

# Busworld Kortrijk points at an electromobile future



**Global bus industry makes a beeline for Busworld Kortrijk with a strong message for the future.**

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Opening its doors to the stakeholders of the bus industry from the world over, Busworld Kortrijk, provided an insight into what is currently the scenario, and what beholds the future. The Belgian skies, given the states' proximity to the sea, gave an impression of being cloudy, and the weather felt like it was a touch humid. An intermittent rain failed to dampen the enthusiasm of those who came to the 23rd edition of Busworld Kortrijk, approximately 100 kilometers from Brussels. Regarded as the biggest bus fair in the world, Busworld Kortrijk (2015), attracted 411 exhibitors from 36 countries, including 67 bus and coach manufacturers. Comprising three different strands — coach

builders, accessories and services respectively, the fair, a biennial affair, was spread over an area of 61,000 sq. m. The best edition ever in the fair's 44-year history according to Inge Buytaert, Marketing & Communication Manager, Busworld (B.A.A.V), the professional bus and coach fair at Kortrijk, marked a growth of nine per cent over the earlier edition. Pointed out Redgy Deschacht, President, Busworld (B.A.A.V), that the rapidly growing activities such as research, production and implementation of Intelligent Transport Systems (ITS), automation, e-ticketing, low or even zero emission vehicles, need to be developed in a close and well-structured manner.

Preceded by the European Coach and Bus Week, where

manufacturers were felicitated for their achievements under labels like comfort, design, safety and ecology, Busworld Kortrijk (2015) confirmed the general breakthrough of alternative powertrains. In 2013, this was already tangible. The 2015 fair brought it to the fore. With Daimler's Setra's TopClass S516 HDH bagging the 'Grand Award Coach' amidst competition that comprised of seven coaches and five buses, the event clearly endorsed the rising clout of electric and hybrid buses as part of the evolution of alternative powertrains. At the outset, launches seem to revolve round the promise of alternate powertrains, starting with the conventional and progressing to the semi-hybrid, hybrid and pure electric buses. Manufacturers lined up their finest products crafted specially for the European market, which seems to already think beyond Euro 6, what with countries like Turkey progressing briskly towards the implementation of Euro 6 standards beginning 2016.

### ■ Towards electromobility

The launch of a Volvo all-electric 12 m city bus at Busworld Kortrijk was marked by an amount of testing at Gothenberg. The bus, termed as Volvo 7900 Electric, is a twin-axle design, and powered by a 120 kW electric motor and lithium ion batteries, which can be recharged through brake energy recuperation or through electricity mains. An electric network could be used to give the bus a fast recharge time of three to six minutes for a 20 km range. In view of the need for supporting



Hakan Agnevall, President, Volvo Buses, feels that electromobility will be one of the main sources for urban transportation in the coming times.

infrastructure, Volvo has joined hands with ABB and Siemens. Capable of carrying 82 people, Volvo, in the 7900 Electric, has installed an Automated Manual Transmission (AMT). The body is made of aluminium, and plays an important role in the bus achieving zero tail pipe emissions. Averred Hakan Agnevall, President, Volvo buses, "CO2 content in the environment is increasing twice as fast as in the 1960s. The need for electricity as the main source of urban transportation in the coming times will increase." Volvo's portfolio of electric buses includes the Volvo 7900 hybrid (also available as an articulated bus) and Volvo 7900 electric. Since 2010, Volvo has sold 2,200 units of electric (and hybrid) buses, and aims to further strengthen its electric bus portfolio with the introduction of 7900 Electric

bus next year. Volvo Buses, in the 'safety' category, won an award for a unique stabilisation system called the Volvo Dynamic Steering (VDS). This system, also displayed at the fair, compensates automatically for surface irregularities, eliminates vibration and unnecessary steering wheel movement.

China-based BYD unveiled three new fully electric buses. These are targeted at the European market, and include a pure electric double decker bus, which is claimed to be the world's first. Developed in collaboration with Alexander Dennis Limited (ADL), UK, this bus is equipped with wheel hub motors and a 345 kWh battery system. Capable of fully recharging in four hours, with an ability to travel 300 kms under the Union International des Transports Public (UITP) SORT test conditions, the bus is capable of ferrying 81 people. The 10.2 m double decker bus was developed specifically keeping in mind the needs of the UK market. The bus has already entered into the service of London Transport (Go-Ahead London). Explaining that the chassis, battery, and the drivetrain has been developed by BYD, and that ADL has built the body, Isbrand Ho, Managing Director, BYD, stated, "We will supply 51 buses to London in the first batch." The other bus BYD displayed was an 18 m articulated electric bus with a capacity to carry 150 passengers. With in-wheel traction motors and an additional battery module, this bus has two passenger compartments and a roof mounted pantograph, which allows it to recharge quickly. The charging of battery can take place even when the bus is parked between route trips. BYD

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also displayed an all-new eight-m mid-size bus, fitted with a 162 kWh battery system. This bus can ferry 49 passengers.

Polish bus manufacturer, Solaris unveiled new Urbino models. The new models will complement as well as strengthen the existing Urbino bus range, which is fully electric in nature, and has found buyers across Europe. Among the new additions, the Urbino 12 is an electric bus that carries third generation ZF AVE 130 electric drive axle, and has axle mounted motors of 125 kW each. Apart from facilitating weight reduction, the technology also helps to generate more passenger space. The Urbino 12 can ferry 41 passengers, and is equipped with three lithium ion battery packs, which help to churn out a power of 450 kW. Apart from plugging-in, the Urbino 12 can be also recharged through the pantograph mounted on its roof. The Urbino 12 LE that Solaris displayed, is a low-entry design. Latest addition to the Solaris inter-city bus range, it is similar to the Urbino 12 electric,



and significantly lighter in weight than its predecessor. Featuring a redesigned body frame with more passenger capacity, the Urbino 12 LE comes with a unified exterior, which allows operators to use many identical components and spare parts for different models of Urbino,

Dr. Andreas Strecker, CEO, Solaris Bus and Coach, with the new Solaris Urbino LE 12, which has an unified exterior that will allow operators to use many identical components.

including the low-entry version. Powering the bus is a Euro 6 Cummins ISB6.7 engine, which meets the most restrictive fuel emission standards. The first Urbino 12 bus Solaris delivered to Wejherowo City Transport in Poland is fitted with thirty seats, fourteen of which are pedestal-free. The passenger compartment of the bus is air-conditioned and monitored with four wide-view CCTV cameras. Powering the bus is a DAF/PACCAR MX-11 Euro 6 engine.

Dutch bus maker, VDL put three new buses on display. One of these was the 18.1 m articulated bus powered by electricity. Entering into an agreement to supply eight such articulated Citea SLFA Electric buses to Cologne-based Kolner Verkehrs-Betriebe (KVB), VDL's articulated bus is equipped with a pantograph developed by Schunk. The pantograph is positioned above the second



Developed in collaboration with Alexander Dennis Limited, BYD will supply 51 all electric double decker buses to London.

axle on the front carriage. Taking 10 minutes to receive a charge of 250 kW, the bus has been designed keeping in mind the growing demands of BRT systems across the world, and flaunts a low-floor design. The VDL Futura FDD2 double decker bus VDL displayed is all-new. Capable of carrying 96 passengers, it could be availed of in two variants. A 13 m variant and a 14 m variant. Both the versions have three axles, and offer a wheel deflection of 52 degree. The DAF MX13 engine that powers the bus is Euro 6 compliant, and delivers 510 hp. It is equipped with a Variable Geometric Turbocharger (VGT) and ZF's AS Tronic AS 2701 BO transmission apart from an Advanced Emergency Braking System (AEBS), Adaptive Cruise Control system (ACC), Lane Departure Warning System (LDWS) and Electronic Stability Program (ESP).

The Ebusco 2.0 fully electric bus, displayed by yet another Dutch bus maker, Ebusco, can cover 300 km on a full charge. It takes two hours for the batteries to charge fully. Capable of carrying 90 passengers, the bus is made of a low floor aluminium monocoque structure. Sans a tail pipe, the Ebusco 2.0's 150 kW electric motor is powered by a 311 kWh battery system. The bus also features regenerative braking system.

Confirming the development of a new range of electric buses to be at an advanced stage, Wrightbus sources drew attention to seed vehicles. These are being built, and will be available for trial early next year. The new offerings will comprise of a range of modular concepts, which have been designed and



Remi Henkemans, MD, VDL Bus and Coach, with the FDD2. FDD2 is the youngest member in the Futura Range.

developed by the experienced Wrightbus alternative driveline business unit.

Coach builder Irizar displayed a fully electric i2e bus apart from the i6, i4 and the new low-entry integral construction i3le. The i3le is powered by a DAF biodiesel

engine aimed at the European inter-city sector.

## Hybrids and other propulsion mediums

Scania's Interlink displayed at the Busworld Kortrijk is available in high, semi, and low deck form. It is powered by a range of engines between 9- and 13-litre capacity. These engines are capable of running on diesel, biodiesel and bioethanol. "Though we have to save energy, it is also important to cut down consumption. We not only need to shift to smarter transport systems but safeguard conventional fuels for tomorrow, thus making biofuels interesting" said Klas Dahlberg, Head of Buses and Coaches, Scania. Scania also displayed a hybrid Citywide bus, which operates on 100 per cent biodiesel. It is designed to maximise the economic potential of hybridisation. With the Citywide 12 m bus, the Swedish commercial vehicle major aims at targetting the suburban-to-suburban and suburb-to-city operators while complying with the EU suburban and short



Ebusco 2.0's batteries can be fully recharged in less than two hours to ferry 90 passengers over 300 kms.

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distance class II regulations. The hybrid unit of Citywide includes an electric motor and a generator coupled to a ZF 6AP 1400B Ecolife six-speed fully automatic gearbox with a retarder. Citywide's hybrid powertrain includes Scania's 320 hp, 9-litre engine. Equipped with SCR, this engine is fully compatible with Hydrotreated Vegetable Oil and 100 per cent bioethanol.

Belgian coach builder Van Hool displayed an all-new bus called the EX17H. Made of stainless steel, the 14.2 m bus is powered by a PACCAR six-cylinder Euro 6 engine, which is coupled to a ZF AS-Tronic 12 AS 2001 gearbox. Equipped with a 500-litre fuel tank, the bus has a carrying capacity of 63 people. Its monocoque structure is equipped with an automatic leveling suspension and frequency selective damping at the rear for a comfortable ride. The Electronic Brake System

Philip Van Hool, CEO, Van Hool, with the EX17H bus. Van Hool is of the opinion that there's still time to enter the Indian market because of the price barriers.



Biofuels will assume importance as the consumption of conventional fuels is cut down, claims Klas Dahlberg, Head of Buses and Coaches, Scania (Second from right).

(EBS) and Electronic Stability Control (ESC) present better stability. After building a new coach facility in Macedonia two

years ago, which is currently 100 per cent operational and employs 800 people, and has the capacity to manufacture 600 vehicles per annum, Van Hool, according to its CEO, Philip van Hool, plans to double the plant capacity by 2016 to reach over 900 vehicles annually. Van Hool delivered its first vehicle equipped with Allison's T525R transmission recently to the Belgian coach operator, De Zigeuner. It is a TX17 Altano 3-axle 13.2 m coach powered by a 350 hp or 510 hp PACCAR MX13 engine. If it plans to enter India, Van Hool said that there's time yet. "Price is still a big barrier to enter the Indian market. Though we will never say no to India, it is still time to enter," he mentioned. Apart from the EX17H and the TX17 Altano, Van Hool also displayed the EX15H, EX16H, TX11 Alicron and TX16 Acron.

MAN premiered the Lion Intercity bus (Hall 2, Xpo) in



a 12 m and 13 m form. Either bus is fitted with a six-cylinder D0836 LOH common rail engine that delivers 290 hp. Coupled to the engine is a ZF six-speed automatic EcoLife gearbox with automatic torque converter and retarder. Complying with ECE R66.02 rollover standards, the 12 m bus has a 55 people seating capacity. With Emergency Braking System (EBS) and Lane Guard System (LGS) as optional, MAN plans to roll out 80 units. The German CV manufacturer also displayed the City bus and the Neoplan Tourliner. Through the Tourliner, MAN aims to offer mobility solutions powered by biodiesel apart from pure electric. Engineers at MAN are said to be developing a zero emissions battery powered bus. In the next edition of Kortrijk. A Volkswagen Group company, MAN is also expected to present a pre-series battery bus (BEV) to cater to the growing requirement for low emissions when it comes to short distance public transport at the next Busworld.

Named as the International Coach of the Year 2016, the Iveco Magelys drew a crowd. Available in 12.2 m and 12.8 m version, the Magelys comes in three model

trims, the Line, Lounge and Pro. Each model trim is fitted with a common rail six-cylinder in-line engine. The one displayed at the Busworld Kortrijk was fitted with 44 seats. It was equipped with ABS and ASR to optimise traction control and grip. The Magelys is also equipped with Advanced Emergency Braking System (AEBS), ESP, lane departure warning system (LDWS) and Adaptive Cruise Control to maintain safety and trigger brakes automatically in case of the bus driving very close to the vehicle in front. Having a basic configuration of 57 seats, the Magelys complies with the R66/01 rollover tests. Apart from the Magelys, Iveco displayed two 13 m Crossline coaches (low entry and normal deck versions), an Urbanway city bus in BRT version, and two new minibuses, Daily tourys and DailyLineElectric. Available in three different variants and four versions, the Iveco Crossway coach has already sold over 25,000 units. It initially came up with a Tector engine, but now can operate on Hydrogenated Vegetable Oil (HVO) as well. "In 2015, more than 50 per cent of the low floor city buses in Europe



Iveco's Magelys won the International Coach of the Year 2016.

have been CNG or full hybrids as the demand of sustainable solutions for public transport is rising fast," said Sylvain Blaise, CEO, Iveco (France) and VP-Global Bus Division.

The Mercedes-Benz Citaro NGT premiered at Busworld Kortrijk. It is fitted with a Mercedes-Benz M936 natural gas engine. This engine runs on Compressed Natural Gas (CNG) strictly, and delivers a power of 302 hp. Using spark plugs with pencil ignition coils, the M936 engine routes power through a Voith torque converter based auto transmission. Containing seven gas bottles with a combined capacity of 1589 litres for a longer operating range, the CNG bus represents a market for urban buses in Europe that is just 1000 units per annum. Mercedes-Benz expects it to grow with the growing concern for CO2 emissions. Citaro NGT will be also available in an articulated form. It will be called the Citaro G NGT, and have a capacity to carry 153 passengers. Launched in 2011, more than 7000 units of Citaro NGT have been sold till date. It was redesigned at the rear to



MAN's all-new Lion's Intercity was an eye catcher and made its presence felt at Busworld.

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suit Euro VI emission standards in 2012. Mercedes-Benz also displayed four Setra models. The S516 HDH with new composition and upholstery; S431 DT double decker coach, which aims at long distance travel operators; S511 HD of the ComfortClass 500 range. Mercedes-Benz also announced the introduction of LED headlamps in the TopClass 500 touring coach range. To mark its expansion in low-entry intercity bus range, Mercedes-Benz showcased the Setra S418 LE business coach, which makes efficient use of the MultiClass 400 modular system. Hartmut Schick, CEO Evobus and Head of Daimler Buses, mentioned, "We will have an electric bus in 2019 in Europe, which we can bring to India as a concept. We have prototypes but the costs are still high. The vehicle has to be feasible, both technically and economically."

### ■ **Suppliers support new developments**

ZF Friedrichshafen AG displayed a slew of aggregates and solutions at Busworld Kortrijk. The re-engineered EcoLife automatic transmission has been equipped with a start-stop function, which the ZF sources claim, leads to a saving of up to 10 per cent in a conventional bus. Expanding the AVE 130 Electric Portal Axle range, ZF displayed a low-floor axle design that significantly increases performance and torque values for the two motors mounted near the wheels, thus providing greater advantage to public transport buses by eliminating the drive shaft and propeller shaft which is necessary in conventional drive systems, thus allowing more room for



passengers. ZF is also offering the AVE 130 with an electronic control unit developed in-house. The innovative damping system, ZF unveiled, eliminates the trade-off between comfort and stability through a Premium Comfort Valve (PCV).

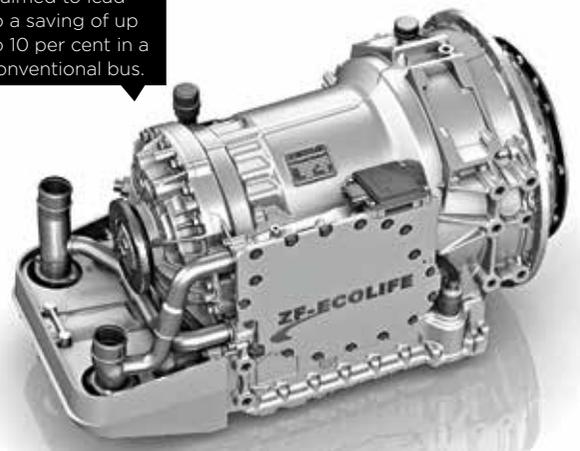
Allison Transmission displayed T3280 xFE, T3325 xFE and T3375 xFE transmissions. The xFE suffix indicates the inclusion of new technology that enhances performance in start-stop, low average speed duty cycles which is largely common to city bus operations. The technology has been on test with the Nottingham City Transport since June 2014. Optimising the gear ratios when coupled with FuelSense Max Package, xFE transmissions has been engineered to allow 1st range lock up. According to Manlio Alvaro, Director, EMEA Marketing, Allison Transmission, "This will increase the fuel

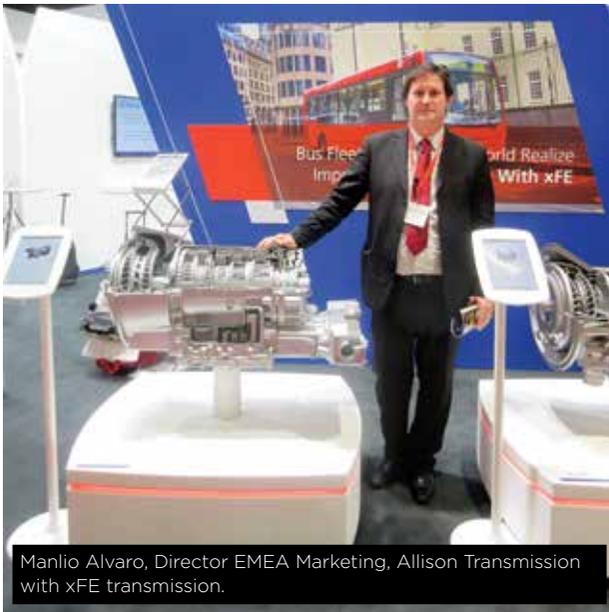
Developing an electric vehicle has to be feasible, both technically and economically says Hartmut Schick, CEO Evobus and Head of Daimler Buses.

EcoLife automatic transmission has been equipped with a start-stop function, which is claimed to lead to a saving of up to 10 per cent in a conventional bus.

economy by up to 8.15 per cent, which can turn out to be significant for a city bus transportation." Mentioned Alvaro, that the Ann Arbor Area Transportation Authority (TheRide) in USA has become the first agency to deploy xFE technology in its 60 buses. As stated above, Allison Transmission has also joined hands with bus maker Van Hool to expand its range of new products in Europe. The TX17 Altano coach displayed at the Van Hool booth was installed with Allison T525R fully automatic transmission. Allison has specially designed the transmission to cater to the unique demands of Euro 6 city buses and suburban buses.

Cummins launched start-stop technology at Busworld Kortrijk. Aimed at ISB engines, the technology has been available on diesel-electric hybrid buses for a while. High investment costs failed to justify its employment in conventional buses. Bringing conventional buses in its scope, Cummins aims to enhance fuel savings by four to seven per cent without a significant cost increase even if the bus stops every minute. "Such technology will be highly beneficial for cities where traffic





Manlio Alvaro, Director EMEA Marketing, Allison Transmission with xFE transmission.

is a huge problem like India. We have redesigned critical engine components and are validating them across four million stop-starts to deliver savings for operators with a competitive payback period,” said Kartik Ramanan, General Manager, Cummins Global Bus Engine Business. Set to go into production by March 2016, post the monitoring of 100 buses which have been fitted with this technology, the advantages, mentioned Ramanan, will include 30 to 40 per cent reduction in NOx emissions.

Eberspaecher Suetrak showcased the AC230 roof top air-conditioner. Equipped with a heat pump, which primarily works on air flow reversal function, the AC230 marks higher operating efficiency. AC 230 has been customised for the central roof top air ducts in both electric and hybrid buses for better efficiency and comfortable climate in the bus. The company also displayed an electric version of AC 136 G4 AC system aimed at electric buses. In order to access the

functions of the air-con system, Eberspaecher has also enabled networking of the system through GPS or telematic services.

Continental unveiled three new tyres for buses. Aimed at city, regional to long haul buses, the tyres are HA3 295/80 R 22.5 with distinctive longitudinal grooves to provide excellent handling and wet grip properties; HA3 295/80 R 22.5 (with special tread compound and a new tread design for greater speed and comfort on long-haul journeys, and is suitable for all axles), and Conti UrbanScandinavia HA3 275/70 R 22.5 winter tyre. Continental also displayed a fully configurable instrument cluster MultiViu Professional 12 and the tyre pressure monitoring system (TPMS) ContiPressureCheck.

Spheros showcased HVAC solutions developed specifically for electric buses. It put on display the most efficient air conditioning system currently on the market for hybrid and electric buses, incorporating innovative air conditioning

components, re-engineered software and the “Spheros Body Interface” operating and control concept. The ‘Revo-E Global’ rooftop unit, the company showed, is also aimed at the Asian markets according to Spheros sources. Another highlight at the booth was a new aluminium front box for air conditioning aimed at the driver’s section. It can be installed either horizontally or vertically depending upon the vehicle configuration, and aids efficient air circulation inside the vehicle.

The 23rd edition of Busworld Kortrijk confirmed the general breakthrough of alternative powertrains. Over the last event, this one saw the coming up of more electric, hybrid and alternate fuel medias. This event was also bigger and reflective of the rapid changes that the bus industry the world over is going through. The adoption of technologies that made news at Kortrijk may not take long to reach India, endorsing the fact that the Belgian bus fair is indeed a place to visit. **CV**



Kartik Ramanan, General Manager, Cummins Global Bus Engine Business, claims 4-7 per cent fuel savings through the start-stop technology.