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PRESS RELEASE

Emission-free Solaris vehicles at Busworld in Brussels

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- **Solaris is going to present three emission-free vehicles at the Busworld exhibition: the Urbino 12 hydrogen, Urbino 18 electric, Trollino 24**
- **World première of the new battery type Solaris High Energy+**
- **Solaris is European leader on the electric bus market**
- **A press conference will be held on 17 October at the Solaris stand (Hall 5, stand number 507), at 9.30 a.m.**
- **Solaris talks. Forum on modern public transportation. A series of presentations every day, at 13.00 at the company's stand**

Solaris has been developing its portfolio of vehicles with alternative drivelines for over ten years now, having become one of the top players on the European market of electromobility. Thanks to the tenders won by Solaris in the past weeks, the firm has turned a European leader in terms of deals secured for electric buses. The electric buses supplied by the company to 17 countries so far have traversed over 15 million kilometres in total, in varying climate conditions.

At the exhibition in Brussels, the Urbino electric family, which is well established on the market, will be represented by an articulated 18-meter bus that will be fitted with the latest advanced driver assistance systems (ADAS) among others, as well as air conditioning combined with a heat pump. The new Solaris High Energy+ batteries boasting extremely high energy density are a complete novelty in the bus.

As more and more European cities strive to make their public transport more environmentally friendly, and because their particular needs are so different, Solaris has decided to add two zero-emission vehicles to its portfolio: the hydrogen-fuelled Urbino 12 hydrogen, which can cover up to 350 km on a single refill, and the 24-meter trolleybus Trollino 24, which will have its début at the Busworld exhibition.

Solaris Urbino 18 electric

Earmarked for a display at the Busworld 2019, the Solaris Urbino 18 electric will be equipped with advanced driver assistance systems (ADAS) which increase significantly both travel comfort and - above all - safety. The Mobileye Shield Plus device minimises the risk of colliding with pedestrians or cyclists thanks to a system of smart cameras which constantly monitor the so-called blind spots in a vehicle. The driver is alerted about potential dangers with acoustic and visual signals.

What is more, the bus will feature a system initiating automatic braking, i.e. the CMS (Collision Mitigation System). When a radar installed in a bus detects the risk of a potential head-on collision, the system goes into braking mode, reducing velocity and thus alleviating the consequences of a potential collision.

Where the side mirrors would be conventionally, the 18-meter Solaris features cameras that ensure improved visibility not only in bright sunlight, but also during rain or snowfall, as well as at night. What is more, the cameras increase the field of view substantially and they improve the aerodynamics of the vehicle. This new solution is already available for the whole Urbino family.

In order to reduce the energy consumption as much as possible, the articulated Urbino electric features air conditioning with a heat pump which uses heat from the outside to generate an adequate temperature inside the vehicle. This device uses carbon dioxide as the working fluid. The implementation of the CO₂ heat pump is supposed to enhance the energy efficacy of the vehicle, and thus to increase its drive range.

Yet another innovation applied in the vehicle is a traction inverter produced in the innovative SiC technology, i.e. using silicon carbide. Owing to this, the device can operate at higher voltage, frequencies and temperatures, which, in turn, results in a significant reduction of the mass and size of the power converter and in a general increase in efficiency of the whole system.

What is an absolute novelty is the batteries used in the bus - the Solaris High Energy+ which the manufacturer is showing for the first time in Brussels. These batteries stand out thanks to their extremely high energy capacity.

Solaris Trollino 24

Solaris is currently the biggest producer of trolleybuses in the EU, having supplied over 1350 vehicles to clients in 16 countries. Unveiled for the first time at the Busworld 2019, the bi-articulated Trollino 24 is the longest vehicle assembled by the Polish manufacturer so far. The idea behind the Trollino was to create a platform for the future, serial production of 24-metre vehicles with an electric or hybrid driveline and of trolleybuses. Its driveline consists of two traction motors of 160 kW each, propelling two drive axles. A pack of 58 kWh Solaris High Power batteries installed in the bus is charged en route, collecting current from the overhead line via a bipolar pantograph traditionally in use in trolleybuses. What is more, the energy accumulated in the batteries will be used to fuel the trolleybus whenever it is detached from the electric traction line. In order to ease manoeuvres in urban traffic, the fourth axle of the vehicle has also been made the steering axle. The vehicle has been also equipped with, among others, an electric power steering system (EPS) and, similarly to the Urbino 18 electric presented at the Busworld, it possesses cameras in lieu of conventional side mirrors. More than 200 persons will be able to hitch a ride on the trolleybus at the same time.

Solaris Urbino 12 hydrogen

It is a completely emission-free vehicle in which hydrogen is transformed in a fuel cell into electricity which, in turn, propels the driveline. The Urbino 12 hydrogen is fitted with a state-of-the-art fuel cell of 60 kW which acts as a miniature hydrogen power plant on board of the vehicle. The sole “by-products” generated during the operation of the Solaris Urbino 12 hydrogen are heat and steam. Thanks to the use of advanced technology, the bus will be capable of covering up to 350 km on a single refill.

As for the hydrogen storing technology, the Urbino 12 hydrogen features cutting-edge solutions. The fuel is accumulated in gaseous form in 5 new-generation composite tanks placed alongside on the bus roof. A multifunctional valve encompassing a range of safety measures is installed at the end of each cylinder.

The bus is equipped with a Solaris High Power battery whose role it is to support the fuel cell in moments of increased demand for electric power. The battery is recharged using energy derived from hydrogen

and recuperated during the braking process. Complementing the driveline is an axle with integrated electric motors.

Just like the Urbino 18 electric, the hydrogen vehicle also features a climate comfort system using a CO2 heat pump. In this particular case, the pump additionally uses waste heat from the fuel cell. This solution guarantees very high efficiency and allows to increase the drive range of the vehicle even more.

Solaris will hold its press conference during the Busworld exhibition on 17th October, at 9.30 a.m., at its stand in hall no. 5.

We would also like to invite you to the "Solaris Talks" forum, which will take place every day of the fairs at the Solaris stand in Hall 5. As part of "Solaris Talks" the manufacturer will share its experience and information about its products, but also invite to talk about modern technologies used in the area of e-mobility and the changing image of public transport. The topics of short presentations opening the discussion will concern, among others types and selection of batteries, charging systems for buses and trolleybuses, hydrogen vehicles or remote diagnosis for electric buses.

Detailed schedule of "Solaris Talks":

18/10/2019 Friday	19/10/2019 Saturday	20/10/2019 Sunday	21/10/2019 Monday	22/10/2019 Tuesday	23/10/2019 Wednesday
1:00 p.m.	1:00 p.m.	1:00 p.m.	1:00 p.m.	1:00 p.m.	1:00 p.m.
1:00-1:15 Solaris Talks: The art of choosing the best e-mobility solution	1:00-1:15 Solaris Talks: Solaris battery solutions	1:00-1:15 Solaris Talks: Optiline. Genuine Solaris parts.	1:00-1:15 Solaris Talks: Solaris goes hydrogen. Another option for zero emission buses	1:00-1:15 Solaris Talks: eSConnect. Remote diagnosis and predictive maintenance of e-buses	1:00-1:15 Solaris Talks: IMC, plug-in, pantograph? Which option to opt for?
1:15-1:30 Q&A	1:15-1:30 Q&A	1:15-1:30 Q&A	1:15-1:30 Q&A	1:15-1:30 Q&A	1:15-1:30 Q&A
1:30-1:45 Networking	1:30-1:45 Networking	1:30-1:45 Networking	1:30-1:45 Networking	1:30-1:45 Networking	1:30-1:45 Networking

About Solaris Bus & Coach S.A.

Solaris Bus & Coach S.A. is one of the leading European bus and trolleybus manufacturers. Benefiting from over 20 years of experience and having manufactured over 17,000 vehicles, Solaris affects the quality of city transport in hundreds of cities across Europe every day. Thinking of the future, the firm is setting new standards by dynamically developing its products, in particular in the electromobility sector. Solaris products have been repeatedly awarded for quality and innovation in Poland, as well as in other countries. The Solaris Urbino 12 electric won the prestigious European "Bus of the Year 2017" competition. In September 2019 Solaris Bus & Coach S.A. joined CAF Group, which acquired 100% of the shares of the company.

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