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BIZ: Legal

Going, Going, Gone - Arrival finally falls into administration

USA / UK – The curtains have finally come down on troubled commercial vehicle manufacturer, **Arrival Ltd** of London, UK, which finally collapsed into administration yesterday (5 February 2024). Valued at GBP 9 billion just three years ago, it has been a tumultuous time for the OEM, whose shares were delisted from the Nasdaq stock market on January 30, 2024, due to non-compliance. The company failed to launch its much-hyped electric van even after raising USD 283 million in a second SPAC deal in July last year, to help with its cash flow issues. With 400 jobs at risk, the business will now look to sell off any and every asset it can, in order to pay back its creditors.

Accounting firm, **Ernst & Young** (EY) is now tasked with handling the administration process. In a statement, EY said: "The group's liquidity

position has been impacted by a challenging market and macroeconomic conditions resulting in delays getting the group's products to market. As such, the joint administrators are now exploring options for the sale of the business and assets of the companies, including its electric vehicle platforms, software, intellectual property and R&D assets, for the benefit of creditors."

With major investors including Hyundai, Kia and BlackRock investment group, coupled with tens of thousands of orders from the likes of UPS, one wonders, is this the last we hear from this once-promising UK EV OEM?

For the latest information on the collapse of Arrival, please refer to this article on our website: <https://truckandbusbuilder.com/article/2024/02/09/arrival-names-ey-as-administrator-the-next-steps>



A once promising UK innovation king, no more, Arrival

BIZ: Product TECH: Aerodynamics

Volvo releases aerodynamic FH with up to 5% fuel economy improvement

Sweden – **Volvo Trucks Corporation** of Gothenburg, Sweden has unveiled a new variation on the 'FH' truck, featuring an aerodynamic design and boasting a fuel efficiency improvement of up to 5% compared to the current model.

Called 'FH Aero', the redesigned truck features a cab which has been extended by 24 cm at the front, making it more aerodynamic. Volvo claims that the new design not only reduces fuel consumption but also provides greater stability under strong winds. The look of the cab is also changed: the Volvo 'iron' logo has been enlarged and repositioned between the headlights.

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The Volvo FH Aero Electric

Dear Reader,

The headline news for this month's issue will not surprise those who have been closely watching the rollercoaster ups and downs in the fortunes of London-based startup manufacturer, Arrival. Vast sums of money were sunk in the EV concern, and investors will no doubt be asking whether the CV market is mature enough yet to allow for the emergence of another Tesla – or whether the fall of Arrival was just down to bad luck or bad management (or all these combined).

In related news, Australian-American retrofit firm SEA Electric is planning to combine with Exro Technologies (p.3) in order to supply e-powertrains to the passenger car as well as the commercial vehicle markets. This repeats the trend of startup companies joining forces to remain afloat – an example of which was seen last month when EV truck startup Xos agreed to combine with ElectraMeccanica, leaving Tevva (whose combination deal with ElectraMeccanica fell through) out in the cold.

This month's features are predominantly concerned with regulations. The article on ZF's ADAS suite (pp. 7-9) is a reminder that the EU's new General Safety Regulation comes into effect this July – though our interview with Martin Mayer reveals that there is far more to ADAS development at ZF than ticking regulatory boxes. The feature on pp.12-13 provides a deeper look into the proposed Euro VII legislation, while also outlining the objections raised by the ACEA.

A slightly different angle from the industry focus usually provided by T&BB is presented on pp.10-11. We interviewed Martyn Bellis, Commercial Director of Bus & Coach at vehicle leasing firm Asset Alliance Group, who told us about his plans to double the group's bus and coach revenues from GBP500m to GBP1bn. Bellis gives a candid appraisal of the challenges to widespread EV adoption in the UK – challenges which no doubt have applicability to other countries as well.

T&BB editorial team, Bradley, Luke and Jim

OTHER NEWS ON OUR WEBSITE

Nikola rejects slate of five "dissident" nominees to board of directors

Harris Group announces business restructure and investment

Viritech launches two energy management systems for fuel cell electric vehicles

Hyvia presents hydrogen van model at Hyvolution 2024



Daily news on the global commercial vehicle manufacturing industry.

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GOV: Funding

USD1.5bn announced by US government for “low- to no-emission” bus fleet renewal, closing April 2024

USA – The US government has announced that it has made a further USD1.5bn in grant money available to applicants who are looking to replace their diesel buses with lower emission alternatives and/or install infrastructure for charging/refuelling at their bus depots.

Through the ‘Low- or No-Emission Program’, public transportation companies and agencies can apply for federal grants to support replacements of diesel buses. Eligible models for replacement include buses with electric and natural gas

drivelines. USD1.1m is being made available for purchasing such buses along with the necessary infrastructure to recharge or refuel them.

The ‘Grants for Buses and Bus Facilities Program’ overlaps somewhat with the Low- or No-Emission Program: its purpose is to provide finance for buses and bus facilities capital projects, including replacement, rehabilitation, purchase, or lease of buses and facilities such as depots. USD390,000 is being offered through this fund.

The announcement was made during a

roundtable at the White House on the subject of “clean bus” manufacturing. Attendees included Paul Soubry, President and CEO of **NFI Group**, and Jennifer McNeill, Vice President of Public Sales and Marketing for NFI subsidiaries **New Flyer** and **MCI**. The *Federal Transit Agency* (FTA) states that it wants to help US manufacturers to bring down production costs, reduce manufacturing timelines, and keep domestic production at pace with growing demand for low- and no-emission buses.

Applications for this round of federal funding closes on 25 April.¹ The FTA says that, through the Bipartisan Infrastructure Law, approximately USD5bn will be awarded to bus operators over the next three years.

¹<https://www.transit.dot.gov/notices-funding/low-or-no-emission-and-grants-buses-and-bus-facilities-competitive-programs-fy2024>

BIZ: Ownership

Knorr-Bremse sells majority stake in Kiepe Electric

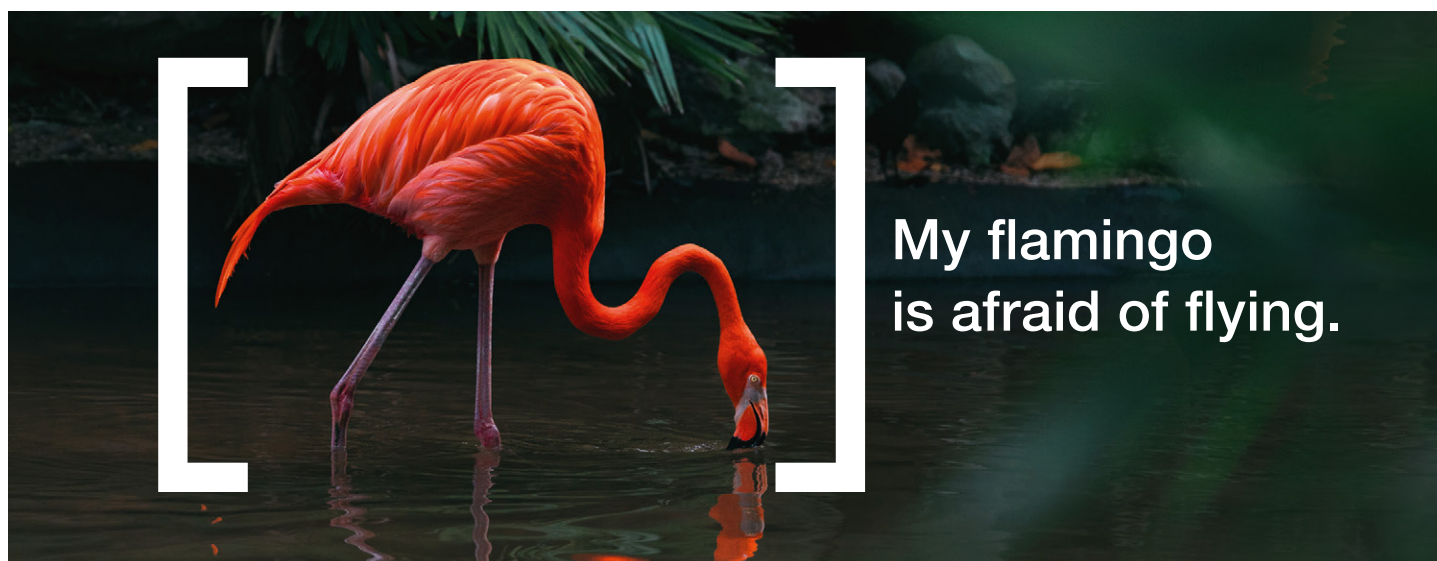
Germany – Commercial vehicle brake and components manufacturer, **Knorr-Bremse AG**, based in Munich, Germany, has announced that they have sold a majority stake in **Kiepe Electric GmbH*** of Düsseldorf, North Rhine-Westphalia, Germany, a specialist in electric traction equipment, to **Heramba GmbH** and **Heramba Holdings, Inc.** Knorr-Bremse will retain 15% equity in the company, and have committed to remaining a strategic partner. Heramba will take over all business

activities and employees (500 +). Ultimately, the sale falls under Knorr-Bremse’s Boost program, “a strategic initiative aimed at fostering sustainable and profitable growth through various strategic actions.” One of those actions is redoubling efforts to streamline business operations by concentrating on core competencies.

Frank Markus Weber, the Chief Financial Officer at Knorr-Bremse AG, said: “The ongoing review of our business portfolio’s performance and its fit with our

strategy is going successfully. With the sale of Kiepe Electric, we have now reached another important milestone, and Kiepe Electric will be able to focus clearly on its own strengths and business.”

*Kiepe Electric has been at the forefront of electrifying urban road and rail transportation, specialising in the development of power electronics, electric drives, and vehicle control systems for rail vehicles and electric buses. The company is known for its advanced fleet and energy management software solutions, along with being a leading provider of In-Motion Charging (IMC) technology and High Power Charging platforms for electric buses. With over 550 employees spread across six international locations, Kiepe Electric remains committed to advancing sustainable public transport solutions.



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BIZ: Mergers & Acquisitions TECH: Electric Drive

SEA Electric to merge with Exro Technologies to become electric powertrain supplier

USA / Canada – **SEA Electric Holdings Pty Ltd**, a retrofit firm based in Los Angeles, California, USA, has agreed to a merger with electric drivetrain components supplier **Exro Technologies Inc** of Calgary, Alberta, Canada, with the intention of forming a new company which will supply e-powertrains to original equipment manufacturers in the passenger car and commercial vehicle segments.

Under the Exro name, the combined company will trade on the Toronto Stock Exchange under the leadership of current Exro CEO Sue Ozdemir and Chairman Rod Copes. Tony Fairweather, CEO and founder of SEA Electric, will assume the role of Chief Product Officer in the new company. The company board will be composed of up to nine members from Exro and SEA Electric.

The details of the transaction are as follows. SEA Electric shareholders will receive approximately 153.8 million common shares and 168.7 million convertible shares from Exro, worth approximately USD248m in aggregate. In addition, Exro will take on USD46m in net debt from SEA Electric. Immediately consequent to the transaction, Exro shareholders will own a 34.5% stake and SEA Electric shareholders a 65.5% stake in the combined

company. As for voting rights, Exro shareholders will hold approximately 52.5% of the voting shares, while SEA Electric shareholders will hold 47.5%. Exro says it is concurrently raising CAD42m to provide for capital expenditures, working

capital, and general business requirements.

The transaction is set to close by the end of the first quarter, or by 30 June at the very latest. Following the merger, the company will be in command of a combined portfolio of electric vehicle products, including the 'SEA Drive' range of commercial vehicle powertrains and Exro's 'Coil Drive' range of traction inverters. Sue Ozdemir commented that the merger with SEA Electric "not only creates significant revenue and cost synergies, but positions Exro to amplify its growth with new partners while continuing to develop our existing relationships."



Promotional image for proposed Exro-SEA Electric merger

BIZ: Agreement / Prototype, Trials and Testing

Ballard signs significant hydrogen fuel cell engine supply deal with the NFI Group

Canada / USA – **Ballard Power Systems Inc**, a manufacturer of fuel cell systems based in Burnaby, British Columbia, has signed an agreement with bus and coach corporation **NFI Group Inc** (brands include New Flyer, Alexander Dennis, and MCI) of Winnipeg, Manitoba, Canada, to supply 100 hydrogen fuel cell engines (FCmove-HD) to power New Flyer's Xcelsior Charge FC buses in North America. Deliveries will occur throughout 2024. The engines will be produced in Ballard's facility in Bend, Oregon in the U.S.

Earlier this year, Ballard signed another lucrative contract with Polish bus manufacturer, **Solaris** to supply 170 hydrogen fuel cell engines to power Solaris buses in Europe.

David Mucciacciaro, Ballard's Chief Commercial Officer said: "We are proud NFI (and subsidiaries New Flyer, Alexander Dennis, and MCI) has chosen Ballard as their committed partner for the next phase

of growth in the fuel cell bus market. We believe New Flyer is well positioned to deliver deployment scale volumes of fuel cell buses, particularly in the US market, where operators increasingly prefer hydrogen fuel cell powered buses for their range, short refuelling times, high availability, and cost-effective infrastructure requirements."



FCmove-HD

Volvo releases aerodynamic FH with up to 5% fuel economy improvement

Continued from p1.

The FH Aero is available as a diesel, natural gas, or battery electric truck. The 'FH16' with new 780hp engine [link] is also available with the new aerodynamic design. The battery electric version features better free-rolling properties, which Volvo claims increases the rate of energy recuperation while braking or going downhill.

The FH Aero comes with the latest Volvo components. These include: a new camera-mirror system, which will automatically pan to follow the trailer while turning; drag-free brake discs with improved braking capacity and reduced energy consumption and emissions; a new infotainment and navigation system; and tyre pressure monitoring.

The FH Aero will be released in Europe, Africa, Asia, and Australia over the next two years. Commercial launch is set for the first quarter of this year.

Volvo is also releasing the FH16 heavy truck range with a new version of the D17 engine. For further details, refer to this article on our website: <https://truckandbusbuilder.com/article/2024/02/14/volvo-introduces-new-780hp-engine-for-fh16>

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BIZ: Mergers & Acquisitions

Recent business mergers and acquisitions

The sales of **Proterra's** transit bus and battery assets to their new owners – **Phoenix Motor** and **Volvo** respectively – were recently completed, following Proterra's filing for Chapter 11 bankruptcy protection last August.

On 12 January, Phoenix Motor announced that it had completed its acquisition of the Proterra Transit business, including its line of battery-electric buses, after receiving approval from the U.S. bankruptcy court. On 2 February, Volvo announced that its acquisition of Proterra Powered, the division responsible for Proterra's battery business, had completed.

SAF-Holland announced its acquisition of **Assali Tecma Srl** ("Tecma"), an Italian manufacturer of custom axle and suspension systems, for a price in the "upper single-digit million euro range". Following the acquisition, which is set to close shortly, SAF-Holland will be able to expand its offering of special axle systems which were not

previously part of its product portfolio.

Reading Truck Group, a subsidiary of **J B Poindexter**, announced its acquisition of commercial vehicle upfitter **General Body Manufacturing Company** ("General Truck Body") based in Houston, Texas. Reading Truck's acquisition of General Truck Body extends its network to 28 locations in the USA. It also expands the range of products and services which Reading Truck can offer to its customers.

In January, **Krone Commercial Vehicles** acquired Edeweicht-based fleet digitalisation service provider, **ECR Solutions Servicegesellschaft mbH**, which will be absorbed into the Krone Group. ECR continues to act independently, providing its clients with digital services that optimise fleet efficiency and business processes. Both companies have been working together since 2016, and in 2022 signed a strategic partnership to develop and expand Krone's fleet management service packages for fleet operators.



Tecma facility near Verona, Italy

Following regulatory approval, **Hitachi Energy** of Japan finalised the acquisition of Milan-based electric equipment manufacturer **Coet S.p.A.** This follows an initial agreement of purchase/sale signed in August 2023. This acquisition strengthens Hitachi's (Hitachi Energy's Grid-eMotion division) position in the electric mobility sector by expanding its product portfolio and production capacity of its electric vehicle charging equipment.

BIZ: Manufacture / Investment

Manufacturing and investment news

German components manufacturer **ZF** announced it is investing USD500m in its facility in Gray Court, South Carolina, USA, which it intends to turn into its first "flex manufacturing" site in North America, capable of serving combustion engine and electric vehicles in the passenger car and commercial vehicle segments.

With the announced investment, ZF will hire 400 new workers and prepare the site for a wider range of manufacturing outputs, serving both internal combustion engines and electric powertrains. In addition, it is investing an extra USD200m to

ramp up production of PowerLine transmissions to more than 200,000 units per year by 2025. Approximately 50,000 square feet of space at the 1.7m-square-foot site has been assigned to PowerLine production.

Volvo subsidiary **Mack Trucks** is investing USD14.5m to expand its Roanoke Valley Operations facility in Virginia, where it builds the Class 6-7 'MD Series'. The money will finance the construction of a 72,000-square-foot extension, which will expand the total size of the facility to 352,000 square feet. Though a groundbreaking ceremony was held in February, building work is not set to begin until April. The projected end date of the project is the fourth quarter of 2025.

Dutch firm **VDL Groep** – the parent of **VDL Bus & Coach** – announced in January that it will wind down its casting operations in Heerlen, citing lower production volumes and rising costs of energy and stricter environmental requirements as reasons behind the decision. The iron foundry in Heerlen, operated by subsidiary company 'VDL Castings Heerlen', produces cast-iron parts for multiple sectors, including the truck industry. The decision affects 140 workers, including 115 permanent members of staff.



ZF plant in Gray Court, South Carolina

BIZ: Legal

Scania loses battle against price fixing cartel ruling

Luxembourg / Sweden – According to a Reuters report, the *Court of Justice of the European Union* (CJEU), the chief judicial authority within the union, has rejected the appeal of **Scania AB** of Södertälje, Sweden against a 2022 ruling which ordered the commercial vehicle manufacturer to pay a fine for its involvement in the 1997-2011 truck price fixing cartel.

In a *European Commission* ruling dated 27 September 2017, Scania was handed a fine of EUR880m for its involvement in a cartel involving five other manufacturers – **DAF**, **Daimler Truck**, **Iveco**, **MAN**, and **Volvo** – which sought to pass on the cost of complying with EU emissions regulations onto customers by fixing truck prices. Of the six manufacturers convicted in the 2017 judgement, Scania was the only one to contest the result, filing an appeal with the General Court of the European Union. It lost that appeal in 2022, and so the Swedish manufacturer took its appeal to the CJEU, the highest court in the union.

In a ruling dated 1 February 2024, the CJEU concurred with the 2022 ruling of the General Court and dismissed Scania's appeal, meaning that the manufacturer has finally lost its case against the EUR880m fine first handed down in 2017.

WHEELS TO DRIVE YOUR BUSINESS



BIZ: Order

Bulletin of recent orders

Swedish software development company and autonomous vehicle fleet operator, **Einride AB**, is partnering with American food producer Mars Inc, to provide a fleet of digitally optimised electric heavy-duty trucks across Mars' European network by 2030. The first two Einride-powered electric trucks and electric charging points have been deployed between the Mars Petcare factory in Verden, Germany, and its distribution centre in Minden, Germany.

A growing fleet of electric trucks will operate in Germany, the Netherlands and the UK with an autonomous pilot project scheduled for 2025. By optimising logistics hubs, redesigning networks and electrifying its fleet, this partnership helps Mars achieve its goal of being net-zero by 2050.

Iveco Bus recently announced a raft of significant orders, including 411 e-buses (E-WAY)

to ATAC S.p.A. in Rome and 153 E-Way buses to Azienda Trasporti Milanese S.p.A. (ATM) in Milan, Italy. The 411 units to be delivered to Rome were part of a tender the company won, with the first batch of 110 buses expected in Q4 2024, and the remainder to be delivered by April 2026. This is the biggest single E-Way order in Italy to date. First deliveries of the Milan order are expected by Q1 2025, with the order completed by June 2026.

Turkish bus manufacturer **Karsan** delivered its first batch of 6-metre 'e-Jest' buses to customers in Japan, representing the first right-hand drive vehicles in the history of the brand. Karsan will therefore accelerate its production of right-hand drive e-JEST vehicles in the coming months aiming to ship 100 of these vehicles to Japan by the end of 2024, whilst it explores entry into other right-hand drive markets such as the UK.



Iveco Bus E-Way 18m Articulated model

BIZ: Restructure / Mergers & Acquisitions

REV Group sells Collins Bus and begins shutting down production of El Dorado buses

USA – REV Group Inc, the parent of several commercial and specialty vehicle brands' based in Brookfield, Wisconsin, has announced it is exiting the transit bus industry by closing down **ENC** (El Dorado National-California) and selling off school bus manufacturer **Collins Bus Corporation**.

ENC, which was founded in 1975 as 'National Coach Corporation' in Riverside, California, is primarily known for its low floor and cutaway buses, including the 'Axess' range of 35- and 40-foot transit buses. In 2022, the company announced it had contracted **Proterra** and **BAE Systems** to supply batteries and electric drive systems respectively for battery and fuel cell versions of the Axess range. However, REV Group President and CEO, Mark Skonieczny, said that delays in the supply of "critical"

EV components – an implicit reference perhaps to the collapse of Proterra last year – and other pressures have made it difficult for ENC to compete profitably "versus peers of greater scale". As such, bus manufacturing at Riverside will wind down by the end of fiscal year 2024, once outstanding commitments to customers have been fulfilled.

Furthermore, REV Group completed the sale of Collins – its school bus subsidiary based in Hutchinson, Kansas – to **Forest River Inc** of Elkhart, Indiana on 26 January for USD303m. With the sale of Collins and the closure of ENC, REV Group aims to generate at least USD250m in net cash proceeds, which it will use to return approximately USD180m to shareholders through a special cash dividend worth USD3 per share of common stock. The remainder will go towards debt repayments.

Following its exit from the transit bus market, REV Group will be reorganised into two business segments: 'Specialty Vehicles', comprising the current Commercial and Fire & Emergency segments and led by Mike Virnig; and 'Recreational Vehicles', led by the current Recreation segment president Mike Lanciotti.

¹REV subsidiary brands include various fire equipment and vehicle concerns (e.g., **Spartan Emergency Response**), emergency vehicles, recreational vehicles, and terminal tractors by **Capacity**.



Axess by ENC

PEOPLE: Appointment

Bulletin of recent appointments

French battery manufacturer **Forsee Power** made two high profile appointments in the last month: Franck Meyer will take up the position of Chief Financial Officer, and Joel Theut has become Chief Technical and Operations Officer.



Franck Meyer, new CFO of Forsee



Joel Theut, new Chief Technical and Operations Officer at Forsee

Tasked with stabilising the company's finances, Meyer brings more than 20 years of experience in international finance. Most recently, he was the CFO at **Akuo**, a company specialising in the development and operation of renewable energy parks.

Theut is to lead all operations relating to the company's supply chain, R&D and innovation, bringing over 30 years of international automotive experience in product development, business development and project management. Most recently, he was the Vice President of Operations, Quality and Health Safety Environment (HSE) at the German automotive HVAC supplier, **Webasto**, for the Asia-Pacific region.

Daimler Truck has named Eva Scherer as the new CFO and member of the board of management, starting August 1, 2024. Scherer leaves **Siemens AG**, where she was an executive VP and head of global investor relations at the German multinational. She takes over from the late Jochen Goetz, who passed away last year.

Hydrogen vehicle manufacturer **Hyzon Motors** appointed Dr Christian Mohrdieck as Chief Technology Officer (CTO), effective immediately. This came after the planned retirement of former CTO Shinichi Hirano. Mohrdieck served as CEO of **Mercedes-Benz Fuel Cell GmbH**, and most recently, was Chief Commercial Officer (CCO) of **cellcentric**, a joint venture between **Daimler Truck** and **Volvo** that specialises in heavy-duty fuel cell systems for the transportation sector.

Jim Walenczak was appointed as the new general manager of **Kenworth Truck Company** and vice president at parent company **Paccar**. He spent two years in the role assistant GM for sales and marketing for Kenworth.

TECH: ADAS & Safety Systems

From passive to active: Martin Mayer talks to T&BB about ZF's ADAS suite for General Safety Regulation II



Visual of ZF's Blind Spot Information System

Germany - From 7 July this year, all newly registered vehicles in the European Union must comply with the second tranche of rules known as the 'General Safety Regulation' ("GSR II"). These regulations will require all new road vehicles to be installed with more advanced driver assistance systems (ADAS) which employ some of the latest innovations being made at the cutting edge of artificial intelligence. These include systems for intelligent speed assistance; reversing detection with cameras and/or sensors; attention warnings in case of driver drowsiness or distraction; event data recorders; and emergency stop signals. For buses and trucks, the regulations are more stringent: in addition to the aforementioned systems, they must also come with blind spot detection, collision mitigation, and tyre pressure monitoring.

Recently, *Truck & Bus Builder* spoke with Martin Mayer, who is Head of Global Product Segment ADAS & Electronics at **ZF Group**, about the upcoming safety regulations. Mayer made it clear, however, that there is more to ADAS at ZF than merely assisting OEMs with regulatory compliance. Far from being a box-ticking exercise, ADAS development is at the forefront of vehicle design: future products will not only make trucks and buses easier and safer to drive; they will also pave the way for semi- and even fully autonomous vehicles.

In Mayer's opinion, widespread use of self-driving vehicles in complex urbanised areas is still years into the future. The development and deployment of autonomous vehicles is very expensive and complex and requires vast amounts of computing power per vehicle. On the other hand, ingenious safety and assistance systems which afford the vehicle a degree of autonomy are already available and can be integrated in existing vehicle models. The "robotaxi" hype of ten years ago has died down

somewhat, as software engineers discover the magnitude of the task they have set for themselves in eliminating the driver altogether from the equation. In the meantime, ADAS is gradually taking more and more work out of the driver's hands without making him entirely redundant.

When talking about vehicle autonomy, we normally refer to the scale of "levels" (0-5) formulated by the American Society of Automotive Engineers (SAE). Vehicles with cruise control, automated lane keeping, and/or automatic emergency braking are at Level 1 on the SAE scale. In the interview, Mayer spoke frequently about "Level 2+": that is to say, vehicles which will allow the driver to take his hands off the steering wheel (Level 2) and his eyes off the road (Level 3) in certain situations. To allow for such scenarios, ADAS must be capable of monitoring the road and taking action to avoid accidents with minimal driver intervention. To elaborate on ZF's current motto ("See. Think. Act."): ADAS must enable the vehicle to perceive its environment and the other road users around it, to quickly make an appropriate decision, and to act immediately on that decision.

For Mayer, the purpose of ADAS development is absolutely clear: the ultimate aim is to eliminate road accidents altogether. By replacing or enhancing the driver's ability to perceive and respond to hazards, ADAS could minimise the repercussions of human error. However, it is impossible to put a date on when technology will have evolved enough to remove human error entirely. In any given road scenario, there are so many unpredictable elements at play that even the most advanced self-driving vehicle conceivable would struggle to interpret and respond to accordingly. Nevertheless, the target of zero accidents remains "absolutely important" to Mayer.

When discussing different applications for ZF's ADAS technology, Mayer described three types of OEM customer which he normally encounters: those seeking components only, those requiring subsystems or those needing complete systems. The components only customers produce most of their truck technology inhouse, and often develop their own systems. They approach ZF simply as a supplier of specific components, such as cameras and sensors. The subsystem customers need more help in developing their ADAS technologies and may contract ZF to develop specific systems which they cannot or do not wish to do for themselves. The complete system customers require entire ADAS systems from ZF for integration in their vehicles – these tend to be manufacturers of buses or specialty trucks. One of the unique points in ZF's favour – thanks to its acquisitions of TRW and then WABCO in 2020 which enabled it to expand its portfolio – is that it is able to supply OEMs with a complete suite of ADAS products, from emergency braking systems and intelligent speed assist systems to turn assist, and it can even support the customer in homologating new vehicles.

Background to ADAS development at ZF

The first raft of regulations retrospectively known as "GSR I" came into effect over ten years ago. These required OEMs to incorporate automatic emergency braking and lane keeping systems in their commercial vehicles. In response to GSR I, ZF developed its AEB and lane departure warning technologies, and it pioneered "data fusion" between the camera and the radar. It was one of the first companies to produce automated braking systems which could take and compare data from camera and radar, improving vehicle perception and thus making the system more reliable. Following the implementation of GSR I, ZF continued to work on the ADAS products developed for it. By 2018, Mayer says that the ZF system (which used brakes supplied by WABCO before it was acquired by ZF) 'was capable of decelerating from 80 kph on their own, exceeding the requirements of EU regulations at the time.

According to Mayer, the reason why ZF originally entered the ADAS market was to address the problem of heavy truck accidents. While collisions involving heavy trucks are rare, when they do happen, they can be acutely severe and more often lethal than those involving just cars. Judging that many of these accidents were due to human error, ZF began developing its first mitigation systems, including automatic emergency braking. These initial forays into ADAS took advantage of early vehicle perception technologies that had been developed for a different purpose: functions such as adaptive cruise control which were made to improve driveability.

By the time that rumours of GSR II were beginning to circulate, then, ZF was already iterating and innovating upon the ADAS products it had under its belt.

Continued on p7.



Visual of ZF's Moving Off Information System

From passive to active: Martin Mayer talks to T&BB about ZF's ADAS suite for General Safety Regulation II

Continued from p6.

Mayer told T&BB that ZF began working on ADAS technologies specifically for GSR II in 2020, though this was before the parameters of the new regulations had been finalised. In any case, ZF's vision "towards zero accidents" meant that it continued developing its ADAS portfolio to improve its functionality and robustness. In 2022, newly homologated vehicles in the EU needed to comply with GSR II, and later this year newly registered vehicles will need to comply as well. Mayer said that, since 2020, ZF has invested "significantly" in ADAS development.

ZF's product suite for GSR II

The image below shows six ADAS functions which will become mandatory for trucks and buses in the EU and for which ZF is able to supply components and systems to OEM customers. In our conversation, we focused on three functions: blind spot information systems, moving off information systems, and driver drowsiness and alertness warnings.

ZF's ADAS technology for trucks is exemplified in the ADAS GSR II Suite which includes a combination of sensors, software, and automatic braking allowing it to meet, and in many ways, exceed

many of the requirements of GSR II. The system is geared towards assisting the driver with "moving off", or starting up the vehicle after pausing at, for instance, a pedestrian crossing. If the system detects a road user such as a cyclist in front of the vehicle or in close proximity to the vehicle sides which may be in the driver's blind spot, it will alert the driver with a visual, acoustic or haptic warning.

The chipset in ZF's cameras for blind spot and moving off systems are supplied by the Israeli tech company **Mobileye**. The chipset and perception software is married together with the functionalities of OnGuardMAX to make the ADAS work correctly and effectively. ZF opted for Mobileye's technologies as its perception algorithms were not something that ZF was keen to replicate itself. "The investment to develop such an algorithm from scratch is huge," Mayer said, requiring hundreds of people and thousands of manhours, to say nothing of cost, to develop to the level required for commercial use.

Such safety systems attempt to overcome the limitations of the driver's perception, bringing his attention to hazards which he cannot see. The driver drowsiness and attention warning system, on the other hand, address the limitations of the driver himself. If it detects that the driver is distracted or inattentive, it gives a warning. The nature of the warning depends on the OEM's preference, though Mayer argues that haptic feedback, such as vibrating the seat or the steering wheel, is the most effective at getting the driver's attention. The system determines whether the driver is becoming less attentive to the road through data from two sources. The front-facing camera monitors the

vehicle trajectory, while a sensor on the steering wheel monitors the turning angle. Using these two sources, the system continuously judges the behaviour of the driver and will activate the warning if, for instance, the vehicle is starting to veer off course in an unusual way.

ZF deliberately chose to monitor vehicle behaviour as a means of detecting drowsiness or inattentiveness instead of monitoring the driver himself. Mayer emphasised that this is not because ZF judged the latter approach to be inferior. In fact, the company is continuing to work on a system which does take the driver into account – for instance, by monitoring eye movement and facial expression. However, the system which it has developed based on monitoring the vehicle is sufficient to comply with the requirements of GSR II. ZF intends to implement a driver monitoring component into the system later in the decade. First of all, though, it must overcome a series of challenges which, though they appear simple, are in fact rather complicated. One is the placement of the camera which is to monitor the driver's face. Truck cabins can vary widely in their configuration, with different dashboards, seating positions, and steering wheel mountings depending on the make or the application. "To find a common place for a camera which works for every variant is complicated," said Mayer. "Some customers, for example, have more than 250 different truck and cabin variations!" The other difficulty is getting drivers accustomed to a camera trained constantly on their faces. "There's always the quite natural concern that maybe the boss can record what they are doing," Mayer explained.

Continued on p8.

ADAS Functions¹ Becoming Mandatory for Commercial Vehicles Based on Upcoming European General Safety Regulation² (GSR)

Function	Purpose	Vehicle Type	Timing
 Moving Off Information System³ (MOIS)	Helps avoid collisions with pedestrians or bicyclists during drive-off	 M2, M3, N2, N3	2024 2022 New vehicle registrations New vehicle homologations
 Blind Spot Information System (BSIS)	Helps avoid collisions with bicyclists riding near the passenger side of the vehicle	 M2, M3, N2, N3	
 Reversing Information System^{3,4} (REIS)	Helps avoid collisions during reversing maneuvers	 M2, M3, N2, N3	
 Intelligent Speed Assist⁴ (ISA)	Helps recognize speed limits and alerts driver, when speed limit is exceeded	 M2, M3, N2, N3	
 Driver Drowsiness & Alertness Warning⁴ (DDAW)	Alerts driver when driving behavior indicates drowsiness or inattentiveness	 M2, M3, N2, N3	
 Tire Pressure Monitoring System (TPMS)	Alerts driver of tire pressure loss to help avoid tire blow out	 M2, M3, N2, N3, O3, O4	

¹ No claim to completeness. Further ADAS functionalities are required effective as of 2024 and beyond.

² REGULATION (EU) 2019/2144 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL.

³ Vehicles where installation of any device for this function is incompatible with their on-road use may be partly or fully exempted from this regulation, subject to the decision of the type approval authority.

⁴ In addition, the function also becomes mandatory for M1 and N1.



From passive to active: Martin Mayer talks to T&BB about ZF's ADAS suite for General Safety Regulation II

Continued from p7.

Current and future applications of ZF ADAS

It is understandable why drivers would take umbrage with bosses potentially monitoring them in the truck cabin. But even less egregious ADAS systems can draw the ire of drivers. Mayer pointed out that a plethora of assistance systems can end up being a hindrance rather than a help. He recalled a conversation with one driver who said he wanted the aftermarket system fitted on his bus to be thrown away as it was causing him too many distractions. Drivers "don't like to have 25 different kinds of system, 40 mirrors, 20 monitors, and so on," said Mayer. Moreover, certain aftermarket systems can, in Mayer's experience, be actively unhelpful, beeping and buzzing constantly while picking up non-existent hazards (or, conversely, not detecting real hazards). If ADAS technologies are to fulfil their purpose – making roads safer – it is crucial that drivers are able to understand how they work and rely on them without being overwhelmed by them.

In practice, this means fitting each safety system to suit its intended application. There is no one-size-fits-all approach to the problem of vehicle safety, with each vehicle segment and application presenting its own challenges. For example, the EU's stipulation for advanced emergency braking in every new road vehicle does not apply to city buses: the reason being, a short, sharp brake automatically applied could throw passengers forwards and cause injuries. ZF's 'Collision Mitigation System' (CMS) designed specifically for city buses avoids this with an adapted braking system. Instead of applying a hard brake, the system first gives a small "pulse" or "jerk" to warn the passengers, allowing them to grab a handrail or sit down before a second, harder brake is applied. The idea is that the system will brake enough to decelerate the vehicle and avoid or mitigate an accident without harming passengers.

As is often the case in the industry, the technological development is driven by the highest volume segment, that is to say the passenger car segment, where ZF, of course, has a strong presence. This has enabled ZF to achieve greater economies of scale when it comes to development costs as well other advantages such as reducing the time to market for new solutions.

That being said, there are some important differences between passenger cars and commercial vehicles with respect to ADAS technology. For one thing, ADAS in cars has been driven more by consumer demand than by regulation: for instance, the safety assessments of Euro NCAP are voluntary and differ from the mandatory type of approval process. ADAS in heavier vehicles is driven more by legislation. Automatic emergency braking, which has been required in new trucks for over a decade, have only just become mandatory in cars with the implementation of GSR II. Moreover, developing a system which is robust enough to withstand the rigours and demands of commercial vehicle applications – for example, a truck working on a construction site or travelling long distances all year round – requires a lot of extra work which is not required for developing a system which passes muster for the passenger car segment.

Nevertheless, ZF has the advantage of leveraging the higher volumes as well as the shorter development cycles for cars to advance the development of its ADAS systems for CVs. Many ADAS technologies begin as products for cars; however, the commercial vehicle division at ZF contributes its ideas and requirements at an early stage to ensure that such products can be redesigned later for heavier vehicles, Mayer told T&BB. Giving a rough estimate of how much crossover is possible between car and CV, Mayer said that about 50-60% of the technology developed for cars can be carried over to trucks and buses. The shortfall represents the tougher working conditions and the greater demand for robustness and safety which any product developed specifically for commercial vehicles must be able to address.

Mayer expects that, in the future, divergence of technologies and segments, rather than convergence, will be the name of the game. Companies such as ZF will continue to adapt their ADAS products to different applications, such as

for trucks, city buses and coaches. But there is one trend which, in Mayer's view, encompasses every segment. As safety systems become more sophisticated, they will also become more active. Systems which are passive today will be in control tomorrow; warnings will be accompanied or replaced by interventions. Certainly, this is the direction of travel for ZF's ADAS division; and as the technology evolves, it will increasingly take over from the driver, making and enacting decisions which, Mayer hopes, will make our roads safer.

¹See the original announcement from 2022: <https://truckandbusbuilder.com/article/2022/05/18/zf-developing-new-collision-mitigation-system-for-city-buses>



Martin Mayer has been Head of the Global Product Segment ADAS & Electronics for ZF's Commercial Vehicle Solutions (CVS) Division since 2022. Prior to this, he managed the ADAS Sensors product portfolio within the company from 2019 to 2021, after working as a development engineer and development manager for passive safety electronics as well as technical sales director for ADAS Sensors at TRW Automotive. Mayer studied electrical engineering and electrical communications engineering (Dipl.-Eng.) at the University of Applied Sciences in Konstanz, Germany. Mayer has also chaired the Euro NCAP HDV (for heavy vehicles) working group at the European Association of Automotive Suppliers (CLEPA) since 2023.

BIZ: Agreement CVS: Associations & Consortia

Recent agreements

At the end of January, three of the major truck manufacturers in the USA – **Daimler Truck North America**, **Navistar**, and **Volvo Group North America** – established a new lobby group in Washington, DC for the expansion of charging



Hyundai and Iveco executives sign agreement

infrastructure which is suited to medium- and heavy-duty commercial vehicles.

Powering America's Commercial Transportation (PACT) claims it is a new "voice for zero-emission commercial vehicle infrastructure". According to a press release, the lack of sufficient charging infrastructure for battery-electric medium- and heavy-duty vehicles is a "increasingly significant bottleneck" to their wider market acceptance. The consortium states that electric charging providers have focused their efforts thus far on supporting light-duty vehicles, which have different requirements than heavier ones.

PACT says that nearly 700,000 chargers consuming 140,000 MW of electricity every day will be required in the U.S. by 2030, supporting a projected fleet of one million Class 4-8 battery-electric medium- and heavy-duty vehicles on the road. This equates to the monthly energy needs of over 100 million American households.

South Korean manufacturer **Hyundai** agreed to supply **Iveco** with an electric light commercial vehicle for the European market, which will be

launched at this year's IAA Transportation event in Hannover, Germany. This electric Light Commercial Vehicle* (eLCV) is based on Hyundai's new (eLCV) platform and will be sold with an Iveco badge alongside the 'Daily' van range. According to the agreement, Hyundai will manufacture and supply the chassis cab, while Iveco Group will handle local customisation and European distribution through its sales network.

French company **Forsee Power** has agreed to supply power and propulsion solutions business **BAE Systems Inc**, based in Endicott, New York, with its Zen Plus battery system to equip BAE's Gen3 powertrain on a class 7 demonstration truck. The Zen plus utilises NMC lithium-ion cells and is composed of 3 packs of the Zen 77 Plus providing 231 kWh for an average range of 321 kms (200 miles). The batteries are to be produced at Forsee's new manufacturing facility in Columbus, Ohio, beginning in Q1 2024.

Allison Transmission announced it is set to supply **Oshkosh Corporation** with electric axles for North America's first fully integrated electric refuse vehicle, the 'McNeilus Volterra ZSL'. Two eGen Power 100S electric axles will be integrated into each **McNeilus** truck. The first vehicle deliveries are expected in Q4 2024.

BIZ: Strategy CVS: Financial Services

Asset Alliance Group plans to double Bus and Coach business unit revenues to GBP1bn in the next three years

UK – With the news that UK commercial vehicle contract hire and leasing specialist, Asset Alliance Group (AAG), is heading into the bus and coach rental market, T&BB thought it wise to set up an interview with Martyn Bellis, Commercial Director of Bus & Coach at AAG, to get a better understanding of the company's strategy to double its turnover in bus and coach from GBP500m currently to GBP1bn in the next three years!



Martyn Bellis, Commercial Director of Bus & Coach at AAG

With more than 5,000 assets (trucks, buses and trailers) under management, AAG's core strength is understanding the UK CV market. The company offers operators a choice of several finance options such as higher purchase (HP), lease, full purchase agreements as well as contract hire and rental agreements, together with maintenance and service contracts. Customers can choose from diesel, hybrid and electric drive vehicles together with one or several of the aforementioned finance options.

The Bus Rental Business Model

Asset Alliance Group was established in 2012 and in 2021, was acquired by the Arbuthnot Latham Banking Group. Bellis referred to AAG as "bank owned", giving it the spending power to invest in a 'new bus fleet' to kickstart its rental offering, which is unlike many of AAG's competitors that need to borrow the capital to buy the vehicles. Having access to capital also provides the advantage of added flexibility to respond to market trends: Just last year, for example, the company's truck division placed a GBP 160 million mixed order of new DAF electric and diesel trucks, Bellis stated.

Bus rental agreements are based on a fixed charge or payment per month for the vehicle with a minimum rental period of a year; however, this



Asset Alliance Group has invested in a fleet of top-of-the range vehicles to kickstart its new rental offering to UK operators

timeframe depends on stock availability. Shorter-term leases are available if stock availability permits, but the monthly rate will effectively go up. AAG said, "we are committed to supporting all contract sizes, and supporting customers for whom running a bus fleet is not part of their core business."

Bellis said: "It's an exciting time for our team. We will have a broad range of products available, everything from smaller minibuses up to single-deck and double-deck buses. We have new buses in stock and on order from a wide range of UK manufacturers to meet the differing needs of customers across the UK. And we can source all vehicle types from new to used, from standard builds to custom design, and from diesel power to hybrid and electric drives. We are here for everyone. The finance options cover everything from single assets to large multiple-vehicle contracts. Our rental service will free customers from extended commitments, providing them with complete flexibility to meet their business requirements."

Plans for the coach market

AAG currently offers finance for a variety of coaches with plans to offer rentals in 2025. However, Bellis said the 2024 timeline has been delayed due to the limited amount of new coach stock currently in the market. The delay comes as Volvo Buses has been winding down its bus and coach body on chassis operations in Wrocław, Poland and moving its body-building operation to Sunsundegui SA, of Alsasua in Spain. This has limited Volvo's stock of both its 9400 and 9700 coaches for the UK and other markets.



Ratho Coaches has become the first operator in the central belt of Scotland to put an electric coach into service, after taking delivery of a new Yutong TCE12 from Asset Alliance Group in January. Michael Gillen, Business Development Manager, Asset Alliance Group (left), hands over the new electric coach to Charles McIntosh, Co-Owner and Director at Ratho Coaches

Plans for growth

In 2023, AAG's Bus and Coach division exceeded GBP 500 million, in funding over 2,500 vehicles in this segment. Bellis aims to hit one billion pounds (GBP1bn) within the next three years. Actioning its strategic plan will get them to this milestone, said Bellis.

The company is expanding its business with Transport for London (TfL) as it continues to lease buses into the capital, but it also plans to take advantage of growth in other parts of the United Kingdom. Bellis confirmed that to achieve this, AAG is making a concerted effort to increase its presence across the UK by deploying more sales teams and service managers into different regions and market segments to speak with potential customers and operators. AAG also plans to have a large presence at this year's Euro Bus Expo taking place from 12 – 14 November at the NEC Birmingham.

Other strategies to thicken AAG's bottom line, include the refurbishment of old buses that come back after an extended lease. There may be demand in the future for a diesel or hybrid bus to be completely converted to electric. This could be a great opportunity for refurbishment and retrofit companies, such as Equipmake and Kleanbus, which specialise in this area in the UK.



Asset Alliance Group prides itself on its high levels of customer service

Strategic appointments

The introduction of the bus and coach rental concept comes a few months after Paul Fairbanks and Michael Gillen joined Asset Alliance Group as Business Development Managers to support the ambitions of this growing segment. The company continued to make certain strategic hires to aid in growth.

Last year AAG restructured its asset finance & leasing department, appointing Michael Bycroft as its new Managing Director to head up this department. Martyn Bellis filled the Bus & Coach role at AAG and in January this year, the company appointed Robert Gwynn as its new Strategic Development Manager. An experienced transport policy and public affairs specialist, Gwynn joins the company with the role of getting more alternatively fuelled vehicles, including buses, across its fleet.

Continued on p10.



Asset Alliance Group has new buses in stock and on order from a wide range of UK manufacturers to meet the differing needs of customers across the UK



Asset Alliance Group last year helped Celtic Travel, one of the largest independent coach operators in mid-Wales, to finance a further three new vehicles

Asset Alliance Group plans to double Bus and Coach business unit revenues to GBP1bn in the next three years

Continued from p9.

Willie Paterson, Chief Executive of Asset Alliance Group, said: "This is a huge investment for the business and a major innovation for our rapidly growing Bus and Coach division. We are confident it will be widely welcomed by operators of all sizes. As we strive to become the number one bus and coach funder and supplier in the UK, this is a significant step in the right direction."

Market trends

Once the topic of electrification came up, Bellis confirmed that many operators are apprehensive about investing in electric vehicle fleets without understanding what their overall cost savings would be over a certain timeframe or in other words what is the Total Cost of Ownership (TCO) of an electric bus or coach. Traditionally, this has been curbed with government subsidies such as the ZEBRA Scheme; a programme that was launched in 2021 to allow local transport authorities to bid for funding for zero-emission buses and supporting infrastructure. According to the UK government, the first round of ZEBRA funding put 1,300 new zero-emission buses on the road.

Whilst AAG already finances electric vehicles in London, Bellis said that it was slightly different outside of London due to the lack of electric charging infrastructure and set routes. This perhaps gives an advantage to larger operators (First Bus

or Stage Coach etc) rather than the smaller ones, which have the capital to invest in the necessary charging infrastructure and not have to wait for government subsidies or assistance. While AAG can provide the finance for the necessary charging infrastructure, Bellis pointed out that the company does not employ engineers directly to go out and install charging infrastructure. However, it could contract out to several established infrastructure installation partners to do the work, such as Zenobe Energy Ltd.

Price of electric buses

Another interesting topic Bellis spoke about was the price of electric buses. Market economics dictates that as the supply of electric buses increase, the price should come down. However, this simply hasn't happened, according to Bellis. Why? Because as operators want more range from the batteries, higher density battery packs are required, this has meant the cost of a battery pack has largely remained static rather than reducing as the demand for BEV has increased. The knock-on effect of this has meant we haven't seen the reduction in the overall vehicle prices as Bellis explained, largely because batteries make up the majority (as much as 50%) of the cost of an electric bus.

More UK government subsidies?

Bellis said that the gap between diesel and full electrification in terms of the cost of the vehicle is still too wide. He added that without subsidies, the implementation of electric buses on UK roads would be halted. Otherwise, he continued, the only other way to make electric buses economically viable without subsidies would be to increase fares, which takes away transport for those who need it most!



UK transport secretary, Mark Harper

Last year, UK transport secretary, Mark Harper, announced that the government had allocated an additional GBP 129 million in funding to aid local authorities in the acquisition of zero-emission buses. The funding is to be allocated and distributed by the Department of Transport under the UK government's Zero Emission Buses Regional Area (ZEBRA, now ZEBRA 2) Scheme. This expansion of the fund enables more remote parts of the UK to benefit from decarbonised public transport, as the government has prioritised the first GBP 25 million of electric bus funding for rural communities and for those local authorities that did not receive money in the previous round of ZEBRA funding. This brings the total investment in new zero-emission buses in the UK to almost GBP 500 million.

Charging infrastructure

The UK government has been making capital investment allowances to fund charging infrastructure, which, of course, is another important piece in the electrification puzzle. Last year, the government teamed up with UK bus operator, First Bus, to electrify a bus depot in Leicester. Of the GBP 6.6 million budget, the UK government contributed GBP 2.9 million in grant funding as part of the ZEBRA scheme. First Bus converted the depot by installing new electric charging infrastructure provided by Heliox BV. This project allowed an additional 18 electric buses (Wrightbus Ltd) to operate on the streets of Leicester.

Driver shortages

Another key issue that Bellis touched upon and one plaguing the transport industry as a whole and therefore the deployment of electric buses in the UK, is the chronic driver shortages. Many industry players have implemented driver programmes to attract, train and retain drivers, but no long-term solution has yet been found. This has prompted a growing interest and investments in autonomous vehicles. AAG is not yet involved in any autonomous vehicle driving projects, but opportunities are being looked at as well as the CAVForth autonomous city bus project is being monitored.



ZEBRA Scheme



First Bus depot in Leicester

GOV: Policy / Emissions

An update on Euro VII: The Future Regulation of the European Commercial Vehicle Industry

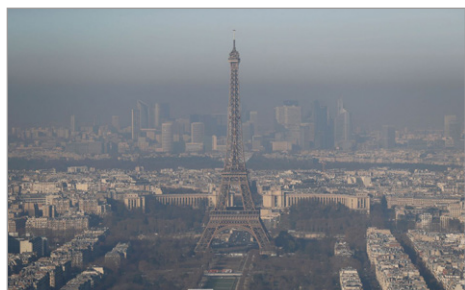
For the first time, the legislation covers cars, vans, and heavy-duty vehicles in one single piece of legislation. The above-mentioned agreement retains the Euro 6 emissions limits for cars and vans but adds stricter limits for buses and trucks, whilst introducing new limits for particles emitted from the exhaust, tyres and brakes.



EU Parliament, Brussels, Belgium

Belgium – Late last year, it was announced that the European Parliament and Council (EC) reached a provisional agreement on the Euro VII* (7) legislation, which still needs to be endorsed and formally adopted by both institutions. This legislation forms part of the EU roadmap to “near-zero emission vehicles by 2035” within the wider European Green Deal**. For the first time, it covers cars, vans, and heavy-duty vehicles in one single piece of legislation. The above-mentioned agreement retains the Euro 6 emissions limits for cars and vans but reduces the limits for buses and trucks, whilst introducing limits for particles emitted from the exhaust, brakes and tyres. Besides gas emissions and particulates, the legislation sets limits for battery durability incorporating what the EC calls, a “whole vehicle approach” as opposed to just engine testing.

According to the European Commission: “The estimated environmental benefits in terms of avoided health impacts from air pollution significantly outweigh these costs to manufacturers, consumers and authorities, by a ratio of more than five to one. The proposed Euro VII laws will also introduce battery durability standards for electric vehicles to help raise consumer awareness and confidence, while plug-in hybrids may be forced to switch to purely electric driving when they enter designated city centres.”



Smog in Paris

A deeper look

In terms of exhaust emission limits for Commercial Vehicles (CVs), there is a more comprehensive list of pollutants, which includes ammonia limits whilst placing restrictions on the formaldehyde and nitrous oxide (N₂O) gas outputs allowed, as well as tailpipe emissions of nitrogen oxides (NO_x), carbon monoxide (CO), particles, hydrocarbons and methane for heavy vehicles. To ensure pollutants are kept within legal limits, Euro VI standards are maintained, requiring new trucks to have onboard emissions monitoring systems (OBM) installed.

Euro VII emissions limits are now more stringent. For cars and vans, the provisional agreement maintains the existing Euro 6 exhaust emission limits, however, Euro VII for trucks and buses limits the emission of solid particles with a diameter starting from 10 nm (PN10), instead of 23 nm as in Euro VI.

Moving onto brake and tyre emissions, limits for these particulate emissions will be set at 3mg/km in the standard driving cycle for pure electric vehicles and 7mg/km for all other powertrains. Specific limits for vans (except for heavy vans) include 5mg/km for pure electric vehicles and 11 mg/km for other powertrains. The logic behind regulating brake dust and other non-exhaust emissions, according to the report, is to force OEMs to accelerate the introduction of regenerative braking technology, which recuperates energy from slowing vehicles and turns it into electricity for on-board battery packs, rather than relying on the clamping force of brake pads on discs to slow a vehicle.

The agreement also proposes stricter lifetime requirements for all vehicles in terms of both mileage and lifetimes; that now goes up to 200,000 km or 10 years for cars and vans.

Proposed application dates after the regulation is ratified into law include 30 months for new types of cars and vans. For new types of buses, trucks and trailers, 48 months and 60 months for all new



Tyre emissions

vehicles. 30 months for new systems, components, or separate technical units to be fitted in cars and vans, and 48 months for those to be fitted in buses, trucks, and trailers.

Manufacturers Reaction: ACEA

We know that ACEA*** (European Automobile Manufacturers' Association) has been a constant dissenting voice, slamming the proposed standards as too severe, unrealistic, and too costly by citing a lack of support both in terms of funding and critical infrastructure. ACEA Chairman Martin Lundstedt warned that over-stringent measures would mean more R&D expenditure on diesel engines and therefore less on electric powertrain technologies. ACEA specifically asked policymakers to focus on accelerating fleet renewal, prioritising investments in zero-emission vehicles, which will have a far bigger impact on both air quality and reduced CO₂ emissions.



2023 ACEA Annual Reception, in Brussels

On behalf of the European vehicle industry, Sigrid de Vries, ACEA Director General said: “Although we will only understand the full details once we can assess the entire document, we note that the inter-institutional negotiators have principally opted to prioritise future-oriented challenges, such as light-duty vehicle brake emissions and electric vehicle battery requirements. Exhaust emission limits and test procedures for heavy-duty vehicles were significantly tightened as well. It is important to note that many of the new provisions bring significant technical and investment challenges at a crucial time in the zero-emission mobility transformation. As key elements are still to be decided through secondary legislation, we will continue working to ensure a realistic Euro 7, within the limitations imposed by the primary legislation.”

Continued on p12.



Sigrid de Vries, ACEA Director General at the 2023 Annual Reception

An update on Euro VII: The Future Regulation of the European Commercial Vehicle Industry

Continued from p11.

Alongside ACEA Chairman Martin Lundstedt, Luca de Meo (ACEA President), Harald Seidel (Chairman of the Commercial Vehicle Board) and Domenico Nucera (Chairman of its Bus and Coach**** division) have been in close consultation with EU policymakers over the impending Euro VII legislation, of which the organisation has been highly critical, namely for moving resources from battery-electric vehicle technology back to internal combustion engines and consequently potentially slowing down the transition to climate neutrality. This came in the form of an open letter to Frans Timmermans, Executive Vice-President of the European Commission, calling on the Commission to align Euro VII policy and the CO2 emission targets so that the industry can streamline developments into one strategic pathway, rather than multiple development pathways.



From left to right, Luca de Meo (ACEA President), Sigrud de Vries, (ACEA Director General) and Martin Lundstedt (ACEA Chairman) at the Annual Reception

Infrastructure Barriers

In terms of transport and logistics infrastructure needed to get zero-emission vehicles on the roads in large numbers, a few topics have been raised by ACEA representatives. These included a dense network of charging and refuelling infrastructure as well as the production of green energy suitable for heavy-duty vehicles. Christian Levin, CEO of Scania, warned that different charging infrastructure for CVs is required due to the size of the vehicles, with at least one-megawatt power output to service



Milence electric truck charging hub, Venlo, Netherlands

demand. This necessary infrastructure would cost between USD50 and USD60 billion according to the World Economic Forum (WEF).

Both public and private institutions have laid out plans to tackle the critical infrastructure shortage. July last year saw the European Parliament pass the Alternative Fuels and Infrastructure Regulation Act. Under the law, charging stations (1,400 kW to 2,800 kW power outputs) for Commercial Vehicles will be placed every 120km along the EU's main highways by 2028, whilst hydrogen refuelling stations will be installed at least every 200 km by 2031. Under the deal, each EU member state must commit to a mandatory minimum infrastructure target, presenting the European Commission with a roadmap to reach its goal.

In the private sector, a charging infrastructure joint venture (JV) between **Traton SE, Daimler**



Heliox e-truck chargers

Truck AG, and AB Volvo called Milence plans to install and operate at least 1,700 charging points, supplied with renewable energy, on highways and at logistics hubs across Europe. Initially proposed in 2021, the JV has received regulatory approvals and in 2022 appointed a CEO, Anja van Niersen. Each company is investing EUR 500 million, intending to encourage greater and swifter uptake of electric vehicles in Europe. In January this year, Milence opened its first charging facility in the Netherlands.

**The European Parliament defines Euro 7 (VII) as "the regulation for the type-approval of motor vehicles and engines, and of the systems, components and separate technical units intended for such vehicles, with respect to their emissions and battery durability."*

***The European Green Deal, approved in 2020, is a set of policy initiatives by the European Commission with the overarching aim of making the European Union climate-neutral by 2050.*

****The European Automobile Manufacturers' Association (ACEA) represents the 16 major Europe-based car, van, truck and bus makers: BMW Group, DAF Trucks, Daimler Truck, Ferrari, Ford of Europe, Honda Motor Europe, Hyundai Motor Europe, Iveco Group, Jaguar Land Rover, Mercedes-Benz, Renault Group, Stellantis, Toyota Motor Europe, Volkswagen Group, Volvo Cars, and Volvo Group.*

*****ACEA's Bus and Coach division brings together Europe's five main bus and coach manufacturers: Daimler Truck, Iveco Group, MAN, Scania, and the Volvo Group.*

MKT: Statistics - Registrations

Bus, intercity and tourism coach markets make a strong recovery in 2023

Europe – Bus and coach deliveries in Europe* (*Countries EU27+UK+ICE+NO+CH) reversed a three year downward trend in 2023 increasing by almost 21% to 31,020 units, up from 25,658 units in 2022, according to figures collated and produced by Wim Chatrou of Chatrou CME Solutions (CME) of The Netherlands - See table below in third column: Bus & Coach - Total Registrations GVW>8t for EU27 & UK, CH, NO & ICE by segment, a comparison for 2019, 2022 and 2023. This total of bus and coach registrations in 2023 came close to but was still shy by almost 2,000 units of the recent high of 32,978 vehicles in 2019.

A closer inspection of the markets showed substantial disparities between segments. For instance, in the city by market, CME reported total

registrations in the EU27+4 countries of 15,142 vehicles in 2022, an increase of 12.7% on 13,434 units in 2022, yet still a decrease of 3% on the pre-Covid year of 15,616 units in 2019. A key statistic pointed out by CME was that registrations of battery electric buses grew for a fourth year in a row from 4,152 in 2022 to 6,354 in 2023; an increase of 53.0%.

The intercity bus and coach market was again the most stable of the three segments with the sector increasing significantly by 18.4% in 2023 to register 9,680 units, up from 8,095 units in 2022. According to CME, this was the second time annual registrations have exceeded the pre-Covid number of 8,179 in 2019.

The coach market in 2023 with registrations of

Bus & Coach - Total Registrations GVW>8t for EU27 & UK, CH, NO & ICE by segment, a comparison for 2019, 2022 and 2023

Segment	2019	2022	2023	2022 v23	2019 v23
City bus	15,616	13,434	15,142	12.7%	-3.0%
Intercity bus	8,179	8,095	9,690	19.6%	18.4%
Coach	9,185	4,129	6,198	50.1%	-32.5%
Total	32,978	25,658	31,020	20.9%	-5.9%

Source: Chatrou CME Solutions

6,198 vehicles was a substantial increase of 50.1% on the 4,129 vehicles registered in the previous year but, never-the less, 2023 registrations were still a long way short of the 9,183 units registered in 2019!

On the following page of this issue is a breakdown of the European bus and coach markets with alternative drives accounting for over 70% of the city bus market. The other two segments, intercity and coach, is seeing an element of mild hybrid vehicles and a few full electric.

MKT: Statistics – Registrations TECH: Electric Drive / HFC / Hybrid Drive / Gas Engines

European bus market continues its pathway to zero emission operations – according to the latest Chatrou CME Solutions market report

Europe – The total number of city buses with alternative drivelines in European Union 27 countries plus the UK, Norway (NO), Iceland (ICE) and Switzerland (EU 27+4) totalled **13,466** units comprising **6,354** electric buses (excludes trolley buses), **4,022** hybrid-

electric buses, **2,883** CNG buses and 207, hydrogen (fuel cell) buses, according to market analysis by Wim Chatrou of **Chatrou CME Solutions** (CME) of The Netherlands – see chart below – Slide 1.

This figure of 13,466 for city buses with alternative

drivelines was much higher (+41%) than the **9,543** units registered in 2022, which was due, CME explained, to higher volumes of electric and hybrid-electric buses. Furthermore, the 13,466 city buses with alternative drivelines made up 89% of all 15,142 city bus registrations in 2023 in the EU27+4 countries. This compares with 62.5% (9,543) of the 13,434 city bus registrations in EU27+UK, NO, ICE & CH countries in 2022 with an alternative driveline, according to CME's figures.

CME's slide indicates that after eight straight years of almost constant growth, demand for city buses with alternative drivelines grew the most last year in 2023!

Electric and hybrid bus sales account for majority of alternative driveline growth

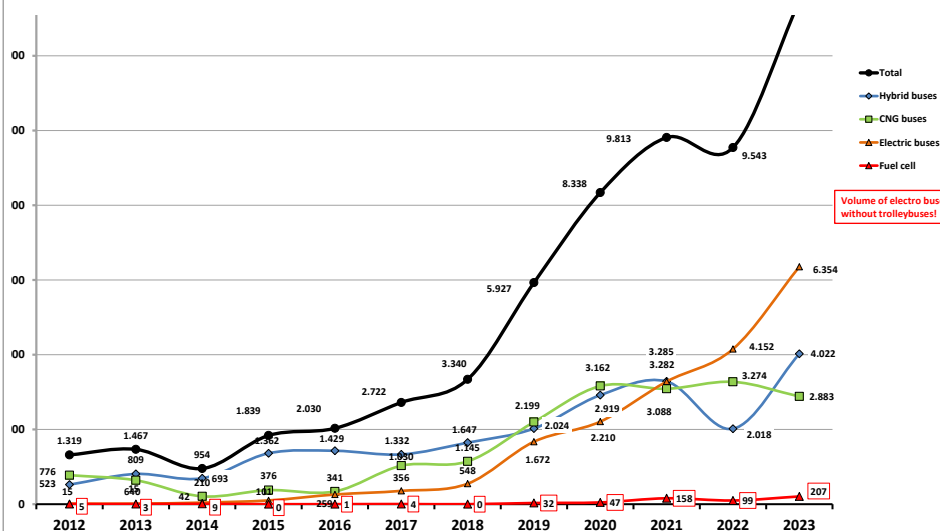
Electric bus: According to the CME figures (Slide 2), absolute volume of battery electric buses (and coaches) grew from 4,152 in 2022 to 6,354 in 2023, an increase of 53.0%! This was a substantial increase on the previous year, in 2022, which had witnessed a growth of 26% from 3,282 in 2021 to 4,152 in 2022.

Hybrid bus: These vehicles (see Slide 2), predominantly fitted with a diesel engine as a power source, doubled in size making up for a substantial dip in demand from the previous year. "In absolute volume terms," said CME, "hybrid buses doubled from 2,018 in 2022 to 4,022 in 2023; a plus of 99.3%!" This is caused by growth of about 1,000 vehicles x two, in the city bus segment as well as in the intercity segment, CME explained.

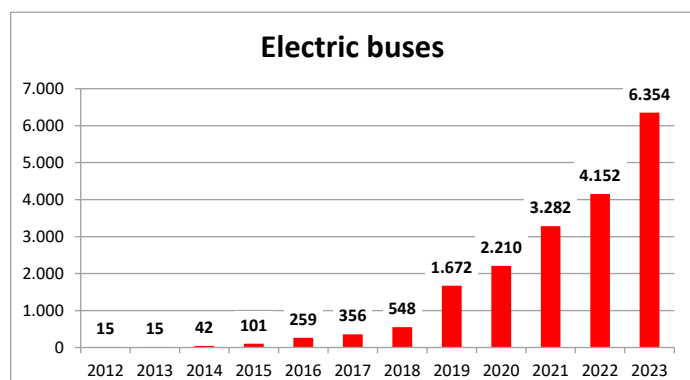
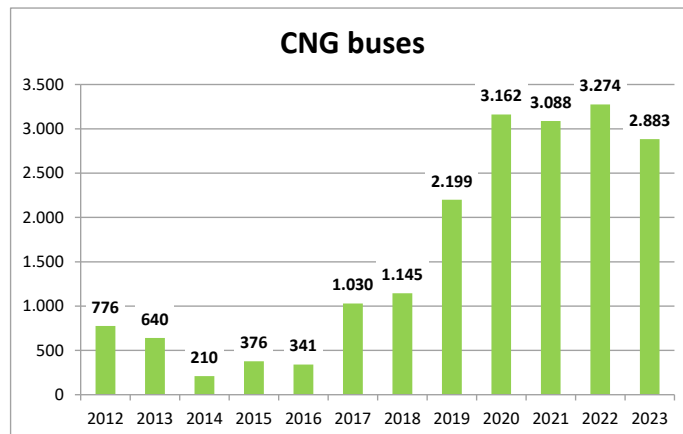
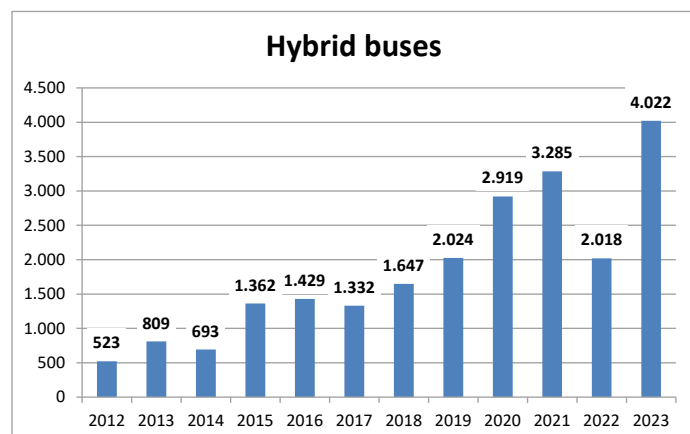
CNG & LNG: In absolute volume terms (see Slide 2), demand for CNG/LNG buses and coaches fell by 11.3% from 3,274 vehicles in 2022 to 2,883 in 2023, stated CME; adding that the CNG-share in the interurban segment was still growing, up from 978 in 2022 to 1,187 in 2023.

Continued on p14.

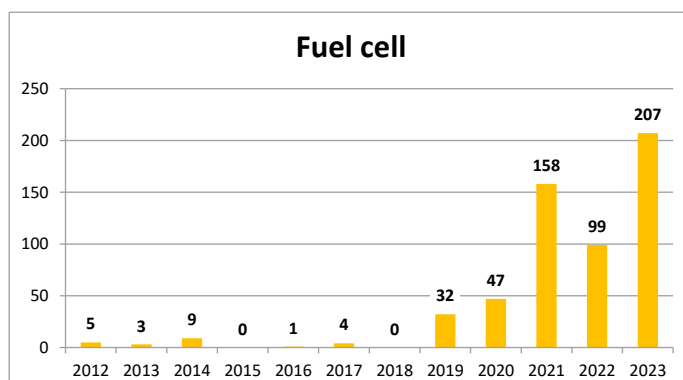
Slide 1: Development alternative drivelines in Western-Europe + Poland for 2012-2019, and then for EU27+UK+ICE+NO+CH from 2020 to 2023.



Slide 2: Development of Alternative Drivelines, GVW >8t for Years 2012-2019: Western-Europe + Poland / Years 2020-2023:EU27+UK+ICE+NO+CH



Volume of electric buses without trolleybuses



European bus market continues its pathway to zero emission operations – according to the latest Chatrou CME Solutions market report

Continued from p13.

Hydrogen Fuel Cell: Prior to 2019, sales of annual hydrogen fuel cell powered buses in Europe were in single figures, since then, however, demand has risen substantially with Solaris being the main supplier with Ballard fuel cell systems. In 2023, according to CME, numbers rose to 207, more than doubling registrations in 2022 of 99 units; however, the year of 2021 had been a previous record year for HFC bus deliveries of 158 units.

More electric bus supplier builders enter market as demand for e-buses in Europe continues to rise

Figures collated by CME for a large part of Europe (EU27+UK+ICE+NO+CH) showing registrations by manufacturer of electric city buses (8t gvw and above or 8m+ in length) for 2023 totalled 6,354 units, up from 4,152 in 2022.

The pie chart opposite (Slide 3) by CME shows the number of electric buses that have been registered in 2023 in EU27+UK+ICE+NO+CH. CME commented: "MAN is leading with 785 registrations (12.4% market share), closely followed by Solaris with 725 registrations (11.4%), and Yutong in third with 483 registrations (7.6%)." This was different from the previous year (2022) when CME announced the top three OEMs as: "Yutong is leading with 479 registrations, followed by BYD-Alexander Dennis {chassis-body combination} with 465 registrations, and Mercedes-Benz with 405 registrations."

This year CME went on to say: "The 467 'others' include manufacturers such as SOR (CZ), Rampini (IT), Van Hool (BE), Isuzu (TR), Switch Mobility (UK), and 24 (!) other manufacturers. It is worth pointing out that there are eight OEMs supplying more than 300 electric city buses each now annually."

Solaris Bus leads the way in electric bus total sales since 2012

There are more than 19,000 electric city buses (GVW>8t) are on the road in Europe now, writes CME. Slide 4, above opposite, shows a pie chart of the division or percentages by manufacturer of the 19,009 electric buses that have been registered in the period 2012 up to and including 2023 (total of 12 years).

Solaris being one of the earliest adopters and trailblazers in the e-bus segment, is still market leader with a total of 2,188 electric buses and a share of 11.5%. China's BYD, possibly the first to offer an electric bus in Europe is still number two, writes CME, with 1,768 registrations (9.3%), followed by BYD-Alexander Dennis (chassis and body combination) with a total of 1,716 buses (9.0%).

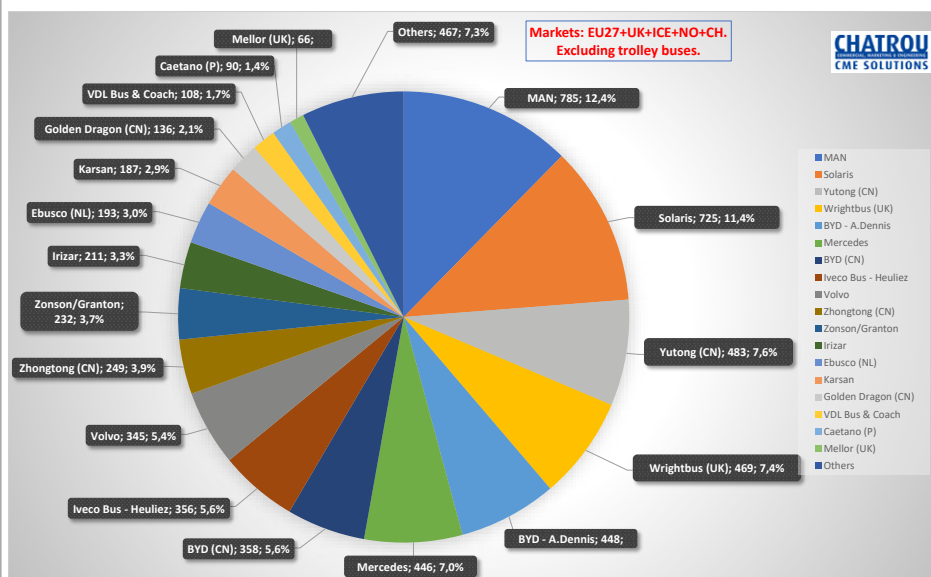
The 1,265 "others" include manufacturers such as Rampini, Van Hool, and Higer, and 38 other manufacturers, of which 12 have ceased manufacturing in the past 12 years, states CME.

UK market leader in electric bus rollout in 2023

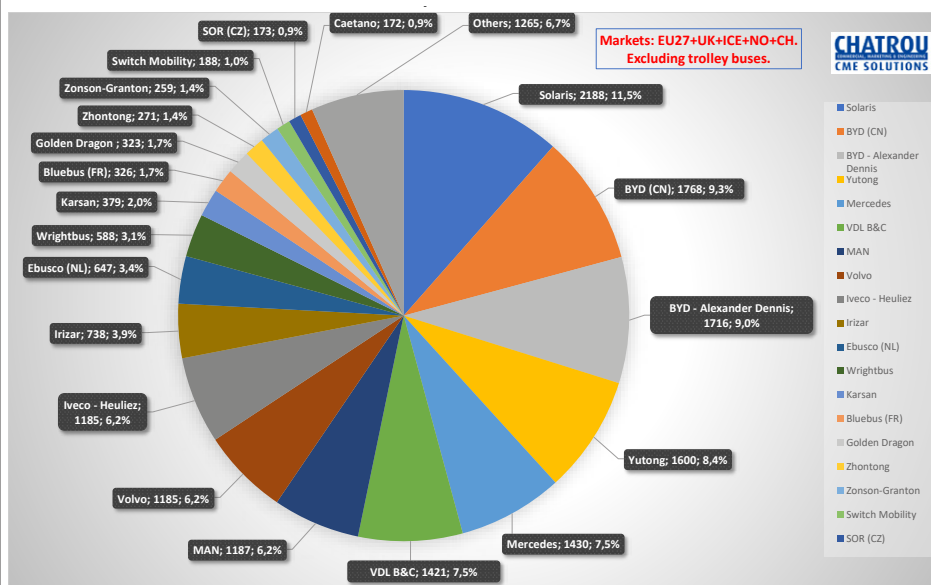
The UK, in 2023, delivered the largest number of electric buses compared with any other country in the EU27+4. The UK reported record registrations of 1,206 electric buses, some 19.0% of the total investment in 6,354 electric buses across Europe.

Continued on p15.

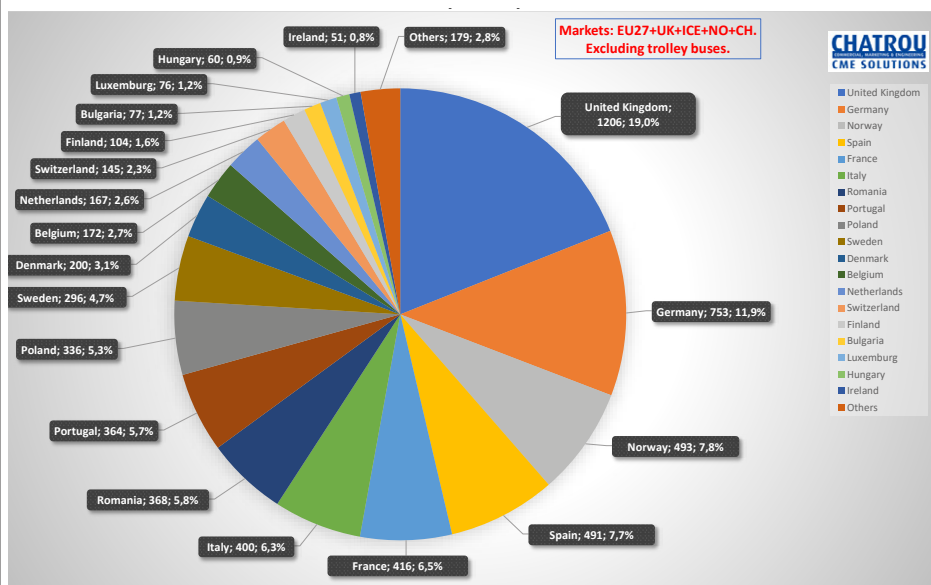
Slide 3: Registrations by manufacturer of electric city buses in 2023, GVW >8t - total volume: 6,354



Slide 4: Registrations by manufacturer of electric city buses 2012 - 2023, GVW >8t - total volume: 19,009



Slide 5: Registrations by country of electric city buses in 2023, GVW >8t - total volume: 6,354



European bus market continues its pathway to zero emission operations – according to the latest Chatrou CME Solutions market report

Continued from p14.

Germany was in second place with a total of 753 electric buses (11.9%), followed by Norway with 493 electric buses (7.8%) and Spain in fourth with 491 registrations and a share of 7.7%.

The two market leaders, the UK and Germany continued from the previous year; in 2022 the UK led with a total of 685 electric buses registered in the UK and 16.5% market share and Germany, with total registrations of 581 electric buses and 14.0%. In third place was France with 549 electric buses (13.2%); while this year's fourth placed country Spain with 491, more than trebled its registrations of 138 in 2022 (3.3%).

2024 is forecast to see great changes in market shares by country as new capital budgets for investment set in 2023 are delivered this year.

UK, Germany and France lead the way in e-bus registrations

The pie chart (Slide 6) shows the distribution of the total number of buses of 19,009 by country between 2012 and 2023: The United Kingdom has the largest fleet of all electric battery buses of the EU27+4 countries – it now has a fleet of 3,041 electric buses (16.0% market share). Germany is second with 2,562 buses (13.5%), CME reports, with France and the Netherlands in third and fourth place with 1,978 buses and a 10.4% market share and 1,581 (8.3%). It is worth pointing out that in the Netherlands under the Voluntary Agreement (with the Local Passenger Transport Authorities in town and cities) on Zero Emission Bus Transport, all new buses must use 100% renewable energy or fuel from 2025 onwards, and that all buses must be fully emission-free as of 2030. This is expected to continue to increase the number of electric buses in the Netherlands and Europe in the coming years.

High demand for Solaris hydrogen buses in 2023

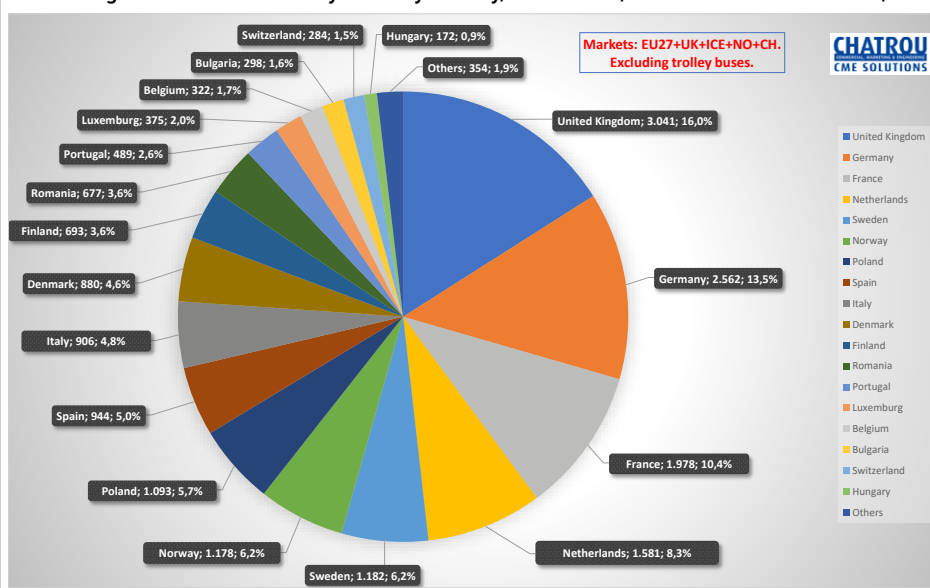
Slide 7 opposite shows the number of hydrogen fuel cell electric buses registered in EU27+UK+ICE+NO+CH countries in 2023, with a record total of 207 units. This was more than double the volume of 99 from 2022 and higher than the previous record year 2021 with 158 HFC registrations. **Solaris** continued as market leader in 2023 with 77 registrations, followed by **Van Hool** and **Caetano**, both with 34 registrations.

Hydrogen powered buses now on the road in Europe exceed 500

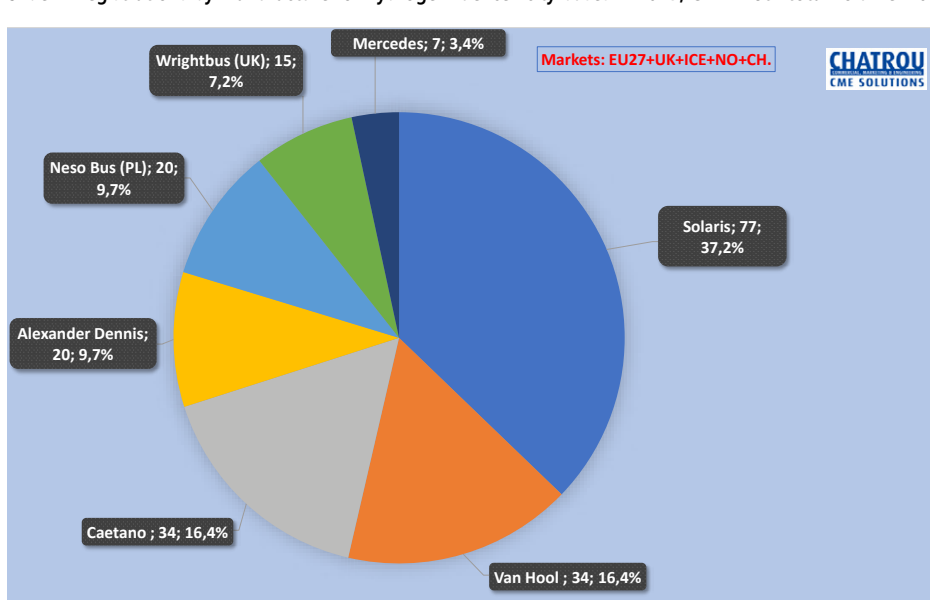
CME writes that of January 1, 2024 there were a total of 577 hydrogen fuel cell powered city buses are on the road in Europe; this being the total number of registrations for the years between 2012 and 2023, although some may have been taken off the road.

Slide 8 opposite shows a pie chart representing bus manufacturers supplying hydrogen fuel cell buses to the EU27+4 countries over 12 years between 2012 and 2023, according to data collated and supplied by CME. Solaris has taken over the leading position from Van Hool with a total of 181 hydrogen buses and a market-share of 31.4%. Van Hool is in second place with 140 registrations (24.3%), followed by Wrightbus with a total of 97 buses (16.8%).

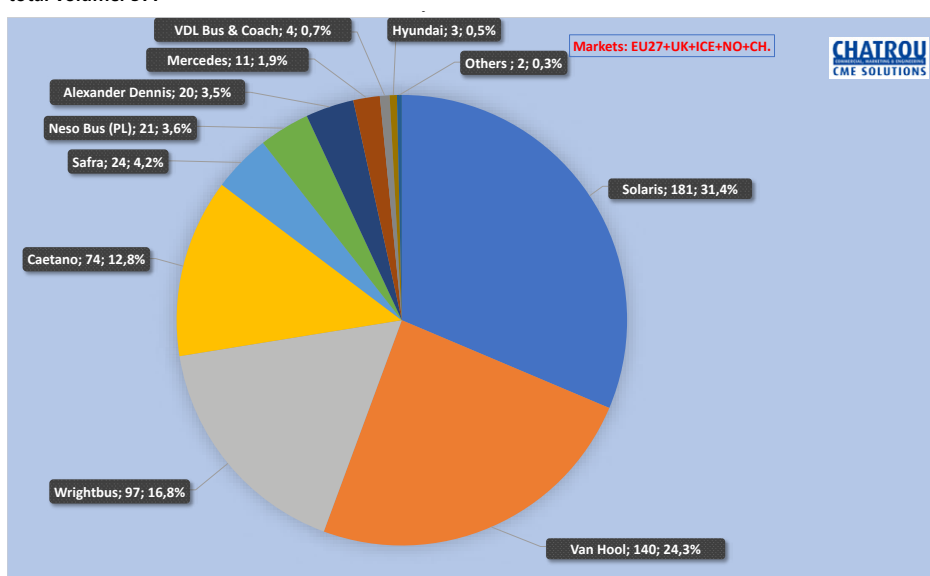
Slide 6: Registrations of electric city buses by country, 2012 - 2023, GVW >8t - total volume 19,009



Slide 7: Registrations by manufacturer of hydrogen fuel cell city buses in 2023, GVW >8t - total volume: 207



Slide 8: Registrations by manufacturer of hydrogen fuel cell city buses from 2021 to 2023, GVW >8t - total volume: 577



BIZ: Manufacture TECH: Electric Drive

GreenPower produces its first electric school buses at new West Virginia factory

Canada / USA – Electric-powered medium and heavy-duty vehicle manufacturer, **GreenPower Motor Company Inc.**, based in Vancouver, British Columbia, Canada has produced its first four electric school buses at its new facility in Charleston, West Virginia, USA. Four Type A Nano Beast* school buses have been delivered to Cabell County, Clay County, Kanawha County and Monongalia County



Type A Nano Beast

school districts in West Virginia.

Furthermore, the company announced further orders from the New York market through its dealer Leonard Bus Sales. Details remain undisclosed.

Fraser Atkinson GreenPower CEO said: "Today marks a significant achievement for all-electric, purpose-built school bus production in the United States. Less than 24 months ago GreenPower joined Governor Jim Justice in announcing our plans to manufacture school buses here in West Virginia to meet the demand for zero-emission school buses on the East Coast. Those plans have come to fruition with the manufacturing of the first four Nano BEAST school buses being completed at the South Charleston facility."

*Greenpower offers two electric school buses, the Type A Nano Beast, which has been in production since June 2023 and the Type D Beast, which will go into production in Q1 2024.

BIZ: Joint Venture I&R: Hydrogen Fuel

Air Liquide and TotalEnergies form European hydrogen station JV

France – Paris-based gas supplier, **Air Liquide S.A.** has formed a joint venture (JV) with French energy giant, **TotalEnergies**, to roll out a hydrogen refuelling network for heavy-duty vehicles across Europe.

This equally owned joint venture, named **Teal Mobility**, will help facilitate access to hydrogen across major European transportation routes, which should help decarbonise the European transport industry. The initial phase will target hydrogen refuelling stations (under the TotalEnergies brand) in Belgium, France, the Netherlands and Germany over the next three years. Both companies will combine their relative expertise in infrastructure development, hydrogen distribution mobility and station management.

Matthieu Giard, Vice President and Executive Committee Member of the Air Liquide Group,

said: "Hydrogen offers clear benefits for heavy-duty mobility. To promote its widespread use, it is imperative to accelerate the development of refuelling infrastructures and to offer vehicle manufacturers and transport operators a sufficiently dense network of stations. It is precisely the ambition of this joint venture, which will benefit from the complementary expertise of Air Liquide and TotalEnergies."

In North America, Air Liquide has already signed a Memorandum of Understanding (MoU) with Trillium Energy Solutions to establish a hydrogen refuelling network for heavy-duty vehicles across the USA. Air Liquide said that in the initial phase of deployment, it plans to refuel 2,000 HDVs per day. This is calculated to require roughly 150 tonnes of hydrogen. Currently, both companies are assessing the viability of the project.

BIZ: Ownership TECH: Diesel Engines

Cummins launches exchange offer for Atmus shares as part of divestment from filtration business

USA – **Cummins Inc.**, an engine and e-powertrain manufacturer based in Columbus, Indiana, has announced that it is offering its outstanding shares in former filtration subsidiary, **Atmus Filtration Technologies Inc.**, in exchange for Cummins common stock, as it moves away from the filtration business to focus on "both core and new technologies".

Established by Cummins in 1958 in Nashville, Tennessee, Atmus has produced filters for multiple applications, including on-highway trucking. However, in May 2023, Cummins began the process of splitting off its filtration business by listing Atmus on the New York Stock Exchange. In its initial public offering, over 16 million Atmus shares were sold, representing 19.5% of the

entity's common stock. Now, Cummins is offering the remaining 80.5% to its shareholders, who have the option of exchanging Cummins common stock for shares in Atmus (at a 7% discount).

The expiration date for the exchange offer is 13 March. Commenting on the decision to sell the company's remaining shares in Atmus, Cummins CEO and Chair Jennifer Rumsey said: "Leveraging its advanced filtration technologies and capabilities, Atmus is well positioned to grow into new markets and help both existing and new customers be successful. We believe now is the right time to distribute our Atmus shares, and we are confident that the share exchange is the appropriate path forward to bring the greatest value to shareholders."

DATES FOR THE DIARY 2024

GERMANY

March 5-7, 2024: Mobility Move '24

Venue: Estrel Berlin, Berlin

W: <https://www.mobility-move.de/en/index.html>

USA

March 5-8, 2024: Work Truck Week 2024

Venue: Indiana Convention Center, Indianapolis

W: <https://www.worktruckweek.com/>

USA

March 21-23, 2024: Mid-America Trucking Show (MATS) 2024

Venue: Kentucky Expo Center, Louisville

W: <https://truckingshow.com/>

UK

April 23-25, 2024: CV Show

Venue: NEC, Birmingham, UK

W: <https://cvshow.com>

GERMANY

April 24-25, 2024: Bus2Bus

Venue: Messe Berlin, Berlin

W: <https://www.bus2bus.berlin/en/>

ITALY

May 8-10, 2024: Next Mobility Exhibition 2024 – NME24

Venue: Fiera Milano, Milan

W: <https://www.nextmobilityexhibition.com/en/>

ITALY

May 8-11, 2024: Transpotec Logitec

Venue: Fiera Milano, Milan

W: <https://www.transpotec.com/en>

UK

May 15-16, 2024: Sustainable Road Transport Show

Venue: Farnborough International Exhibition and Conference Centre, Farnborough

W: <https://www.sustainableroadtransport.show/>

INDONESIA

May 15-17, 2024: Busworld Southeast Asia

Venue: Jakarta International Expo, Kemayoran, Jakarta

W: <https://www.busworldsoutheastasia.org/en>

INDONESIA

May 15-17, 2024: Indonesia International Truck, Trailer, Equipment and Parts 2024

Venue: Jakarta International Expo, Kemayoran, Jakarta

W: <https://iibt-exhibition.net/>

USA

May 20-23, 2024: Advanced Clean Transportation Expo

Venue: Las Vegas Convention Center, Las Vegas, Nevada

W: <https://www.actexpo.com/>

TURKEY

May 29-31, 2024: Busworld Turkey

Venue: Istanbul Expo Center, Istanbul

W: <https://busworldturkey.org/en>

UK

June 4-6, 2024: Road Transport Expo

Venue: NAEC, Stoneleigh, Warwickshire

W: <https://roadtransportexpo.co.uk/rtx2024/en/page/home>

UK

September 4-5, 2024: Cenex Expo 2024

Venue: UTAC Millbrook, Bedfordshire

W: <https://cenex-expo.com/>

BIZ: Agreement / Ownership / Investment TECH: Electric Drive

Mitsui and VDL to invest in electric bus builder Pinnacle Mobility

India / Japan – Tokyo, Japan-headquartered investment group, **Mitsui & Co Ltd** and privately owned manufacturing group, the **VDL Groep** of Eindhoven, Netherlands, in December announced joint planned investments of up to USD 100 million and undisclosed equity stakes in **Pinnacle Mobility Solutions Pvt Ltd**. Pinnacle Mobility, which sells vehicles under the brand name, EKA Mobility is based in Pune and is an electric bus and light and medium-duty e-truck builder.

As part of this partnership, VDL Bus & Coach (a subsidiary of VDL Groep and a leading European manufacturer of electric buses & coaches) will support EKA Mobility by transfer of technology to produce electric buses in India for the Indian market. Mitsui, for its part, will extend support to EKA for exports to select emerging markets namely in countries in Africa, Middle East, and Europe over the next three to four years as well as assist in establishment of systems and processes for production.

Pinnacle Mobility says it is already focusing on public service vehicles (namely public services buses and refuse trucks). Pinnacle Mobility will also focus on e-commerce last-mile logistics, for which demand is expected to increase in large cities. Concentrating on these two areas, the company plans to expand its manufacturing and sales business of electric buses and small commercial vehicles.

An interesting statement by Pinnacle, said: "India

is aggressively promoting a policy to popularize EVs as a countermeasure to its serious air pollution problem. By 2030, the government aims to make EVs account for 70% of commercial vehicles, 30% of passenger cars, 40% of buses, and 80% of motorcycles and three-wheelers."

Earlier this year, EKA Mobility had plans to scale up production capacity to roll out 5,000 electric buses and 6,000 light commercial vehicles per annum in the first phase. This new investment would further increase to produce 12,000 electric buses and commercial vehicles.

Mitsui & Co. India GM Mobility Business Division, Nobuyoshi Umezawa, said, "Through the cooperation of EKA, VDL, and Mitsui, we aim to contribute to 'Make in India' by leveraging EKA's excellent engineering and local network and VDL's cutting-edge technological capabilities."

RACE comment: 'This target is unrealistic. The quote of 40% electric CVs is by the Union Minister in 2021. Currently, India is looking to move towards LNG and hydrogen powered CVs rather than battery electric. After the elections in May 2024, the new government is expected to restructure the programme, accordingly. 70% electric is seen more of a political statement with a much lower realistic penetration of electric, especially in CVs in the future: RACE analysis anticipates not more than 10% of CVs in the future will be battery electric.'



Pinnacle, Mitsui and VDL people in Pune. Dr. Sudhir Mehta, Pinnacle Mobility CEO (Front row - fourth from left)

BIZ: Manufacture / Investment TECH: Electrical Systems & Components

ZF opens new CV electrical components plant in Tamil Nadu

Germany / India – On 14 February, **ZF Friedrichshafen AG** of Friedrichshafen, Baden-Württemberg opened another manufacturing facility in the Indian state of Tamil Nadu, where it will produce electrical components for the Indian and Asian commercial vehicle markets.

The plant, which is located in an industrial suburb of Chennai (called Oragadam), will produce various electrical components for CV chassis and, in the near future, air compressors for light- and medium-duty vehicles. Spanning more than 7,000 square metres, the new plant will eventually be doubled in size to 15,300 square metres following a second phase of construction work. ZF says that it is investing EUR200m up until 2032 in the plant.

The factory in Oragadam is ZF's 19th plant on the subcontinent and the 10th in the state of Tamil Nadu. Dr Peter Laier, head of Commercial Vehicle Solutions at ZF, said: "With our plant in Oragadam, we are expanding our global production network that will enable us to meet the expected growing demand of Indian and Asian manufacturers with



Opening ceremony held at new ZF plant in Oragadam, Tamil Nadu

local production [...] In this production network, our European and German plants, in addition to serving the local European market, play an important role as lead plants for production technology know-how globally."

Dear Reader,

The Indian market is on the road to recovery measured by vehicle sales in the third quarter and three quarter period of this fiscal year. Some segments are doing better than others.

Delivery of Bharat Stage VI compliant diesel medium and heavy buses and coaches is rising steadily, and cities are witnessing increasing deliveries of electric buses by Tata Motors, Switch Mobility, Pinnacle Mobility, and JBM. Heavy-duty rigid truck and tractor sales are leading the Indian post-Covid recovery with increases in registrations in both sectors.

With a carbon net zero economy targeted for 2060, there are signs that the country is endeavouring to shift its transportation towards this goal. In this issue we announce several large orders for low carbon (BS VI) and zero carbon (electric) vehicles, investment in e-bus and e-truck makers and electric component manufacturing, as well as the opening of vehicle material recycling centres and new energy vehicle training centres. For other articles and statistics on India visit our [website](#).

Jim Gibbins & RACE Innovations Inc

BIZ: Aftermarket CVS: Remanufacture & Recycling

Tata Motors inaugurates fourth vehicle recycling facility in Chandigarh

India – Truck and bus builder, **Tata Motors Ltd** of Mumbai, has opened its latest Registered Vehicle Scrapping Facility (RVSF) in Chandigarh, its fourth such vehicle recycling facility, which it has branded, **Recycle With Respect (Re.Wi.Re)**¹. The new facility operates and complies with the standards set out by the government under its vehicle scrapping policy - Voluntary Vehicle Fleet Modernization Program (V-VMP), which took effect in April 2022. The company's three other Re.Wi. Re registered facilities are in Jaipur, Bhubaneswar and Surat.

This latest RVSF has been developed and is operated by Tata Motors' partner, Dada Trading Company and is equipped to scrap both passenger and commercial vehicles, regardless of their brand.

Tata Motors states the facility uses environmentally friendly processes and has the capacity to disassemble up to 12,000 end-of-life vehicles safely and sustainably each year!

¹Re.Wi.Re. is purpose-built for dismantling end-of-life passenger and commercial vehicles across all brands, with a focus on employing environmentally friendly practices. A fully digital facility, all operations are seamless and paperless. Additionally, there are dedicated stations for the safe dismantling of various components, including tyres, batteries, fuel, oils, liquids and gases. Every vehicle undergoes a meticulous documentation and dismantling process specifically designed to meet the requirements of passenger and commercial vehicles.



Inside the new Tata Motors RVSF unit in Chandigarh

BIZ: Product / New Company

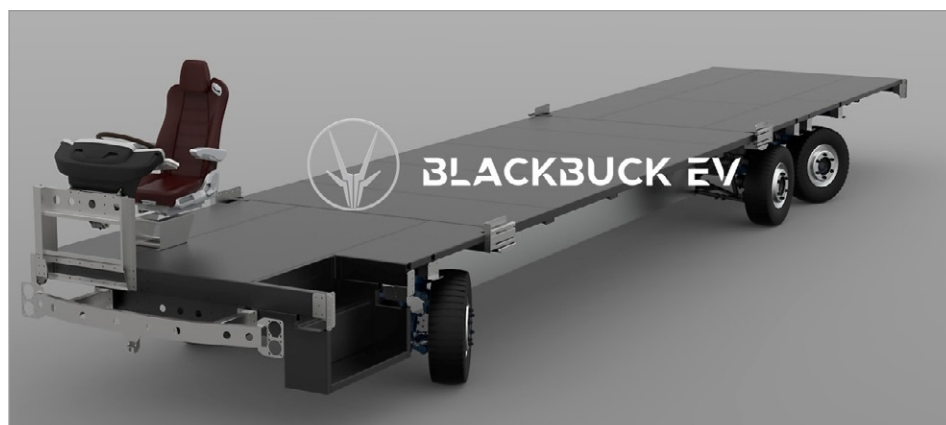
Startup firm Blackbuck EV India announces 13m electric bus prototype for intercity applications

Hyderabad - Hyderabad-based startup, **Blackbuck Electric Vehicles India Pvt Ltd**, a new entrant in the electric vehicle marketplace has revealed a three-axle electric intercity coach prototype, called ELON 3X.

The company says its engineering team has focussed on making the ELON 3X ultra-light weight and modular in design. It is based on, what Blackbuck calls, the 'ELON skateboard platform', which is seen as a way to offer other length models, like ELON 2X (10.5m) and ELON 4X (14.5m) in the coming years. The company states that the Skateboard platform

comes with corner axles, advance independent suspension and drive motors on each corner and steer-by-wire steering, and that the design reflects the company's strong commitment to passenger comfort, drivability, and safety.

With the most advanced bus the ELON 3X can be supplied using different route to market platforms or tools such as using different grades of SaaS (Software as a Service) and eBaaS (backup as a service). Following model testing, Blackbuck says the ELON 3X is scheduled to roll off the production line in Hyderabad at soon as the end of 2024!



Blackbuck EV 13m skateboard platform

BIZ: Agreement CVS: Distribution & Aftermarket

Scania India signs sales and service agreement with PPS Motors for heavy-duty tipper trucks

India / Sweden - **Scania Commercial Vehicles India Pvt Ltd** of Kolar, Karnataka State - a wholly owned subsidiary of **Scania AB** of Sodertalje, Sweden has signed an exclusive partnership agreement with automotive dealer principle, **PPS Motors Pvt Ltd** of Hyderabad, for sales and service of its heavy-duty tipper trucks and tractor units for mining applications across the country. The trucks arrive in CKD kit form from the HQ and factory in Sodertalje for assembly at Scania's factory in Narasapura, Karnataka State, India. The tipper body is built and supplied by **SSAB**

Swedish Steel (India) Pvt Ltd (a subsidiary of SSAB, Sweden) of Bengaluru.

PPS Motors has been appointed as the sole representative for Scania's mining tippers in India. The dealer principle has six regional warehouses across the country, close to the mining sites. The warehouses are also strategically connected to Scania's central warehouse in Nagpur, creating a robust hub-and-spoke model.

Johan P Schlyter, Managing Director of Scania Commercial Vehicles India, remarked: "Through the



Scania tipper trucks at PPS Scania dealer centre

BIZ: Aftermarket TECH: ADAS

Greenline Mobility partners with smart camera telematics firm Netradyne to boost driver safety

India - **GreenLine Logistics** (Green Planet Logistics Pvt Ltd.) of Mumbai, a trucking logistics company that operates gas trucks, has partnered with specialist electronic warning and safety devices firm, **Netradyne Technology India Pvt Ltd** of Bengaluru, to enhance fleet and driver safety using its **Driver•i¹ AI (Fleet Camera System)**.

The LNG trucks operated by Greenline, are manufactured and supplied by **Blue Energy Commercial Vehicles Pvt Ltd** (Blue Energy Motors) of Pune, a two-year-old start-up.

Anand Mimani, CEO, **GreenLine Mobility Solutions** said: "By integrating Netradyne's Driver•i, our goal is to enhance driver safety, fostering a secure environment for our dedicated drivers while delivering superior service excellence to our customers."

Durgadutt Nedungadi, Senior Vice President of Netradyne Technology said: "Netradyne will ensure a smooth implementation and work closely with GreenLine Mobility to align better to their evolving business needs — and together, work towards creating safer roads and improved transportation standards in the industry."

'Driver•i[®] is a vehicle monitoring system using cameras to capture footage in front and around the cab that using software (called Edge Computing) to analyse video footage immediately and in real time to create timely alerts to help drivers avoid risky and damaging situations. Driver•i's high-definition cameras have advanced AI object detection that "see" the entire drive. Managers receive the complete safety picture via alerts, reports, and video-on-demand.



Truck operator Greenline Mobility signs ADAS agreement with Netradyne

recent signing of an agreement with PPS Motors, we have laid the foundation for an impactful alliance focused on our mining tipper segment in India. By leveraging our cutting-edge technology, we are optimistic about making a substantial contribution to India's efforts in reaching its Net Zero Emission* goal."

Rajiv Sanghvi, Managing Director of PPS Motors, added: "We are happy to partner with Scania as their exclusive distributor for their mining trucks business in India. The response and the trust that the customers have shown in Scania's products and services have been overwhelming."

*Scania has a range of zero emissions trucks that it is starting to offer in Europe. As yet no BEV or hydrogen fuelled trucks have been launched in India. However, it does offer a range of gas trucks in other regions, such as South America and Europe.

BIZ: Product TECH: Transmissions

Eicher offers Pro 8035XM tipper truck with E-Smart Shift AMT transmission

India – Commercial vehicle manufacturer, **VE Commercial Vehicles Ltd** (VECV) of Pithampur, has launched the new Pro 8035XM tipper offered for the first time with the E-Smart Shift - Automated Manual Transmission (AMT) specifically designed for tippers operating in mining applications. The E-Smart Shift AMT is derived from Volvo Truck's I-Shift AMT.

Vinod Aggarwal, MD and CEO, VECV, said: "The Eicher Pro 8035XM E-smart embodies 15 years of our dedicated efforts in this direction, offering enhanced features to boost operational efficiency for our customers. With the government's infrastructure initiatives driving the tipper demand in the country, this launch will contribute significantly to national development and infrastructure expansion."

Gagandeep Singh Gandhok, Senior Vice President – HD Truck Business, VECV, added: "Over the years, the Eicher Pro 8000 series tippers have represented the pinnacle of Indian trucks with leading engine power, transmission, body capacity, and cabin quality, making it the best-in-class mining tipper. The introduction of the AMT in the Eicher Pro 8035XM is the next step in its development and will improve driver comfort and enhance the overall productivity and profitability for Eicher customers."

'The PRO 8035XM truck offers up to 35t gvw and is fitted with the Volvo Eicher VEDX8, BS-VI diesel engine with an output of 258 kW @ 2200 rpm and torque of 1350Nm @ 1200-1600 rpm which is matched with an ET 140S9, 9 speed (1C + 8F + 1R) with e-smart AMT. The chassis is fitted with hub



VECV tipper truck chassis with AMT option

reduction axle and two stage differential lock on at the rear and heavy-duty forged I-beam Reverse Elliot type axle with stabilizer bar at the front, which is suspended using parabolic spring assembly.

BIZ: Order TECH: Electric Drive

Tata Motors delivers 100 Starbus EVs to Assam State Transport Corporation

India - **Tata Motors Ltd** of Mumbai, has now delivered a further 100, Tata Ultra 9-metre electric buses to Assam State Transport Corporation (ASTC), which are to operate on the roads of Guwahati, Assam. The company claims that it has delivered some 1,500 electric buses to date.

The Tata Ultra Urban 9/9 AC electric bus measures 9m in length and has a wheelbase of 4.92m. It has a permanent magnet alternating current (PMAC) traction motor with continuous output of 145kW (max: 245 kW or 328hp) and continuous torque of 1145 Nm (Max: 3000Nm). The electric motors and inverters are supplied to Tata Motors by its sister company, **Taco Prestolite Electric Pvt Ltd**, a joint venture of **Tata AutoComp Systems Ltd** and **Prestolite Electric Beijing Ltd** of Beijing, China. The battery type is a Li-Ion battery pack, which has

a storage capacity of 124kWh, which is expandable, with a charging time of two to 2.5 hours with fast charging. Batteries are source from Tata Motors group subsidiary company, **Tata AutoComp GY Batteries Pvt Ltd** (branded as Tata Green Batteries), a joint venture of Tata Auto Comp Systems Ltd and **GS Yuasa Corporation** of Kyoto, Japan.

The full-electric buses come with regenerative braking system and Tata's Intelligent Transport System (ITS) telematics system. The Starbus AC electric buses are equipped with advanced features for the comfort of the driver and of the passengers. For instance, features include a 'Lift Mechanism' that extends an automated ramp for easy ingress and egress of less able passengers, ergonomic seats, roomy interior, and passenger utility provisions such as charging ports and wide entry and exit passages.

Rohit Srivastava, Vice President & Business Head – CV Passengers, Tata Motors, said: "Making public transport more effective and efficient is our mission and we are thankful to the Assam State Government and the ASTC for giving us the opportunity to supply a modern fleet of electric buses. Built with cutting-edge technology and rigorously assessed under varied conditions, these buses are eco-friendly and will make public transportation safe, comfortable, tech driven and more efficient. We are elated to have our Tata Ultra electric buses inducted and operational to serve the residents of Guwahati."



Tata Motors delivers 100 Starbus EVs to Assam State Transport Corp

BIZ: Order

State of Odisha orders 122 premium intercity Volvo 9600 coaches

India – **Volvo Buses India Pvt Ltd** of Bangalore, a wholly-owned subsidiary of **VE Commercial Vehicles Ltd** (VECV) of Pithampur has received an order for 122 premium luxury coaches (Volvo 9600) from the Odisha State Road Transportation Corporation (OSRTC) under the Location Accessible Multi-modal Initiative (LAccMI)² Scheme; a flagship programme of the Government of Odisha's Commerce & Transport (C&T) Department, which is aimed at enhancing road passenger transport connectivity.

Continued on p20.



Volvo 9600 intercity tri-axle coach for Odish

BIZ: Investment PEOPLE: Training

DICV inaugurates an additional two new BharatBenz Regional Training Centres

Chennai - **Daimler India Commercial Vehicles Pvt Ltd** (DICV) of Oragadam, a wholly owned subsidiary of Germany's **Daimler Truck AG**, has inaugurated two new BharatBenz Regional Training Centres (RTCs) in Haryana and Maharashtra, in collaboration with its dealer partners, **Dhingra Trucking Pvt Ltd** of Haryana and **Autobahn Trucking Corporation Pvt Ltd** of Maharashtra. These two new facilities add to the two other Regional Training Centres already in operation in Chennai and Odisha.

The purpose of the BharatBenz Regional Training Centres is to upskill and reskill the capability and competence of more than 3,500 drivers and, sales and service personnel across the BharatBenz network, annually.



DICV BharatBenz's New Regional Training Centre

The Regional Training Centre in Dharuhera (Haryana State) in partnership with Dhingra Trucking is spread across 6,600 sq. ft. and the Autobahn Trucking-backed Centre in Pune (Maharashtra State) covers 7,800 sq. ft. Both facilities accommodate 60 trainees simultaneously, featuring dedicated trainers, 500 plus tools, and two BS VI vehicles each with 10 associated truck and bus Bharat-Benz dealers.

GOV: Legislation & Regulations

Indian government mandates air conditioning in truck cabs from October 1, 2025

India – The **Ministry of Road Transport and Highways** (MoRTH) has issued a new regulation mandating that the trucks manufactured on and after October 1, 2025, must be fitted with air conditioning for drivers; the new regulation will apply to trucks above 3.5 tons gross vehicle weight (GVW) – applies to trucks in the N2 and N3¹ categories.

In 2022, the notification date for air conditioning systems in truck cabins was set as January 1, 2023, but the date was delayed allowing manufacturers to incorporate air conditioning systems into the

cabin designs and changed to October 2025.

The testing of the cabin fitted with air-conditioning system shall be as per the Bureau of Indian Standards: Automotive Vehicles Air-Conditioning & Heating Systems Thermal Performance Method of Measurement: IS 14618: 2022.

¹N2 & N3 - Category N2 means a motor vehicle used for carriage of goods and having a GVW exceeding 3.5 tons but not exceeding 12 tons. Category N3 means a motor vehicle used for carriage of goods and having a GVW exceeding 12 tons.

BIZ: Order TECH: Alternative Fuel Engines

Tata Motors continues delivery roll out of 921 e-buses to Bengaluru

India - **Tata Motors Ltd** of Mumbai, through its wholly owned subsidiary, **TML Smart City Mobility Solutions Ltd¹**, also of Mumbai, has delivered a further 100 StarBus EV buses to **Bengaluru Metropolitan Transport Corporation (BMTC)**, as part of a contract for 921 units of Tata Motors' Urban 12m electric buses² in Bengaluru. (Deliveries to date account for approximately 40% of the contract, Tata Motors states).

As part of this major consortium purchase contract agreement by **Convergence Energy Services Limited** at the start of 2022, TML Smart City Mobility Solutions Ltd is to supply, operate, and maintain all 921 units 12-metre low-floor electric buses for 12 years.

Mr. Asim Kumar Mukhopadhyay, CEO and MD, TML Smart City Mobility Solutions Limited, said: "We are confident that our buses will further strengthen

BMTC's fleet and make public transportation safe, comfortable, tech driven and energy efficient. These buses have been developed and manufactured at state-of-the-art facilities and have been rigorously tested and validated across varied conditions."

¹TML Smart City Mobility Solutions Ltd of Mumbai, a subsidiary of Tata Motors Ltd created in May 2022 for providing solutions in the urban mass mobility business sector as a separate entity from its parent Tata Motors. It is responsible (subject to contract) to own, operate and maintain mobility systems for a fixed price contract).

²Tata Urban 12m electric bus has a permitted gross weight of 17.8 tons. It is powered by an electric motor with a maximum of 245 kW and continuous power of 145 kW, which is supplied by a Li-ion 186 kWh battery pack. Charging time is two to three hours with fast charging, and it has a range of more than 150 kms (as per standard test conditions / CMVR) and has a maximum speed of 75km/hr. The 12-metre long, 35-seater Tata Starbus AC electric buses are equipped with advanced features for the comfort of the driver and of the passengers. For instance, features include a 'Lift Mechanism' that extends an automated ramp for easy ingress and egress of less able passengers, ergonomic seats, a roomy interior, passenger utility provisions such as charging ports and wide entry and exit passages. The full-electric buses also come with Tata's Intelligent Transport System (ITS).



100 more Tata Motor Starbus 12 e-buses delivered to Bengaluru

State of Odisha orders 122 premium intercity Volvo 9600 coaches

Continued from p19.

Scheduled for delivery in 2025, the Volvo 9600 coaches, known as Jagannath Express & Laxmi Express, will connect major districts and business hubs to the state capital, Bhubaneswar, and Jagannath Dham Puri. The coaches are to be built at the Volvo Buses India factory in Hoskote in accordance with the Automotive Indian Standard (Code AIS 119).

Vinod Aggarwal, MD and CEO, VECV, said: "We are honoured to be selected as the preferred partner for this landmark initiative by OSRTC and the Government of Odisha. Over the past 25 years, Volvo Bus India has provided state-of-the-art, sustainable mobility solutions, and this order further solidifies our commitment to the citizens of Odisha."

¹Volvo 9600 platform offers up to 22.2t gvw and is powered by the Volvo D8K (8-litre) engine with a peak output of 260kW (350hp) @ 2200 rev/min and a torque

of 1350 Nm @ 1200-1600 rev/min, fitted with the Volvo I-Shift automated transmission with integrated retarder. It has an Electronically Controlled Suspension (ECS) system, while safety is bolstered by the Electronic Braking System (EBS). The 15-metre seater coach has a passenger capacity of 55, whereas the sleeper coach has 40 berths. The seater and sleeper applications incorporate 15.1 cu.m and 9.2 cu.m of luggage space respectively. The 13.5m coach seats up to 47 passengers, while the sleeper variant hosts 36 berths. The corresponding luggage space for the seater and sleeper variants are 13.6 cu.m and 8.1 cu.m respectively.

²The LAccMI Scheme, reflecting the visionary approach of the Odisha government, seeks to elevate the state's public transportation infrastructure through the Odisha State Road Transport Corporation (OSRTC). Under the scheme, the government plans to launch 1,000 coaches which will operate on various routes across the state. The allocated budget of the scheme is USD380m. The tenure of the scheme will be 10 years, which will be extendable by two years. OSRTC will operate the coaches.

BIZ: Order

Ashok Leyland and Tata Motors enjoy major Euro VI coach tender spoils from Karnataka and Uttar Pradesh states

Chennai - **Ashok Leyland Ltd** of Chennai has announced that it has won a tender from Karnataka State Transport Undertakings (KSTC) for 1,225 fully built Bharat Stage (BS) VI diesel coaches, which are to be delivered by April this year – the contract value is estimated at USD 62.8m.

The fully built AL Viking bus of 16.2t GVW is powered using Ashok Leyland's in-house iGen6 BS VI H Series, 6 cylinder diesel engine, which offers a peak output of 147kW (197hp) @ 2400 rev/min, and 700Nm of torque @ 1200-1900rev/min. The engine is matched with a 6-speed manual synchromesh with overdrive, using a cable shift system. The 12m length chassis, 5334mm (210inch) wheelbase is suspended with either a rubber ended leaf spring or an air suspension option at front and rear.



Ashok Leyland Viking Euro VI coach for intercity and interurban transport

Tata Motors wins 1,350 bus chassis order from UPSRTC

Meanwhile, Tata Motors Ltd of Mumbai, also won a major Bharat Stage VI coach order, this time from the Uttar Pradesh State Road Transport Corporation (UPSRTC) to supply 1,350 units of its Tata LPO 1618* BS VI diesel bus chassis, developed for intercity (long-distance) operations.

Rohit Srivastava, Vice President and Business Head – CV Passengers, Tata Motors, said: "The Tata LPO 1618 is a proven work horse with its robust build, quality engineering and low maintenance. It is designed and engineered to deliver best-in-class productivity with high uptime and optimal total cost of operations. We look forward to commencing supplies as per the guidance of UPSRTC."

¹The Tata LPO 1618 BS VI bus offers 16.2t gvw and is powered by the Tata Cummins B 5.6 Euro VI diesel engine, which offers an output of 139 kW (186 hp) @ 2300 rev/min, 850 Nm torque @ 1000-1600 rev/min and which is fitted with G 750 OD (6F + 1R). The ladder chassis of 11.8m length is fitted with a Weweller air suspension front and rear.



Tata LPO 1618 coach chassis

BIZ: Product CVS: Exhibition & Conferences

Excon 2023 – A launch pad for OEMs of new heavy duty trucks and tipper models



SIGNA 3530 TK 8x4 tipper

India - Excon 23, a construction equipment exhibition, organised by the **Confederation of Indian Industry (CII)**, took place on December 12 to 16, 2023 at Bangalore International Exhibition Centre (BIEC), Bengaluru, Karnataka, India. There were several OEMs displaying new heavy trucks at the show including **Mahindra Truck & Bus Ltd**, **Tata Motors Ltd** and **Scania Commercial Vehicles India Pvt Ltd**.

Mahindra unveils Mahindra BLAZO XM-DURA 28

Mumbai - Mahindra Truck & Bus Ltd, a division of Mahindra & Mahindra Ltd of Mumbai, used the show to launch the Mahindra BLAZO XM-DURA 28 tipper truck.

The Mahindra BLAZO XM-DURA 28 is a 28t gvw tipper powered by the Mahindra MPOWER 7.2-litre BSVI engine, which offers an output of 206kw @ 2200 rev/min and maximum torque of 1050Nm @ 1200-1700 rev/min and which is fitted with an Eaton 9/6 speed gear box. The BS VI compliant engine is fitted with a diesel oxidation catalyst (DOC), a diesel particulate filter (DPF), ammonia selective catalytic reduction (NH 3 -SCR), and an ammonia slip catalyst (ASC). The ladder chassis is fitted with semi-elliptical leaf springs with shock absorbers at front and inverted leaf bogie suspension at the rear.



The Mahindra BLAZO XM-DURA 28t gvw tipper truck

Tata Motors launches new LNG, diesel and electric truck tipper models

Mumbai – Tata Motors Ltd of Mumbai used Excon to launch a range of heavy-duty truck models; three LNG trucks (Tata Prima 5528.S LNG,



TATA 5528.S LNG tractor unit

5530.TT LNG and the Tata Prima 3528.K LNG), two clean diesels, Tata Prima 2830.TK VX, Tata signa 3530.TK VX and an electric truck, Tata Prima E.28K.

Tata Motors e-Truck specification	
Parameter	Description
GVW	28000kg
Battery Pack	LFP Battery Pack (150kWh to 400KWh with 230Ah Cell) 660VDC
Traction Motor	6 Phase PM Motor Peak Power 245KW, Peak torque- 2950Nm,
Charger Specification	CCS2 (2nos)
Gearbox	2 Speed auto shift e-Gbox with PTO provision
Rear axle	Tata RA-210HR-T with 6.14 RAR
Parameter	Description
Tires	11 x 20-18 PR Mining Tires
Suspension	Front Parabolic Rubber Bush and Rear 37T optimised Bogie suspension
LB Capacity	18m ³ box
Range	150km to 200km
Grade-ability	44.15% (at 28T) 28% (at 40.4T)
Tipper body	18m ³ Box body
Brakes	Drum S Cam air brake (Noise free Liners), EBS with HAS



Tata Prima E.28K all electric 28t gvw tipper truck

LNG: Tata Signa 5530.TT LNG (tractor) offers a gross vehicle weight of 55,000 kg and is fitted with the Cummins ISBe 6.7-litre gas 300hp (1100 Nm) engine fitted with the G1150 gearbox. The 55t LNG tractor delivers 500km range with a 450-litre LNG cryogenic tank; two other tank sizes are available offering an increased range of 800km and 1200km.

Tata Prima 3528.K LNG tipper is 35t gvw and is also fitted with the same Cummins engine, 9-speed gearbox and 600-litre capacity LNG tanks. It has a front suspension with parabolic leaf springs and a rear bogie suspension.

Diesel: Tata Prima 2830.TK VX of 28t gvw is powered with Cummins ISBe 6.7-litre BS VI 300hp (1100Nm) engine, which is fitted with 9S G1150 gear box. The chassis has heavy-duty forged I beam Reverse Elliot type front axle and single reduction heavy duty rear drive axle with differential lock.

Tata Signa 3530.TK VX of 35t gvw is fitted with the same drive train and drive line as its lighter 28t ton gvw counterpart.

Electric: Tata Prima E.28K is fitted with a PEMA 245kW traction motor providing a maximum torque of 2950 Nm at 3000 rev / min and 2-speed auto shift e-G Box with PTO provision. The motor is powered with a battery pack with capacity of 453 kWh, which provides an operating range of 150 to 200km, ideal for tipper applications. This tipper is configured with an 18m³ box body suitable for multiple applications.

Scania launches G500XT 8x4 heavy tipper

Kolar - Scania Commercial Vehicles India Pvt Ltd of Kolar, Karnataka State - a wholly owned subsidiary of **Scania AB** of Sodertalje, Sweden launched the G500 8x4 super heavy tipper at EXCON 2023.

The G500XT 8x4 tipper is powered with the Super DC 13-litre 500hp engine and fitted with the G33, 14 Forward + 2 Reverse type of gearbox. A robust 395-litre steel fuel tank with fuel optimization unit, a new chassis composition generation that is 40% stronger and robustness specifically developed for mining, and higher safety margins on critical components.



Scania G500 8x4 super heavy tipper

BIZ: Order TECH: Electric Drive

GSRTC celebrates start of operations of Switch EiV electric double deck buses in Gujarat

India – In keeping with its tradition of its British Leyland franchise* days of building double deck buses for India's major cities, **Switch Mobility Automotive Ltd** of Bengaluru (a subsidiary of **Switch Mobility Ltd** of Leeds, UK, which is also a subsidiary of Ashok Leyland Ltd of Chennai), has supplied the **Gujarat State Road Transport Corporation's (GSRTC)** with two of five electric double deck air-conditioned buses – the Switch EiV 22 (Switch Mobility unveils electric double-decker for the Indian market). A ceremony was held to celebrate start of operation at the Gujarat International Finance Tec-City (GIFT City) on the outskirts of Delhi. The five Switch EiV 22 buses in Gujarat are set to operate on the route between Gandhinagar and Ahmedabad along the SG Highway; they are the first e-double deck buses to be delivered to Gujarat; others are already in service in Mumbai and Hyderabad.

Ashok Leyland states the Switch EiV 22 is powered by a liquid cooled, high density, 231 kWh NMC battery pack and uses a 650 V system - the same platform as Switch EiV 12, launched in June

2022, which is also common with Switch e1. (The Switch e1 is the European platform model adapted for Indian conditions). The battery pack, when fully charged, offers a range up to 250 kms in intra-city applications. The chassis is suspended with a **VDL Weweller** air suspension at the front and rear. The Switch electric double decker has 65 seats, almost twice the number of seated passengers as a comparable single deck bus, and with the use of a lightweight aluminium body, it has an increase in kerb weight of just 18%.

Maresh Babu, Chief Executive Officer of Switch Mobility Automotive Ltd, expressed his dedication to redefining urban mobility, emphasising the groundbreaking nature of the Switch EiV 22. "These electric double-deckers aim to provide a panoramic, comfortable, and electrifying experience for passengers, embodying a new era of elevated commuter comfort. With premium seating, extra-wide doors, and innovative features, the buses symbolise not only technological advancement but also a commitment to a transportation system prioritising people and the planet."



Switch EiV 22 double decks

*The Leyland Titan was a forward-control chassis with a front-mounted engine designed to carry double-decker bus bodywork. It was built mainly for the United Kingdom market between 1927 and 1942, and between 1945 and 1969.

The type was widely used in the United Kingdom, and it was also successful in export markets, with numerous examples shipped to Australia, Ireland, India, Spain, South Africa and many other countries. From 1946 specific export models were introduced, although all Titans were right-hand drive regardless of the rule of the road in customer countries.

After Leyland ended the production of the Leyland Titan in UK, Ashok Leyland of India took up production and marketed the bus in South Asia as the Ashok Leyland Titan, which, in much developed form, is still in production. (Source: Wikipedia).

BIZ: Agreement / Product TECH: Electric Drive

IPLTech Electric delivers ten fast charge electric heavy-duty tractor units to mining firm in Udaipur

India – Heavy-duty e-truck builder startup, **IPLTech Electric Pvt Ltd**¹ of Gurugram has delivered to Indian metals (zinc, lead, silver and cadmium) mining company, **Hindustan Zinc Ltd** (a subsidiary of **Vedanta group**) of Udaipur, has delivered ten electric Rhino 5536e tractor trucks. The trucks have been delivered by Hindustan Zinc's logistics partner, Inland EV Green Services Pvt Ltd (a subsidiary of Inland World logistics (Brand Name - Enviirro Wheels) of Mumbai.



IPL's Electric Rhino 5536e tractor trucks on delivery to Hindustan Zinc

It is understood that cab and based chassis for the Rhino 5536e is a re-engineered chassis cab from China. It offers a gross combined vehicle weight (GCVW) of 55 tons is powered by Permanent Magnet Synchronous Motor (PMSM) develops maximum output of 360hp @ 1200 rev/min and torque of 2400Nm @ 600 rev/min using a 258Kwh LFP (Lithium Iron Phosphate) battery pack and which is transferred through a 12 speed automated manual transmission (AMT). The truck chassis features conventional axles and suspension: The front axle is a locally made forged Meritor 7 ton (GAW) axle with parabolic leaf spring suspension and the rear is fitted with a Meritor 21 ton (GCAW)

SRT tandem axle with a Tata Hendrickson Bogie suspension. Its range on a single charge is 185 km with a full rapid recharging time of 90 minutes. It has a slope gradability capability of 28%.

¹**IPLTech Electric Pvt Ltd** (formerly known as **Infraprime Logistics Technologies Pvt Ltd**) of Gurugram, was started in 2019. In July 2022, **TI Clean Mobility Private Ltd (TICMPL)**, a subsidiary of **Tube Investments of India** (a **Murugappa Group** company) bought a majority stake of 65% equity for a total consideration of USD 31.1m. IPL is focussed on the 55-tonne truck segment, covering short haulage operations for the iron and steel, cement, and construction industries. These e-trucks are to be made at the manufacturing facility in Manesar, Haryana.

TICMPL (Tubes India) states it has built a plant with the following potential annual vehicle production capacities: 70,000, electric three-wheelers and 25,000 electric tractors. Current the plant is geared up to make between 3,000 and 3,600 units heavy commercial vehicles a year.



IPL's Electric Rhino 5536e tractor trucks on delivery to Hindustan Zinc

BIZ: Order / Product TECH: Electric Drive

JBM begins delivery of 375 ECOLIFE 12e e-buses to Haryana Transport

India – **JBM Electric Vehicles Pvt Ltd**, a subsidiary of **JBM Auto Ltd (JBM)** of Gurugram has delivered its first batch of five JBM ECOLIFE e12¹ electric buses to **Haryana City Bus Services Ltd**, a subsidiary of **Haryana Transport Department**. This is part of a major order for 375 electric air conditioned full electric buses placed under the National Electric Bus Programme by CESL (Convergence Energy Services Limited) following a major tender for more than 5,000 buses last year.



JBM EV's ECOLIFE e12 e-bus in Haryana Transport livery

In July last year, JBM inaugurated and commenced electric bus manufacture at its plants in Haryana, where it boasts a manufacturing capacity of 20,000 electric buses annually.

¹**ECO-LIFE e12** is fitted with 80-160KW electric motor powered by fast-charging lithium-ion batteries offering a range of up to 200km per day, depending on working conditions. The 12m bus ladder frame chassis with full air suspension front and rear. The newly launched JBM ECOLIFE electric buses, as Zero Emission Vehicles (ZEV), are equipped with fast-charging lithium-ion batteries and boast modern features such as Real-Time Passenger Information System (PIS), Panic Buttons for emergencies, Automatic Bus Vehicle Location System, CCTV cameras, public address system, and stop request buttons.

MKT: Statistics – Rigid trucks

Rigid truck sales stagnate overall but heavy weight volume segment dips 8.9%

India - Sales of medium and heavy rigid trucks (7.5t gvw and above) in India was stable in Q3 (October to December) of FY2023-24 falling by a whisker (-0.1%) to register 63,635 units compared with 63,713 units in same quarter of 2022-23. Exports of rigid trucks increased by 6.5% to 2,209 units (2,074 units), while production of rigid trucks increased by 4% to 69,302 units in Q3 of FY 2023-24 from 66,637 units in the Q3 of the previous year.

Sales of medium-duty rigid trucks sales (7.5t to 12 tons) increased by 18.1% to register 9,454 units in Q3 of FY 2023-24 from 8,004 units in Q3 of FY 2022-23. Exports improved by 45.2% to over 1,100 units and production increased by 37.3% to more than 12,000 (8,800).

Sales of upper medium weight (12t to 18.5t gvw) trucks registered 17,063 units in Q3 of FY 2023-24, a rise of 7.5% compared with 15,869 units in Q3 of FY 2022-23. Yet despite this substantial growth, production decreased by 18.4%!

Sales of lighter-weight heavy-duty rigid trucks (18.5t to 25t gvw) also improved, increasing 6.7% to 5,722 units in Q3 of FY 2023-24 from 5,362 units in the same period of FY2022-23. Production increased by 74.1% incongruously to 12,481 (7,167) perhaps reflecting the lag in sales and eventual production due to a mixture of supply chain issues and production to dealer stock, which has been the tradition in India.

Sales of heavy-duty rigid trucks (above 25t gvw), which remain the largest volume sub-segment by far accounting for more than 50% of the market, shrank by 8.9% from 34,478 units in Q3 of FY 2022-23 to 31,396 units in Q3 of FY 2023-24. Production decreased by 8.8% and exports stagnated at +2.6%.

MKT: Statistics – Light-duty trucks

While LCV truck sales stagnated overall in Q3 of 2023-24 the 3.5 to 6 ton segment makes a major comeback

India - Sales of LCV goods carrier (truck) vehicles gvw ≤ 7.5t stagnated in Q3 of FY 2023-24 with sales rising by just 0.6% to 134,163 units compared with 133,340 units in same period of FY 2022-23. Production also rose by very little (0.4%) to 136,523 units and there was little change in export sales, rising just 0.7% to 12,941.

The second largest segment, GVW ≤ 2t, reflected the market overall; domestic sales dipped by 0.4% to 43,396 units in Q3 of FY2023-24 from 45,364 units in Q3 of FY2022-23, whereas production improved 7.6%, up 3,000 to 43,080 and export sales also added a few, up by 15.6% to register 1,372 units compared with Q3 in the previous year.

In the 2t ≤ GVW ≤ 3.5t segment, which is the largest volume segment, sales increased 8.3% to register 73,361 units in Q3 of FY2023-24 compared with 79,959 units in the same period of FY2022-23. Production, however, decreased by 14.2%.

The 3.5t ≤ GVW ≤ 6t segment, strangely leapt by 330.4% in Q3 of FY 2023-24 to register 11,272 units, up from 2,619 units in the same period of FY 2022-23; production increased by 202.1%

Trucks - Production, domestic sales and exports for October to December 2023-24 v 2022-23									
Manufacturer	Production			Domestic Sales			Exports		
	2022-23	2023-24	% Chg	2022-23	2023-24	% Chg	2022-23	2023-24	% Chg
7.5 tons < GVW ≤ 12 tons									
Ashok Leyland Ltd	918	1,567	70.7	901	1,282	42.3	51	185	262.7
Mahindra Trucks and Buses Ltd	59	130	120.3	60	99	65.0	0	0	0.0
SML Isuzu Ltd	702	558	-20.5	777	515	-33.7	147	0	-100.0
Tata Motors Ltd	3,741	5,620	50.2	2,873	3,724	29.6	307	676	120.2
VECVs - Eicher	3,380	4,211	24.6	3,393	3,834	13.0	282	282	0.0
Sub total	8,800	12,086	37.3	8,004	9,454	18.1	787	1,143	45.2
12 tons < GVW ≤ 18.5 tons									
Ashok Leyland Ltd	5,032	2,526	-49.8	4,437	2,372	-46.5	84	163	94.0
Mahindra Trucks and Buses Ltd	367	423	15.3	389	367	-5.7	14	11	-21.4
SML Isuzu Ltd	12	2	-83.3	12	3	-75.0	0	0	0.0
Tata Motors Ltd	4,269	2,364	-44.6	4,841	7,525	55.4	529	345	-34.8
VECVs - Eicher	5,622	7,172	27.6	6,190	6,796	9.8	131	61	-53.4
Sub total	15,302	12,487	-18.4	15,869	17,063	7.5	758	580	-23.5
18.5 tons < GVW ≤ 25 tons									
Ashok Leyland Ltd	2,824	4,538	60.7	2,353	4,364	85.5	54	80	48.1
Tata Motors Ltd	3,298	6,740	104.4	1,999	139	-93.0	246	174	-29.3
VECVs - Eicher	1,045	1,203	15.1	1,010	1,219	20.7	33	31	-6.1
Sub total	7,167	12,481	74.1	5,362	5,722	6.7	333	285	-14.4
GVW < 25 tons									
Ashok Leyland Ltd	14,875	10,294	-30.8	13,193	10,162	-23.0	42	28	-33.3
Mahindra Trucks and Buses Ltd	449	581	29.4	640	569	-11.1	14	3	-78.6
Tata Motors Ltd	18,977	20,280	6.9	19,472	19,276	-1.0	121	162	33.9
VECVs - Eicher	1,067	1,093	2.4	873	1,026	17.5	19	8	-57.9
VECVs - Volvo	0	0	0.0	300	363	21.0	0	0	0.0
Sub total	35,368	32,248	-8.8	34,478	31,396	-8.9	196	201	2.6
Total	66,637	69,302	4.0	63,713	63,635	-0.1	2,074	2,209	6.5

Source: RACE Innovations Inc. Note: These figures do not include sales by Bharat Benz and some imported trucks

Light Trucks - Production, domestic sales and exports for October to December 2023-24 v 2022-23									
Manufacturer	Production			Domestic Sales			Exports		
	2022-23	2023-24	% Chg	2022-23	2023-24	% Chg	2022-23	2023-24	% Chg
GVW ≤ 2 Tons									
Mahindra & Mahindra Ltd	7,902	8,307	5.1	10,236	11,267	10.1	20	15	-25.0
Maruti Suzuki India Ltd	4,564	7,568	65.8	7,098	8,117	14.4	981	545	-44.4
Piaggio Vehicles Pvt Ltd	0	0	0.0	0	0	0.0	0	0	0.0
Tata Motors Ltd	27,589	27,205	-1.4	28,030	24,012	-14.3	186	812	336.6
Sub total	40,055	43,080	7.6	45,364	43,396	-4.3	1,187	1,372	15.6
2 Tons ≤ GVW ≤ 3.5 Tons									
Ashok Leyland Ltd	16,470	17,260	4.8	15,854	16,342	3.1	166	283	70.5
Force Motors Ltd	98	12	-87.8	61	8	-86.9	3	0	100.0
Isuzu Motors India Pvt Ltd	3,311	3,635	9.8	373	425	13.9	3,849	6,811	77.0
Mahindra & Mahindra Ltd	50,172	36,009	-28.2	48,091	42,379	-11.9	5,487	2,643	-51.8
Tata Motors Ltd	15,500	16,572	6.9	15,463	14,952	-3.3	1,464	951	-35.0
Toyota Kirloskar Motor Pvt Ltd	119	15	-87.4	117	-745	-736.8	0	0	0.0
Sub total	85,670	73,503	-14.2	79,959	73,361	-8.3	10,969	10,688	-2.6
3.5 Tons ≤ GVW ≤ 6 Tons									
Force Motors Ltd	523	206	-60.6	495	194	-60.8	2	28	1300.0
Mahindra & Mahindra Ltd	83	9,374	11194.0	154	9,349	5970.8	5	7	40.0
SML Isuzu Ltd	125	98	-21.6	112	83	-25.9	3	0	-100.0
Tata Motors Ltd	2,794	2,115	-24.3	1,436	1,173	-18.3	170	192	12.9
VECVs - Eicher	567	567	0.0	422	473	12.1	130	76	-41.5
Sub total	4,092	12,360	202.1	2,619	11,272	330.4	310	303	-2.3
6 Tons ≤ GVW ≤ 7.5 Tons									
Ashok Leyland Ltd	535	677	26.5	303	418	38.0	104	298	186.5
Mahindra & Mahindra Ltd	177	262	48.0	236	322	36.4	0	0	0.0
SML Isuzu Ltd	388	686	76.8	320	551	72.2	60	0	-100.0
Tata Motors Ltd	3,126	3,712	18.7	2,628	2,981	13.4	180	191	6.1
VECVs - Eicher	1,886	2,243	18.9	1,911	1,862	-2.6	39	89	128.2
Sub total	6,112	7,580	24.0	5,398	6,134	13.6	383	578	50.9
Total	135,929	136,523	0.4	135,929	134,163	0.6	12,849	12,941	0.7

Source: RACE Innovations Inc. Note: These figures do not include sales by Bharat Benz and some imported trucks

to more than 12,000 (4,092 in Q3/2022-23). Mahindra dominates the segment with the sale of 9,349 units, and it looks to strengthen sales further with the market introduction of the its new model

Bolero Maxx HD truck.

The 6≤ GVW ≤7.5t truck segment registered an increase of 13.6% to 6,134 units. Exports improved by 50.9% and output went up by 24% in the quarter.

MKT: Statistics – Tractors

Tractor demand strong in Q3 with sales up 25%

India - Tractor sales increased by 25.3% during the third quarter of FY 2023-24 to register 17,010 units compared with 13,578 units in the same quarter of the previous year (FY 2022-23). Tractor production increased by 24.2% overall from 13,717 units to 17,030 units and export sales decline by 14.3%.

The light-weight tractor (26.4 tons < GVW ≤ 40 tons) segment saw sales fall sharply by 42.5% to 784 units in the Q3 of FY 2023-24 from 1,364 units in the Q3 of FY 2022-23. Export sales also declined sharply by 56.5% yet production increased by 69.4%.

The light-heavy-duty segments (40T < GCW < 46t) segment saw sales rise by 62.5% to register 881 units in Q3 of FY 2023-24 from 542 units in the same quarter of FY 2022-23. Yet incongruously production decreased by 84.3% to just 154 (evidence that dealers carry stock and production is not in line with demand / deliveries and vice versa) and exports were reduced to zero!

The main tractor segment, where the volume of tractors is bought, the heavy-duty tractor unit (46t < GVW < 55t) segment, saw sales increase by a massive 31.5% from 11,672 units in Q3 of FY 2022-23 to 15,345 units in Q3 of FY 2023-24. Production increased at similar levels with growth of 30.9% and an output of almost 16,000 units; a segment dominated still by Tata Motors.

Tractors - Production, domestic sales and exports for October to December 2023-24 v 2022-23									
Manufacturer	Production			Domestic Sales			Exports		
	2022-23	2023-24	% Chg	2022-23	2023-24	% Chg	2022-23	2023-24	% Chg
26.4 tons < GVW ≤ 40 tons									
Ashok Leyland Ltd	499	706	41.5	506	596	17.8	5	10	100.0
Mahindra Trucks and Buses Ltd	3	0	-100.0	26	0	-100.0	0	0	0.0
Tata Motors Ltd	0	0	0.0	832	0	0.0	0	0	0.0
VECVs - Eicher	18	175	872.2	0	188	100.0	18	0	-100.0
Sub total	520	881	69.4	1,364	784	-42.5	23	10	-56.5
40 tons < GVW ≤ 46 tons									
Ashok Leyland Ltd	52	101	94.2	10	0	-100.0	0	0	0
Mahindra Trucks and Buses Ltd	7	48	585.7	20	35	75.0	2	0	-100.0
Tata Motors Ltd	789	0	-100.0	355	824	132.1	37	0	-100.0
VECVs - Eicher	130	5	-96.2	157	22	-86.0	0	0	0.0
Sub total	978	154	-84.3	542	881	62.5	39	0	-100.0
46 tons < GVW ≤ 55 tons									
Ashok Leyland Ltd	3,960	4,512	13.9	3,828	4,630	21.0	0	0	0.0
Mahindra & Mahindra Ltd	406	543	33.7	450	800	77.8	0	0	0.0
Tata Motors Ltd	7,386	10,388	40.6	6,966	9,424	35.3	36	74	105.6
VECVs - Eicher	467	552	18.2	417	469	12.5	0	0	0.0
VECV - Volvo	0	0	0.0	11	22	100.0	0	0	0.0
Sub total	12,219	15,995	30.9	11,672	15,345	31.5	36	74	105.6
Total	13,717	17,030	24.2	24.2	24.2	25.3	98	84	-14.3

Source: RACE Innovations Inc Note: These figures do not include sales by Bharat Benz and some imported trucks

MKT: Statistics – Bus & Coach

Bus and coach sales in Q3 of FY 23-24 up by nearly 30% at 10,799 vehicles

India - Domestic sales of buses and coach of 7.5t gvw and above, finished the third quarter (October to December) of the financial year 2023-24 up by 28.8% with registrations of 10,799 units; this compares with 8,387 units in Q3 of FY 2022-23. Total bus production increased in the first quarter of FY 2023-24 by 16.8% to 13,100 to meet demand. Total exports decreased by 8.3% in Q3 of FY 2023-24 to record 2,784 units, down from 3,035 units in Q3 FY 2022-23.

Turning to the individual segments, sales of medium-duty buses (ICV: 7.5 tonnes - 12 tonnes) improved by 40.3% to total 5,172 in Q3 this FY from 3,687 units in same quarter the previous year. Production of ICV buses and coaches increased by 16.2% to register 7,144 units (6,148 units), and exports fell by 17.5% to 664 (805). VECV Eicher led this segment just ahead of Tata.

The medium duty bus segment (12t<gvw≤ 14.5t) saw demand contract slightly in the period under review, shrinking by 5% in Q3 of FY 2023-24 to 738 units compared with 777 units in same period of the previous year. This remains a segment that's still very unrepresented.

The medium and heavy bus and coach segment (14.5t<gvw≤ 18.5t) saw domestic sales grow by 24.4% in Q3 of FY 2023-24 to 4,878 units compared with 3,922 units in Q3 of the previous fiscal year. Production increase by 18.7% to deliver 5,290 in the Q3 period, while exports shrank slightly, down by 8.5% to 2,041 units from 2,230 units previously.

One point of note were the first deliveries of Switch Mobility's electric double decker in the over 18.5 ton GVW segment; Switch has had one additional order recently for the EIV 22 decker.

Bus & Coach - Production, domestic sales and exports for October to December 2023-24 v 2022-23									
Manufacturer	Production			Domestic Sales			Exports		
	2022-23	2023-24	% Chg	2022-23	2023-24	% Chg	2022-23	2023-24	% Chg
7.5 tons < GVW ≤ 12 tons									
Ashok Leyland Ltd	1,453	997	-31.4	430	378	-12.1	596	468	-21.5
Force Motors	0	0	0.0	0	0	0.0	0	0	0.0
SML Isuzu Ltd	929	919	-1.1	509	537	5.5	9	10	11.1
Tata Motors Ltd	1,727	2,163	25.2	1,276	2,075	62.6	0	18	100.0
VECVs - Eicher	2,039	3,065	50.3	1,472	2,182	48.2	200	168	-16.0
Sub total	6,148	7,144	16.2	3,687	5,172	40.3	805	664	-17.5
12 tons < GVW ≤ 14.5 tons									
Ashok Leyland Ltd	431	462	7.2	362	444	22.7	0	0	0.0
Olectra Greentech Limited	136	98	-27.9	135	98	-27.4	0	0	0.0
Tata Motors Ltd	0	0	0.0	215	128	-40.5	0	79	100.0
VECVs - Eicher	40	91	127.5	65	68	4.6	0	0	0.0
Sub total	607	651	7.2	777	738	-5.0	0	79	100.0
14.5 tons < GVW ≤ 18.5 tons									
Ashok Leyland Ltd	3,956	4,569	15.5	2,201	3,022	37.3	1,685	1,301	-22.8
Olectra Greentech Limited	12	61	NA	12	61	NA	0	0	NA
Switch Mobility Automotive Ltd	0	23	100.0	0	10	100.0	0	0	100.0
Tata Motors Ltd	0	0	0.0	1,247	1,249	0.2	502	641	27.7
VECV-Eicher	487	637	30.8	462	536	16.0	43	99	130.2
Sub total	4,455	5,290	18.7	3,922	4,878	24.4	2,230	2,041	-8.5
18.5 tons < GVW									
Olectra Greentech Limited	1	0	0.0	1	0	0.0	0	0	0.0
Switch Mobility Automotive Ltd	0	15	100.0	0	11	100.0	0	0	0.0
	1	15	1400.0	1	11	100.0	0	0	0.0
Total	11,211	13,100	16.8	8,387	10,799	28.8	3,035	2,784	-8.3

Source: RACE Innovations Inc

MKT: Statistics – Light-duty bus

LCV bus demand increased across all segments in Q3 of fiscal year 2023-24

India - Sales of light duty buses and coaches (7.5t & below) in quarter three (Q3:October to December) of FY (fiscal year) 2023-24 increased by 9.2% to register 8,837 units when compared with the 8,093 units sold in the same period in FY2022-23. Production increased by 24.4% from 9,237 units to 14,810 units, while exports grew by 52.4% from 588 units to 896 units.

In the minibus segment with seats more than 13 seats (GVW ≤ 5 tons no. of seats including the driver exceeding 13) sales decreased by 23.2% to register 2,801 units in Q3 of FY 2023-24, down from 3,647 units in Q3 of FY 2022-23. Production increased by 67.4% to more than 4,000 units and export sales ground almost to a halt.

In minibus segment with fewer than 13 seats, sales rose by 30.8% from 1,851 units in Q3 of 2022-23 to 2,422 units in Q3 of FY 2022-24. Production increased by 122.1% to 5,178.

In the heavier weight light duty small bus sector (5 tons ≤ GVW ≤ 7.5 tons), domestic sales were also up, increasing by 39.3% to 3,614 units from 2,595 units; exports improved by more than 400 units or by 71% to almost 900 units and production on the back of this improved demand increased by 24.4%.

Light Bus & Coach - Production, domestic sales and exports for October to December 2023-24 v 2022-23									
Manufacturer	Production			Domestic Sales			Exports		
	2022-23	2023-24	% Chg	2022-23	2023-24	% Chg	2022-23	2023-24	% Chg
GVW ≤ 5 Tons (No. of seats including driver exceeding 13)									
Ashok Leyland Ltd	0	347	0.0	0	0	0.0	0	0	0.0
Force Motors Ltd	1,887	2,835	50.2	1,715	2,318	35.2	50	21	-58.0
Mahindra Trucks and Buses Ltd	144	220	52.8	148	197	33.1	0	0	0.0
SML Isuzu Ltd	0	0	0.0	0	0	0.0	0	0	0.0
Tata Motors Ltd	387	646	66.9	1,784	286	-84.0	17	0	0.0
Toyota Kirloskar Motor Pvt Ltd	0	0	0.0	0	0	0.0	0	0	0.0
Sub total	2,418	4,048	67.4	3,647	2,801	-23.2	67	21	-68.7
GVW ≤ 5 Tons (No. of seats including driver not exceeding 13)									
Force Motors Ltd	1,429	1,923	34.6	1,408	1,821	29.3	0	1	100.0
SML Isuzu Ltd	0	0	0.0	0	0	0.0	0	0	0.0
Tata Motors Ltd	902	3,255	260.9	443	601	35.7	11	2	-81.8
VECVs - Eicher	0	0	0.0	0	0	0.0	0	0	0.0
Sub total	2,331	5,178	122.1	1,851	2,422	30.8	11	3	-72.7
5 Tons ≤ GVW ≤ 7.5 Tons									
Ashok Leyland Ltd	356	0	-100.0	248	103	-58.5	149	312	109.4
Force Motors Ltd	681	749	10.0	605	815	34.7	2	15	650.0
Mahindra & Mahindra Ltd	211	361	71.1	201	430	113.9	0	0	0.0
SML Isuzu Ltd	1,287	1,417	10.1	680	693	1.9	33	75	127.3
Tata Motors Ltd	1,392	2,367	70.0	524	1,017	94.1	296	459	55.1
VECVs - Eicher	561	690	23.0	337	556	65.0	30	11	-63.3
Sub total	4,488	5,584	24.4	2,595	3,614	39.3	510	872	71.0
Total	9,237	14,810	60.3	8,093	8,837	9.2	588	896	52.4

Source: RACE Innovations Inc

MKT: Statistics – Rigid trucks

Demand for light heavy-duty rigid trucks increases 24% from April to December 2023

India - India - Sales of medium and heavy rigid trucks (7.5t gvw and above) in India declined marginally and by 0.5% in the first nine months (April-December) of FY 2023-24 to 180,986 units from 181,934 units in same period of the year 2022-23. Exports of rigid trucks declined by 39.3% to 5,630 units in the first three-quarters of FY 2023-24 from 9,274 units in the same period of the previous fiscal year. Production of the rigid trucks fell by 0.3% to 198,141 units from 198,820 units in the same three-quarter year period of 2022-23.

Sales of medium-duty rigid trucks (7.5t to 12 tons) increased 7.7% to 27,255 units in the first three-quarters of FY 2023-24 from 25,297 units in the same period of FY 2022-23. Production increased by 11.7% to 35,652 units, but export sales fell by 17.9%.

Sales of upper medium weight (12t to 18.5t gvw) rigid trucks decreased by 9.3% during the first three-quarters of 2023-24 to register 43,672 units compared with 48,126 units in the same period of 2022-23. Exports fell by 47.2% and production followed suit, declining by 32.1%.

In contrast to the other segments, sales of lighter-weight heavy-duty rigid trucks (18.5t to 25t gvw) surged 23.9% to 18,682 units in the first three-quarters of 2023-24, up from 15,076 units in the same period of 2022-23. Production increased substantially, up by 62.9% to almost 35,000 (21,000) but exports tumbled by more than half.

Sales of heavy-duty rigid trucks (above 25t gvw) fell marginally by 2.2% to 91,377 units in the first

Trucks - Production, domestic sales and exports for April to December 2023-24 v 2022-23									
Manufacturer	Production			Domestic Sales			Exports		
	2021-22	2022-23	% Chg	2021-22	2022-23	% Chg	2021-22	2022-23	% Chg
7.5 tons < GVW ≤ 12 tons									
Ashok Leyland Ltd	2,979	4,284	43.8	2,620	3,806	45.3	397	372	-6.3
Mahindra Trucks and Buses Ltd	226	319	41.2	223	300	34.5	0	0	0.0
SML Isuzu Ltd	1,745	1,658	-5.0	1,828	1,492	-18.4	174	20	-88.5
Tata Motors Ltd	16,203	16,783	3.6	10,860	10,256	-5.6	1,397	1,372	-1.8
VECVs - Eicher	10,753	12,608	17.3	9,766	11,401	16.7	1,159	802	-30.8
Sub total	31,906	35,652	11.7	25,297	27,255	7.7	3,127	2,566	-17.9
12 tons < GVW ≤ 18.5 tons									
Ashok Leyland Ltd	14,676	7,806	-46.8	12,910	7,133	-44.7	1,109	676	-39.0
Mahindra Trucks and Buses Ltd	992	1,048	5.6	947	1,029	8.7	14	12	100.0
SML Isuzu Ltd	22	19	-13.6	24	17	-29.2	0	0	0.0
Tata Motors Ltd	16,035	5,928	-63.0	17,923	17,427	-2.8	1,723	890	-48.3
VECVs - Eicher	17,885	18,864	5.5	16,322	18,066	10.7	725	307	-57.7
Sub total	49,610	33,665	-32.1	48,126	43,672	-9.3	3,571	1,885	-47.2
18.5 tons < GVW ≤ 25 tons									
Ashok Leyland Ltd	8,453	14,135	67.2	7,731	13,490	74.5	298	205	-31.2
Tata Motors Ltd	10,153	17,260	70.0	5,014	2,183	-56.5	1,263	431	-65.9
VECVs - Eicher	2,683	3,282	22.3	2,331	3,009	29.1	139	83	-40.3
Sub total	21,289	34,677	62.9	15,076	18,682	23.9	1,700	719	-57.7
GVW ≤ 25 tons									
Ashok Leyland Ltd	38,259	32,383	-15.4	36,206	31,249	-13.7	78	33	-57.7
Mahindra Trucks and Buses Ltd	1,761	1,801	2.3	1,623	1,743	7.4	55	25	-54.5
Tata Motors Ltd	53,350	57,152	7.1	52,505	54,920	4.6	470	373	-20.6
VECVs - Eicher	2,645	2,811	6.3	2,296	2,585	12.6	273	29	-89.4
VECVs - Volvo	0	0	0.0	805	880	9.3	0	0	0.0
Sub total	96,015	94,147	-1.9	93,435	91,377	-2.2	876	460	-47.5
Total	198,820	198,141	-0.3	181,934	180,986	-0.5	9,274	5,630	-39.3

Source: RACE Innovations Inc Note: These figures do not include sales by Bharat Benz and some imported trucks

threequarters of this fiscal year, down from 93,435 units the same period of FY 2022-23. Production

decreased by 1.9% to 94,147 down from 96,000 and exports fell by 47.5%.

MKT: Statistics – Light-duty trucks

Mixed LCV truck segment performance leaves sales 2.9% lower at the nine month mark of FY 2023-24

India - Sales of LCV goods carrier (trucks) vehicles, gvw ≤ 7.5t, fell marginally during the first nine months (April to December) of fiscal year (FY) 2023-24 by 2.9% to 399,988 units from 412,019 units in same period of 2022-23. Production of LCV trucks decreased also and by 2.3% to 440,482 units (451,000), while exports fell by more than 7,000 units (-17.3%).

Sales in the GVW ≤ 2t segment fell by 11.8% to 127,693 units from 144,761 units, while production decreased by 9.9% to 134,088 (148,796) and exports totalled 4,703 vehicles, down by 12.2%.

The largest volume segment, 2t ≤ GVW ≤ 3.5t, saw sales dip by 1.1% to 238,890 units in the first threequarters of FY 2023-24 from 241,558 units, with production following suit, down 1.2% at 265,045 (268,395) and exports ended the period lower by 17.5% at 28,291 (34,309).

The medium weight segment 3.5t ≤ GVW ≤ 6t saw sales surge 80.9% in the first three-quarter period of FY 2023-24 to total 15,720 units compared with just 8,690 units in same period of 2022-23. Production increased by 79.0% to more than 19,000 (10,892) but exports slowed over the period by 24%.

The heavy lighter weight truck segment (6 ≤ GVW ≤ 7.5t) saw sales improve 4% in the first nine months of FY 2023-24 to 17,685 units (17,010), whereas production declined 4.6% and exports shrank 24.3%.

Manufacturer	Production			Domestic Sales			Exports		
	2021-22	2022-23	% Chg	2021-22	2022-23	% Chg	2021-22	2022-23	% Chg
GVW ≤ 2 Tons									
Mahindra & Mahindra Ltd	31,340	30,354	-3.1	31,844	31,896	0.2	367	25	-93.2
Maruti Suzuki India Ltd	29,294	23,209	-20.8	26,607	23,613	-11.3	2,543	1,541	-39.4
Piaggio Vehicles Pvt Ltd			0.0			0.0			0.0
Tata Motors Ltd	88,162	80,525	-8.7	86,310	72,184	-16.4	2,454	3,143	28.1
Sub total	148,796	134,088	-9.9	144,761	127,693	-11.8	5,364	4,709	-12.2
2 Tons ≤ GVW ≤ 3.5 Tons									
Ashok Leyland Ltd	47,818	49,128	2.7	46,236	47,098	1.9	566	971	71.6
Force Motors Ltd	233	48	-79.4	190	40	-78.9	3	7	100.0
Isuzu Motors India Pvt Ltd	14,012	15,765	12.5	1,014	1,379	36.0	12,084	14,577	20.6
Mahindra & Mahindra Ltd	154,894	151,898	-1.9	145,351	145,107	-0.2	16,976	10,158	-40.2
Tata Motors Ltd	50,859	47,128	-7.3	48,193	44,874	-6.9	4,680	2,578	-44.9
Toyota Kirloskar Motor Pvt Ltd	579	1,080	100.0	574	392	100.0	0	0	0.0
Sub total	268,395	265,047	-1.2	241,558	238,890	-1.1	34,309	28,291	-17.5
3.5 Tons ≤ GVW ≤ 6 Tons									
Force Motors Ltd	1,286	753	-41.4	1,285	716	-44.3	3	39	100.0
Mahindra & Mahindra Ltd	672	9,699	1343.3	572	9,676	1591.6	110	30	-72.7
SML Isuzu Ltd	250	287	14.8	278	268	-3.6	14	0	-100.0
Tata Motors Ltd	6,900	6,983	1.2	5,281	3,644	-31.0	693	601	-13.3
VECVs - Eicher	1,784	1,773	-0.6	1,274	1,416	11.1	427	278	-34.9
Sub total	10,892	19,495	79.0	8,690	15,720	80.9	1,247	948	-24.0
6 Tons ≤ GVW ≤ 7.5 Tons									
Ashok Leyland Ltd	1,380	1,666	20.7	941	1,089	15.7	254	518	103.9
Mahindra & Mahindra Ltd	858	792	-7.7	876	887	1.3	0	0	0.0
SML Isuzu Ltd	1,067	1,303	22.1	1,116	1,087	-2.6	98	5	100.0
Tata Motors Ltd	13,641	11,565	-15.2	8,437	8,836	4.7	848	397	-53.2
VECVs - Eicher	5,965	6,526	9.4	5,640	5,786	2.6	307	221	-28.0
Sub total	22,911	21,852	-4.6	17,010	17,685	4.0	1,507	1,141	-24.3
Total	450,994	440,482	-2.3	412,019	399,988	-2.9	42,427	35,089	-17.3

Source: RACE Innovations Inc Note: These figures do not include sales by Bharat Benz and some imported trucks

MKT: Statistics – Tractors

Tractor segment resurgent in first nine months of FY 2023-24

India - Total haulage tractor sales increased by 38.8% in the first three quarters (April to December) of fiscal year (FY) 2023-24 to register 49,028 units compared with 35,334 units in the same period of the previous fiscal year (2022-23). Tractor production was also up and by 40.9% at 50,263 units compared with 35,677, but exports fell by 44.5%.

Light-weight tractor (26.4 tons < GVW ≤ 40 tons) segment sales improved by 2.3% to 4,052 units in the first three-quarters of 2023-24 from 3,960 units in the same period of 2022-23. Production increased by 58.9% to 2,163 units, but still representing only half the numbers sold during the period.

The light-heavy-duty segment (40t < GCW < 46t) witnessed sales growth of 51.3% to 2,356 units in the first three quarter period of FY 2023-24 from 1,557 units in the same period of 2022-23. Production increased by 1.3% to more than 3,000 and exports fell by 64.2%.

Sales of tractors in the heavy-duty segment (46t < GVW < 55t) increased by 42.9% to 42,620 units, up from 29,817 units in the first three quarters of 2022-23. Production increased by 43.8% to more than 45,000, while export sales also increased.

Incredibly, the tractor segment remains a duopoly between Tata Motors, as the clear market leader and Ashok Leyland.

Manufacturer	Production			Domestic Sales			Exports		
	2021-22	2022-23	% Chg	2021-22	2022-23	% Chg	2021-22	2022-23	% Chg
26.4 tons < GVW ≤ 40 tons									
Ashok Leyland Ltd	1,168	1,979	69.4	1,195	1,864	56.0	60	10	-83.3
Mahindra Trucks and Buses Ltd	55	0	-100.0	100	1	-99.0	0	0	0.0
Tata Motors Ltd	0	0	0.0	2,577	1,999	-22.4	0	0	0.0
VECVs - Eicher	138	184	33.3	88	188	100.0	59	8	-86.4
Sub total	1,361	2,163	58.9	3,960	4,052	2.3	119	18	-84.9
40 tons < GVW ≤ 46 tons									
Ashok Leyland Ltd	102	276	170.6	50	35	-30.0	0	0	100.0
Mahindra Trucks and Buses Ltd	52	208	300.0	42	153	264.3	24	10	100.0
Tata Motors Ltd	2,577	2,098	-18.6	1,226	1,802	47.0	125	47	-62.4
VECVs - Eicher	239	427	78.7	239	366	53.1	10	0	-100.0
Sub total	2,970	3,009	1.3	1,557	2,356	51.3	159	57	-64.2
46 tons < GVW ≤ 55 tons									
Ashok Leyland Ltd	9,095	12,771	40.4	8,938	12,690	42.0	11	2	100.0
Mahindra & Mahindra Ltd	1,307	2,650	102.8	1,296	2,490	92.1	0	0	0.0
Tata Motors Ltd	19,862	28,171	41.8	18,360	25,941	41.3	64	119	100.0
VECVs - Eicher	1,082	1,499	38.5	1,045	1,278	22.3	0	0	0.0
VECV - Volvo	0	0	0.0	178	221	24.2	0	0	0.0
Sub total	31,346	45,091	43.8	29,817	42,620	42.9	75	121	61.3
Total	35,677	50,263	40.9	35,334	49,028	38.8	353	196	-44.5

Source: RACE Innovations Inc Note: These figures do not include sales by Bharat Benz and some imported trucks

This phenomenon stems from many years of sales of the same brand year on year, which makes repairing and replacement of components in a

country as vast as India, relatively simple and easy to do, either sourcing those components from dealers or cannibalizing other vehicles.

MKT: Statistics – Bus & Coach

Bus and coach sales recover strongly in April to December of FY2023-24

India - Sales of buses and coaches (7.5t & above) increased by 37.7% in first three quarters (April to December) of fiscal year (FY) 2023-24 to register 33,088 units compared with 24,025 units in same three quarter period of 2022-23. Total bus and coach production increased by 30.2% from 28,371 units in same period of 2022-23 to 36,939 units in April to December of FY 2023-24. Bus and coach exports (>7.5t gvw) rose marginally by 3.8% to 7,691 units in the first three quarters of FY 2022-23, up from 7,406 units in same three quarter period of FY 2022-23.

Turning to the individual segments, domestic sales of medium-duty buses (ICV: 7.5 tonnes - 12 tonnes) increased by 26% to 18,389 units, up from 14,589 units in the same period of the year before, while production also improved by a similar margin, up by 26.7% from 16,905 units to 21,427 units. Export sales increased by 10.8% from 2,236 to 2,477 units.

The medium and heavy bus and coach segment (12t<gww≤ 14.5t) experienced a sales growth of 57.3% to 2,464 units in the first nine months of FY 2023-24 compared with 1,566 units in same period in the prior year.

The heavy bus and coach segment (14.5t<gww≤ 18.5t) enjoyed strong demand and sales growth of 54.1% in the first three quarters of FY 2023-24 to 12,124 units compared with 7,869 units. Exports rose marginally by 1.3% to 5,135 units from 5,070 units, while output increased 30.2% to almost 37,000 vehicles (28,371)!

Bus & Coach - Production, domestic sales and exports for April to December 2023-24 v 2022-23

Manufacturer	Production			Domestic Sales			Exports		
	2021-22	2022-23	% Chg	2021-22	2022-23	% Chg	2021-22	2022-23	% Chg
7.5 tons < GVW ≤ 12 tons									
Ashok Leyland Ltd	3,227	3,141	-2.7	1,306	1,887	44.5	1,246	1,396	12.0
Force Motors	37	0	0.0	37	0	0.0	0	0	0.0
SML Isuzu Ltd	2,609	3,191	22.3	2,261	2,891	27.9	18	51	183.3
Tata Motors Ltd	3,641	5,668	55.7	4,802	5,837	21.6	413	576	100.0
VECVs - Eicher	7,391	9,427	27.5	6,183	7,774	25.7	559	454	-18.8
Sub total	16,905	21,427	26.7	14,589	18,389	26.0	2,236	2,477	10.8
12 tons < GVW ≤ 14.5 tons									
Ashok Leyland Ltd	971	1,817	87.1	865	1,689	95.3	0	0	0.0
Olectra Greentech Limited	300	137	-54.3	299	137	-54.2	0	0	0.0
Tata Motors Ltd	0	0	0.0	317	438	38.2	100	79	-21.0
VECVs - Eicher	54	277	413.0	85	200	135.3	0	0	0.0
Sub total	1,325	2,231	68.4	1,566	2,464	57.3	100	79	100.0
14.5 tons < GVW ≤ 18.5 tons									
Ashok Leyland Ltd	8,674	11,143	28.5	4,615	7,640	65.5	3,931	3,559	-9.5
Olectra Greentech Limited	128	96	NA	128	96	-25.0	0	0	NA
Switch Mobility Automotive Ltd	0	32	100.0	0	28	100.0	0	0	0.0
Tata Motors Ltd	0	0	0.0	2,126	2,991	40.7	906	1,247	37.6
VECV-Eicher	1,338	1,923	43.7	1,000	1,369	0.0	233	329	0.0
Sub total	10,140	13,194	30.1	7,869	12,124	54.1	5,070	5,135	1.3
18.5 tons < GVW									
Olectra Greentech Limited	1	66	6500.0	1	66	6500.0	0	0	0.0
Switch Mobility Automotive Ltd	0	21	100.0	0	45	100.0	0	0	0.0
Sub total	1	87	8600.0	1	111	11000.0	0	0	0.0
Total	28,371	36,939	30.2	24,025	33,088	37.7	7,406	7,691	7,691

Source: RACE Innovations Inc

MKT: Statistics – Light-duty bus

LCV bus demand trending upwards in FY2023-24 with total sales exceeding 51,000 units

India - Sales of light-duty buses (7.5t & below) increased by 20.3% to 36,417 units in the first three quarter period (April December) of fiscal year (FY) 2023-24, from 30,278 units in same period of FY 2022-23. Production increased by 64.3% to more than 51,000 units, and exports rose by 45.8% to 2,172 units.

In the minibus segment with seats of more than 13 seats (GVW ≤ 5 tons no. of seats including the driver exceeding 13) sales increased by 3.1% to 10,886 units from 10,558 units; exports rose up by 7.5%, while production also soared by 38.1% to 12,800 (9,272).

In minibus segment with fewer than 13 seats, sales increased 9.3% from 7,750 units to 8,472 units in same period of 2023. Production increased incongruously by 132.1% to more than 18,000 compared with fewer than 8,000 units in the same period of FY 2022-23. Export sales tumbled by 96.0%.

In the heavier weight light duty small bus sector (5 tons ≤ GVW ≤ 7.5 tons), domestic sales increased by 42.5% to 17,059 units in three-quarter year of 2023-24, up from 11,970 units in same period of 2022-23. Exports too increased strongly during the period, up 61.2% to 2,025 units, while production increased to match demand, up by 44.3% to more than 20,000 units!

Light Bus & Coach - Production, domestic sales and exports for April to December 2023-24 v 2022-23

Manufacturer	Production			Domestic Sales			Exports		
	2021-22	2022-23	% Chg	2021-22	2022-23	% Chg	2021-22	2022-23	% Chg
GVW ≤ 5 Tons (No. of seats including driver exceeding 13)									
Ashok Leyland Ltd	0	347	100.0	0	0	0.0	0	0	0.0
Force Motors Ltd	5,379	8,884	65.2	5,049	8,005	58.5	95	129	35.8
Mahindra Trucks and Buses Ltd	413	651	57.6	383	655	71.0	0	0	0.0
SML Isuzu Ltd	0	30	100.0	0	21	100.0	0	0	0.0
Tata Motors Ltd	3,480	2,888	-17.0	5,126	2,205	-57.0	38	14	-63.2
Toyota Kirloskar Motor Pvt Ltd			0.0			0.0			0.0
Sub total	9,272	12,800	38.1	10,558	10,886	3.1	133	143	7.5
GVW ≤ 5 Tons (No. of seats including driver not exceeding 13)									
Force Motors Ltd	4,664	5,891	26.3	4,651	5,680	22.1	2	2	0.0
SML Isuzu Ltd	0	0	0.0	0	37	100.0	0	0	0.0
Tata Motors Ltd	3,203	12,368	286.1	3,099	2,755	0.0	99	2	-98.0
VECVs - Eicher			100.0			0.0			0.0
Sub total	7,867	18,259	132.1	7,750	8,472	9.3	101	4	-96.0
5 Tons ≤ GVW ≤ 7.5 Tons									
Ashok Leyland Ltd	947	559	-41.0	652	495	-24.1	293	509	100.0
Force Motors Ltd	1,831	3,033	65.6	1,701	2,894	70.1	19	49	157.9
Mahindra & Mahindra Ltd	491	1,650	236.0	470	1,637	100.0	0	0	0.0
SML Isuzu Ltd	3,672	4,262	16.1	3,081	3,622	17.6	55	89	61.8
Tata Motors Ltd	5,425	8,885	63.8	4,361	6,440	47.7	763	1,300	70.4
VECVs - Eicher	2,029	2,376	17.1	1,705	1,971	15.6	126	78	-38.1
Sub total	14,395	20,765	44.3	11,970	17,059	42.5	1,256	2,025	61.2
Total	31,534	51,824	64.3	30,278	36,417	20.3	1,490	2,172	45.8

Source: RACE Innovations Inc