



SOLARIS

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The Solaris family of new generation electrically-powered Urbino models has grown with the addition of a new midibus. The 9-metre, low-floor electric bus was launched on 30 September 2021.

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Electrifying discussions about the future of urban mobility, inspiring visions of what awaits us in the field of transport, and an exchange of experiences with experts from the sector – these are just some of the reasons for which few hundreds of people took part in the #SolarisTalks conference on 7 October.

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The electrification of Venice is one of the most exciting e-projects ever carried out by Solaris. 30 Urbino 12 electric buses are now employed in passenger transport in two of the city's districts situated on the islands of the Lido and Pellestrina in the Venetian Lagoon.

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As an introduction



Dear Readers, Dear Friends,

Another year is coming to an end. Entering the new one, we are all hoping for more stable times. And we strongly believe that, through our activities, we can build a better future and make the world more sustainable. Despite many obstacles and challenges, our company is constantly committed to pursuing its goals. Our customers' trust and fruitful cooperation with our partners certainly contributes to reaching them. However, our joint success wouldn't be possible without our ambitious, dedicated employees. Therefore I would like to thank the whole team for this year. Congratulations! Together we can change public transport to become more sustainable and passenger-friendly.

In recent months we had the pleasure to meet several times during great events – via virtual platforms, and in person – during fairs. The launch of the new 9-meter electric bus, which fits in well with the urban landscape of many European towns and cities aroused a lot of emotions. During the whole-day #SolarisTalks event we discussed

the future of transport and shared with you our knowledge and long experience in mobility.

Changes, dynamics, technologies, innovation – these are the leading principles of our brand since the very beginning.

The #SolarisTalks online conference, the format we would like to repeat in the next years, has given us a great chance to talk about, how Solaris puts these principles into practice. Many people participated in this online event, which shows that our initiative has been very well received. This also shows that we really need to talk about mobility and its future.

In recent months we have also had a chance to meet many of our clients and partners in person during the Transexpo fair in Kielce, and the Czechbus fair in Prague. We are grateful for every conversation and every meeting! We have prepared an overview of these events for those of you who were not able to take part in them.

For Christmas and the New Year let me wish you first and foremost good health. Recent months have shown that health is the basis of any activity, both in our private lives, and professionally. May you and your nearest and dearest stay healthy and safe.

Have a look at the articles and information we have prepared for you in this new issue of Solaris Customer Magazine.

My warmest regards and happy reading!



Javier Calleja
CEO of Solaris

Solaris's **accomplishments in Italy**

➤ Solaris is the undisputed leader when it comes to sales of electric buses in Italy. Another success in this segment has been winning a tender for the delivery of as many as 30 e-buses to operator AMT in Genoa. This coastal city wants to replace its fleet with all-electric vehicles by 2025. The value of the new contract exceeds €15 million.

30 Solaris electric buses will soon join the fleet of AMT (Azienda Mobilità e Trasporti SpA) in Genoa. The Italian carrier's investment in innovative vehicles is part of its broader strategy to fully electrify the city's bus fleet. Solaris buses are very well-known to the inhabitants of Genoa, but it is the first time that electric vehicles will come to this Italian coastal city. The carrier has opted for our flagship Urbino 12 electric buses, which will stand out due to their state-of-the-art equipment and their extremely high safety and comfort levels.

This order confirms the strong position of Solaris in the field of e-mobility in Italy. Today, over half of all electric buses plying Italian streets are Solaris vehicles, and in 2020 the manufacturer claimed an almost 70 percent share of the Italian e-bus market.



Zero-emission Solaris buses will debut in Denmark

➤ 29 electric Solaris buses will make their way to Aarhus, the second biggest city in Denmark, in the first half of 2022. The scheduled delivery of 6 Urbino 12 electric buses and 23 articulated Urbino 18 electric vehicles is the result of a contract concluded in the summer of 2021 between Solaris and Danish carrier AarBus (previously: Busselskabet Aarhus Sporveje).



The inhabitants of Aarhus will be the first ever in Denmark to have the opportunity to travel aboard zero-emission Solaris vehicles. “We were very glad to receive news of Denmark joining the group of countries with electric Urbino buses plying their streets. It is wonderful to observe the dynamic development of the electric transportation network in Europe, and to be part of that green revolution at the same time”, said Petros Spinaris, Board Member of Solaris Bus & Coach, for Sales, Marketing and After Sales.

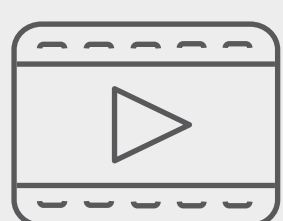
The very first Solaris buses made it to Aarhus in 2006. So far, the bus maker has delivered almost 200 buses to this Danish city.

Another 100 CNG buses will hit the streets of Tallin

➤ In the summer, Solaris signed a contract with its customer TLT for the supply of 100 Urbino CNG buses. It also includes an option to extend the order by another 50 vehicles. Tallin has been consistently pursuing its strategy to expand the city's fleet by as many as 350 CNG-powered buses.

The capital city of Estonia is one the leading smart cities worldwide. Therefore, it comes as no surprise that the largest public transport operator in the country, i. e. Aktsiaselts Tallinna Linnatransport (TLT), has again opted for low-emission CNG-powered Solaris buses. In mid-July representatives from TLT signed a contract for 100 Urbino CNG buses, including 75 12-metre and 25 articulated vehicles. The contract is worth nearly €27 million.

200 CNG-powered Urbino buses, ordered by TLT in 2019-2020, are already operating on the streets of Tallin. In line with the new contract for the supply of 100 Urbino CNG vehicles, the customer can, as an option, order an additional 50 CNG buses. If so, a total of 350 environmentally friendly Urbino CNG buses will ply the routes in the picturesque city of Tallin and this is the objective that the operator has clearly communicated.



[Click & watch the relation from signing this unique contract \[LINK\]](#)



From the left: Javier Calleja (CEO of Solaris), Deniss Boroditš (CEO of TLT), Petros Spinaris (Board Member of Solaris)

More eco-friendly **Solaris buses in Spain**

➤ Spanish towns and cities are investing in eco-friendly transport and opting for low-emission and zero-emission Solaris vehicles. Contracts for the delivery of hybrid, CNG- and electric buses signed in the course of the last few months are ample proof of this.

By the end of the year, 30 Solaris Urbino hybrid buses (and by the end of 2022 - 24 Urbino 12 electric units) will have made their way to Barcelona. Both deliveries have been ordered by operator TMB Barcelona. The new buses will strengthen the city's zero-emission fleet, which already boasts, among other vehicles, 19 articulated Urbino 18 electric buses delivered by Solaris as part of previous contracts.

Another four electric vehicles, i. e. Urbino 8,9 electric and Urbino 12 electric units, will operate in the vicinity of Bilbao, in the Basque Country. Customer EuskoTren has also decided to purchase a nearly 35 kW onboard charger, and a 150 kW dual output charger that enables the concurrent charging of two buses. Following the execution of a contract concluded with the Town Hall of Martorell (Ayuntamiento de Martorell), two Urbino 8,9 LE electric buses will be seen on roads in the Province of Barcelona. What is more, the town has ordered two 40 kW mobile chargers. The contracts are to be completed by the end of 2022.

However, this is not the end of deliveries by Solaris to the Iberian Peninsula. The Spanish cities will soon welcome a total of over 300 CNG-powered buses (for more, see pages 34-36).

The very first Solaris buses made their way to Spain over 10 years ago. At present, nearly 300 Solaris units ply routes there, most of them featuring a zero-emission or low-emission drive.



Sustainable Bus Award

for the Urbino 15 LE electric bus

➤ The Sustainable Bus Award ceremony took place on 19 November. The winner of the Urban category was the three-axle, intercity Solaris Urbino 15 LE electric bus.



This year's Sustainable Bus Award is the fourth edition of this international competition for the most innovative and sustainable buses and coaches available on the European market. This year, the main prize in the Urban category was awarded to the Solaris Urbino 15 LE electric bus.

“We feel honoured that our Solaris Urbino 15 LE electric bus has been recognised by the jury of this prestigious competition. Innovative public transport opens up completely new possibilities to us: clean air, quiet streets and no unpleasant noise. This is becoming a reality for an increasing number of towns and cities that are both people- and environmentally friendly. We are very glad that Solaris's contribution to safe, generally accessible, sustainable transport is increasingly being recognised”, said Mateusz Figaszewski, E-mobility Development and Market Intelligence Director at Solaris Bus & Coach.

The 15-metre electric bus was launched in October 2020. The vehicle has already received the “Sustainability Award 2021” for “the best electric bus”, awarded by the trade magazine “busplaner”.

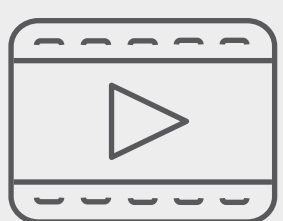
Our first Sustainability Report – and right away it scoops a prize!

➤ In June of this year, Solaris published its first Sustainability Report, giving an overview of the activities of the company in the field of Environmental Social Governance in 2020. A few months later, in November, Solaris's publication was awarded a prize, for the best debut, at the Gala of Sustainability Reports competition.

The Sustainability Reports competition is organised by the Responsible Business Forum and Deloitte. In this year's edition, Solaris was awarded a prize for the best debut. The distinction was awarded "for a report that contains a multitude of well-prepared information, with a clear layout, a concrete set of ESG actions and an interesting description of the company's role in the 'zero-emission' future".

The 2020 Sustainability Report is the first publication from Solaris to present the full range of data and information on the company's ESG-related initiatives in such a comprehensive manner. It is an extensive description of the company's impact on the economy, environment and society.

The competition has been running for 15 years. Every year, the best CSR and Sustainability reports are given prizes by the jury. This year, 55 reports were submitted to the competition.



[Click & read our Sustainability Report \[LINK\]](#)



In the photo, from the left: Marzena Strzelczak (CEO of Responsible Business Forum), Norbert Nijak (ESG Director, Solaris Bus & Coach), Irena Pichola (Global Climate Action and Sustainability Bold Play Lead Global Public Sector, Deloitte), photo: Tadeusz Miroisz.

New CEOs at Solaris

France and Solaris Sverige AB

➤ Solaris Bus & Coach has appointed new CEOs at its subsidiaries in France and Sweden. Solaris France is now headed by Olivier Michard, and Robert Schneider has become the new CEO of Solaris Sverige AB.



Olivier Michard



Robert Schneider

Olivier Michard has over 20 years of experience in the automotive industry. He has worked for, among others, Iveco France as a Business Director, and held the role of Business Director EMEA in ESG – the Ecco Safety Group. “I am really excited to join the Solaris team, which has been operating in France for a long time and which is a leader in electromobility across Europe”, underlined the new CEO of Solaris France when assuming his new post on 1 June 2021.

Robert Schneider has replaced Klaus Hansen, who was retiring and who had headed the Swedish company since 2014. The new CEO of Solaris Sverige AB brings over 30 years of vast experience in managerial positions in commercial, logistics and military fields. His recent professional work has been closely related to public transport, he has worked, inter alia, for Ebusco, Transdev Sverige AB and Go-Ahead Nordic. “We are gaining a highly experienced managers who know public transport in both markets inside out. Congratulations to Robert and Olivier on their new positions! I wish them a lot of success with their new responsibilities”, said Petros Spinaris, Board Member of Solaris Bus & Coach when welcoming the new CEOs in September 2021.

eCity powered by Solaris

➤ What will the future of public transport look like? Pantograph or plug-in – which one to choose? What are sustainable cities? Answers to these and many other questions can be found at www.ecity.solarisbus.com. eCity is a specialist website, entirely dedicated to zero-emission public transport.

eCity is a virtual space for clients, sector representatives, local governments, journalists, drivers, and all enthusiasts of modern urban transport. We would like to promote the belief that the development of zero-emission technologies is crucial to reaching climate neutrality. Via eCity, we share with you our extensive experience gained steadily over the past decades in this area, which is particularly important to us all.

What kind of content can you find on eCity? The latest news from the world of sustainable public transport, technical advances, a knowledge compendium on e-mobility, projects being implemented at present, studies on specific cities and carriers – these are just some of the wide range of topics covered. eCity is updated on an ongoing basis, which is why we invite you to visit the website regularly.

See you on

www.ecity.solarisbus.com!





New addition to the electric Solaris Urbino family

Introducing the Urbino 9 LE electric bus

The Solaris family of new generation electrically-powered Urbino models has grown with the addition of a new midibus. The 9-metre, low-floor electric bus was launched on 30 September 2021, at 1 pm. The Urbino 9 LE electric bus was unveiled by the company's Management Board and the design team during an online launch - the second ever in the company's history - organised in a unique, interactive format.

E-mobility is no longer a thing of the distant future. Public transport in the modern world should be quiet, clean, safe and powered with green energy. Electric buses are becoming a natural component of

our everyday life and are a perfect solution for urban traffic. However, public transport vehicles are part of a larger system, and every town, city and every bus route has different needs. Solutions are needed that can easily be adapted to different urban and suburban spaces. The latest Solaris vehicle marks yet another step towards climate-neutral mobility.

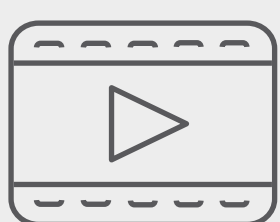
With all the features of the 4th-generation Urbinos, the Solaris Urbino 9 LE electric bus, with its dynamic bodyline, is a real looker. Its stylish design and extremely comfortable interior encourage people to use public transport, whereas its all-electric drive and cutting-edge safety solutions make sustainable and quiet urban and regional transport possible. After the Urbino 15 LE electric bus, this vehicle is yet another option in Solaris's electric range that meets the requirements for both vehicle classes I and II. This compact bus will be able to spur a real improvement in the quality of life in towns and cities and their surroundings, and thus change the image of public transport.

”

“Being in the lead and introducing cutting-edge technical solutions, when ensuring the greatest reliability, is part of our philosophy and our approach to innovation. All the solutions we offer are comprehensive and perform successfully under difficult conditions, as our operators and our customers need to use buses for many hours a day, all year round. We are striving to be leaders in introducing new technologies into everyday life.”

Javier Calleja
CEO of Solaris Bus & Coach

”



[Click & watch the premiere of our new model! \[LINK\]](#)

The perfect link between the urban and suburban road network

The low-floor Solaris Urbino 9 LE electric bus is ideally suited to the current needs of the European market. The possibility to type-approve the vehicle as class I and class II allows clients to tailor it even more to their needs. The 9-metre bus provides an excellent link between the urban and suburban road network across whole conurbations. Thanks to its compact dimensions, the vehicle will perform excellently in e.g. cramped city spaces, on the narrow streets of old towns, or in districts with increased pedestrian and cyclist traffic, as well as in regions with small and dispersed towns and villages, often scattered across hard-to-reach, mountain areas.

Particular emphasis in the latest model has been placed on passenger comfort. Increased distances between the seats, that also meet the Bus Nordic standards, ensure a great travel experience. The updated design provides more headroom in the rear of the bus, which enhances ride comfort. This newly released model offers a possibility to install in it any type of air conditioning out of all those available in the range of the manufacturer, including air conditioning with a heat pump.

This light vehicle, equipped with a powerful motor, will cope with the most demanding of routes. The heart of the vehicle is a central electric motor with a peak power output of 220 kW, and the driving power is transmitted to the second axle of the vehicle. The propulsion system is powered by energy from Solaris High Power or Solaris High Energy batteries. This next generation midibus can accommodate a higher number of energy storage units than was the case with its predecessor. This will make it possible to cover much longer distances and for operators to plan zero-emission routes not only within city confines but also beyond them.

The batteries can be recharged conventionally using a plug-in connection. In addition, there is an option to mount a pantograph, of which there are three types, on the roof. Apart from the traditional pantograph, the manufacturer offers an inverted pantograph, which up until now hasn't been available for the 8,9 version. Another



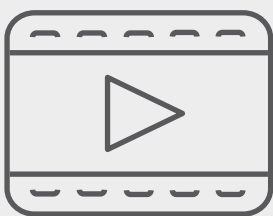
possible option is a completely new type of pantograph with a higher working range than competing solutions.

Despite its compact dimensions, the vehicle has room for a significant number of seats, most of which are forward-facing. Passengers are offered as many as 27 seats in the class I vehicle and up to 31 in the class II vehicle, and they board through doors arranged in a 1-2 layout. It is also possible to fit the bus with dedicated spaces for passengers with disabilities or those travelling with prams or pushchairs, as well as to fit the seats with ISOFIX, a system that enables child seats to be secured safely. The new electric model also boasts innovative systems to further improve the safety of both passengers and the driver. An interactive driver's panel combines numerous advanced safety features and provides access to automatic advanced driver assistance systems (ADAS).

First orders

The Urbino 9 LE electric buses have already attracted considerable interest. Even before the official launch, Solaris had signed contracts for 17 units of its latest, 9-metre bus in total. Next year, due to a contract with operator Società Autobus Servizi d'Area S.p.A, eight units will make their way to the Italian city of Bolzano. The rest of the ordered Urbino 9 LE electric vehicles will roll onto the streets of the Polish towns of Żyrardów, Cieszyn and Zawiercie.

Solaris has vast experience with regard to the production of zero-emission vehicles. So far, the manufacturer has supplied almost 3000 such vehicles to its customers. The launch of the smallest electric vehicle available in the Solaris range, i. e. the Urbino 8.9 LE electric bus, took place 10 years ago. The newly released Urbino 9 LE electric bus, which is even more versatile and flexible, has been designed solely with zero-emission drivelines in mind. Constructed using solutions applied in new generation vehicles, the vehicle is ideally suited to the current needs of the European market.



[Click & get to know our new product even better \[LINK\]](#)

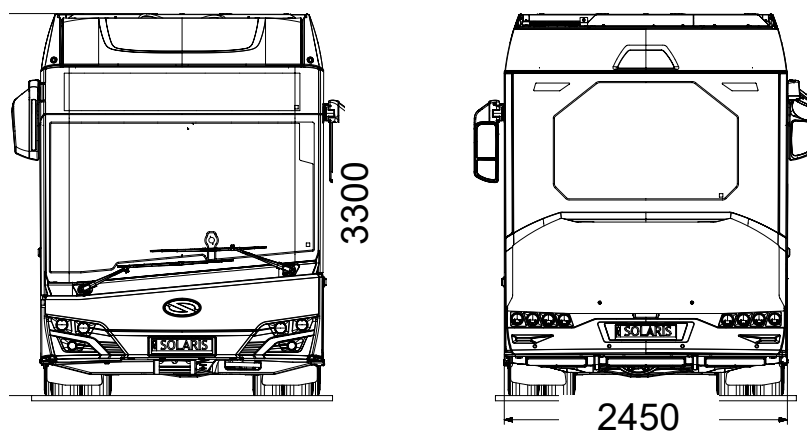
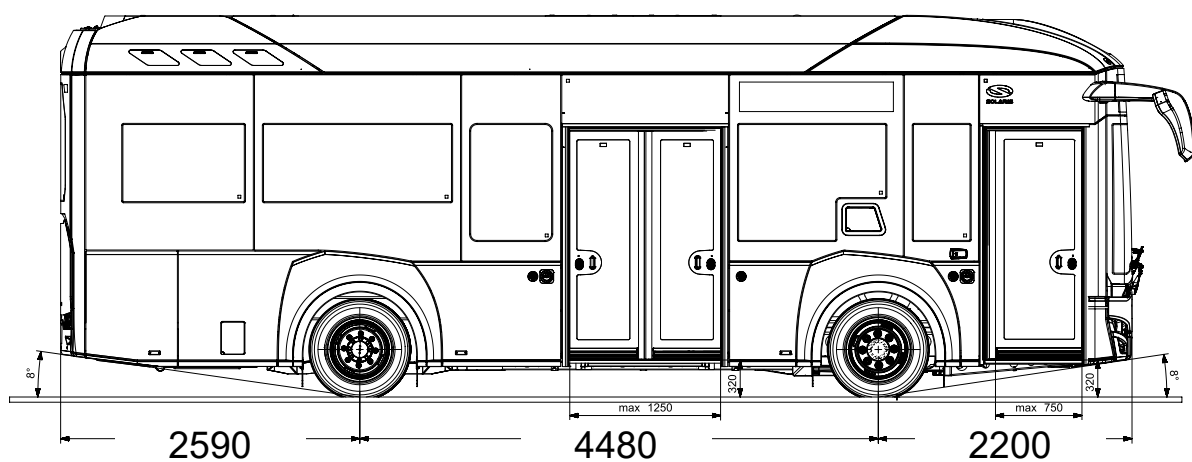


Solaris Urbino 9 LE electric

Technical details

Full electric 2 axle bus
— I class (II class as an option)

Dimensions	L: 9270 mm W: 2450 mm H: 3300 mm (3315 mm II class)
Front overhang	2200 mm
Wheelbase	4480 mm
Rear overhang	2590 mm
VGW	16 T
Doors	1-2
Motor	Central traction motor (maximum power 220 kW)
Batteries	Solaris High Energy (Solaris High Power as an option)
Battery capacity	Up to 350 kWh
Charging	— Plug-in — Pantograph
Axles	— Front: RL 55EC — Drive: G150
Wheels	— 265/70/19,5 (285/70/19,5 II class)
Minimum turning radius	9100 mm
Passenger capacity	Up to 73 people depending on configuration and equipment
Seats	— Up to 27 seats (including 8 low floor seats) + dedicated space for passengers with disabilities — Max. 31 seats (II class, without dedicated space for passengers with disabilities)
Air-conditioning	— Air conditioning in the whole vehicle — AC with CO2 heat pump heating function (option)
Driver assitance systems	— Mirror Eye — Mobileye Shield Plus, detects blind spot — Dusk and rain sensor (turns up windshields and lights) — Automatic corner lightening — Touchscreen



* For wheels 265x70R19.5 - 3300 mm
For wheels 285x70R19.5 - 3315 mm

Online
e-mobility
conference



Let's talk about a zero-emission future

Electrifying discussions about the future of urban mobility, inspiring visions of what awaits us in the field of transport, and an exchange of experiences with experts from the sector – these are just some of the reasons for which a few hundreds of people took part in the #SolarisTalks conference on 7 October.

We look back at #SolarisTalks 2021, a conference entirely dedicated to e-mobility. The event took place online, and the participants included our clients, business partners, local authorities and fans of Solaris from all across Europe.

The idea for #SolarisTalks has emerged as a natural extension of meetings focusing on swapping experience and discussions about the future of urban mobility. It was at Busworld 2019 in Brussels, two years ago, when we invited you to #SolarisTalks, a forum dedicated to modern public transport, for the first time. Due to the pandemic, it



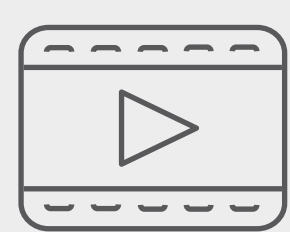
Javier Calleja during the #SolarisTalks keynote speech

was clear right from the beginning that this year's event would take place online. The changed format opened up new possibilities. We invited our participants to a virtual environment which they could join from any place in the world. Multiple chat rooms (a general one and specific chat rooms dedicated to every presentation), to be used by all participants and speakers, were open throughout the event. The content-related part of the conference was complemented by special attractions streamed live from Columbia, the USA and Portugal. What is more, at the end of the conference, participants had an opportunity to meet with the company's representatives at dedicated networking sessions.

The latest trends in urban mobility, electric vehicles, and advances in hydrogen technology – these are the main topics that were addressed at #SolarisTalks 2021. The conference programme was divided into two sessions: on electric and hydrogen issues. During each of them, the participants listened to expert presentations given by Solaris specialists as well as to panel discussions with the participation of guests and hosted by Mateusz Figaszewski. Invited speakers included transport operators with extensive experience in the field of e-mobility, customers implementing hydrogen technology, as well as the CEO of Hydrogen Europe.

Before the presentations began, Javier Calleja, CEO of Solaris, took the floor. In his speech he emphasised the unique goal that had brought all the participants together: "We have come together today at the #SolarisTalks event because we are united by our concern for

our future – the towns and cities we live in, their inhabitants, and the state of the environment.” He also referred to the role Solaris intends to play when it comes to creating the towns and cities of the future. Primarily, this is about providing effective support to urban centres in the green transformation process. Jointly shaping sustainable public transport, with offerings tailored to the specifics of each town and city, is paramount in Solaris’ activities. Javier Calleja also remarked that Solaris doesn’t have just one recipe for sustainable public transport: “E-mobility has many faces - it can mean electric vehicles, hydrogen vehicles or trolleybuses.” This means openness and a willingness to consistently seek the best solutions. His invitation to listen to a number of presentations on various technologies took on particular significance in this case.



[Opening Speech - Javier Calleja \[LINK\]](#)

GUEST SPEAKER

A special highlight of the programme was a lecture by Peter Hinssen, an entrepreneur, author and futurologist. In his inspiring speech he laid great emphasis on how information technologies have changed our world. He referred to the concept of the “new normal”, in which technology is



an integral part of everyday life, and not, as previously, only an attractive addition and enrichment. He also referred to the role of public transport, which, in his opinion, will significantly increase in the future. What is more, taking into account current technological achievements, it is possible, according to Peter Hinssen, to create a public transport which will be much more pleasant to use than private means of transport.



ELECTRIC SESSION

Solaris e-buses ply routes in over 100 towns and cities across Europe and their number is steadily growing. Operators opting for electric buses now have an increasing number of e-mobility options and solutions to choose from. Hence, the electric session, which kicked off the #SolarisTalks conference, was a great opportunity to discuss how e-mobility actually works in practice, in which direction battery technology is advancing and how Solaris can support cities in developing zero-emission transport.

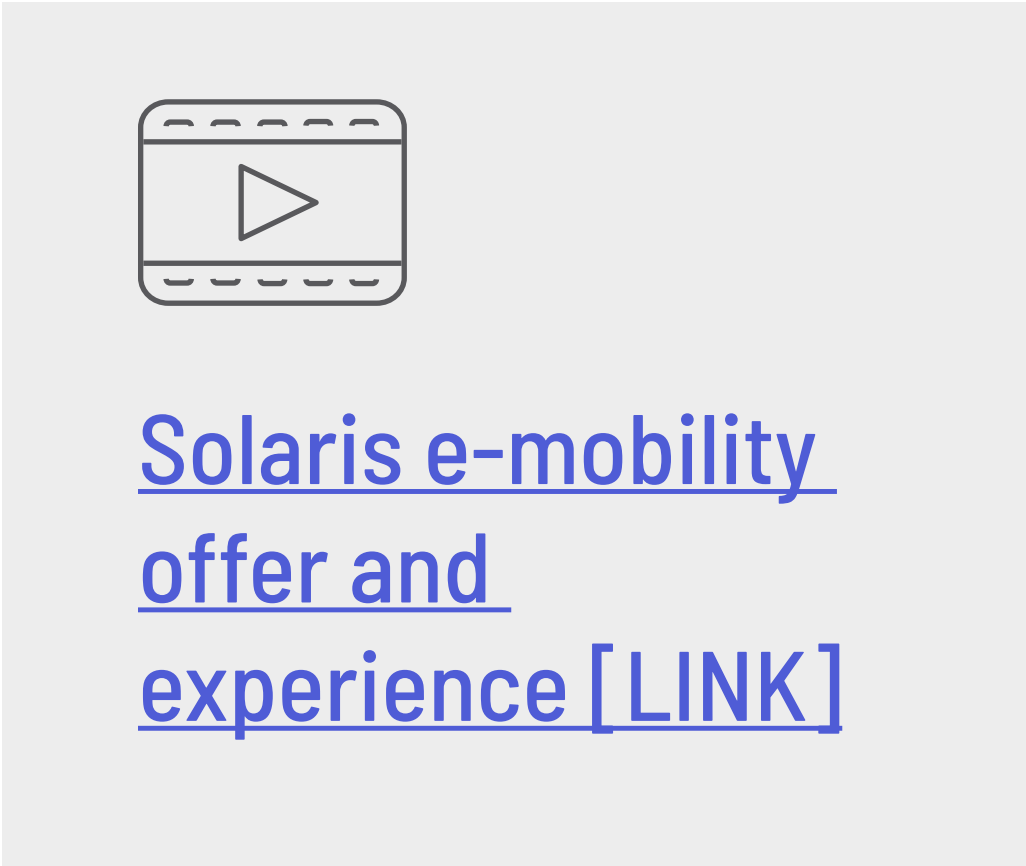
1. “Solaris’s e-mobility offering and experience”



Marta Lis,
Sales Director



Ewelina Politenko,
Regional Sales Manager



When presenting the latest data concerning registrations of electric vehicles, the speakers demonstrated that the green revolution of public transport has come true and Solaris is at its forefront. Moreover, the experts discussed the most interesting projects implemented recently, for instance, the delivery of 30 electric Solaris buses to Venice, a city built on 117 islands. Zero-emission vehicles have completely replaced the existing diesel fleet and thus contributed to reducing CO₂ emissions in one of the most famous cities in the world.

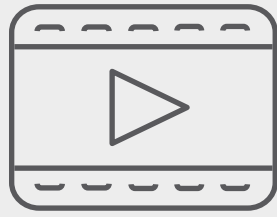
2. “Batteries in electric buses – what is the future of battery technology?”



Łukasz Chęłchowski,
Bus Development
Director



Dariusz Adamczyk,
Design Engineer



[Batteries - what will be the next battery technology? \[LINK\]](#)

During their presentation, the experts brought up the issue of the considerable increase in the number of registrations of e-buses in EU countries in the last three years, as well as the fact that they make up 44% of Solaris’s total output. They also mentioned the latest technologies and explained the difference between High Energy and High Power batteries. When laying out their vision for the future of battery technology, both experts underscored that energy density and power density ratings will constantly grow. This means that electric vehicles will increase their range on a single charge and thus provide greater operability for operators.

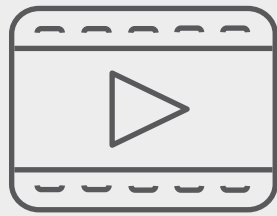
3. “Charging infrastructure - which solution to choose?”



Angieszka Pril,
Junior Design
Engineer



Marcin Pilachowski,
Electrical Systems Manager



[Charging options and infrastructure - which solution to opt for? \[LINK\]](#)

The implementation of zero-emission transport is not just about the purchase of vehicles, but also about ensuring there is appropriate infrastructure. The presentation gave participants an insight into the solutions that are currently on offer, i. e. plug-in and pantograph charging. The experts discussed the battery charging process in detail, taking into account battery types applied in Solaris vehicles.

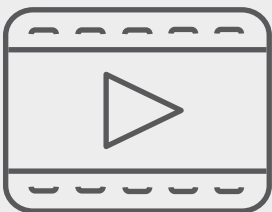
3. “After Sales package as part of the e-mobility offering”



Jakub Józwiak,
After Sales Director



Michał Ostachowski,
Deputy Director for
Spare Parts



[E-mobility after sales package \[LINK\]](#)

In this session the participants could learn more about after sales services - designed and fine-tuned by Solaris over the years - dedicated to vehicles with electric drives. Moreover, the speakers talked about the eSConnect platform, which allows operators to have unrestricted access to all fleet-related data, and about the Optiline brand, i. e. a proprietary spare parts line developed by Solaris. They also raised the topic of implementing VR technology as part of maintenance services.



PANEL DISCUSSION

Participants:

Luigi Di Stasio, manager at ATM Milano

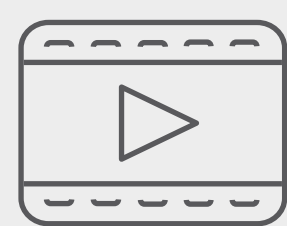
Przemysław Sowa, Board Member at PKM Jaworzno

Stephan Bartosch, Board Member at Freiburger Verkehrs AG (VAG)

Josep Armengol, Director for Bus Technology at TMB Barcelona

Moderator: **Mateusz Figaszewski**, E-mobility Development and Market Intelligence Director

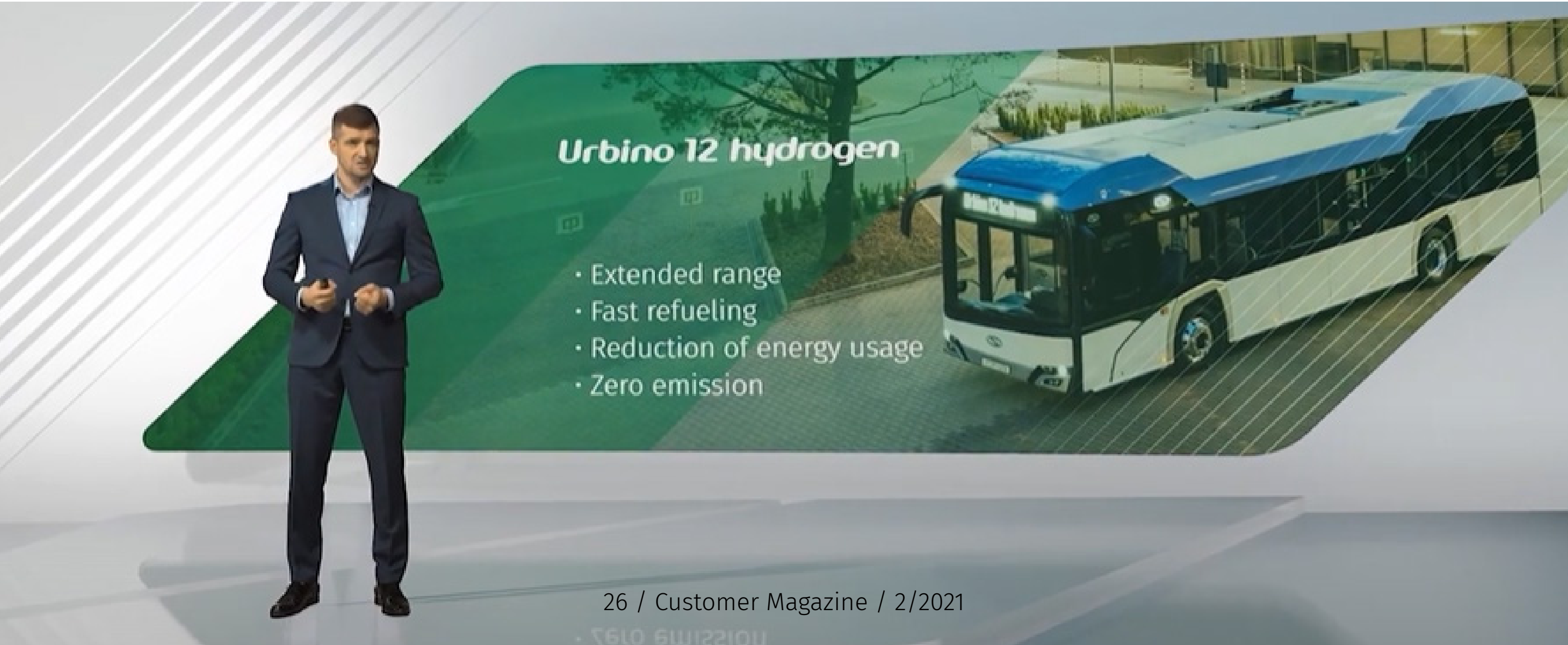
The final part of the electric session was a panel discussion with the participation of operators’ representatives from various European cities. One incredibly interesting aspect was that it discussed the experiences of cities in which electric buses have been in use for a long time and make up a substantial part of their public transport fleet (Milan, Jaworzno), and those of cities which are only just starting to implement such vehicles (Freiburg).



[Electric Buses panel discussion \[LINK\]](#)

HYDROGEN SESSION

Along with battery-powered vehicles, hydrogen technology is another crucial area of development for Solaris. Extending its zero-emission range with vehicles powered by fuel cells marks a step towards making the fastest possible transition to zero-emission public transport. This results from a belief that it is a synergy of state-of-the-art solutions that is the key to ensuring a successful and safe future for urban spaces.



1. “Hydrogen-powered Solaris buses – our offering and experience”



Katarzyna Morska,
Regional Sales
Manager



Romuald Witkowski,
Deputy Director
for Project Management

[Solaris hydrogen buses - offer and experience \[LINK\]](#)

The hydrogen session was opened with a presentation on the accomplishments of Solaris in this field. The speakers talked, among other topics, about the dynamic development of the hydrogen technology market in Europe and highlighted the fact that 1/4 of all hydrogen vehicles ordered to date by European towns and cities are Solaris units. They also announced the launch of an articulated hydrogen bus in 2022.

2. “Hydrogen fuel cells: the future of zero-emission mobility”



Paweł Mańkowski,
Team Leader for
Hydrogen Technologies

[Hydrogen fuel cell – the future zero emission mobility? \[LINK\]](#)

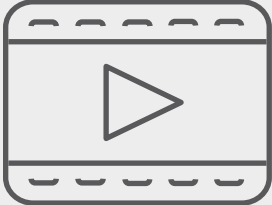
The audience was given a broad overview of hydrogen’s applications. By mentioning inventions from 200 years ago, and referring to the deployment of hydrogen technology in aerospace by NASA, as well as the miniaturisation and improvement in robustness of hydrogen fuel cells, the expert demonstrated that this technology has a long tradition and is no mere fad. Moreover, he explained the

working principle of a fuel cell and spoke of the attractiveness of hydrogen as a fuel. Its key advantages are, among other aspects, no local emissions and higher power density compared e. g. to diesel. What is more, the expert outlined challenges related to the deployment of hydrogen and measures instituted by Solaris in this regard.

3. “Safety and future of hydrogen technology”



Piotr Malaca,
Manager for Mechanical
Design Development



[Safety and future of hydrogen technology \[LINK\]](#)

In his speech, the expert raised a very important issue, i. e. the emissions inherent in hydrogen production and the safety of its deployment. The conference participants learned that the most eco-friendly method of hydrogen production is electrolysis, whereby hydrogen is created in its purest form. Attention was also paid to the characteristics of hydrogen, for example to its lightness, which makes the risk of fire during use much lower than in the case of petrol. Finally, Piotr Malaca presented arguments proving that the large-scale application of hydrogen technology will contribute significantly to the decarbonisation of transport.



PANEL DISCUSSION

Participants:

Jorgo Chatzimarkakis, CEO of Hydrogen Europe

Bart Kraaijvanger, Zero Emission Program Manager for Transdev Netherlands

Petra Piffer, General Manager of SASA Bolzano

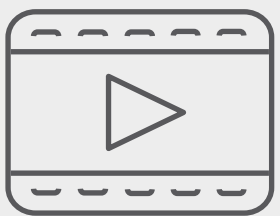
Silvia Kaupa-Götzl, Managing Director of Österreichische Postbus AG

Magdalena Przybyła, CEO of MZK in Konin

Moderator: **Mateusz Figaszewski**, E-mobility Development and Market Intelligence Director

This part of the conference concluded with a panel discussion attended by various representatives of EU institutions as well as European towns and cities and operators that boast experience in implementing hydrogen solutions.

After the two sessions, Petros Spinaris, Board Member of Solaris, took the floor. Wrapping up all the presentations, he underlined the importance of Solaris's comprehensive approach to public transport, which is not only about providing state-of-the-art vehicles, but also appropriate infrastructure, technical support and access to knowledge. All this to achieve a common goal, i. e. zero-emission public transport. "We want to exert a positive impact on the



[Hydrogen Buses panel discussion \[LINK\]](#)

Petros Spinaris, concluding the #SolarisTalks conference



environment and air quality in our towns and cities, both for present and future generations. I trust that together with our customers we can achieve it.”

Afterwards, the participants were invited to a networking session with Solaris representatives. Each participant could enter one of four rooms (corresponding to individual European markets) and talk directly to one of our representatives. It was the last of the content-related sessions planned as part of the conference.

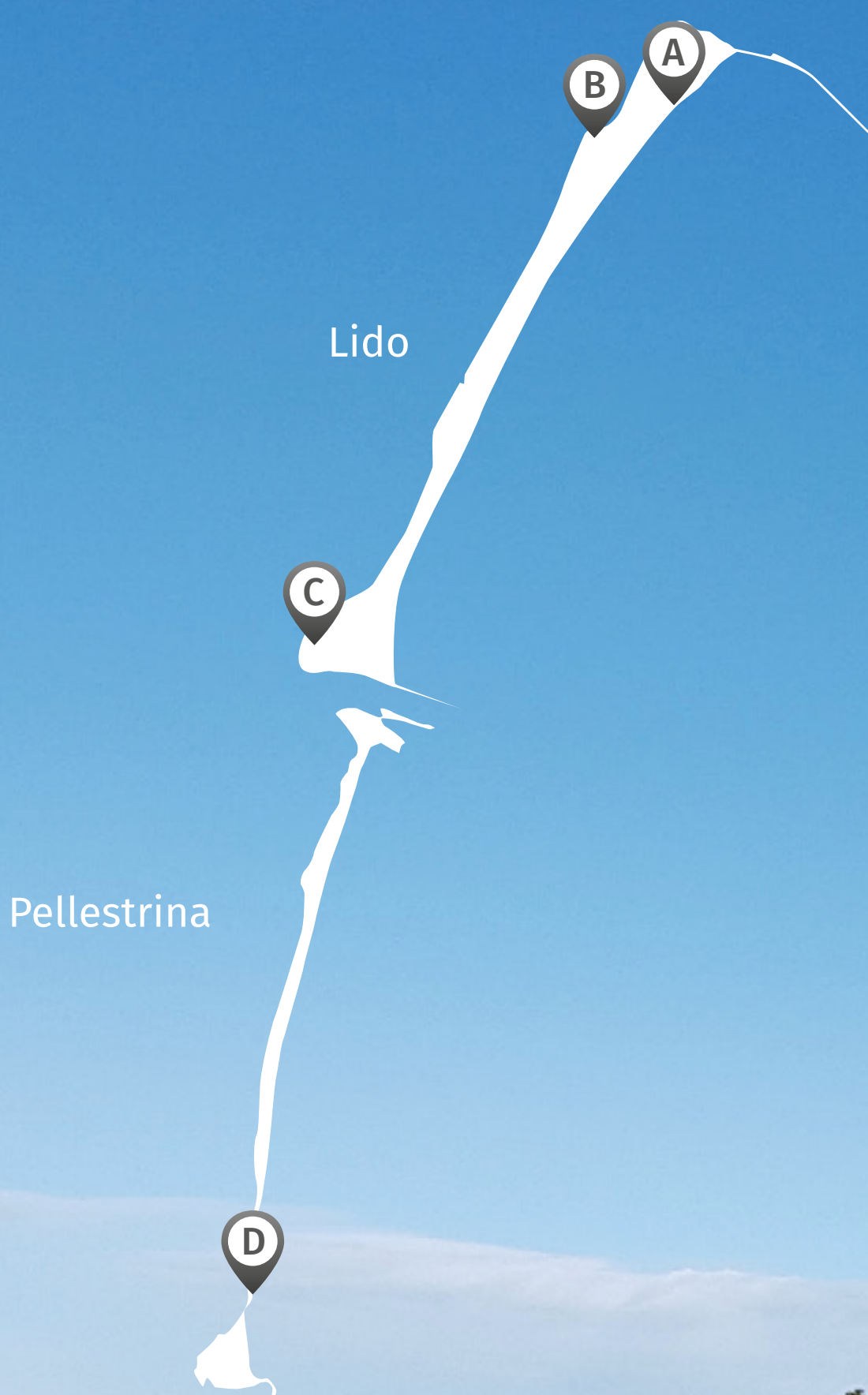
SPECIAL ATTRACTIONS

However, the discussions about the zero-emission future of public transport were not everything that Solaris had planned for its guests. As a relaxing break from all the serious topics, the participants of #SolarisTalks had the opportunity to take part in a few special events. The first one was an unusual coffee break, which was at the same time a coffee brewing workshop, conducted live from Colombia by Leandro, a professional barista. Another highlight was a visit to a Portuguese apiary. During the “Meet My Bees” event, Joanna introduced the participants to the everyday life of bees and invited them to take part in a traditional beekeeping ritual. Fans of unusual phenomena could, in turn, take part in the “Interactive Magic & Illusion Show” hosted by Eric from the USA. It made for a very nice finish to this hectic day, and was also a novelty in the hitherto format of our meetings.

The first #SolarisTalks online conference was attended by almost 700 participants from 38 countries. This widespread interest and geographical diversity show just how important the e-mobility topic is. Transitioning to zero-emission public transport is our common future and we are very glad that Solaris can be part of this process. Thank you very much for your participation and your involvement. We look forward to future editions of #SolarisTalks!

Solaris e-buses at the Venetian Lagoon

The electrification of Venice is one of the most exciting e-projects ever carried out by Solaris. 30 Urbino 12 electric buses are now employed in passenger transport in two of the city's districts situated on the islands of the Lido and Pellestrina in the Venetian Lagoon. As part of this remarkable project, Solaris has also delivered comprehensive charging infrastructure. The electric Urbino buses have completely replaced diesel buses on the two islands, thus inaugurating Italy's first ever fully-electric "green" bus routes with a minimal impact on the environment. The city of Venice is an icon of culture and trade and is a romantic dream for every tourist. Today, it is also a symbol of modernity and of a deliberate, environmentally friendly shift towards sustainable development.



ELECTRIFICATION OF LIDO AND PELLESTRINA ISLANDS

30 Solaris Urbino 12 electric buses
with charging infrastructure

Placement of chargers:

- A** Bus depot at via Zeno on the Lido
6 plug-in chargers
3 fast pantograph chargers
- B** Terminus Santa Maria Elisabetta on the Lido
2 fast pantograph chargers
- C** Terminus in Alberoni
2 fast pantograph chargers
- D** Terminus on the Pellestrina
2 fast pantograph chargers



The Lido is a prestigious district of Venice, situated on an island in the Venetian Lagoon. In contrast to the historic part of the city, the Lido's landscape is formed by seaside promenades, grand villas and wide thoroughfares. In August 2021, 30 Solaris e-buses rolled onto its streets. Electric vehicles operate on all bus routes on the Lido, as well as in the neighbouring Pellestrina district, located on a nearby island. The A, C, CA and V bus routes on the Lido go through the whole island, which is more than 10 km long, from the terminus at Santa Maria Elisabetta square, with its magnificent view of Venice as well as the famous St. Mark's Square, to the Alberoni terminus located in the southern part of the island, where the buses are loaded onto a ferry, a traghetto, serving the Venetian Lagoon, and in this way they travel between the islands of Lido and Pellestrina. The everyday loading and unloading of buses onto, and off, ferries hence poses an additional challenge for the operator ACTV.

Once a year, the Lido turns into a Mecca for the film industry. It becomes home to the famous Venice International Film Festival, La Biennale di Venezia. And that is when the biggest film stars, celebrities and film-makers, together with fans and paparazzi, arrive in droves on the island. During this year's edition of the festival, a dedicated film bus route was established and it was operated by Solaris electric buses.

The Urbino 12 electric vehicles commissioned by the Venetian carrier offer space for 88 passengers, including 27 on comfortable seats. Moreover, the buses feature two dedicated spaces for passengers with disabilities. The equipment on board includes USB charging ports, a modern passenger information system and CCTV cameras. The vehicles use energy derived from Solaris High Power batteries



with a capacity of over 115 kWh. The drive unit consists of an axle with 125 kW integrated electric motors. At the request of the client, Solaris adapted the vehicles to be charged using a plug-in depot charger and for fast charging by means of a pantograph mounted on the roof.

The city’s investment also included the construction of the necessary charging infrastructure on the islands. Solaris was also responsible for this part of the project and delivered a total of 15 chargers to the city: 9 fast pantograph chargers and 6 slow plug-in chargers. Due to the application of state-of-the-art technology, the charging processes take place automatically, without the need for manual intervention. What is more, such charging ensures the full operability of the buses according to the islands’ transport needs. The whole investment, i. e. vehicles and charging infrastructure, is worth about €27 million.

The newly delivered e-buses have replaced the existing diesel models and have allowed for zero-emission public transport on the Lido and Pellestrina. These are the first ever fully-electric “green” bus routes in Italy. According to ACTV’s calculations, the investment helps to reduce CO₂ emissions generated by public road transport by 2,300 t a year! For local residents this makes living more pleasant, i. e. less noise, less exhaust gases and a possibility to unwind and breathe in the fresh sea breeze.

“

„The city’s investment also included the construction of the necessary charging infrastructure on the islands. However, the real technological challenge was to tame the forces of nature. In the case of Venice, we are dealing with a specific maritime climate. Wind, humidity and salt may lead to corrosion or even damage of the infrastructure, if it is poorly designed and constructed. Solaris was also responsible for this part of the project, delivering a total of 15 chargers to Venice.”

Alberto Fiore,
Managing Director of Solaris Italia

”



Green transformation of Madrid

Zero-emission buses are our future and fuel gas constitutes an optimal transitional solution on the way to carbon neutrality. Spanish public transport operator Empresa Municipal de Transporte (EMT) Madrid perfectly understands this. The first of 250 CNG-fuelled Solaris Urbino 12 buses, ordered by the carrier, have already arrived in the Iberian Peninsula. Thus, Solaris has begun to fulfil its first contract awarded in the capital of Spain. The delivery of all 250 buses is slated to be completed in 2023.

A dynamic and environmentally friendly transformation of public transport is crucial to developing sustainable, safe and – as far as it is possible – the most climate neutral towns and cities. Empresa Municipal de Transporte (EMT) Madrid is the largest public transport operator in Spain and the second biggest in Europe. The

carrier is well aware of the fact that the development of all e-mobility branches, be they low- or zero-emission vehicles, should proceed in synergy, and that this process is part and parcel of ensuring sustainable transport for the future. EMT has set itself an ambitious goal to have solely electric, hybrid and CNG buses plying the streets of Madrid by 2023.

The carrier has launched a tender for the delivery of 520 CNG-powered 12-metre buses. As many as 250 of them will be supplied by Solaris. The carrier's plan, to replace all diesel vehicles in its fleet with gas-fuelled buses, is a bold step towards the eco-friendly transformation of public transport.

The use of natural gas as a fuel provides for safe and diversified energy supplies. In addition, gas vehicles constitute a real, environmentally friendly alternative to still relatively expensive buses with an electric drive. At the same time, as the EMT example illustrates, the development of a gas-fuelled fleet doesn't scupper plans to introduce electric vehicles to public transport. What is more, CNG may even act as a bridge to hydrogen fuels. Natural gas is mainly composed of methane, and hydrogen is already now produced from natural gas in a simple and cost-effective way worldwide.





At the heart of the vehicles ordered by the Spanish carrier will be a 239 kW engine adapted to use compressed natural gas. The driveline will be supplemented by an automatic transmission to ensure optimal travel comfort for drivers and passengers. Five CNG storage tanks, with a total capacity of 1575 litres, will be mounted on the roof in the front part of the vehicle. This amount of fuel, and a reserve to maintain the required minimum CNG concentration, will allow the buses to cover about 400 km on a single tank.

To enhance passenger comfort, the operator has opted for a high equipment standard in both the passenger compartment and the driver's cabin. In the spacious air-conditioned interior of the Urbino 12 CNG buses, passengers will benefit from a modern and comprehensive passenger information system, USB ports to recharge their mobile devices and a state-of-the-art video surveillance system to enhance passenger safety. The buses will each provide space for 100 passengers. The enclosed driver cabin has been designed in accordance with the standards and requirements of EMT so that the integrated driver assistance devices ensure a safe and ergonomic workplace.

This is the largest order ever landed by the manufacturer in the Spanish market. So far, Solaris has delivered over 250 vehicles to Spain, including electric, hybrid and CNG buses.



Practical exam

The fourth edition of comparative tests of e-buses in Bonn, carried out by German trade magazine Omnibusspiegel, is already over. Carriers and journalists from all over Europe once again had the opportunity to examine vehicles hands-on and to compare the models made by various manufacturers. The Solaris Urbino electric, for obvious reasons, had to be there too.

In the first edition conducted in 2016, a closer look was taken at solo buses, whereas two years later articulated buses were examined. In 2019, 12-metre vehicles were again the subject of the test. This year, after a break due to the pandemic, the test focused again on articulated vehicles. However, this time the number of manufacturers that put their vehicles on trial doubled, from three to six. What is more, half of the tested buses, including the Urbino 18 electric unit, were vehicles that are in regular service under normal operating conditions. Additionally, there were two 12-metre buses available, yet they didn't take part in the test. However, this allowed all interested parties to gain an insight into the wide spectrum of solutions applied in the industry.



It is worth bearing in mind that the format of the tests doesn't foresee a direct comparison of technical and operational parameters. Both demo vehicles and those already delivered to customers take part in the test. They feature different battery capacities, motors and heating and air conditioning systems. The test procedure is above all about the opportunity to drive the bus as a driver on a designated route. This perspective is particularly important for journalists and representatives of carriers. They can check to what extent the specified parameters, applied solutions and manufacturers' assurances are reflected in reality.

The main part of the event took place from 26 to 28 October 2021. Before starting the test runs, presentations were held by manufacturers, sub-suppliers and carriers. Then, in accordance with the schedule, journalists and representatives of operators had a chance to drive on a test route as drivers or passengers. If needed, they were accompanied by employees of a given bus manufacturer, who answered any questions and supported the drivers in the optimal use of the vehicles' capabilities.

The route was 19 km long and went through diverse areas. The buses were tested in typical city traffic, as well as on road sections with higher speed limits and a noticeable slope. The vehicles stopped

at bus stops so as to best reflect how they operate under real conditions. The journalists also completed a questionnaire on the driving experience, noise level and execution quality. One of the parameters measured by organisers was energy consumption. Due to the diversity of the vehicles, only the consumption range will be published, without indicating concrete values achieved by individual manufacturers. As part of the test drives, the electric Urbino bus covered almost 300 km with different drivers at the wheel.

The Solaris Urbino 18 electric that took part in the tests can be called a local vehicle, as it was borrowed for the tests from the Bonn-based operator Stadtwerke Bonn Bus und Bahn (SWB). The bus was one of three vehicles supplied by Solaris to this client last year. They are equipped with seven packs of High Energy batteries with a total capacity of over 560 kWh. In addition, the buses use a CO2 heat pump, which is an efficient and environmentally friendly solution compared to other technologies, that also helps to reduce energy consumption.

Our bus earned recognition from both drivers and service staff, who appreciated the solutions used by Solaris compared to its competitors. The event was also an excellent opportunity to talk to each other and to exchange experiences with representatives of the media, carriers and manufacturers on how the market and technology is developing. The next round of tests is slated for spring 2023.





It is wonderful to meet in person again!

The latest electric vehicles, an innovative hydrogen bus and even more possibilities to customise orders: we look back at the 15th International Fair of Public Transport, Transexpo, and the 10th Central European Bus and Public Transport Fair, Czechbus.

During this year's autumn exhibitions Solaris showcased four of its innovative products representing an extensive range of e-mobility vehicles. All the buses feature electric drives, which Solaris believes to be the future of city transport and in which development the company is investing consistently.

Transexpo 2021

On 27-29 October 2021, at the 15th International Fair of Public Transport, Transexpo, in Kielce, the manufacturer showed its latest and most innovative e-mobility solutions: the Solaris Urbino 15 LE electric, the Solaris Urbino 9 LE electric and the Solaris Urbino 12 hydrogen buses. What is more, in the outdoor area Solaris displayed a product unique when it comes to Europe – an electric school bus.

At the Transexpo fair Solaris was awarded the prestigious Targi Kielce (Kielce Fair) medal for its Urbino 12 hydrogen bus, for the best product in the Bus category. A distinction was also conferred on the Urbino 9 LE electric bus. Moreover, the manufacturer also received the Top Design award for its fair stand.

Czechbus 2021

Less than a month later, on 23-25 November 2021, participants in the interactive Czechbus fair in Prague had another opportunity to admire two Solaris vehicles: the latest 9-metre electric Urbino bus and the innovative Solaris Urbino 12 hydrogen bus.

The Solaris Urbino 15 LE electric and the Solaris Urbino 9 LE electric are both electric buses that have taken Solaris beyond cities' boundaries. The vehicles meet the requirements for both vehicle classes I and II and can cut it not only as city but also as intercity buses.

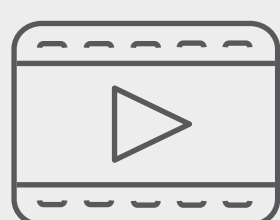
The Urbino 12 hydrogen bus is, in turn, a highly technologically-advanced vehicle that uses energy contained in hydrogen to power itself. Thanks to the technology applied in it, the vehicle is capable of covering up to 350 km on one tank. In barely two years since its launch, Solaris has delivered hydrogen buses to customers from Germany, Italy and the Netherlands, and its order book is growing steadily.

”

“It is great to be able to again meet our customers, suppliers and sector representatives in person. 2021 has been a very challenging year, but also a very successful one for Solaris. We are making progress, we are developing. We are pleased with our results and very proud of our accomplishments. 2022 looks like it will be even more promising. We plan to implement numerous interesting e-mobility projects and hope to be able to share good news with you soon.”

Javier Calleja
CEO of Solaris Bus & Coach

”



[Click & watch our relation from Transexpo Kielce 2021](#)
[\[LINK\]](#)





Debut in a grand style

At the beginning of October, Solaris landed a prestigious order for 14 bi-articulated electric buses from bus company Tide Bus Danmark. At the same time, it marks the market debut of these exceptional over 24-metre Solaris vehicles. There is something else that singles them out: the e-buses will be produced in the unique MetroStyle version.

The 24-metre vehicle, manufactured by Solaris, was presented to the public for the first time at Busworld Europe 2019 in Brussels. The idea behind the bus was to create a platform for the future serial production of vehicles with an electric or hybrid drive but also of trolleybuses.

In October this year, carrier Tide Bus Denmark ordered 14 bi-articulated Urbino 24 electric buses in the MetroStyle version. Denmark will be the first country with passenger traffic served by these vehicles, which are unusual in many respects. This is a unique order when it comes to Europe, due to both the length of the vehicles

and the choice of the MetroStyle design, specially designed for Bus Rapid Transit (BRT) routes.

The bi-articulated e-buses will be deployed for passenger transport in Aalborg, a Danish city in North Jutland. The drive of the 24-metre electric bus will consist of two traction motors with a total power of 240 kW, propelling two drive axles. The installed Solaris High Energy battery pack, with a total capacity of over 700 kWh, will be charged via a plug.

The ordered e-buses will be fitted with automatic driver assistance systems. MirrorEye is a system of cameras that replaces the rear- and side-view mirrors, ensures optimal visibility and reduces the total width of the bus. The Mobileye Shield+ system will, in turn, allow risks related to the vehicle's blind spot to be eliminated. In order to improve fleet management, the Urbino 24 electric MetroStyle will also be equipped with eSConnect, a comprehensive diagnostics instrument, to enhance their operational efficiency and facilitate maintenance.

In its distinctive MetroStyle version, the Urbino 24 electric bus is a response to the latest trends in the public transport industry. It is an ideal solution for metropolises with increased passenger traffic. At the same time, the order placed by the operator from Denmark is the first ever for this bi-articulated vehicle with an electric drive.

”

“We were very glad to hear that Denmark would be the first country ever to receive delivery of electric Urbino 24 MetroStyle buses. This is a bus generation with a high passenger capacity and unique design that perfectly suits the character of modern cities.”

Petros Spinaris
Board Member of Solaris Bus & Coach

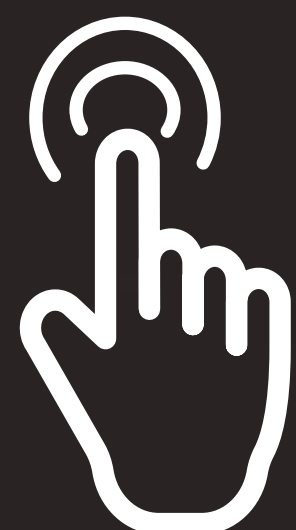
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- › interesting case studies
- › sustainable urban development
- › e-mobility knowledge base

www.ecity.solarisbus.com



Hydrogen: Update

In the spring issue of our Solaris Customer Magazine we shared with you our experience in the field of hydrogen technology (“Hydrogen acceleration”, see pages 23-28). And although only a few months have passed since that article, it is worth mentioning some more remarkable developments that have occurred in this fast-changing area. Let’s have a look at an overview of the most important news on the fuel of the future.



Nearly 100 x Urbino 12 hydrogen

The hydrogen revolution is truly under way. Worthy a note is just how much interest there is in this technology. Only a few years ago, hydrogen-fuelled vehicles were mostly... prototypes. At present, Solaris has signed contracts for 97 Urbino 12 hydrogen buses, a proportion of which have already been delivered. Orders for hydrogen buses have been placed by carriers from Austria, France, the Netherlands, Germany, Sweden and Italy. This group of countries has recently been joined by Poland. The first Polish carrier to add a hydrogen bus to its fleet is MZK Konin.

On mountain bends

An example of a completed order for hydrogen vehicles is the partnership between Solaris and the city of Bolzano. 12 Urbino 12 hydrogen buses delivered by the manufacturer to this Italian city have been bolstering local public transport for a few months now. Moreover, the order includes an 8-year service contract and dedicated training for drivers and service staff on the safe operation and servicing of hydrogen vehicles. These hydrogen buses joined electric buses, both 12- and 18-metre units, that have been used by operator SASA Bolzano for years now. The inhabitants of Bolzano can thus enjoy these cutting-edge public transport solutions – amid beautiful natural scenery as a bonus!





Hydrogen tour

For carriers interested in hydrogen technology, various tests and presentations are organised. This is an excellent way to demonstrate how reliable and useful hydrogen is in everyday transport. Therefore, it comes as no surprise that so many operators are willing to put the qualities of the Solaris hydrogen bus on trial. In the last few months, the Urbino 12 hydrogen demonstration bus has been on tour in Austria, France, Spain, Germany and Romania and visited towns and cities that are planning to purchase hydrogen vehicles.

Among other places, the hydrogen bus has been tested in the town of Neuenstadt am Kocher in Germany. Carrier Omnibus-Verkehr Ruoff GmbH (OVR), which is part of the Transdev Group, is committing to innovative solutions. As part of the “H2 Impulse” project, it is planning to use “green hydrogen” produced in an environmentally friendly way to fuel public transport.

Moreover, the Urbino 12 hydrogen has been test-driven in the town of Wels in the Upper Austria region. The bus was put into operation on the streets of this picturesque town and tested as part of the “Hydro-Motion” mobility project, which is unique to Austria.

Promoting hydrogen

Solaris has been actively participating in initiatives to promote and standardise hydrogen technology solutions for many years now. The

European Clean Hydrogen Alliance and the StasHH Consortium are amongst the most significant of them. The most recent activity of the company in this area has been its involvement in collaboration on the development of the Wielkopolska Hydrogen Valley. Solaris, as one of the signatories to the letter of intent, is joining forces with officials from the Wielkopolska Region, the mayors of its largest towns and cities, as well as representatives from the local academic world and business community to usher in a hydrogen-based future.

And in 2022 ...

The manufacturer is proud to announce the launch next year of its 18-metre, articulated hydrogen bus. This is another step taken by Solaris towards a new, zero-emission future. Looking at the rate of technological development and growing interest from operators, we feel reassured every day that we are on the right track in fostering the decarbonisation of public transport.

Hydrogen buses of the Solaris brand have already been delivered or will be delivered to seven European countries in the near future





Solaris Charging Park

One of the most innovative charging parks for electric vehicles in Europe is now being built on the grounds of the Solaris factory in Bolechowo, near Poznań.

In 2021 Solaris delivered several hundred e-buses to almost 30 towns and cities across Europe. It is zero-emission vehicles that are the sales priority of the company and year by year they are accounting for an ever larger share of orders fulfilled by the producer. Investment in its own Charging Park - i.e. a single central site for charging e-buses - marks a natural step in the dynamic development of Solaris's zero-emission range.

Featuring different charging systems and with bidirectional power flow capability, the park will be one of the most innovative of its kind in Europe. The possibility it will provide to test a variety of solutions

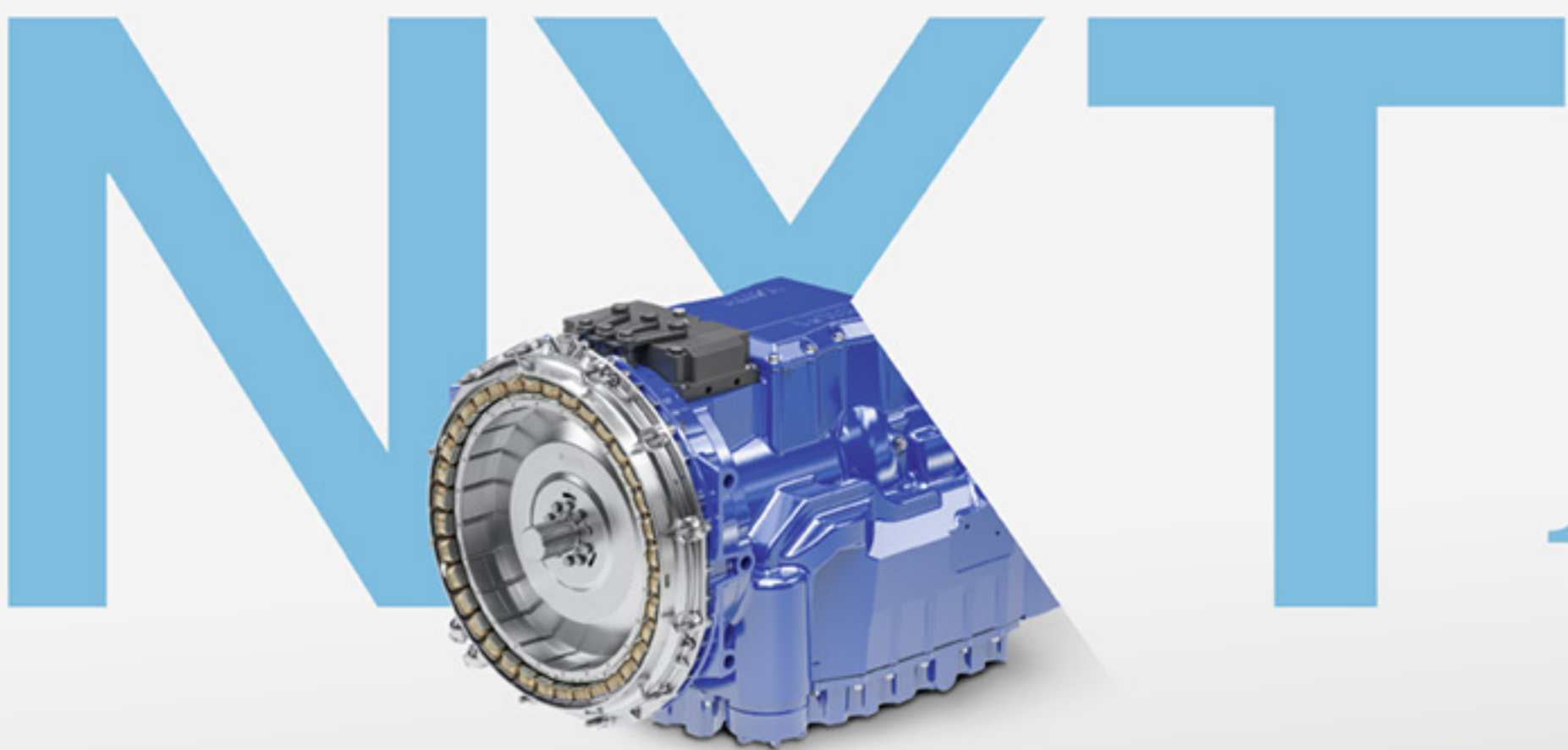
will allow Solaris to respond with precision to the growing demand for electric buses from European operators.

The whole Charging Park will have an area of 5000 m². The roofed part will house four bus charging stands, a main charging station and a technical room. Photovoltaic panels will be installed on the roof of the structure to enable energy to be generated locally from renewable sources. Next to it, plug-in charging islands will be located. Altogether, it will be possible to charge up to 8 vehicles simultaneously in the Park. One of the chargers will also be adapted to trolleybuses' needs.

This new space will become a place where all charging and discharging processes and tests of new technologies and functionalities will take place. Moreover, the Charging Park will also serve clients – it is here where innovative solutions offered by Solaris will be showcased.

The construction work is now nearing completion and the Park will be fully operational by mid-2022.

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- 7% Fuel savings transmission
- 16% Reduced fuel consumption

The right transmission. At the right time.

DIWA NXT

DIWA NXT is the logical response to the soaring demand for environmentally friendly drive solutions. Thanks to its hybrid system, the automatic transmission closes the gap between conventional and alternative drive technologies and achieves

fuel savings of up to 16%. As well as offering fleet operators and bus drivers a wide range of possibilities, DIWA NXT is also efficient, comfortable and quiet.

VOITH

Optiline

– quality tried and
tested in all conditions



26. That is the number of countries that, so far, Optiline spare parts have been delivered to. What does it mean in practice? First of all, this means extensive experience.

The wide range of weather and road conditions that Solaris original parts have to face during operation allows for a number of observations to be gathered. Are our proprietary solutions up to the challenge of serving markets with sometimes very diverse weather conditions?

To answer this question, let's have a look at selected solutions that have successfully been applied in Optiline parts.

Air bellows

These have two essential functions. On the one hand, they ensure that passengers do not feel bumps in the road, and on the other, that the vehicle structure is not damaged as a result of excessive vibration while driving. Two key components of an air bellows are its rubber part and



metal end caps. The rubber part in the Optiline air bellows ensures optimal effectiveness in temperatures ranging from -60°C to +70°C. Resistance to high temperatures helps to prevent this component from becoming too flexible, so that the bellows can effectively cope with the enormous weight of the vehicle. In extremely low temperatures, the air bellows do not become too stiff, which ensures that the vehicle can absorb bumps and ensure a smooth and comfortable ride for passengers. A major problem for buses running on roads during harsh winters is salt. It of course improves safety, but, at the same time, it makes metal parts, including the end caps of air bellows, corrode, and thus creates a risk of their unsealing. The Optiline air bellows feature two layers of an anti-corrosion coating, which help to prolong their lifespan, uninterrupted by the effects of a severe winter.

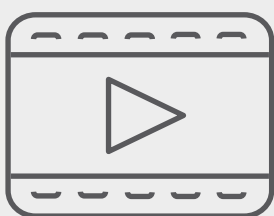
Air filters

These are some of the most important filters for the motor’s operation. Air filters are responsible for the supply of many thousands cubic metres of clean air to the motor, and thus determine its power. It is in the air drawn in from the outside where most solid pollutants and moisture accumulate, something which is particularly important in coastal areas, and, irrespective of the location, during rainy periods. What can excessive moisture cause? Well, a softening or deformation of the filter material, which, in turn, significantly reduces the filter’s effectiveness, or else rusting of intake system components. The filter material used in the Optiline filter has been reinforced with natural resins to enhance its resistance to these types of external factors.



Brake pads

Due to their robust structure they may seem to be extremely resistant to any external factors. The composition of the friction material, which is decisive for the quality of brake pads, is just like a well-kept secret recipe. And it is worth guarding. In the case of Optiline brake pads, millions of kilometres covered have proved that the mixture doesn’t lose its flexibility, adjusts itself well to the surface of the brake disc, and therefore enables efficient braking and doesn’t damage the disc’s surface.



[Click & learn more about Solaris Optiline brand \[VIDEO\]](#)

Air-conditioning filters

These are another crucial element for passenger comfort. This Optiline filter type ensures clean and fresh air for people travelling by bus in very different conditions: from a hot Italian city's streets to freezing Scandinavia, with high air humidity. For filters, weather conditions may also



contribute to their deforming and excessive humidity may decrease their filtration efficiency. That is why the filtration materials used in Optiline filters have been very carefully selected. The synthetic non-woven cellulose fabric used keeps moisture from the filtered air on its surface and inhibits its absorption. As a result, the component doesn't deform and doesn't lose its properties.

The Optiline product range is always prepared with the utmost care. Before new products are added to the product line, they undergo a series of laboratory and road tests. Thanks to this, high-quality solutions are developed, which makes Solaris vehicles operate smoothly and without any problems, regardless of the specifics of a given market. The applied solutions perform excellently in practice. And the best proof of this is the growing number of clients that opt for Optiline and stay loyal to the brand in the long run.





Photo: TTPSC SkillWorx

Servicing and augmented reality

Up until recently, augmented reality seemed to be a technology known only from science-fiction films. Meanwhile, though, solutions of this type are actively and successfully being applied in business. Solaris is also planning to use AR to support service technicians and streamline repairs.

When it comes to innovative solutions, Solaris is deploying them not just in its buses. At present, the manufacturer is developing a new, alternative form of remote vehicle maintenance. The new system uses an augmented reality tool, based on Google Glass. And all of this with the goal of streamlining servicing for clients and being able to act as quickly as possible.

This new solution will prove useful not only for repair and servicing purposes, but it will also become a significant training aid. The AR goggles will support the Solaris training team wherever training on-site is not possible. This is particularly important right now, in our new COVID-19 reality.

The latest generation of these devices features a range of functionalities that come in handy primarily for servicing operations. Using the glasses, the employees are able to send, in real time, images and videos “from their perspective” to the central workshop, as well as use voice communication. On the screen of the devices it is possible to display material such as specifications and the next steps to be taken as per the instructions or procedures.

With these capabilities, service technicians are able to promptly receive expert support in a given field. What is more, they can communicate all relevant information during the work that is being carried out, react in real time and follow the instructions and materials they receive.

Should a failure be detected by an employee, they can document and fix it, by using materials displayed on the glasses’ screen, or contact the staff at the central workshop. In the latter case, they will immediately receive support via images transmitted to the glasses.

This translates to faster repair times, fewer business trips and, last but not least, minimizing the time that vehicles are out of service. The workshop staff carry out their duties with greater efficiency and, thanks to the technology, their training process is accelerated. Furthermore, it is possible to introduce additional mechanisms to enhance their safety.

Currently, in collaboration with a partner, an AR pilot programme is being implemented in selected locations. As the project develops, the programme is expected to expand to other markets. Solaris thus continues to provide its customers with innovative technological solutions that effectively support them in their daily work.



Photo: TTPSC SkillWorx



DIRECTION >
Optiline

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SOLARIS

Designed by those who brought
your bus to life.





Vintage Urbino 12 on tour again!

First it served the inhabitants of Bydgoszcz, then those of Wrocław, and all so that it could now come back to its home region of Wielkopolska after many years. During the summer holidays this year, the first ever Solaris bus from the Urbino family turned up again in an urban space. This time playing an exceptional role – as a guide in Poznań.

Tours of the famous Poznań Tourist Line, operated by vintage vehicles and available in spring and summer, have already become a permanent fixture in the landscape of the Wielkopolska region. The inhabitants of Poznań as well as tourists visiting the city are

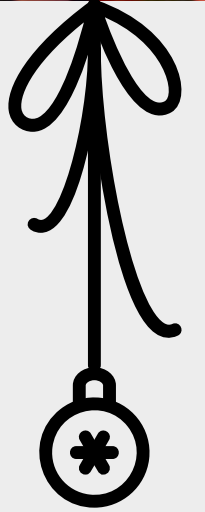
delighted to choose this form of urban travel. Buses no. 100 and 102 offer two sightseeing tours taking in all the major attractions on the city's map. For one weekend in July this year, as a special event, passengers were able to explore the city on board the first ever Solaris Urbino 12 bus.

Produced in 1999 in Bolechowo, the progenitor of the Urbino family was a pioneer vehicle in many respects. The solutions applied in it, for instance the kneeling function, or ABS, were a novelty in Poland at that time. Its first owner was a private carrier from Bydgoszcz, the Forbus company. Next, the vehicle became the property of Polbus from Wrocław. And it was in Wrocław where the bus would have ended its service, had it not been bought back by Solaris. At the turn of 2015 and 2016, thanks to the great commitment of the company's employees, the bus was renovated and restored to its state in 1999, when it left the factory gates. After several months of intensive work, the vehicle had returned to its former glory.

It is worth recalling that last year the vintage Urbino 12 was present at a parade held to celebrate the 140th anniversary of public transport in Poznań. We hope that in the future there will still be numerous occasions for bus enthusiasts to admire this unique vehicle.

“Our company is focused on promoting zero-emission transport boasting state-of-the-art solutions based on electric and hydrogen drives. Yet, Solaris doesn't forget its roots. We take care of our vehicles by tending to the work started 25 years ago by the company's founders. We are very glad that our first ever Urbino bus can once again offer its services to passengers.”

Petros Spinaris
Board Member of Solaris Bus & Coach



Christmas charity campaign

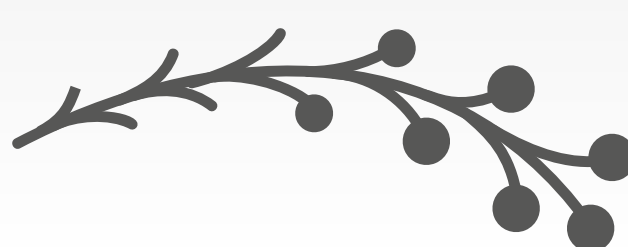
Every day we design and build our buses and take care of the comfort and safety of our passengers. But there is a special time of year when each and every one of us comes to a rest. It is Christmas time. A time when we become more friendly and willing to help other people.

In November and December, our company organised a Christmas fund-raiser for pupils and students at the Special School Complex in Kowanówko, located near the Solaris factory. Help came from all company locations where Solaris has its factories, from the Central Workshop, and also the Logistics Center, i. e.: from Bolechowo, Murowana Goślina, Środa Wielko-polska and Jasin. Thanks to the commitment and generosity of our employees we managed to achieve our desired goal.



We have been proving for over a decade now that nothing is impossible for us. We regularly support the school and its students – children and young people requiring special or individual care. We try to make sure that all the gifts we donate are as useful as possible and serve them for many years. This year, the school asked us to contribute to the purchase of teaching materials that support the emotional development of the children. In addition, thanks to the engagement of our employees, the school will be equipped with some necessary kitchen appliances. This is a great opportunity for the children to acquire new skills.

On behalf of the students and all the teachers of the Special School Complex in Kowanówko, we would like to extend our most heartfelt thanks to all those who have supported this campaign, and we wish them a Merry Christmas!





SOLARIS

A CAF GROUP COMPANY

Wishing you a **Merry Christmas**
and Happy New Year.

May this Christmas be healthy & cheerful
for you and your family.

And may New Year be filled with joy,
happiness and peace and bring you
great success and many achievements.

Board and Team
of Solaris Bus & Coach

