

## IRIZAR at BUSWORLD 2019



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**The Busworld International Bus and Coach Fair, which will take place between the 18th and 23rd of October, will feature an unprecedented display of the Irizar Group's brand, technology and sustainability strategy. It will present its full range of integral, hybrid and electric buses and coaches and a host of technological innovations that are the key to its future.**

The Irizar Group, which this year celebrates its 130th anniversary, is an increasingly strong group and continues to be committed to developing new solutions and services to guarantee a more sustainable future in economic, social and environmental terms.

At the stand, number 636 of Hall 6 which measures 2000 m<sup>2</sup> six latest generation vehicles can be viewed: two Irizar brand integral units (Irizar i8 and Irizar i6s), one hybrid coach (the new Irizar i4) and two electric buses (the new ie bus and ie tram). All these vehicles offer innovations in accessibility, safety, technology and sustainability.

The presentation of these developments for the first time, at Irizar's stand on Friday, 18 October at 11.30, gives an indication of the Irizar Group's positioning in all segments of passenger transport, including private hire as well as public, urban, intercity and long-distance transport, and of its status as a benchmark in the sustainable mobility sector. It also shows Irizar's commitment to society and to offering high added-value service to its customers in such vital aspects such as design, customisation, safety, operating cost, future technology and sustainability.

Busworld has also become the venue for celebrating its 130th anniversary, with a powerful staging of a show that brings together the essence of the brand, combining dance, audiovisual and live music. To extend this celebration to the operators, it is supplying them with the limited series 130, which includes an extra equipment package of great added value for operators of the Irizar i8 and Irizar i6S model coaches.

### **Rafael Sterling, New CEO of the Irizar Group**

One of the main novelties is the change in the Managing Director of the Irizar Group. After 26 years of dedication to Irizar, José Manuel Orcasitas has decided to end his professional career at Irizar and devote himself to his family, friends, and hobbies. Beginning September 1, 2019, he will be replaced by Rafael Sterling. Born in Bilbao on March 22, 1975, and married with three children, he is a Senior Telecommunications Engineer from the Universidad del País Vasco and an MBA Executive from the Universidad Comercial de Deusto. Prior to his appointment, Rafael Sterling was the International Business Director of the Irizar Group

Rafael is taking up his new role at a time when the Group is very robust financially and is in a position of strength that enables us to continue advancing and developing new



solutions and services while ensuring a more sustainable future economically, socially, and environmentally.

Today Irizar is a business group of more than 3,400 people, a group that will close 2019 with growth in turnover of around 15%, once again beating its own record and making this year the best in the 130-year history of the Group. A group that owns 13 production plants, 8 proprietary brands, an R&D centre, 8 proprietary distribution and after-sale companies, operating in 6 different sectors (passenger transport, electromobility, energy, motors and electric generators, connectivity and electronics) and has sales and post-sales networks worldwide.

This year the Group's 130th anniversary, is also the tenth year since Irizar first attended this Busworld fair with its own stand and ten years since it became a manufacturer of integral buses. Likewise, this year is the 20th anniversary of Irizar Mexico, and the 10th anniversary of Datik.

Irizar is continuing to increase its global presence. The recent acquisitions of Irizar Italy, the opening of Irizar Benelux, the consolidation of Irizar USA and the signing of new distribution agreements in Sweden, Germany, and countries such as Ecuador, Argentina, Egypt and Cameroon are evidence of this expansion.

Irizar has become a benchmark for coaches and buses by consolidation in very important markets with very high standards in products and services. Not surprisingly, it continues to develop and deploy its wide range of integral products, integral electromobility solutions for cities, as well as those developed in collaboration with the main chassis brands.

Its financial strength and experience in mobility, both urban and medium and long distance, enables Irizar to continue innovating, contributing its knowledge in the development of new technologies, solutions and services that guarantee an emissions-free future. In short, a more sustainable future in economic, social and environmental terms.

*"I am assuming the management with great pride and, above all, I am full of enthusiasm and gratitude. Irizar is a very stable and consolidated industrial project but which is very much alive, with great challenges ahead. It is a project comprised of valuable people, fully committed to customers, and based on innovation as a sign of identity. It has the absolute conviction that the way of the future is sustainable solutions and is committed to the talent of people who, accordingly, become ideal partners that will accompany transport operators into the future.*



*Irizar will continue on the path of growth, committed to the values that strengthen our brand, investing in new technological developments that place us as a global leader in the bus and coach market, and committed to sustainability as an indispensable value for present and future mobility. To meet the milestones established by the previous objectives and to maximize the profitability that our products and services offer, we will continue to place customers at the centre of all our activities.*

*We want Irizar to continue to mean proximity, and I therefore want to make myself available to customers, partners, the press, institutions, and to all members of the Irizar project and to support you in everything within my power.*

### **Cost efficient, more sustainable and safer coaches**

Irizar continues to take great steps in the development of new technologies and services that offer pioneering solutions to the different mobility needs of the future worldwide to reduce consumption and emissions, improve sustainability and add more value to customers.

The engines presented meet the Euro6 Step D emissions. Fuel consumption, and consequently, CO2 emissions of Irizar integral vehicles are at their best levels and increasingly close to 20 l/100 km or 5 km/l for 12.2m and 19.5mt maximum weight units.

Irizar is always alert to opportunities for identifying the needs of the world of bus or coach transport and developing the technologies that involve the minimum level of emissions in addition to guaranteeing profitability for our customers. Based on these assumptions, we are currently investing in and developing hybrid alternatives with electric range and engines fuelled by HVO and natural gas, compressed or liquefied gas.

Irizar will therefore be able to offer a complete range of conventional, electric and hybrid vehicles, to meet all the needs of every Customer. A complete range of hybrids with two types of combustion engines, Euro6 D, 6.7l and 8.9l, approved for operation with fossil diesel, HVO (vegetable-based diesel), and N (compressed natural gas), with and without electric autonomy, in addition to versions with external charging, connected or pantograph.

### **Latest generation of the Irizar i4**

The new lighter and more aerodynamic Irizar i4 generation is available with integrated radar in the centre of the front end, new optional full-LED Irizar headlights that provide up to 30% more lighting capacity, rectangular end-outline marker LED fog and pilot



lights, full LED tail lights, new windscreen with greater curvature, more robust windscreen wiper system, updated lever design, rear end to reduce bumpiness, and a three-section rear bumper.

In the interior, the use of new materials and modern manufacturing technologies improve durability, ageing, and recyclability of side panel, interior visors, and roof centre materials. Notable, also, is the new design of the dashboard that enables modular integration of vending machines and SAE systems, aesthetic redesign of seats and partitions to create a warmer and modern environment, a new line of more robust and functional diffusers, new lighter luggage racks, full LED lighting integrated in the central part of the roof, and panel covers made of stainless steel for improved reliability and access for maintenance tasks.

The structural redesign of this version, the incorporation of new and lighter materials and corresponding reduction of weight, along with a more aerodynamic front end, provide this Irizar i4 with significant fuel savings.

### **New door opening system**

The Irizar i8 incorporates the new Swing Synchro door system and Evolution control electronics recently developed by Masats. This system represents an important development, a change in the design of door opening systems for coaches.

The smoothness of movement, completely horizontal without wedges or stabilizer bars, enables perfect sealing and the elimination of friction noise, which increases the comfort of passengers and drivers.

The door is tamper-proof and incorporates different systems in the interior which, combined with manufacturing simplicity, enables a reduction of assembly time by 50%.

The Swyincro system also substantially improves the MTBF (mean time between failure) of the product, increasing reliability and availability of the vehicle. It has been designed with maximum passenger safety in mind.

### **New lightened PMR KS8 lift.**

The Irizar i6S also incorporates an innovation, a new PMR lift system with a significant weight reduction that incorporates an indication detector for deployed barriers, and a safety device to prevent pick up if the platform is full.

We have been applying life cycle analysis (LCA) methodologies for more than 4 years while establishing Product Category Rules (PCR) to evaluate the environmental profile



of our combustion, hybrid, and electric coaches, as our objective is to make efficient and cutting-edge environmental products and technologies applied to the entire product life cycle available to all. The result of this work is the achievement this year of the first Environmental Product Declaration (The International EPD System), which makes us the first company in the sector worldwide to achieve this certification in the environmental area.

## Irizar e-mobility, one year later

One year since the launch of the Irizar e-mobility facilities in 2018, the Irizar Group continues to advance and innovate with the firm conviction of contributing to the transformation of cities in terms of mobility.

The range of electric vehicles with the 12-metre Irizar ie tram bus and the new generation 12 m Irizar ie bus.

2019, in addition to witnessing a major boost in the development and manufacture of different battery solutions and investment in photovoltaic energy, is the year in which the BRT electric fleet has been commissioned (with interoperable ultra-rapid and slow charging stations) in Bayonne, Aix en Provence, and Amiens.

Our workforce has grown from 150 to 200 employees, which underlines the steady pace at which the company is taking on the challenges of the future and confirms the commitment to local employment and the creation of wealth in the territory.

### **New generation of the Irizar ie bus**

At the Busworld fair, Irizar i4 e-mobility is presenting a new generation of the Irizar ie 12 m bus. This bus has been operating since 2014 in different climate conditions in different European cities, and its performance data demonstrates its reliability and range.

#### *Futuristic design*

The bus has been provided with a new exterior and interior design, achieving a more attractive, efficient, reliable, and safe vehicle.

The front end, with a more pronounced and elegant touch, is increasingly similar to the aesthetic features of Irizar products. The interior design has also been modified so that



it can optionally incorporate some features of Irizar ie tram; low windows, side lighting or screens in the ducts, among others.

As it is modular, it facilitates interior configuration by the customer. It also offers the option of replacing the rear view mirrors with cameras that show images on two screens located inside the vehicle on both sides of the driver.

*Greater passenger capacity.  
Greater range*

This new generation, available in 10, 12, 15 and 18 metres, incorporates several innovations, as well as new batteries. The space has been optimized to provide greater passenger capacity and greater modularity. The new generation of the Irizar ie bus can be certified in Class 2.

A new generation of more efficient batteries is combined with a regenerative braking system, which reduce consumption and offer greater vehicle range. In urban environments, driven by 350 kWh in a SORT 1 cycle and in standard climate conditions, it offers an approximate autonomy of 250 km, which means about 17 hours of operation.

The new Irizar ie bus has greater flexibility in terms of charging point positions (slow, fast, or ultra-fast) as well as increased charging power (up to 600 kW).

Charging speed has decreased with the ability to perform slow charge of the vehicle in 3 hours. There is also the option of fast charging via pantograph.

*A safer vehicle*

In addition to complying with the anti-overturning standard in electric vehicles, ECE-R66 / 02, the European regulation that measures the structural strength of large passenger transport vehicles, the AVAS (Acoustic Vehicle Alerting System), an acoustic warning system that complies with R138, has now been incorporated.

A new dashboard which complies with fire regulations 118R annex 6, 7, and 8 has also been included.

*Improved vehicle maintenance*

The new generation of the Irizar ie bus enables easier, safer, and more ergonomic vehicle maintenance based on optimized and improved accesses at different points.



In short, a more reliable vehicle has been achieved, with more personality and style than ever. This fully electric vehicle eliminates tons of polluting emissions and creates a healthier and more sustainable environment for citizens.

### **Expanding the Irizar ie tram range**

Irizar e-mobility presented the 12 m Irizar ie tram at the Global Public Transport Summit organized by UITP in Stockholm from June 9 to 12.

The 18m Irizar ie tram was presented at the 2017 Busworld international fair. Now the 12m version is here. This model has become the authentic flagship and the best-selling to date. It operates in cities such as Amiens, Aix-en-Provence, Bayonne, Barcelona or Las Palmas.

The Irizar ie tram is a 100% electric, zero-emission bus with the appearance of a tram that combines the large capacity, ease of access and internal configuration of a tram with the flexibility of a city bus.

Accessibility, safety, passenger flow and passenger comfort are the inspiration behind the interior design architecture, resulting in a bright, comfortable, spacious, pleasant and safe interior.

### **Irizar Group technology - on the front line**

The stand also has a space dedicated to technology, which shows the permanent magnet electric engine and a battery pack, both developed and manufactured by the Irizar Group.

The Irizar battery system incorporated by hybrid and electric vehicles uses a modular design, developed to meet the needs of any operator. Also included is a cooling system that enables optimization of useful life and the possibility that vehicles can operate in extreme weather conditions. This is a robust and safe system that complies with the latest European regulations: R100 v2, R10.v5 and UN38.3.

The different solutions we offer on the market are:

- Energy pack for slow charging. Designed so that the vehicle can travel the maximum number of kilometres and complete the operation with a single daily charge.





- Nano pack for fast charging. The perfect ideal pairing between battery charge and power for mixed operations, where the vehicle has sufficient battery life to operate during peak hours. The charge may be both slow and fast.
- Power pack for ultra-fast charging. This is the solution for 24/7 operation with charging of up to 600 kW.

The Irizar battery pack is a highly recyclable product. Treatment of all its components is ensured through a controlled process with the possibility of use for other types of applications being evaluated. Additionally, Irizar is constantly searching and researching increasingly efficient products with the least environmental impact.

### *Second life and recycling of batteries*

Irizar e-mobility, in collaboration with the Cidetec Technology Centre, participates in projects related to the analysis of the second life of batteries, which are used in urban electric buses. It is estimated that these batteries will reach their end of life at an approximate SoH (State of Health) of 80%. They must then be replaced and repurposed for other uses with less demanding electrical specifications, such as stationary applications including electrical storage for photovoltaic systems or electric vehicle charging systems.

Meanwhile, the issue of recycling is also being addressed in collaborations with several European companies, to ensure final treatment of each component, controlling each process for safety and environmental aspects.

## **The future today**

The integral vision of the mobility of the future combines zero emissions technology with smart information. The Irizar Group is working on following a path towards smart connectivity of our coaches, driverless operation and new mobility concepts. Because fulfilling our responsibility to society and the environment is an obligation.

### **Safety, our priority**

For this fair Irizar is announcing that it has reached a collaboration agreement with Mobileye, in the Intel Group, the world leader in the development of advanced features aimed at addressing the different levels of automation for Irizar Group buses and coaches while improving safety, efficiency, and connectivity (5G).

One of these features is an accident prevention system that identifies potentially dangerous situations and provides visual and acoustic warnings to help drivers avoid or



mitigate a collision, acting as a "third eye" that constantly monitors the road ahead of the vehicle.

This intelligent system warns of an impending frontal collision with a vehicle, including motorcycles, pedestrians and cyclists, both on the road and in the city, up to 2.7 seconds before it occurs. It helps maintain the correct safety distance with the vehicle in front and activates audible and visual warnings if the distance becomes unsafe. It activates visual and acoustic warnings up to 2 seconds before an imminent collision with a cyclist or pedestrian or when there is involuntary departure from the driving lane. It recognizes traffic signals and speed limit signs and is able to switch from high-beam to low-beam lights automatically so as not to dazzle other road users.

As a result of this agreement, all Irizar integral vehicles will be equipped with these systems starting October 2019.

### **Towards autonomous driving**

Connectivity and digitalization will play a crucial role in the future of mobility. Autonomous vehicles and new and more efficient services will shape this future. At the international level, six levels (from 0 to 5) are defined to classify autonomous driving. This classification system describes the degrees of automation of vehicles as well as the requirements that drivers must meet.

The Irizar Group is working to introduce different levels of automation for both buses and coaches.

For zero-emission urban vehicles, the Group is currently actively participating in local and European projects with the objective of reaching level 5 of driverless operation.

Work is also taking place on driverless medium and long-distance coaches, with investment in advanced driver assistance system (ADAS) projects. Some functions that are being developed are the recognition of traffic signals; intelligent headlight control; signal recording; detection of bicycles, animals and pedestrians; and lane change assistance, among the main ones.

### **Connectivity - easier and more efficient**

Additionally, the Group offers intelligent driver assistance systems with a range of optional equipment to provide drivers and passengers an optimal form of mobility. Extensive experience in machine vision and deep-learning enables Datik to offer fleet management, preventive and predictive maintenance, and autonomous driving systems.



The Irizar Group is also involved in projects to develop technologies and strategies to create eMobility solutions (urban public transport based on 100% electric buses) that are modular flexible and scalable in order to make viable the mass deployment of medium / large electric bus fleets, thus minimizing the impact on the power grid and reducing initial and operational costs.

These projects are an important strategic challenge as it seeks to unlock the limitations of a booming market in which the Irizar Group has been positioning itself since 2011.

### **Life cycle analysis (LCA) and Environmental Product Declaration (EPD)**

At Irizar, we continue to make significant progress in all aspects related to the improvement of the environment, in both the treatment and reduction of waste, as well as in emissions, etc.

After more than 4 years applying life cycle analysis (LCA) methodologies and establishing Product Category Rules (PCR) to assess the environmental profile of combustion and hybrid and electric buses, this year Irizar was awarded the First Environmental Product Declaration (The International EDP System), which makes it the first company in the sector worldwide to achieve this certification in the environmental area.

Environmental Product Declarations (EPD) have been developed in accordance with ISO 14025 and they add a new dimension in the market, given that they enable information to be provided on the environmental performance or scope of products and services. They are created and registered in the context of the Type III Eco-Labeling Programme under the International EPD System, based on the following reference standards. UNE-EN ISO 14040:2006. (Environmental management. Life cycle analysis. Principles and frame of reference). UNE-EN ISO 14044:2006. (Environmental management. Life cycle analysis. Requirements and regulations). UNE-EN ISO 14025:201. (Environmental labels and declarations. Environmental declarations type 111. Principles and procedures). Product Category Rules for preparing Environmental Product Declarations for Public and private buses and coaches (PCR 2016-04).

This life cycle analysis project has been carried out on the Irizar integral i4 model, at 13 metres in length, 55 seats, and DAF MX 11 E6 diesel engine and ZF motorised gear-box, and is being applied to the rest of the Irizar Group's product range.



## **Production installations with completely sustainable energy**

The Irizar Group integral environmental policy includes the use of renewable energy in its production plants.

An example of this is the Irizar e-mobility production plant, which has already been awarded the Type A energy efficiency certificate, the maximum currently available at the European level. This is the first European electromobility plant where all the energy consumed will be supplied by the largest solar photovoltaic park located in Alava, Basque Country, where Irizar has invested, acquiring 3 megawatts. The plant will be located in the Arasur logistics platform, in Ribera Baja (Alava).

The park, operated by the Basque Energy Agency (EVE) and the Krean group, will have 67,000 panels of 355 watts each. The installed power will be 24 million watts and will double the photovoltaic power installed in Euskadi. It will generate 40 billion watts per year, equivalent to the annual electricity consumption of 15,000 families.

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