW power, 320 km range
- **Volvo FE Electric:** optimal for light construction transportation & deliveries; 27 tonnes GCW, 225kW power, 200km range
- **Volvo FL Electric:** optimal for door to door delivery & last mile delivery; 16.7 tonnes GCW, 130 kW power, 300km range, 395kWh capacity (3-6 batteries)





# MAN Electric Trucks

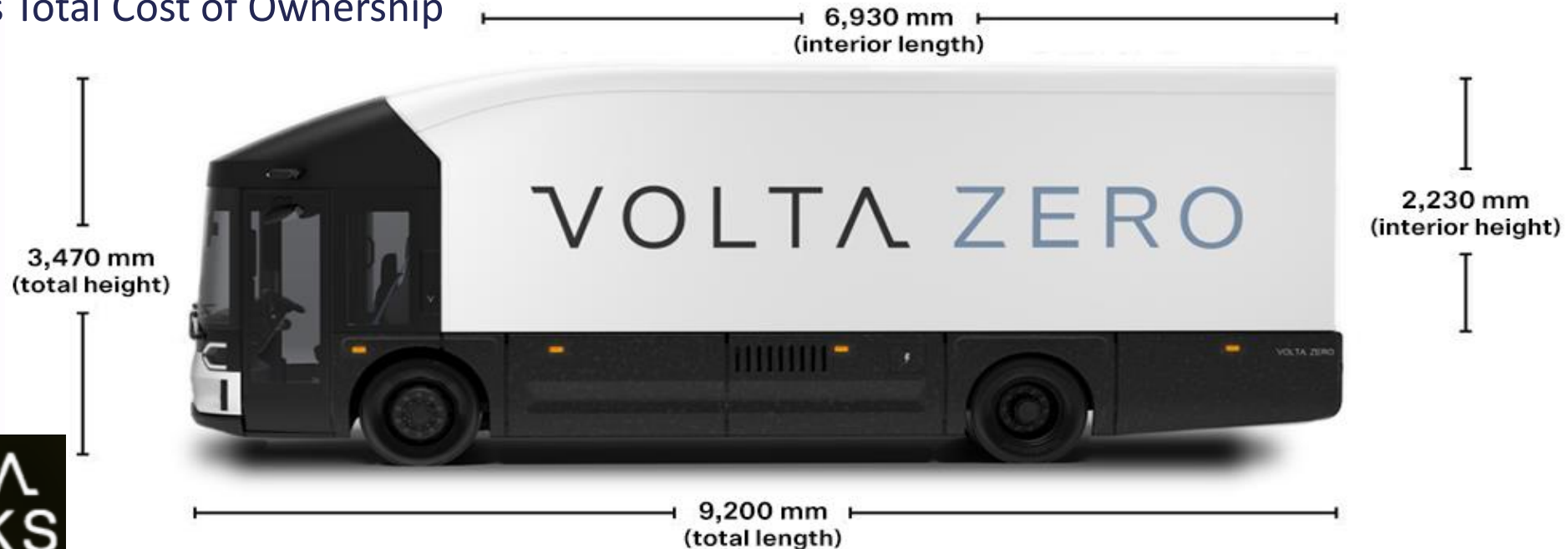
- MAN Truck & Bus will begin production of heavy-duty e-trucks in Munich in early 2024
- Initial delivery of 200 e-trucks & in-house assembly of battery packs
- “Our focus at MAN and in the TRATON Group is clearly on battery-electric drives. They form the basis for our heavy-duty e-trucks, which we will be launching on the market from 2024,” says Alexander Vlaskamp, CEO of MAN Truck & Bus.
- In addition to e-trucks, MAN is developing comprehensive eMobility solutions: "We need to drive the electrification of our fleet even faster. However, we will only succeed in ramping up e-mobility if we support our customers in their transition and convince them to do so. To this end, we are creating integrated digital solutions and charging offers," explains Vlaskamp.



# Volta Trucks



- Volta Trucks to begin production in 2023, with Steyr Automotive (Austria)
  - 2023: Volta Trucks to build 5,000 units.
  - 2024: Volta Trucks to build 14,000 units.
  - 2025: Volta Trucks to build 27,000 units
- Portfolio of 4 Volta Zero models: 7.5 tonne, 12 tonne, 16 tonne & 18 tonne models variants.
- Major order from DB Schenker for 1,500 electric trucks
- Volta Trucks total order book over 5,000 electric trucks, value exceeding €1.2 billion (21 February 2022)
- Offers Truck as a Service (TAS), includes charging infrastructure, maintenance, insurance & training
- TAS cuts Total Cost of Ownership



- Tevva Truck to begin production in 2022 of 7.5 tonne electric truck with hydrogen range extender
- Offers range up to 250km in pure battery mode or 500km with hydrogen fuel cell range extender.
- The total cost of ownership is comparable to a diesel; parity is achieved at approximately 3,000 km or when 500 litres of diesel is consumed per month.
  - July 2022: Mass production to commence in Tilbury (UK), deliveries to begin Q3 2022.
    - Expected price £139,000
  - 2023: 3,000 units to be produced

Tevva will produce a range of commercial trucks, up to 19.5 tonnes for European and Middle East markets including Israel.



# 03

## Who's buying electric?

Logistics players buy electric heavy duty trucks in Europe

# Battery Electric Car Carrier

- German vehicle manufacturer Kässbohrer Transport Technik GmbH and Designwerk Products AG are the companies behind the revolutionary customized electric car carrier built in collaboration with Swiss finished vehicle logistics player Galliker Transport AG.
- The storage capacity of the electric truck consists of four 225 kWh lithium-ion batteries - in comparison, an average electric passenger car has a capacity of 40 to 60 kWh net energy content. The car transporter is designed for a driving range of up to 300 miles.
- The performance of the newly developed car transporter and the batteries is now being tested in 100% real-life logistics operations over a longer period of time.



- Volvo Trucks has received an order for 100 Volvo FM Electric Trucks from DFDS.
- Delivery of the Volvo FM electric trucks to commence Q4 2022.
- Volvo FM electric have a range up to 300 km and will be used for short and long haul in Europe. Maximum load of 44 tons (Gross Combination Weight)
- New fleet will replace conventional trucks during 2022 & 2023
- "At DFDS, we're determined to become carbon neutral and offer a sustainable supply chain for our customers across Europe and Turkey. Electrification is an important element in this journey to reduce our carbon footprint. The electrical trucks will be in operations during 2022 and 2023 replacing conventional trucks", says Niklas Andersson, Executive Vice President and Head of Logistics Division at DFDS.



# **DB SCHENKER** DB Schenker orders 1,470 Volta e-trucks

VOLTA  
TRUCKS

- 30 November 2021: DB Schenker confirms intensive partnership and pre-order of nearly 1,500 full electric Volta Zero, 16 tonne vehicles to transport goods from distribution hubs to city centres. Partnership to develop a 12 tonne Volta Zero variant.
- Cyrille Bonjean, Executive Vice President Land Transport at DB Schenker in Europe, said: “The large-scale partnership with Volta Trucks allows us to significantly increase the pace of electrification of our fleet and invest in greener transport solutions, bringing us closer again to our goal of carbon neutral logistics.”
- DB Schenker will use the first prototype of Volta Zero Trucks in real distribution conditions in spring and summer of 2022, with a roll out to 10 locations in 5 countries.
- Serial production of 1,470 vehicles built at Volta Trucks’ new contract manufacturing facility in Steyr, Austria.





# Einride orders 120 e-trucks from Mercedes-Benz

- 15 December 2021: Einride orders 120 battery powered eActros Mercedes-Benz Trucks
- Delivery of eActros trucks in mid-2022, combination of eActros 300 & eActros 400.
- Einride –a Swedish freight technology company that specializes in electric and autonomous transport.
- Ellen Kugelberg, Chief Operating Officer, Einride: “As we continue to build out our global fleet of connected electric vehicles, it is imperative that we partner with best in class technical performance, to pair with our software solutions, and we confidently found that with the Mercedes-Benz eActros. Through joint product development we’ll continue to provide an effective and efficient path to electrification for the industry together.”





# 04

## In Discussion

with electric truck manufacturers

# In Discussion with Kässbohrer

**Question: Kässbohrer has built an electrified car transporter. What is the total permissible load and, in terms of cars, how many cars is it able to carry?**

- With this first electric articulated vehicle transporter we can load 8 cars. The loading possibilities correspond to a conventional car transporter, with the exception that the height above the driver's cab and at the first loading position behind the cab is somewhat limited due to the overall vehicle height. To design the world's first electric car transporter, not in the laboratory but for normal logistics, use was a key objective from the outset – and we have succeeded in doing so, with zero emissions and maximal loading capabilities of cars!

**Question: Please could you explain a little bit about the 4 batteries of 225kWh powering this electric car carrier?**

- The batteries work together in one pack. They can be recharged at all standard charging stations. Usually, 150 kilowatt charging stations are already available today. With these high capacities, however, the manufacturer 'Designwerk' offers co-ordinated charging options up to 350 kW. This means that rapid recharging (80% of capacity in less than 2 hours) is possible with this electric car transporter!

**Question: Do you see EU regulations such as Regulation 2019/1242 on regulations for heavy duty vehicle CO<sub>2</sub> emissions due out in Q4 2022 as a major incentive to electrify the HDV fleet at Kässbohrer?**

- Inspired by these legal objectives, we currently see a strong interest in projects where the BEV truck is to be tested in various specific uses. However, with the current costs of electrification, economic efficiency calculations naturally play a role not only in these projects.

**Question: What are Kässbohrer's plans for moving from pilot project stage to roll out of more such vehicles?**

- Based on the experience of the pilot projects to date, we would like to provide standardised body configurations suitable for BEV trucks for different key applications (e.g. shuttle transport, vehicle distributions,...), which can be assembled from a modular system. This should be possible already in the near future - and just as Kaessbohrer developed the first (fuel) car transporter almost a century ago, we are sure that, together with our partners, we will also be able to make important contributions to the (zero emission) future of the industry.



# In Discussion with MAN

**Question: With MAN to begin production of e-trucks in Munich from 2024 please could you explain why vehicle logistics players should consider zero emission heavy duty trucks?**

- The energy cost advantage of battery-electric trucks is the key to a rapid switch to e-trucks, because fuel and energy costs account for the largest share of the total cost of ownership (TCO) for intensively used commercial vehicles. They exceed the purchase costs many times over. The better the vehicles are utilized, the more intensively, longer and more regularly they are used, the greater the energy cost advantage of e-trucks becomes. Overall, a typical heavy-duty e-truck in Europe is likely to be ahead of a conventional diesel truck in terms of total costs as early as 2025. However, this requires an area-wide fast-charging infrastructure, in Europe designed for a driver's 45-minute break after four and a half hours of driving.

**Question: Are routes pre-planned such that there is adequate charging infrastructure--or/and does MAN get involved in this?**

- At the moment there is no (or almost none) public charging infrastructure available that can be accessed by trucks (or by buses). In the future digital solutions will support our customers in route planning.

**Question: Would it be possible to share the actual MSRP for the new e-truck compared with the equivalent diesel truck?**

- We do not publish a price list, not for diesel nor electric trucks. But in terms of acquisition costs, the eTrucks will be around two to three times more expensive than today's trucks with combustion engines. The decisive factor for our customers, however, is the energy cost advantage of the battery-electric trucks, because fuel and energy costs account for the largest share of the total operating costs of a truck in intensively used commercial vehicles. They exceed the acquisition costs many times over.

**Question: Does MAN assist clients in accessing EU funding for the high upfront costs involved in purchasing an e-truck?**

- The landscape of funding for BEV is changing rapidly and varies from country to country and within these countries from region to region. Our sales personnel are well trained and often help in getting financial support for our customers.



# In Discussion with Mercedes-Benz Trucks

- **An overview of the framework conditions for e-trucks from Mercedes-Benz Trucks:**
  - For truck and bus customers, the focus is on the total cost of ownership (TCO), i.e. the costs over the entire life cycle. This includes not only the acquisition costs, but also all other aspects of later use such as energy costs, repairs and maintenance, as well as tolls and government subsidies.
  - In many cases there are funding opportunities at European, national and regional level, which can often, but not always, be combined. These can include the purchase of the vehicle and infrastructure but also reduced toll rates, low taxes etc.

- Due to the very different regulations behind the funding programs (amount, scope, conditions), an individual assessment is always necessary, from which a recommendation for the individual customer requirements can be derived.
- For example: depending on the configuration and market, the battery-electric Mercedes-Benz eActros for heavy distribution costs about three times as much as a comparable Actros with a conventional diesel drive. However, in Germany, e-trucks and the corresponding infrastructure can be subsidized by the federal government. (80% of the cost difference to a regular truck for vehicles and up to 80% for the infrastructure)

# 05

## Overview of Emission Standards

Regulation EU 2019/1242

# Overview: Emission standards for heavy duty vehicles (HDV)

- Regulation 2019/1242 – first EU wide CO<sub>2</sub> regulation for HDV introduced in August 2019, setting a 15% CO<sub>2</sub> emission reduction requirement for new HDVs for 2025-2029, and 30% reduction for year 2030 and beyond. The reduction target applies to manufacturers and is based on reference emissions reported in the period 1 July 2019 to 30 June 2020.
- Large lorries affected by regulation
- Incentive mechanism for zero and low emission (ZLEV) vehicles, by means of a system of credits for manufacturers. This is to be replaced in 2025 by a benchmark system.
- 2022 Review of Regulation 2019/1242 –expected in Q4
- Other vehicle types such as smaller lorries, buses, coaches and trailers expected to be added to Regulation.
- 2030 benchmark level to be set.
- CO<sub>2</sub> standards assessment to be addressed. Possible lifecycle CO<sub>2</sub> emissions and CO<sub>2</sub> credits for manufacturers.
- UK: Although the UK has left the EU, Regulation EU 2019/1242 has been copied into UK law, with Dept of Transport reserving right for amendments.

# Regulation EU 2019/1242

## Incentives and Credits

- Zero Emission Vehicles (ZEV), lorries with NO tailpipe CO<sub>2</sub> emissions
- Low-Emission Vehicles (LEV), lorries with a technically permissible maximum laden mass of no more than 16t, with CO<sub>2</sub> emissions of less than half of the average CO<sub>2</sub> emissions of all vehicles in its group registered in the 2019 reporting period.

**Super Credits System:** Applies from 2019 – 2024, and can be used to comply with target in 2025. A multiplier of 2 applies for ZEV and a multiplier of 1 and 2 applies for LEV depending on CO<sub>2</sub> emissions. An overall cap of 3% is set for this system.

From 2025 **a new benchmark based crediting system** will be set at 2%. The 2030 benchmark level will be set in the 2022 Review.

- Average CO<sub>2</sub> emissions of a manufacturer based on the entire new heavy-duty vehicles fleet is adjusted downwards if the share of ZLEV in the entire new heavy vehicle fleet exceeds the 2% benchmark; of which at least 0.75 percentage points have to be vehicles subject to CO<sub>2</sub> targets –the largest vehicles. Each percentage point above the benchmark will decrease the manufacturers average specific CO<sub>2</sub> emissions by 1 percent.

In both systems, ZEV not subject to the CO<sub>2</sub> targets are accounted in the incentive mechanism. Buses and coaches are excluded from the scheme. The ZEV not subject to the CO<sub>2</sub> targets can contribute to a maximum of 1.5% CO<sub>2</sub> emissions reduction.

# 06

## In Conclusion

The lure of electric, of playing a part in climate goals, overrides costs



# Conclusion of TCO analysis:

- Electric Trucks are the main zero-emission vehicle option for heavy duty trucks currently on the market in Europe.
- EU mandates are pushing for carbon neutrality by 2050, with all new vehicles including heavy duty trucks to be zero emission by 2040.
- EU Member States (MS) offer different incentives from purchase incentives and contributions toward charging infrastructure to promote shift to zero emission trucks.
- Current prices of electric trucks are up to three times as much as diesel trucks, but with purchase subsidies offered across MS, the Acquisition Cost of electric trucks drops.
- Cost Parity for electric trucks is reached earlier in markets where strong regulatory pressure exists, such as discounts in road tax, higher annual vehicle tax based on emissions and exemption for electric trucks.
- With the EU pushing to meet carbon neutral 2050 targets, incentives for zero emission trucks will increase fuelling growth of sector.
- OEMs are pushing for transparent supply chains, with low carbon options for transport of finished vehicles and components accelerating the development of electrified options such as electrified car carriers.
- Residual value, that is the resale value of electric trucks is higher as depreciation costs are lower than ICE diesel trucks under current market conditions.

# In Conclusion:

- Medium & Heavy-Duty road transport contribute a disproportionately high share of transport sector emissions therefore a shift to zero emission vehicles, where possible, is needed:
  - HDVs are responsible for 27% of road transport CO<sub>2</sub> emissions in the EU + UK
  - New HDV CO<sub>2</sub> emissions standards to be released Q4 2022 (Update on EU 2019/1242)
    - Further HDV emissions targets, possible lifecycle emissions targets and credits for manufacturers
- National level incentives such as no road tax, no toll taxes, special lanes for pure electric vehicles encourage the shift to electric HDVs:
  - Grants and funding available for new electric vehicle purchase
  - Grants and funding available for electric vehicle charging infrastructure at national and EU level
- Image enhanced of company showing commitment to meet climate targets, this also helps companies align with national climate goals:
  - Increasing number of logistics companies choosing to transform a portion of fleet to alternative fuels, including electric
  - Increasing number of end user clients requesting transparency and low emission supply chains
- EU Climate Policy & Member States' national policies to decarbonize Europe by 2050 major accelerator in push for transport sector to move to zero emission vehicles.

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