

# *Irizar Group magazine*

12 | 21

No. 4

## *Smart sustainable technology at your service*

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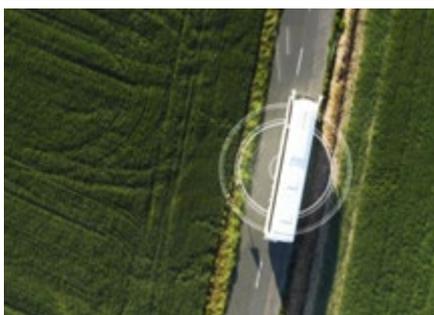
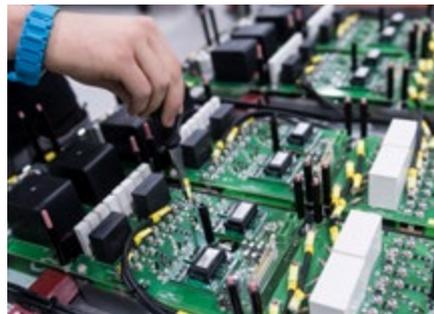
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“Sustainable mobility has become one of the transport priorities of the future, a motto that we make our own and that is an element of the strategic decisions that we are adopting in the Irizar Group.”

We started 2020 after having celebrated our 130th anniversary, with the optimism of facing the year full of major challenges and opportunities. But in March corona virus arrived, bringing a major health crisis of unknown dimensions that ushered in an unprecedented global economic crisis, which we have not yet overcome today.

This crisis has brought us an opportunity to reinforce the international positioning of our brand and to refocus and redefine our strategic plans to continue innovating and adapting to meet the key challenges that the energy transition and the new sustainable and intelligent mobility will set us in the future, which is coming closer every day.

Buses and coaches play a crucial role in achieving the sustainability goals of the European Green Deal, and in the efficient transition towards decarbonisation and climate neutrality by 2050. The bus is the means of transport that generates least greenhouse gas emissions compared to other modes of transport: 3.7 times less than an aeroplane, 5.5 times less than a car and 13% less than a train. In terms of CO2 emissions, the bus generates fewer emissions per passenger/kilometre than any other mode of land transport, except rail. In fact, figures from the European Environment Agency show that almost all CO2 emissions associated with road transport are not produced by bus transport.

Sustainable mobility has become one of the transport priorities of the future, a motto that we make our own and that is an element of the strategic decisions that we are adopting in the Irizar Group.

Today, after 132 years, we understand our ability to respond and adapt successfully to different challenges, by making a continuous effort to position ourselves at the forefront and improve the experience, safety and sustainability of public transport and by offering a customised service and quality. We also understand our flexibility in meeting the needs of our customers and our commitment to remaining closer than ever to everyone, to offer the best of ourselves.

This year we have reaffirmed our unwavering commitment to move ahead in the implementation of the 10 Principles and increase our contribution to the Sustainable Development Goals of the United Nations 2030 Agenda. This is, without a doubt, the ideal framework in which to reinvent ourselves, emerge stronger and have a positive impact on our stakeholders and on society.

With our characteristic optimism, we are involved in new goals for the future. We approach this from the value of a solid brand, with agility and adaptability, by developing high technology in strategic sectors and through close relationships and collaboration with our customers, suppliers and partner suppliers and with the absolute commitment of all the incredible people who make up the Irizar family.

**Rafael Sterling**

*CEO Irizar Group*

# Covid-19

## Global crisis and impact on the sector

No one could have predicted that in early 2020 a virus like Covid-19 would spread throughout the world, causing a global pandemic that would lead to the deepest economic crisis since the Great Depression of 1929 and World War II. Beyond the impact on the lives of millions of people around the world, the new corona virus pandemic has dealt a severe blow to the global economy.

World GDP contracted by more than 4% in a single year, very unevenly in terms of countries and areas. While China managed to save the year with positive growth of around 2%, the United States suffered a contraction of 3.7% and in the Eurozone it soared to 7.5%. In Spain, the long lockdown to put a stop to the pandemic dragged us into the most severe recession since the Civil War, leaving in its wake "an economic and social crisis of unprecedented magnitude."

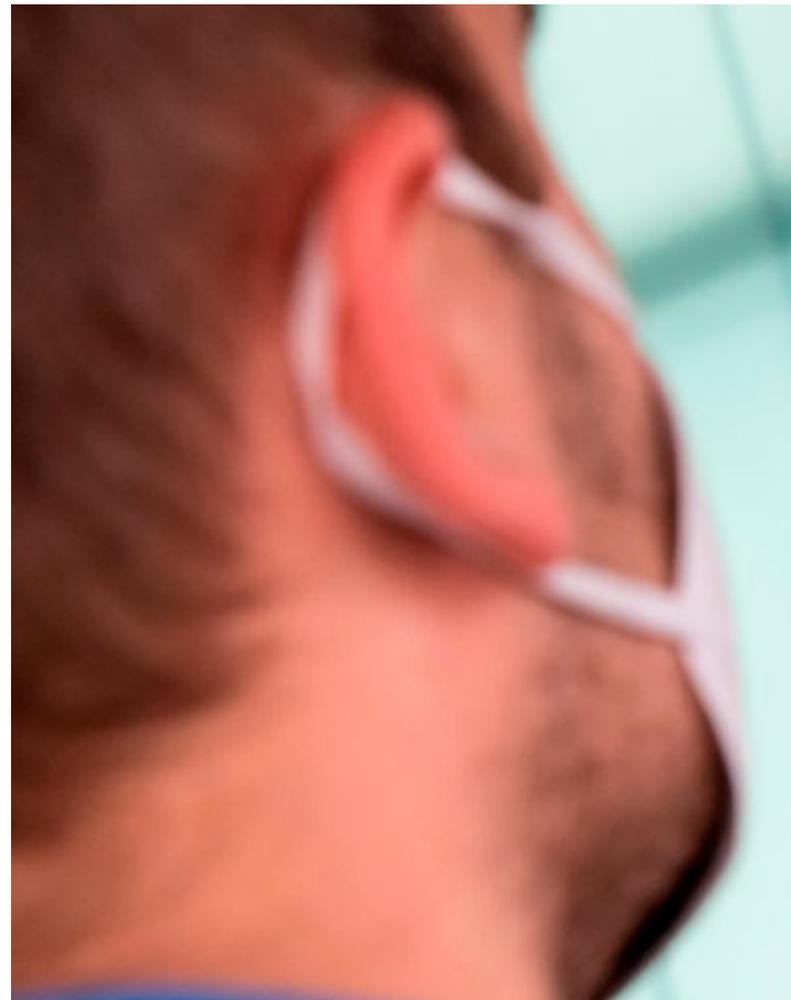
The tight restrictions on public transport and mobility, as a way to control contagion and the spread of the virus, dealt a major blow to the public transport sector, especially medium and long-distance passenger transport, as well as international tourism. Citizens could only travel on public roads for activities related to basic needs: food purchases, visits to health facilities, cases of force majeure or situations of need, etc. The impact was felt, without exception, in all means of transport: air, rail, sea and road transport. And in both public and private transport.

The fall in passenger volumes had an uneven effect in the different market segments, practically 100% of discretionary transport, except for school and personal transport; around 60% in inter-provincial transport and 40% in urban and commuter transport. Consequently, there was a collapse of around 60% in bus and coach registrations in Europe in discretionary and regular lines and 30% in intercity-school.

At national level, the decreases were 90% in discretionary transport, which practically disappeared, with the exception of school, 70% on regular lines and 50% on commuter lines - an average drop of 54%, which confirms that this is one of the sectors worst affected by the crisis, along with commerce, tourism, hospitality, leisure and real estate, and that mobility is linked to economic activity.

This crisis has undoubtedly accelerated changes that we already anticipated in mobility habits that now more than ever must go hand in hand with the objectives of decarbonisation and climate neutrality.

The bus is a crucial element in combating climate change, as it generates fewer greenhouse gas emissions than any other mode of transport: 3.7 times less than an aeroplane, 5.5 times less than a car and 13% less than a train. Also, in terms of CO2 emissions, the bus generates fewer emissions per passenger/kilometre than any other mode of land transport, except rail. Moreover, each bus replaces between 14 and 30 cars on the roads, so it is an effective



tool for reducing congestion, CO2 emissions and the use of fossil fuels.

It will be necessary to produce the right diagnosis and lay the foundations for our future. The reactivation of the sector and economic recovery will depend on this. As Mario Draghi recently recalled in Italy "every Euro wasted today damages the generations to come, it takes away their rights".

What has gained strength is that the mobility of the future will be sustainable and smart. And that future is already a reality. The solutions for emission-free public transport, regardless of

the service performed, are one of the key social demands that the Covid has left behind. Technological developments will be fundamental to the innovation plans of transport companies and at Irizar we want to be at the forefront. We continue to focus our efforts on sustainable mobility and the energy transition.



# The Irizar Group today

## Strengthening our strategic positioning

The health crisis has imposed a very complex management environment on us in which we are required to balance different needs: in the short term, to protect the health and safety of people and their families; in the medium and long term, guaranteeing business sustainability and the continuous generation of value for all our stakeholders. The different actions that we are implementing during this period further reinforce, where needed, our strategic positioning and the inherent values of the Irizar brand.

### Closer than ever to our customers, supporting them where necessary

We are developing major innovations in the Group and we have provided anti-Covid safety solutions aimed at reactivating and recovering the sector: protection screens for driver and passengers, access temperature control cameras, eCo3 air purifiers, air renewal systems and passenger compartment disinfection. More than 10,000 buses and coaches are fitted with these Irizar innovations that comply with the necessary safety and hygiene standards and thus help prevent the spread of the virus.

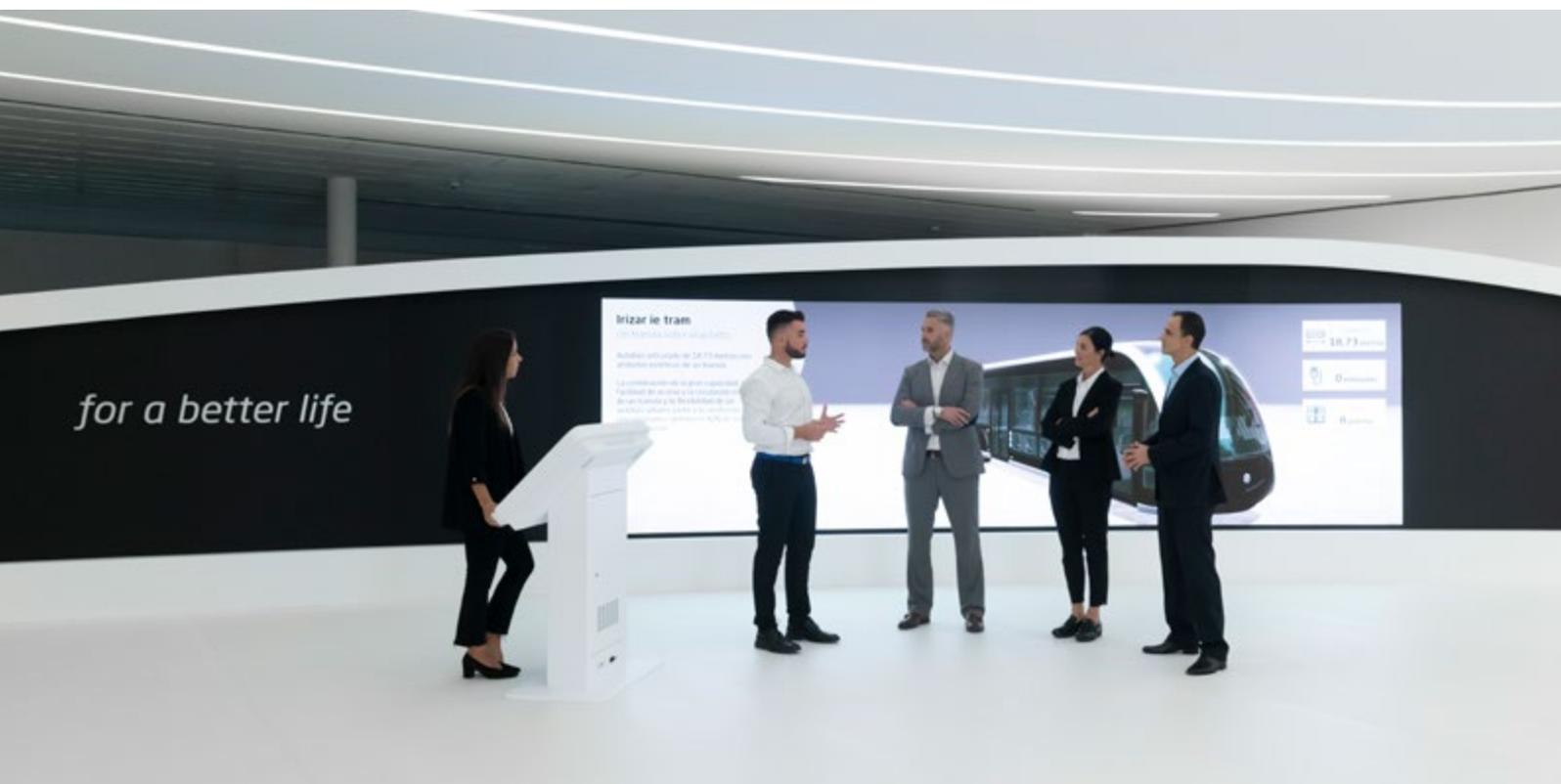
### We safeguard employment and retain talent

In the economic crises of 2009 and 2020-21, we managed to protect the jobs of the Irizar Group's staff. We achieved this through collaboration and by being more supportive than ever. We have improved communication and training in order to continue preparing for the new normal. We remain involved in Social Innovation Projects.

We are proud to see the level of commitment, flexibility, strength and adaptability that Irizar people demonstrate every day.

We continue to cultivate talent and generate quality jobs and we remain an attractive company. All within a culture and business approach of integrity that is governed by Ethical Principles.

We play an active role in defending the industry and its high added value, promoting economic recovery and the generation of local wealth and employment.



*for a better life*

### **We are increasing our collaborations**

We continue to collaborate with the entire network of suppliers, local technology centres, institutions, universities, training schools, etc. to continue feeding the industry and the company and the wealth of the area.

We believe that this is how to continue to face major challenges, by strengthening ties and looking for partners with the aim of staying at the cutting edge and continuing to build the future.

### **We innovate and create new products and new technologies**

We want the Irizar Group to become a global player in urban, medium- and long-distance sustainable mobility. We seek solutions with high technological content to enable our customers, who undoubtedly guide the objectives that we set ourselves, to provide their services more efficiently and sustainably, based on the conviction that the future will involve mass public transport, as a fundamental solution for the sustainability of the planet.

Reducing the impact of our vehicles and products, eliminating emissions of greenhouse gases and noise pollution, improving information for users and increasing passenger safety are our priorities. We judge these to be the foundations on which to build all our sustainability actions that society demands of us.

We are taking on new projects not only in passenger transport, but also new heavy duty traction systems, new developments in chargers, charging interoperability with different vehicle brands, network quality communication standards, storage and transition towards renewable energy, operating assistance systems. Likewise, in the railway sector the Group's companies are strengthening their positioning.

In 2020, we put the Irizar Group's first autonomous bus, a 12-metre, zero-emission electric vehicle, into operation in Malaga. The pioneering project has two characteristics that make it a breakthrough, which are its capacity to transport passengers and its interaction with vehicles, pedestrians and infrastructure under real conditions in the city of Malaga.

### **We provide social support**

in accordance with our principles and mission. We are collaborating with more than 30 associations at local and provincial level, and 25 NGOs at international level, to promote education, health and gender equality, and to eradicate poverty, hunger and inequality.

### **We reaffirm our unwavering commitment to moving ahead in the implementation of the 10 Principles**

We are increasing our contribution to the Sustainable Development Goals of the United Nations 2030 Agenda. We have therefore ratified our adherence to the Global Compact and our commitment to this initiative, in which we are fully engaged. This is the framework that gives us the opportunity to reinvent ourselves, so that we emerge stronger and can have a positive impact on our stakeholders, by adopting the three dimensions of sustainability: economic-governance, social and environmental.

### **We have launched the new Irizar Group website**

A platform that collects detailed information about the Irizar Group, facts and figures, the international dimension and its member companies. At a single glance, users can access information about its technological and innovation capacity, the activity sectors in which it is present, future projects, as well as its strategy. [www.grupoirizar.com](http://www.grupoirizar.com)



## Key player in sustainable and smart mobility

The mobility of the future will be different to what we are used to. Technology at the service of public needs and sustainability goals will undoubtedly bring about disruptive changes, some of which can be predicted while others are yet to be discovered.

Our current vision sees the mobility of the future as sustainable, safe, smart and connected, with the presence of vehicles powered by different energy sources, increasingly efficient and with different levels of range and services that will improve people's experience.

At the Irizar Group we aim to become a key player in facing these challenges, putting our capacity and technology at the service of society, forging alliances (suppliers, network of local technology centres, institutions, universities, training schools, etc.) and seeking out partners.

We are committed to mass public mobility, to reducing the level of polluting emissions, connecting means of transport for better fleet management, improving information to users and introducing new technological developments to enhance the safety and experience of passengers.

In this context, technology is key and our Group positioning strategy is to promote innovation and the creation of our own high technology in strategic sectors with the aim of providing pioneering solutions so that we can anticipate successfully future challenges and positively impact on wealth creation and employment and the development of society and the economy.

All of this will require significant flexibility and adaptability and our future developments revolve around the following keys:



## Sustainable Mobility

Change is coming in urban environments towards smart cities that are more liveable and sustainable and where mobility and transport play a crucial role.

Passenger transport will be emission-free and there will be a combination of technologies, ranging from electric-powered propulsion, or propulsion by natural gas or hydrogen, the latter being an alternative and green energy source, especially for long-haul vehicles.

In this sense, Irizar is continuing to make progress in offering alternatives that reaffirm our commitment to sustainability that began years ago. We have a wide range of solutions ranging from zero-emission urban buses and trucks, suburban coaches and medium- and long-haul coaches, hybrids, diesel combustion, biogas, HVO, biodiesel, B100 and compressed or liquefied natural gas. Recently we started several mobility projects with electric vehicles with hydrogen fuel cells.

Another of the great challenges of the future is the generation of clean, inexhaustible energy, without radioactive waste or the use of non-renewable fuels. The Irizar Group is positioned in three business areas: nuclear fusion, renewable energy and energy management and storage, essential for achieving zero-emission targets.

## Shared and collective mobility

Public transport is a fundamental economic sector, both for the contribution of the wealth and employment it generates, and for its dynamic nature in society, facilitating the mobility required by daily life. It has a beneficial impact on the health system, due to better air quality and reduced noise emissions.

Promoting the use of public transport and researching and improving alternative fuels are the main challenges that we chose to prioritise some time ago. Public transport is a fundamental economic sector, both for the contribution of the wealth and employment it generates, and for its dynamic nature in society, facilitating the mobility required by daily life. It has a beneficial impact on the health system, due to better air quality and reduced noise emissions.

## Safer and more autonomous mobility

Digital will play a key role in the future and autonomous vehicles will become the standard means of travel. Its evolution to "zero error" will undoubtedly bring environmental, social and health benefits. The Irizar Group is currently involved in autonomous driving projects and already has a prototype with dual, manual and automatic modes.

## Connected and on-demand mobility

Connected vehicles are poised to become powerful information platforms.

The copious information they will generate will allow constant monitoring and updates, as well as predictive maintenance. It will also offer drivers and passengers novel interaction experiences through voice commands and virtual or holographic assistants. This technology is constantly being improved using artificial intelligence and intuitive interfaces. Vehicles will go from being mere means of transport to multimedia environments.

On-demand services will be standard practice, with technology at the service of people, to improve their experience, time between destinations and vehicle efficiency. The Irizar Group's extensive experience in artificial vision and deep-learning provides innovative systems for monitoring and predictive detection of incidents to offer solutions for fleet management, preventive and predictive maintenance.

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**"The mobility of the future as sustainable, safe, smart and connected, with the presence of vehicles powered by different energy sources, increasingly efficient and with different levels of range and services that will improve people's experience."**

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# Passenger transport



# Sustainable technology at your service

**We are constantly working on the development of technical solutions for sustainable and smart mobility and we have expanded the range of coaches with new technologies and versions to offer maximum energy efficiency and performance, so that operators can reduce fuel costs and polluting emissions, as well as TCO and be able to rely on vehicles for which safety, availability and reliability, plus comfort, accessibility and connectivity, are key aspects.**

## New hybrid coaches

We have invested in new parallel hybrid vehicles, especially on routes that converge in cities. All of this has made it possible for us to enter new market segments and develop new versions for new customers.

For example, the commissioning of more than 150 hybrid units for the national market

The last 30 Irizar i3 parallel hybrid coaches launched in the Gipuzkoan area of Buruntzaldea through the new Lurraldebus concession that has 18 permanent regular lines (14 daytime and four night-time) while providing coverage for special services for cultural, holiday, social and sports events in the area.

39 Irizar i4 have also gone to the CRTM Consortium in Madrid for different lines in the Community of Madrid.

## Innovations on the Irizar i4, efficient and highly profitable

The main innovations of the Irizar i4 focus on reducing and improving the distribution of weight so that it can accommodate more passengers on board and increase luggage capacity.

Special emphasis has been placed on making it lighter and on optimal weight distribution, and there have been improvements to its inner comfort, with the new generation of Hispacold Breeze HVAC equipment. All this seeks to offer high efficiency and profitability to operators.



## Natural gas or liquefied biogas (LNG) for long distance

The first liquid natural gas (LNG) coach with a range of more than 1000 kilometres for intercity or short distance routes is already available. This is the class II Irizar i4 - a versatile coach, ideal for metropolitan, commuting, school, company or discretionary use. A coach that is part of the first tender of more than 80 LNG units developed for operation in Italy.

It has two cylindrical cryogenic (-162° C) type tanks placed longitudinally on both sides of the coach's central baggage area, which is completely watertight and isolated from the passenger area. They have a gas capacity of 704 litres and they weigh 830 kg when completely full.

It provides a range of up to 1000 km and the environmental benefits provided reduce CO2 emissions by 25%, NOx emissions by 85% and particle pollution by 96%, minimising air quality reference emissions that affect health to nearly zero. It offers greater thermal performance than diesel, noise levels are also reduced by 50%. Insofar as operating costs (TCO), it is estimated that they may be up to 30% lower depending on the cost differential of natural gas and diesel. The maintenance cost remains similar to a conventional diesel vehicle.

The LNG (natural liquid biofuel) range of vehicles from Irizar includes the i4, i6S and i6 Irizar model coaches. The first is already available with 9l and 340 hp engines and the second will be fitted with 13L and 410 hp engines, from the second quarter of 2022.

## New versions of natural gas or compressed biogas (CNG)

In 2020 we delivered the first 12.920 m Irizar i4 class II coaches with CNG engines in France. This model is now being joined by the first 14 and 15 metre coaches for delivery to Estonia and France.

They incorporate four type IV longitudinal cylindrical tanks mounted on the roof, providing a total volume of 1260 dm<sup>3</sup> and an approximate gas capacity of 240 kg, giving it a range of up to 700 km.

The integration of the storage tanks preserves the aesthetics and aerodynamics of the vehicle, and the hold capacity, and means it can perform the same type of service as a similar diesel vehicle with optimum road behaviour and maximum safety.

It should be noted that in addition to the environmental benefits of reducing noise emissions and CO2 emissions, emissions of NOx and of particles, by more than 98%, these vehicles offer superior thermal performance to diesel and vibrations are also minimised. Regarding TCO it is estimated that its reduction may be as high as 35%, depending on the differential between the cost of gas and diesel, while the cost of maintenance remains similar to that of a conventional diesel vehicle.





**Our product catalogue includes all propulsion technologies currently on the market. Zero emission electric buses, diesel coaches, biogas, natural gas, HVO, hybrids, biodiesel and B100. Endless options covering all market segments: city buses, suburban, medium and long-distance coaches for both regular, occasional and premium services.**

## Urban buses

### 100% electric, zero emission buses

We provide turnkey e-mobility solutions for cities and operators that include interoperable charging infrastructure and systems. The zero-emission electric buses in our catalogue comprise the Irizar ie bus, the Irizar ie tram and the Irizar ie truck. Both feature Irizar Group technology.

**Irizar's ie bus** offers a sustainable, eco-efficient urban mobility option for current and future city transport needs. The versions developed so far are articulated 10.8m, 12m, 15m and 18m models.

**Irizar's ie tram** is a zero-emission electric bus with an attractive tram-like appearance and offers high capacity,

easy access and enough space for passengers to move freely inside. This model is available in both 12m and 18m articulated versions, with a maximum capacity for 155 passengers.

**Irizar's ie truck** is a sustainable zero-emission truck, designed to meet the needs of cities and urban environments, without generating atmospheric or noise pollution. A truck for different industrial applications. Performance, energy efficiency, safety, accessibility, versatility and environmental benefits are some of the most significant qualities that define this vehicle.



## Suburban buses

### **Diesel, HVO, B100, hybrid and biogas natural gas (CNG or LNG)**

Latest generation Irizar i3LE and Irizar i4 buses and coaches, both with diesel, HVO, B100, hybrid and natural gas (CNG or LNG) propulsion systems, in either Irizar's exclusive version or versions combining bodywork with existing chassis on the market.

The **Irizar i3LE** is a low entry vehicle whose main features are its functionality and accessibility. It is available in lengths from 10.95 to 15 metres, with different configurations to allow the number of seated and standing passengers to be maximised, and door locations (double leaf, single leaf), and PMR ramps (manual or automatic) on the front or central door.

The **Irizar i4** is a versatile bus, ideal for metropolitan, commuting, school, company or occasional use. The different versions of this vehicle (H, M, L) strike a perfect balance between accessibility and luggage compartment capacity, depending on the needs of

each operator. The floors, which can be flat or lowered, and the unobstructed aisles underline the concept of adaptability.

- H with a central aisle, for medium distance and more luggage capacity.
- L for short distance lines, frequent stops, many standing and aisle passengers and lowered floor for better accessibility.
- M with flat floor and no aisle or steps, allowing different layouts for PRMs.

This vehicle is available in lengths ranging from 9.4 m to 15 m.

## Medium and long distance coaches

### **Diesel, HVO, B100, hybrid and biogas or liquid natural gas (LNG)**

The **Irizar i4**, an ideal vehicle for short- and medium-distance lines

The **Irizar i6** is a multi-purpose coach ideal for regular and occasional services featuring an attractive, modern design for customers demanding maximum profitability. Its performance, aerodynamics and attention to detail and comfort are outstanding. It is available in lengths from 10.8m to 13m on 2 axles (3 axles on request only) and a single height of 3.5m (HD).

The **Irizar i6S** is a coach that combines design and technology and has been designed for medium, long-distance and occasional lines. It is a vehicle with its own personality where quality, efficiency, robustness and reliability have their place. The Irizar i6S is available in lengths from 10.8 m to 15 m, in 2 and 3 axles and two heights of 3.5m (HD) and 3.7 m (SHD).

## Coaches for premium and long distance services

### **Diesel, HVO and B100**

The Irizar i8 is a vehicle with diesel, HVO and B100 propulsion, in either Irizar's exclusive model or versions combining bodywork with existing chassis on the market.

The **Irizar i8** is a luxury coach for Premium, long-distance or occasional services and other special uses. Featuring the most advanced technology on the market, this coach is the cornerstone on which Irizar is basing its future prospects for the long-haul and occasional service sectors.

The Irizar i8 is a combination of design, technology and sustainability. It is exceptionally comfortable for the driver, tour guide and passengers and highly prestigious for the owners. It is the ultimate representation of quality, robustness, reliability and efficiency. Nominated "Coach of the Year", the Jury singled out this vehicle "as a benchmark in the area of total costs, taking into account purchase price, depreciation and residual value, fuel consumption, repair and maintenance costs." It is available in the following lengths: 12.4m, 13.22m, 14.07m and 14.98m and a single height of 3.8m (SHD).









Rafael Sterling, CEO Irizar Group and Sameh Atalla, Vice President Evo Motor



# A greater presence in the Mediterranean

**Irizar is continuing to conquer new countries and has added Egypt and Libya to its historic presence in the Mediterranean.**

## Irizar expands to Egypt

Irizar has signed a distribution agreement with EVO MOTOR in Egypt, boosting its presence in the Mediterranean and its position in North Africa. Through this agreement, Irizar is making its wide range of innovative products and services available to Egyptian operators and passengers, thus guaranteeing sustainable growth. Irizar will have an extensive distribution network and a competent and wide service coverage that will be able to provide efficient transport solutions.

The agreement also includes the sale of the first 10 Irizar i6 coaches, 13 metres long, with capacity for 52 passengers. These units are added to the GoBus fleet and will operate on

a new line called SuperGO that offers service throughout the country. Passengers will be able to enjoy the comforts of a modern bus with free Wi-Fi, power sockets, 2 TV screens and comfortable seats that will provide an unforgettable transport experience.

GoBus is a private company founded in 1998 that operates under the supervision of the Ministry of Transport. It is the first private company in the sector in Egypt that operates in passenger transport - both lines and discretionary - and has extensive experience and recognised prestige in the sector.



## A benchmark company in Italy

Irizar's presence in Italy dates back to 1993, the year in which the company started operations in this Northern Mediterranean country. Irizar currently enjoys significant prestige among Italian operators who see Irizar as a trusted brand that provides great value in reliability, sustainability, technology, profitability and service, with rental and warranty packages for second-hand vehicles.

Customers can choose from a wide range of existing products and technologies (diesel, biodiesel, CNG-LNG, hybrids and electric), one of the most complete on the market, which puts Irizar at the forefront of the mobility market. It includes a generation of high tech buses for the Premium sector, intercity buses, class II models with hybrid technology or biodiesel and class I zero emissions urban electric buses. And it covers all passenger transport segments, both in the public and private, urban and long-distance sectors.

Especially in this last year, Irizar Italia has gained ground in the public sector and in medium- and long-distance coach services, essentially with Irizar i4 model coaches with compressed and liquefied natural gas technology and the i6 in an integral version of the Irizar brand.

## Israel, a historic country

Israel is another of the historic countries for Irizar, it has been operating there for 42 years and anybody travelling to the country can see its cities and streets flooded with Irizar coaches.

2019 was one of the best years that Irizar has known in Israel with a market share of around 50%.

Today, we have the confidence of Israeli operators who continue to purchase both integral and conventional coaches on chassis available on the market. We remain the market leaders and with the announcement that the country will soon open up to international tourism, the market will gradually return to pre-Covid volumes.

## Cyprus, in the medium-distance segment

Cyprus has always been known for the tourist services that the island offers, especially attractive to European and Russian citizens. Historically, Irizar has monopolised this tourist segment in recent years, satisfying the needs of a demanding target audience.

In 2021, following the new segment growth and development strategy, Irizar conquered the medium-distance service by entering into an agreement for the delivery of 31 units of the Irizar i4 and Irizar i3 models to operate in the Famagusta region. The adaptability and versatility of these vehicles offer a wide range of comfort and connectivity possibilities that provide a more than satisfactory experience for travellers.

These characteristics have conquered the Cypriot market and Irizar's growth plans remain promising on the island.

## Greece

Greece is another of the consolidated markets for Irizar - it currently has a market share of around 15% in the tourism segment.

Coaches are a popular mobility alternative as they are considered reliable, inexpensive and efficient.

Throughout 2021, the Greek government published aids for the renewal of the fleets that connect tourist places and cultural spaces that contain part of the history of Ancient Greece, the cradle of civilisation.

This acceleration in renewal has enabled operators to offer quality transport options to both national and international tourists on their journeys along the country's roads by adding to their fleets a new generation of vehicles with a superior level of safety and comfort, where Irizar is positioned as one of the benchmark options.

## Libya, in the oil sector

Libya is another country where Irizar has earned the trust of oil and gas producers. In this case, to transport workers to the large oilfields in the Libyan Sahara desert. The coaches that will transport people on long journeys safely and comfortably are two Irizar i6 units, 13 metres long and with 53 seats, with extra legroom. They are equipped with all comfort facilities such as audio and video equipment, wifi, usb and 220V charging for passengers, fully automatic aircon and a virus-free atmosphere with an eCo3 purifier,

The oil company, which places great emphasis on the health, safety and well-being of its workers, selected the Irizar coach as the most competitive solution to provide the required level of comfort and convenience.

The Libyan oil sector is now on the road to recovery after several years of reduced oil and gas production due to civil unrest in the country. The oilfields are a long way into the Sahara desert, which poses major logistical problems for producers, as they require a large-scale movement of personnel to and from the fields, with trips of between 600 and 800 kilometres to the main coastal cities of Tripoli, Benghazi Misurata, etc.

The oilfields are almost entirely operated by companies in the country and the Libyan National Oil Corporation (NOC) places great emphasis on the health and well-being of workers.



# Premium coaches for the healthcare

**The flexibility and major capacity for customisation and adaptation to the needs of our customers means that we can offer a wide range of options, aimed at converting Premium or high-end vehicles into vehicles for multiple uses.**

For example, the Irizar i8 and Irizar i6S models, coaches that are very well received in the Premium market and whose versatility make it easy to design and create all kinds of interior layouts.

This year we have seen how the health sector has added to the demand for this type of vehicle for transferring patients or donating blood.

Two ambulance vehicles equipped with all kinds of medical facilities are already operating in the Värmland region in Sweden for the simultaneous movement to hospital of several patients on stretchers and in wheelchairs.

These are two Irizar i6S coaches, 15 m long, built on Scania chassis and with different spaces: the front area has 21 seats with USB sockets and plugs, to transport 18 patients, and three healthcare workers; the central area includes bathrooms adapted for PMR and the rear area is fitted out for patients who require wheelchairs or stretchers - total capacity for 6 stretchers or four wheelchairs or a combination of both.

The vehicle is equipped with all the technical facilities required for patient care, including oxygen and air circuits, space for four oxygen cylinders with a control monitor for healthcare personnel, rear cabinet and compartments to house instruments, medicines and clinical samples, plus independent air conditioning, Wi-Fi systems, air purifier and specific radio frequency system for ambulances.

In this region, responsibility for healthcare and public transport go hand in hand, so it is no surprise to see these buses running

daily between Karlstad, Uppsala and Örebro transporting patients who need to travel between hospitals. In Uppsala and Örebro, where previously patients required transporting by ambulance, quality and sustainable healthcare has been restored.

The buses serve patients with healthcare needs during transport, which clearly means savings in resources, which in return, can be used in home care. The on-board staff are very satisfied with this new delivery method.

Another example is the mobile blood donation unit that will be delivered shortly, for operation in the southern area of Jutland (Denmark), where for four days it will visit various towns in the region with the aim of collecting blood to supply the central hospital in Odense.

This coach is also divided into different spaces: a waiting and doctor interview area, donation area, kitchen area and private area for health personnel. The health equipment includes reclining donation stretchers, blood bag storage refrigerators, as well as pre-installations for other necessary equipment such as blood bag balancers, etc.

As this issue nears completion, a third ambulance is being manufactured. In addition to all the aforementioned facilities, it will also have an external emergency sound and visual alert system.

## Where everything is possible

Vehicles are increasingly being designed for adaptation of their space to uses where everything is possible - such as spacious lounges, training and meeting rooms, kitchens, dining rooms, places for leisure, entertainment and rest, mobile classrooms, exhibitions, massage spaces, health services, ambulances or mobile libraries. Endless Possibilities

Customers seek functionality and comfort because, in many cases, they spend a lot of time travelling and the coach becomes their second home. So, in addition to providing maximum safety, reliability, profitability, comfort, luxury and the latest technological advances, at Irizar we dedicate a host of internal and external resources to designing, developing and implementing the necessary adaptations to meet the demands of an increasingly demanding market.

Among the most common alternatives are different layouts for a lower number of maximum comfort seats kitted out with all kinds of options. There are coaches equipped with large single or double high-end bathrooms, refrigerators, microwaves, coffee makers, wardrobes, games tables for leisure time, stretcher chairs where injured athletes can rest, freezers, washing machines, dryers, bicycle stands, changing rooms or showers, outdoor awnings and so much more.

For entertainment we offer all kinds of equipment such as fixed and retractable monitors, satellite antennas, individual sound sockets, digital terrestrial television, GPS, on-board Wi-Fi, multimedia stations with internet connection, individual monitors integrated in the seats, like on planes, plugs and USB sockets among other things. Connected mobility and technology are key; in the future, drivers and passengers will enjoy novel interaction experiences through voice or holographic assistants. The evolution of artificial intelligence and intuitive interfaces will mean that vehicles become more than mere means of transportation.



# Hydrogen, an energy vector for sustainable mobility

**The European legislation on polluting emissions of vehicles, Euro Standard NOx and PM, is the forerunner to a new regulation that will limit CO2 emissions which, for heavy vehicles, includes the CO2 reduction objectives of 15% for 2025 and 30% for 2030.**

This concern for the environment has led to a new concept of mobility in which everything indicates that different types of alternative energies will coexist, depending on many variables (legislative, types of application, types of market, etc.). We are, therefore, on the threshold of the second turning point in the sustainable mobility sector.

In this context, renewable hydrogen will have a role as one of the main energy elements for achieving climate neutrality in 2050 and the decarbonisation of the economy, given that its production and consumption is climate neutral and does not generate polluting emissions.

The European Hydrogen Strategy positions this gas as an essential element in support of the eurozone's commitment to achieving carbon neutrality by 2050 in three phases (by 2024, 2030 and 2050) for which it defines a succession of milestones. The first phase, between 2020 and 2024, is estimated to see the installation of at least 6GW of electrolyzers in the EU and the production of up to 1 million tons of renewable hydrogen. In the second phase, 2025-2030, hydrogen must become an intrinsic part of an integrated energy system with the aim of installing at least 40 GW of electrolyzers and the production of up to 10 million tons of renewable hydrogen. In the third phase, to end in 2050, renewable hydrogen technologies will have to reach maturity and be deployed on a large scale to reach the sectors that are most difficult to decarbonise.

At state level, the recently approved Climate Change and Energy Transition Bill encourages the use of renewable gas, including biogas, biomethane, hydrogen and others. MITMA has an allocation of € 1,500 million until 2023 for green hydrogen, in order to distribute it among Autonomous Communities, Metropolitan Councils and private companies.

Thus, Spain has the opportunity to position itself as a technological benchmark in the production and use of renewable hydrogen. It must lead a country project towards a decarbonised economy through the promotion of the hydrogen value chain,

through the creation of technological clusters, pilot projects on a regional scale, the promotion of industrial innovation and the availability of renewable energy at competitive prices.

Beyond production, the national objectives target activity areas where the demand for renewable hydrogen has the greatest potential for growth - this is the case of future sustainable mobility.

Public transport in buses and coaches is a key element for achieving the aforementioned objectives. Currently buses transport more than 3,000 million passengers in our country, although they only represent 0.2% of the total number of vehicles.

Buses and coaches are safe, with no fatalities in 2019. Undoubtedly sustainable, they are the means of transport that generates the lowest GHG emissions. They guarantee the mobility of millions of people every day through 160,000 km of road and because they consume hardly any public resources, they contribute more than 1,550 M € per year to the treasury, invoice more than 5,900 M € and employ more than 95,000 people.

The sustainable mobility of the future depends unavoidably on the use of the bus and coach in urban and intercity transport whose capillarity and dense network of connections enable the connection of more than 8,000 towns every day and account for 50% of the trips by public transport in our country, in school or work transport that reduces traffic congestion and contributes to the Transport to Work Plans (PTT) and in the sector of discretionary and tourist transport due to the relevant strategic importance of this activity, given its close link to the tourism, to the Spanish industrial sector.

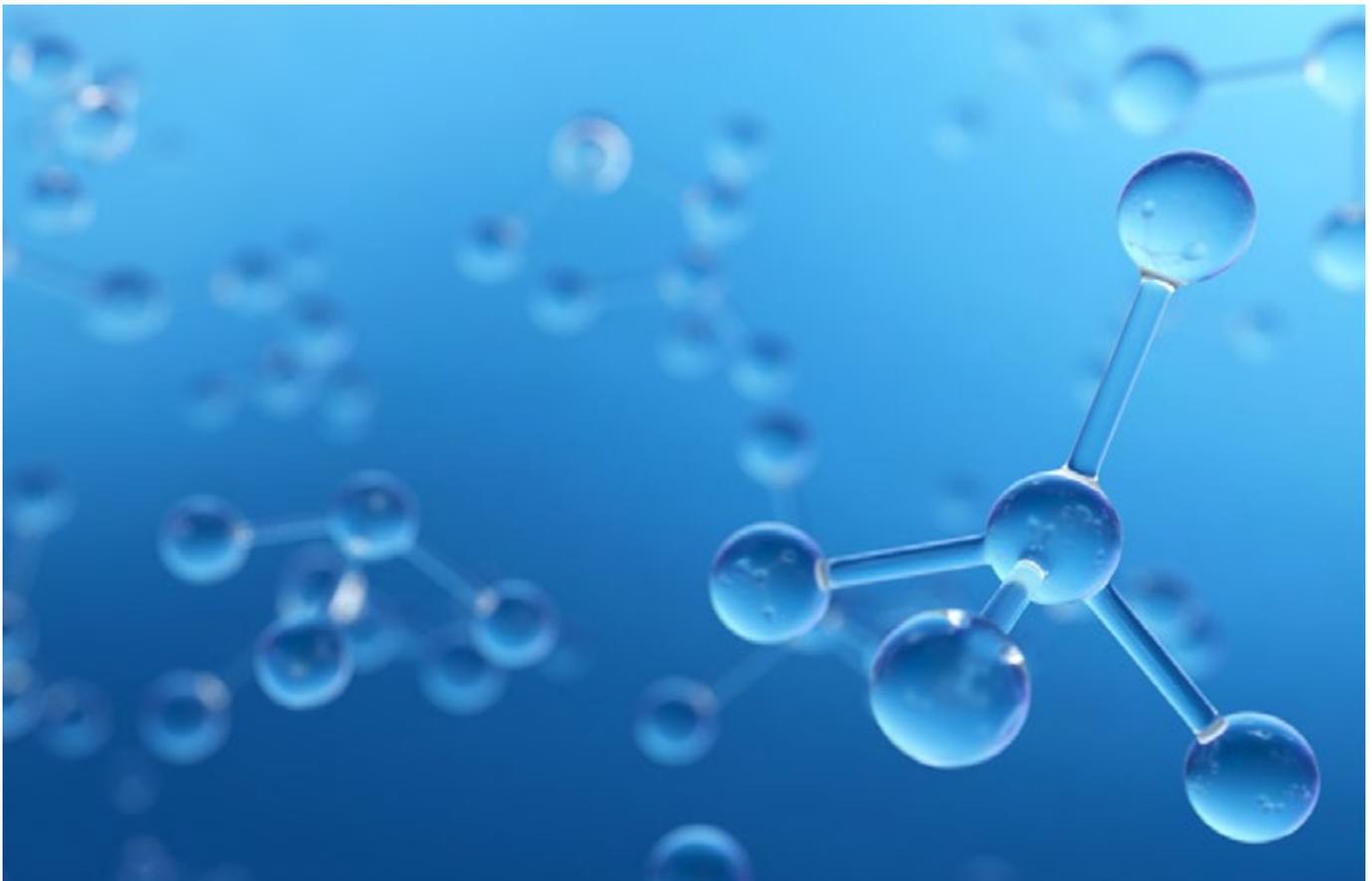
The creation and promotion of an environment conducive to recognizing the potential of renewable hydrogen is decisive and it becomes a competitive energy source and can be used in industry, public transport, intermodal transport, etc.

It will be decisive to appeal to the efforts of all the agents and institutions involved in this strategy and to undertake incentivisation, penetration, infrastructure implementation projects, as well as support for the bus and coach manufacturing industry and the promotion of sustainable public transport to guarantee a quality, sustainable supply, at competitive prices.

Strategically, the Irizar Group is committed to battery and fuel cell technologies in order to achieve zero emissions. The customer will be able to choose between the battery or fuel cell technology that best meets their needs. The Irizar Group's

short-term technological road map includes the development and manufacture of coaches, especially vehicles that travel long distances between refuelling stops, propelled by hydrogen fuel cells and will gradually extend this technology to the rest of the range of Irizar Group vehicles (buses and trucks for urban applications).

It is already making progress in hydrogen-powered coach development projects; one as part of the Basque corridor and others at European level.



# The role of hydrogen in the mobility and transport of the future

Over the last 60 years, two main attributes of the hydrogen molecule as an energy vector have been recognised, depending on the circumstantial crisis of the moment. In the chronological order in which these were highlighted, first as a possible solution for energy independence in the oil crisis in the 70s, and in the 90s, after the United Nations Framework Convention on Climate Change (UNFCCC), established at the Second Earth Summit (Rio 1992) and which entered into force in March 1994, with the premise of strengthening public awareness globally about the problems related to climate change, as a clear energy vector for the decarbonisation of different sectors. However, it was never embedded as a real solution for any of the objectives in the world energy system as it was not a sufficiently mature technology.

In December 2015, the twenty-first session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21) took place in Paris, together with the eleventh session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (COP-MOP11). This meeting led to the Paris Agreement, which took over from the Kyoto protocol, which entered into force in 2020. The central objective of the Paris Agreement is to ensure that the global temperature increase this century is less than 2 degrees Celsius above pre-industrial levels, and to continue efforts to further limit the increase in temperature and only reach 1.5 degrees centigrade.

In the transport sector, with the rise of renewables from 2010 together with the technological development of batteries that has accompanied the development of the electric car, the CO2 emissions of this sector were targeted ambitiously. The Paris Agreement reinforced and globalised the need to decarbonise transport. However, when the problem of the decarbonisation of transport is analysed in depth there is a clear need for access to an amount of energy that exceeds 25% of world energy consumption, which renewables are still far from being able to supply. That is compounded by the limitations of batteries in terms of energy density, the need to deploy recharging infrastructure, the need to maintain economic activity, evidence



**Arturo Fernandez Goyenechea**  
*Innovation Manager at Petronor*

that the transition to decarbonised transport will require time and a lot of investment in technologies that complement electric vehicles.

Hydrogen has once again emerged as a promising decarbonisation alternative and as a vehicle for energy independence by allowing effective coupling of renewables with the gas and fuel sectors. This will allow a massive deployment of renewables, in many cases overcoming the limitations in problems of access to the power transmission and distribution grid. In transportation, hydrogen is becoming socially accepted as a real alternative in the near future. In this case Toyota is the equivalent of the Tesla for electric cars, although possibly not accompanied by quite

the same media fanfare and focus. Hydrogen will undoubtedly be an alternative in the near future, but it faces major future challenges such as finding more mature and cheaper technology to enable it to compete with conventional options, the deployment of a full network of recharging stations and, as in the case of any decarbonised solution, it will be subject to the growing penetration of renewable generation. It is true that hydrogen enjoys major advantages in road transport in terms of the ratio between its range and the weight of the hydrogen in the tank in the vehicle compared to battery solutions. Even so, despite the high performances of an electric fuel cell solution, in transport of goods or passengers over very long distances, the volume required to house the necessary energy in the form of pressurised hydrogen will reduce its competitiveness compared to low carbon liquid fuels. Of course, this can be most markedly extended in sea and air transport.

Our vision as a company responding to the challenge of transport and mobility decarbonisation is that there is no single solution for all segments, nor even a single solution for each segment. For light vehicles, motorcycles and cars especially, we see electrification as a competitive option, although there is a risk in the availability of raw materials for battery production that may make alternative technologies necessary to complete the decarbonisation of this segment. In heavy transport there are many options already, as we have seen. In maritime and air transport, electrification is not viable at the moment and, for this reason, we see biofuels and synthetic fuels as the only possible decarbonisation solution, as they are cost-efficient and available in the short and medium term. As a company we approach the transition from a position of technological neutrality that enables us to assess objectively the steps that we must take to continue being a leader in the supply of energy for mobility.

The only thing we can say with certainty is that the transition of the transport sector towards the progressive abandonment of fossil fuels, discounting the percentage that can be covered by advanced biofuels, will keep pace with three variables: the

growing penetration of renewable generation and the lower costs of this energy, technological development in the different options mentioned and access to the new raw materials necessary for technological developments. The first variable is a necessary condition in any case. The way the other two variables develop will mark the final picture of the sector in the future.

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**“Hydrogen has once again emerged as a promising decarbonisation alternative and as a vehicle for energy independence by allowing effective coupling of renewables with the gas and fuel sectors.”**

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# Irizar Brasil

## A special year

**This past year has been a special year for Irizar Brasil. Despite the difficulties, important milestones were achieved in Chile, which remains the target export country par excellence. This market accounts for 53% of the production of Irizar Brasil, including the i6 and i6S models.**

**Irizar Brasil continues to lead the market in this country and is fully committed to developing the best solutions, products and services, always remaining close to customers and commercial partners.**

## 3000 coaches in use

*The 3000th unit was delivered in Chile, Irizar's long-lasting and solid export market. Irizar started its commercial operations in Chile in 1998, a few months after Irizar was established in Brazil through the distributor which was transformed into the current Transportes Cabal.*

*"In a trip to Europe, in 1995 - 1996, I was privileged to see many Irizar vehicles operating in a number of cities and I was drawn to their innovative design and market positioning, something which was a long way from what was present in Chile and South America in general. Just a couple of years later, in 1998, we reached an exclusive collaboration agreement with Irizar for Chile, which led to the creation of an ongoing business relationship with hundreds of satisfied customers in Chile", states Zvonimir Matijevic, founder and CEO of the Cabal Group.*

*Irizar has managed perfectly to gauge the needs of the market and of the customers of the most diverse Chilean markets, such as tourism, roads, staff transport, especially for mining transport, which is one of the most demanding in terms of safety and in which Irizar is currently the market leader.*

*According to Tomislav Matijevic, Corporate Managing Director of Transportes Cabal, this success is linked to the high level attributes that characterise the Irizar brand:*

*"Probably the key achievement of the result is that it has been in a highly competitive market, with open borders, in which we are the product of greatest initial investment, but the most profitable for customer and operators. The explanation for our success is undoubtedly related to the high market valuation of the aspects which our main competitive advantages today: safety, design, operation efficiency, durability, among others".*

*Tomislav concludes by mentioning the importance of gaining loyalty and a closer relationship with customers, which are major competitive advantages that have enabled Irizar to hit the milestone of 3000 units. "Without doubt we rely on our customer and on their capacity to evaluate Irizar as an integrated and efficient product, a long-term solution and support proposal."*



## Buses Hualpén – loyal to Irizar

*Buses Hualpén, is another customer that has continued to trust in Irizar for more than 15 years. During 2020 the company took on another 150 Irizar i6 coaches. It currently has a fleet of 800 coaches, 55% of them being Irizar vehicles.*

*According to Daniel Gonzales, General Manager of Buses Hualpén, the choice of our brand was mainly due to the safety offered for long, dangerous routes and the adaptability of our coaches to the most extreme climates:*

*“The Irizar buses operated by Hualpén provide services throughout the geographical diversity of Chile, from Arica to Punta Arena. They cross cities, on roads with tarmac and stony surfaces to the interior of mining operations, up to an altitude of 4,500 metres at*

*Compañía Minera Doña Inés de Collahuasi in the Tarapacá where temperatures exceed 40°C in summer and go down to -20°C in winter, with hard snow and ice conditions.”*

*His opinion on the choice of the Irizar brand is clear: “There are three attributes that make Irizar stand out: The first is that the buses are very comfortable inside. Second, the after-sales and spare parts service is excellent, which makes maintenance very efficient. Finally, Hualpén has established a relationship of trust and work, not only with the local representative, but also with Irizar’s factory, which has been very flexible and focused on responding to our requirements.”*



# Irizar Brasil

## The safety of Irizar coaches confirmed

**Passenger transport on Peruvian roads is among the most complex in the world. Peru's topography, the types of roads and the Andes Mountains, with sections at altitudes of over 4,500 metres, impose extreme operating conditions.**

Passenger transport on Peruvian roads is among the most complex in the world. Peru's topography, the types of roads and the Andes Mountains, with sections at altitudes of over 4,500 metres, impose extreme operating conditions.

The country's main industry is mining, with production centres in remote areas of the Andes. Mining production processes make it necessary for thousands of people to be transported safely and efficiently on challenging roads.

*Hence the importance of coach safety - to minimise the risks of large-scale accidents.*

*Today Irizar is a recognised and established brand, precisely because it is the safest transport option, as confirmed by the behaviour of Irizar vehicles in real-world situations.*

*"It has been demonstrated, unfortunately, that they are, as they say, among the strongest vehicles and they really build the structure with the strength that they claim. I say unfortunately because our company had an accident and, in a word, the body structure was practically unscathed", explains Luiz Miguel Ciccía Vasquez, the General Manager of Civa.*

*The accident he mentions happened some months ago in an inter-provincial operation, on the Chiclayo - Tarapoto route. An Irizar coach fell down a ravine of about 120 metres, overturning 5 times.*

*"For us, Irizar is a brand that does what it claims in terms of safety and gives us support and confidence. We have a large fleet of*

*Irizar coaches for the mines and we convey to our customers precisely that our buses are the safest", says Roberto Matos Vargas, General Manager of Movil Bus, who concludes:*

*"That is why we were the first company in Peru to acquire an Irizar bus in 1998. Since then we have been able to confirm the reliability of the product compared to the claims".*

*These events only confirm that the utmost concern for safety has been an element of Irizar's DNA from the beginning of its history and subsequent commercial relationship with the Peruvian market. This is because since its arrival in Brazil in 1997, Irizar has pioneered compliance with European regulation R/66.00, which became mandatory only years later, and today we are ahead of the curve with R/66.02, which shows that Irizar is always on the forefront in safety matters.*

*In the words of Luis Fernando Salaverry Mannucci, General Manager of Transportes Línea: "Irizar mining coaches comply with the demanding standards requested by Línea and this guarantees that, when unwanted events happen, the survival of our passengers is assured, due to the strength of the structure and to the seat anchors, 3-point seat belts, and safety in luggage compartments and windows".*

At Irizar Brasil, we will continue to focus on complying with the highest safety standards, to present operators and users with the best alternatives in active and passive safety, so that we can meet the major challenges that characterise this market.



# Irizar Mexico

## Record market share

**Irizar Mexico has consolidated its position as the undisputed market leader, with a market share of over 75%; a historical record that makes Irizar the main benchmark trusted by Mexican carriers.**

This achievement is the result of the customer approach strategy, its adaptability and flexibility capacity, supported by the main brand values such as reliability, profitability, comfort, safety and service.

Irizar Mexico is developing its promotion of these values, which throughout history have enabled the company to grow, achieve so many successes and earn the recognition and trust of all the large groups of leading operators in Mexico who see Irizar as

the most advanced, competitive and sustainable option on the market.

The service and listening to needs are undoubtedly other fundamental values that during 2020 led Irizar Mexico to develop and offer new service packages for review, maintenance and commissioning, including the extension of guarantee periods so that operators could have their vehicles ready for any eventuality during crises.



In response to new needs and the commitment to technology and innovation, it has also invested in a new version of the i6S, 10.8 metres long, that improves manoeuvrability, optimises load capacity and converts the i6S range into the most versatile model on the Mexican market.

The coach production process and lay-out has also been redesigned to improve the supply of materials and warehouse management. The result has been the implementation of a new management system that has made it possible to increase efficiency, reduce waste and increase storage capacity by 25%, resulting in more sustainable processes and greater efficiency.

And, for Irizar Mexico, the most immediate future task is to continue applying cutting-edge solutions that optimise production, for gains in efficiency and competitiveness and to continue building a sustainable production model that results in the quality and reliability of the range of buses and coaches.

Juan de Dios Gómez, New Director of Irizar Mexico since 2020, accepts the challenge of this leadership commitment: *"I am proud to have faced this difficult period with the conviction that we must be optimistic. All the improvements we have put in place are advances that will assist us in the future. The market is slowly beginning to recover and I hope and wish that the decisions taken will lead us to maintain a market share similar to our current share in the coming years. The Irizar brand remains the preference of operators in the sector".*



# Irizar Maroc

## Continues its expansion in public transport

**In addition to the 200 Irizar i3 Low Entry model buses destined for public transport in the city of Casablanca last year, there is now an order for 89 new buses, also Irizar i3, which will be delivered before the end of 2021 in the city of Kenitra to satisfy its mobility needs.**

These buses, bound for the city of Kenitra and its region, are part of the order awarded to the MAN group and its importer Sefamar, by the local urban transport delegation Foughal Bus. They will be delivered gradually throughout 2021 with completion by the end of the year. The bus in question is the 12m long Irizar i3 Low Entry with the latest generation MAN chassis, fully customised and adapted to the operational needs of the city and its passengers. It incorporates the latest technology in terms of safety, comfort, accessibility and sustainability and also has an air conditioning system, which is a "plus" for the comfort and experience of passengers.

The buses for both Casablanca and Kenitra have been manufactured at the Irizar Maroc plant in Shkirat, which has modern facilities and state-of-the-art production systems,

which guarantees the same quality and reliability standards as the rest of Irizar's production plants. It should be remembered that Irizar Maroc has established itself as a production centre to support Irizar Ormaiztegi in the manufacture of coaches for certain niche markets for Europe. It currently exports buses to Europe and North Africa and manufactures the Irizar i6, Irizar i6S and Irizar i3LE models, all with the latest generation Euro6 chassis, which offers advantages in terms of sustainability.

The Irizar remains the leader in the luxury coach market and is now expanding into public transport in Morocco. It is becoming the essential key to any investment or purchase of coaches in the country, as a symbol of profitability by design, reliability, safety, comfort and sustainability.



# Irizar Southern Africa

## Zambia, a key market

Although the pandemic has affected all the countries of the southern African region, some are already beginning their recovery in the hope that 2022 will definitely bring to an end this period of uncertainty and transition and will usher in a new path of growth.

Over the years, the Irizar brand has become a benchmark in the more than 20 African countries where it operates and continues to expand, investing in the development of products and services, always adapting to the needs of customers and users.

Particularly in the south of the continent, Irizar's solutions are the most in-demand options in cross-border and tourism services due to attributes such as comfort, luxury and safety that they provide. Operators praise their quality, durability and performance in the harsh African conditions and, after years of experience, they consider Irizar to be one of the most reliable and profitable brands.

In this group of countries, in addition to South Africa where we are market leaders, Zambia stands out as a key market. With 18 million inhabitants, Zambia is a strategic nexus which borders

seven neighbouring countries. It is notable for its flora and fauna and the Victoria Falls are one of its main attractions.

Irizar has been operating in this market since 2008, where it works with the country's main customers and is the preferred option of UBZ, one of the transport companies that was formerly a benchmark in the market. UBZ re-emerged in 2021 and opted for the Irizar i6S to cover all its routes, both national and cross-border. With highly innovative design, this bus is having a very positive impact among travellers in the country.

One of Irizar Southern Africa's main commitments is to guarantee technical service wherever our customers are found. Hence, as Irizar's presence expands throughout the African continent, we are building up our assistance network in each country, allocating official technical service points both for bodywork and air conditioning, as well as guaranteeing the availability of spare parts in any place.

This is a key activity that our customers value and highlight at Irizar; we will continue to build it so that we can always guarantee the best customer service.



# Irizar Asia Pacific

## Change of leadership

Eight years have passed since the Irizar Group established itself in Australia. Since then, the brand has forged strong links with customers and chassis manufacturers; it has supplied the main operators in Australia and has recorded double digit growth during the last four years, gaining an astonishing 25 new customers per year on average and closing 2020 as the market leader with a 23% share.

The service has also evolved - Asia Pacific has become the first manufacturer to offer, as do chassis manufacturers, R&M contracts for bodywork and air conditioning. Currently, in addition to the well-established sales and administration teams, Irizar has a group of factory-trained technicians based in four different states. The mobile service team serves the main fleets working on express contracts and mining contracts. Irizar's work philosophy is to eliminate the day-to-day problems of an operation, managing customers' assets (buses and coaches) so that they can focus on their business strategy.

2021 will be the year in which the 1000th coach will be delivered, thus demonstrating the success of the brand's strategy over the last eight years.

Daniel Castro is leaving his position as Managing Director in Australia to become Director of Irizar in America. *"I am proud to be involved in Irizar's history in Australia", says DC. "Seeing the start of a market, helping to remove obstacles and seeing a brand achieve strong recognition is a long cycle that not many professionals have the opportunity to follow, and I have had that opportunity", says Daniel.*

To continue and move forward with the successful strategy in Australia, the Irizar Group has appointed Steven Heanes as its new Managing Director. Steven is well-known in the sector and has more than 20 years' experience in the bus and coach industry. Steven is bringing a very mature vision of the market to Irizar and is adding the knowledge and the network that Irizar needs to continue growing. *"My dedication for 37 years in the commercial vehicle sector has given me the opportunity to learn what is required to offer good customer service, which fits with Irizar's values", says Steven. "I am very excited to join the Irizar family and grow the business. Irizar has become a key player in the public transport sector and has been very innovative in offering it to the market with service packages that make a difference", he concludes.*

The addition of Steven Heanes to the team as leader complements Irizar's long-term vision strategy in the Australian market. *"We are delighted that Steven Heanes has agreed to join Irizar. His experience and ability to forge relationships are assets that we value very much within the Irizar Group. This will mean we can continue to strengthen our positioning and strategy of approaching customers and our brand, developing and manufacturing turnkey solutions and services for efficient, sustainable, intelligent, safe and connected public transport", adds Rafael Sterling, CEO of the Irizar Group.*







# Intense activity and major future projects

**Despite being indelibly marked by the Covid-19 pandemic that we are fighting, 2021 has been a very intense year in terms of projects for Hispacold.**

## Inauguration of thermal testing laboratories

We recently announced the inauguration in our own facilities of two thermal testing laboratories for the validation of equipment under the increasingly demanding requirements of customers. We can state with pride that, in Andalusia, and in Spain, there are not many facilities at the same technological level.

## Breeze range

Another notable project has been the fitting, using air conditioning systems from the Breeze range, of 79 city buses for the Portuguese city of Cascais. The Cascais urban fleet was boosted with new UNVI C21 diesel vehicles, compatible with the use of biodiesel and with capacity for 32 seated passengers. These vehicles have been equipped with Hispacold Breeze HVAC systems.



## Consolidation of our presence in the United States

Busworld North America Digital Summit was the setting in which Hispacold's news for the United States was presented. Through the presentation "Air purification solutions to prevent the spread of viruses" the advantages of the eCo3 air purifier that eliminates microorganisms, germs, allergens and viruses, including SARS-CoV-2, and with the projection of the video "The Hispacold Story" the company demonstrated its key novelties: its new test rooms equipped with the latest technology, its air purification systems and its new ranges of HVAC systems for electric vehicles.

Our presence in the North American market was consolidated when the bus and coach manufacturer Alexander Dennis Limited placed an order for air conditioning for the Enviro500EV Charge, its first three-axle, zero emissions double-decker bus for North America. The installed system is a compact integrated HVAC unit, Phicool model, with two independent circuits activated by two compressors. The system is fitted with a 100% electric reversible heat pump and heating elements, with extension of the heating for extreme cold. Its has 2x21 kW capacity for cold and 2x18 kW for heating. The first version of the Phicool model has been produced for the North American market, using an electrical engineering design that complies with the with UL regulations, although it can also be developed for adaptation to other electrical specifications.



## eCo3 air purifier

The Seville Area Metropolitan Transport Consortium has installed our eCo3 air purifier, inside all the vehicles in its fleet of 149 buses, a total of 307 units. This initiative has been extended to the rest of the Andalusian Provincial Transport Consortiums, consisting of about 1,000 vehicles, and is expected to conclude this year.

## Moving forward in the railway division

In the railway division, it is of note that the IRIS certification (ISO / TS 22163) has been renewed, with a rating improvement from Bronze to Silver level quality performance. The IRIS Certification programme assigns companies in the rail industry around the world performance levels that indicate their commitment to quality. There are currently two levels available for audited companies: Bronze and Silver. Although IRIS-certified companies have already demonstrated their strong business management systems, the award of a Silver rating indicates that the organisation is able to meet the most demanding criteria in the market.





# Masats revolutionises vehicle access

## **Masats continues to add value to access systems for public transport and is becoming a world leader in accessibility.**

Following the presentation of the Swyncro system for coach doors, Masats is moving ahead with its continuous transformation process, now presenting solutions for urban transport to add value to both users and operators, by leveraging the opportunities offered by new technologies.

In 2021 Masats launched the new O29i Sliding-Tilting Door onto the market. The door brings the technology, speed and safety of sliding doors to inward opening doors. It is a highly reliable door, whose speed (it opens in less than two seconds) does not affect its smooth and controlled movement. This stability in opening cycles is maintained even in unfavourable conditions, such as sloping roads or sides.

The advanced passenger safety is also of note – it includes new central anti-entrapment sealing rubbers, which can detect even thin objects such as a bag strap. The O29i door also features a mechanical lock to guarantee that, once closed, it cannot be opened unintentionally.

Maximum safety and reliability, to achieve an excellent life cycle cost (LCC).

Digital transformation is a reality – to this end, Masats is delivering a Predictive Maintenance project, to improve the maintainability of vehicles and offer greater added value to users. The main objectives of this project are:

- Improve user experience.
- Increase user safety.
- Increase the availability of vehicles in service.

- Optimise LCC (Life Cycle Cost).
- Contribute to environmental sustainability.

Masats started this project in 2017, in collaboration with the Irizar Group company Datik and the EURECAT technology centre. The project's feasibility has been analysed and a functional prototype of an artificial intelligence engine has been developed and validated. It detects anomalies in access systems (doors and ramps) and enables the repair of anomalies to be planned before they occur. Pilot tests have been conducted on sustainable buses at TMB Barcelona and EMT in Madrid.

At the same time, door and ramp control electronics have been developed, to provide the information that analysis systems need. These electronics have been developed with JEMA Energy, another Irizar Group company.

Another pilot test will soon be conducted in Singapore, led by the Land Transport Authority, in which the behaviour of 50 vehicles will be monitored.

A strategic project, which will position Masats as a technological benchmark and which will undoubtedly be very advantageous for operators in the medium term, both in terms of vehicle availability and lower maintenance costs.



# Electromobility







# A benchmark in the industry

**The company's strategy, aligned with the energy transition and sustainability has been essential for Irizar e-mobility to increase its activity by 50%. This has been achieved through customer proximity and with the firm objective of contributing to the reactivation of the public transport sector.**

Far from experiencing a halt, Irizar e-mobility has continued to advance, strengthen and consolidate the brand, expanding the sales and after-sales network, based on the unwavering commitment to the creation of wealth and employment at local level. It currently has a workforce of more than 300 people, combining talent, youth and experience and the forecasts point to new recruitments, proportional to the growing demand for projects that we are receiving.

The company has become a benchmark in the sector due to the growing number of electric vehicles now operating in the main cities of a dozen European countries, because of its customer proximity and loyalty and because customers trust in the innovative DNA and technology of the Irizar Group. And Irizar continues to support and provide bespoke solutions for customers in different European cities.

## Leaders in France

Irizar e-mobility is the leader in electric buses, with more than a 40% share of buses registered in France and its expansion throughout the country is increasing.

**Paris.** In July 2021, Irizar e-mobility signed a framework agreement with the RATP (la Régie Autonome des Transports Parisiens) for the supply of 113 zero emissions electric buses in the city of Paris. It is one of the largest electric bus purchasing projects in Europe.

**Strasbourg, Orleans and Marseilles** will be the next destinations in France. The Marseilles RTM is once again putting its trust in Irizar after commissioning its first fully electric line in 2016 with six of the company's units.



## Consolidation in Europe

Our electromobility solutions are expanding throughout Europe and being used in new countries such as Switzerland, Germany, Italy, Bulgaria, Germany, Switzerland and Liechtenstein, among others.

**Zaragoza** will take on 68 ie tram electric buses to electrify the lines of its city, in addition to which Barcelona and Madrid have placed orders for additional units, thus endorsing the reliability of the buses which have been used in these cities since 2014 and 2016 respectively.

The Italian operator AMT **Genoa** has had 14 zero-emission electric buses, since the end of 2020.

Irizar buses are also bound for **Burgas and Stara Zagora in Bulgaria**, a country in which the company is consolidating its position. The first 18 metre ie bus model units will be put into operation at the end of this year. This is the first electro-

mobility project in that city and one of the largest in Bulgaria so far. Meanwhile, Stara Zagora, will receive 33 Irizar ie bus units with certain aesthetic features of the Irizar ie tram, creating a distinctive vehicle with maximum comfort, accessibility and safety.

**Liechtenstein** will put 4 x 100% electric, zero emissions, ie bus model, 12-metre long Irizar buses into operation.

Irizar solutions can also be seen in the cities of **Hamburg, Frankfurt and Düsseldorf** in Germany and Bern in Switzerland.

# From challenge to success

Irizar e-mobility is committed to turnkey electromobility solutions with the aim of offering sustainable, efficient, accessible, safe and connected public transport. In this context, the Irizar Group's strategy is particularly important as it promotes innovation and the creation of its own technology in strategic sectors which form the basis for pioneering solutions that have a positive impact on the development of cities, society and the economy.

Hence, its active commitment to the environment, the well-being and health of people and to the creation of better urban environments with a special emphasis on reducing emissions, noise pollution, and increasing efficiency, in low consumption that has an impact on lower costs. The challenges, now generating success in the implementation of electromobility solutions of the Irizar Group, serve as experience on this path towards sustainable and smart urban mobility for the future.

## Schaffhausen, a unique project in Switzerland and Europe

Thanks to the contribution made by the solutions of the Irizar Group companies, Irizar e-mobility and Jema energy, Schaffhausen will begin the electrification of the public network of its city, and will become the example for Switzerland. This is a unique project in Switzerland and Europe because the energy needed for the charging stations will be generated in the river Rhine as it passes through the city. In addition to this ambitious challenge, the entire charging infrastructure must be adapted to a very limited space with difficult access, as the infrastructure is buried.

The first of a total of 15 Irizar ie tram electric buses have been delivered and the slow charging stations with a power of 50 kW have been installed in garages and the 12 opportunity fast charging stations of 600 kW have been distributed in the main street of the city thus meeting the challenge of minimising charging to less than 5 minutes, as required by the city council.

Chargers with a smart charging system in garages will offer night-time vehicle charging and battery voltage balancing.



## Vitoria-Gasteiz, and the IEB, a new mobility model

Vitoria-Gasteiz's IEB (Intelligent Electric Bus) draws a step nearer every day; its start-up, scheduled for the end of 2021, is becoming increasingly real. The IEB involves commissioning the first fully electric zero-emission line in the city, a project with a 360° approach that includes, among other tasks, engineering, civil works, signalling, communications, as well as vehicles and charging infrastructures.

With the mission of providing a new means of transport, it includes high-capacity buses, access platforms at stops, exclusive lanes and traffic light preference, definitely an environmentally friendly means of transport that enables journeys to take less time.

For this ambitious challenge, the Irizar Group has combined the knowledge of the companies Irizar e-mobility, Jema Energy and Datik.

Irizar will supply a total of 13 buses, seven of which are 18-metre articulated buses while the remaining six vehicles are 12-metre, both Irizar ie tram models.

Jema Energy has turned the smart charging process into a fully sustainable cycle, by installing pantograph opportunity charging stations at two points along the route and smart chargers in the garages, all interoperable with energy supplied from the EKIAN photovoltaic plant, located a few kilometres from the city, providing bus charging in four minutes during their trip around the city.

Datik has just completed the installation, integration, start-up and maintenance of a comprehensive transport management system that includes operating assistance solutions to offer a higher quality service, on-board screens, people-counting sensors, video surveillance, as well as passenger information.

## Smart mobility today

The Irizar Group has presented the first high-capacity autonomous bus in Europe, a 12-metre long, zero-emission electric bus with capacity for 60 passengers. This autonomous bus is suitable for use in real traffic conditions, without a preferred lane and with passengers - a pioneering experience worldwide, both in terms of the size of the vehicle and its capacity.

For 21 days the autonomous bus has been operating passengers in the city of Malaga on a regular EMT (Empresa Malagueña de Transportes) line operated by Avanza by MOBILITY ADO, connecting the passenger terminal of the Port and Paseo del Parque.

This was all made possible thanks to the AutoMOST Pilot Project, financed by the CDTI through the CIEN programme. Avanza participated as an operator alongside 11 partners, which included the Irizar Group through Irizar e-mobility and Datik. The Polytechnic University of Madrid, Insia, CEIT-IK4 and the University of Vigo also participated. To explore the possibilities of connectivity and automation of public and cargo transport, AutoMost implemented a shared control driving system (Dual Mode), thus facilitating interaction between driver and the bus, which could be guided both automatically and manually, as required by the different traffic situations within the city.

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**“The Irizar Group has presented the first high-capacity autonomous bus in Europe”**

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# ***Irizar ie truck***

## Series production kicks off

The first Irizar Group trucks can already be seen at the factory. As a result of the agreement with FCC Medio Ambiente the production of the first 10 Irizar ie trucks for waste collection was commissioned. The excellent results of the tests conducted in different European cities and the satisfaction of the operators have resulted in this decision.

Series production of these involves the definite impulse to contribute to the deployment of feasible e-mobility of urban service vehicles in metropolitan areas, with a positive environmental impact regarding contaminating emissions and noise, reduction of carbon footprint and energy efficiency.

## The first time at an international fair

The Irizar ie truck made its first appearance at the international Solutrans fair to hold in Lyon (France) from 16 to 20 November. The Irizar Group used its presence at this fair to introduce this electric truck internationally.

## Entry into the Swiss market

As a result of the agreement reached with Jebesen & Jessen Industrial Solutions, Switzerland will be the first destination for this vehicle in Europe.

Meanwhile, different road shows are still taking place in France, Germany and Switzerland.



## Designed for unlimited applications

The Irizar Group's strategy, its global vision for the electrification of cities and the search for synergies with charging infrastructures in cities has made it possible to extend the range of products to industrial vehicles for cities. The Irizar ie truck is an electric truck which responds to different market needs and enables it to move around cities and urban

environments without atmospheric or acoustic pollution. The main attributes of this product, designed to operate in urban environments, are its smooth and innovative aesthetic design, operator safety and ergonomics, technology and flexibility for adaptation to market needs. In short, a totally versatile vehicle designed for unlimited applications.



**Fuel and food tanker**



**Sea container**



**Crane**



**Waste container**

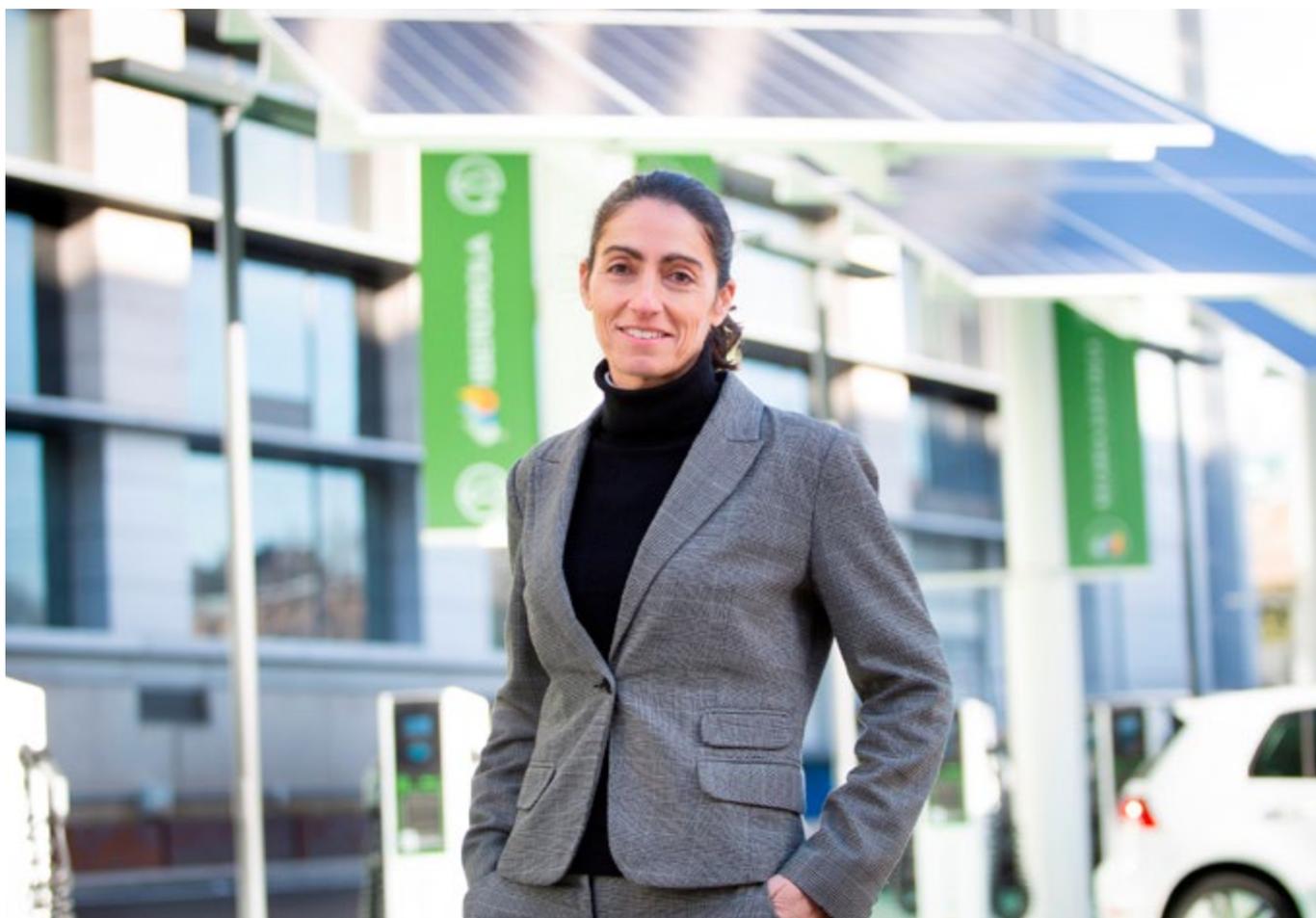


**Commercial services  
(with and without wheel)**



**2-axle commercial services**

“It is, therefore, impossible to think of a gradual reduction in emissions without comprehensive action on two main fronts: energy production and consumption, in transport, construction and industry.”



Raquel Blanco Collado  
*Iberdrola's Global Smart Mobility Director*

**In recent months, marked by the pandemic, citizens have become aware of the vulnerability of a globalised world to unforeseen crises. This awareness is also present in companies and industry and in our institutions and governments that have taken the decision to align the recovery of the economy and employment and the growth and transformation of countries with a strategy for the decarbonisation and digitisation of our economy.**

We all know that “green” electricity is the most efficient way to reduce emissions, improve air quality and transform other sectors due to its cross-cutting nature. Decarbonising the economy will require action on all of our energy needs and the transformation of sectors such as transport, industry and the air conditioning of homes and buildings, source of most greenhouse gas emissions. It is, therefore, impossible to think of a gradual reduction in emissions without comprehensive action on two main fronts: energy production and consumption, in transport, construction and industry.

Promoting decarbonisation is not only possible, but can become an opportunity for our country. Spain has more renewable resources than most surrounding countries and a national industry that is a global benchmark in capital goods, in vehicle manufacturing and in the deployment of charging points. An industry which is ready to take on rapid decarbonisation in the energy sector, as a driver of the recovery of our economy and employment, also in the automotive sector.

Technologies for end-use electrification in land transportation are both available and efficient. The electric engine for automotive is four times more efficient and generates no direct emissions, but it also generates fewer emissions over its full life cycle - less than 0.15 kgCO<sub>2</sub> / km eq - well below other engines. The manufacture of batteries in our country and advances in their reuse will also close the circle of mobility sustainability.

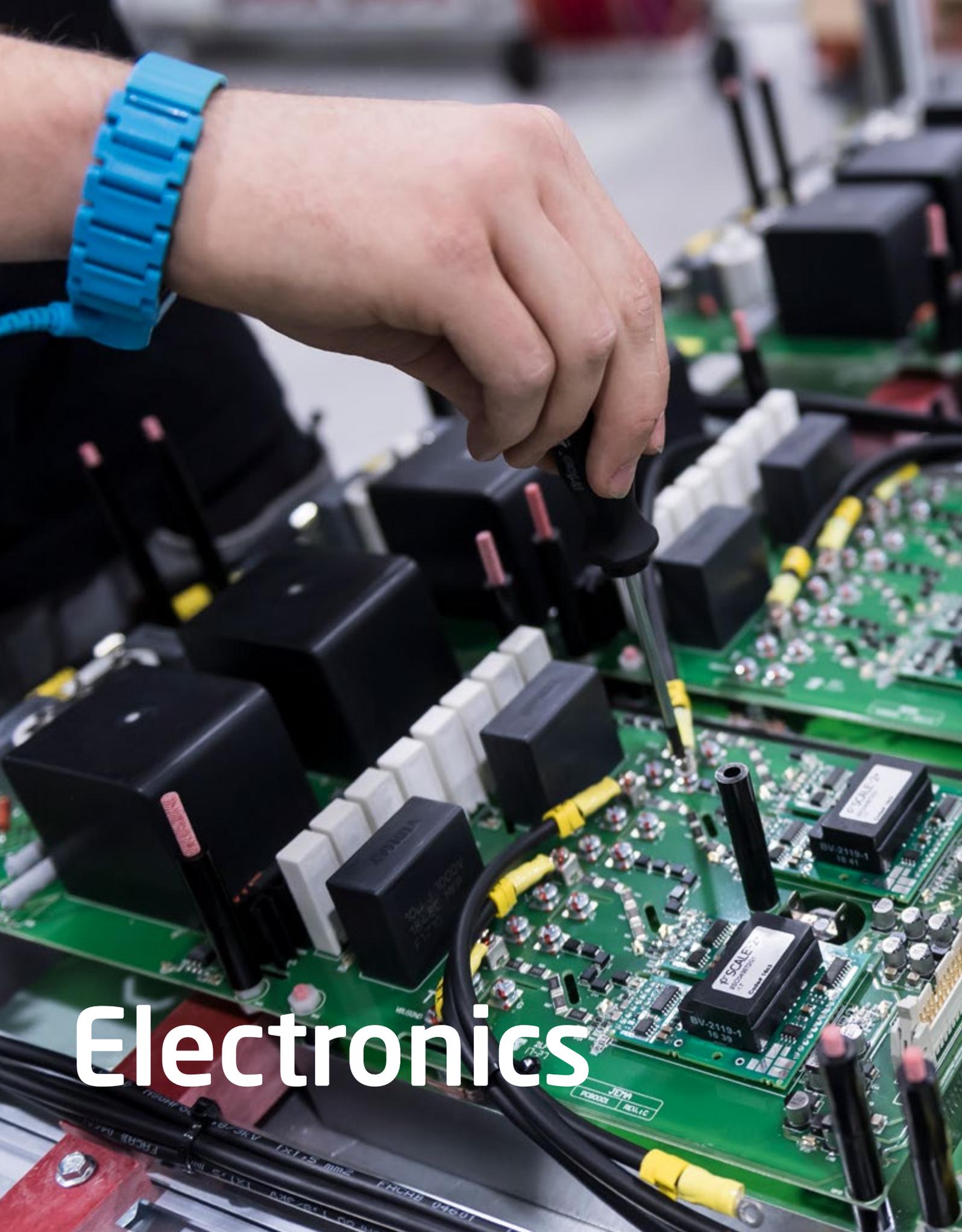
For years, Iberdrola has been committed to the electrification of transport in its strategy of transition towards a decarbonised economy as a key lever in the fight against climate change, in favour of green recovery. This commitment will see it installing around 150,000 ultra fast (350 kW), super fast (150 kW) and fast (50 kW) recharging points for private vehicles, fleets of buses,

sharing (cars, motorcycles, bicycles, scooters ...), public transport on demand (taxi and VTCS) or last mile delivery or waste collection fleets. They can all be managed - identification, reservation and payment- through a single platform, the Iberdrola public recharge app.

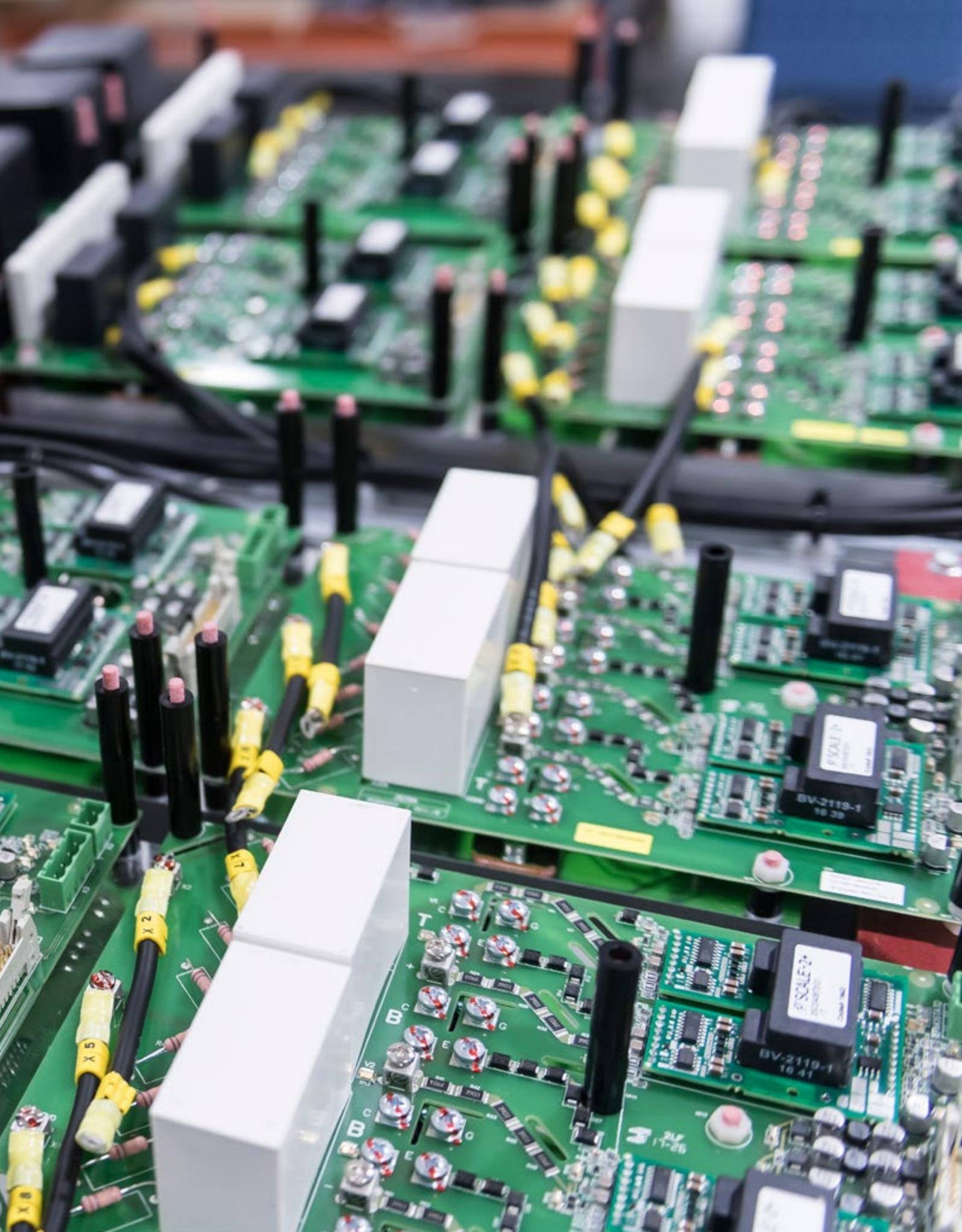
Solutions that respond to urban movement models must be provided in areas, such as micromobility, to promote comprehensive electrification. Iberdrola has met this challenge by moving into recharging for electric motorcycles, together with Cooltra and Inetum. Another solution targets the storage of second-life batteries to power electric vehicle recharging points. The system implemented by the company, together with BeePlanet Factory, confirms a change in the battery manufacturing model based on the reuse of raw materials, extending battery service life, reducing the impact of the extraction of raw materials and reducing CO<sub>2</sub> emissions by 70%, compared to a new battery.

Iberdrola is aware of the need to promote electromobility through coordinated and effective action with the main agents involved. The company is working on the construction of an industrial, commercial and innovation ecosystem - consisting of administrations, institutions, companies, service stations, dealers and vehicle manufacturers - to consolidate the development of sustainable mobility.

This is the context in which Irizar and Irizar e-mobility have reached an agreement to join forces for technological innovation in the electrification of bus transport and to provide solutions to the immediate decarbonisation challenges in urban mobility, by electrifying bus fleets and deploying a charging infrastructure.



# Electronics





# Future Solutions

**Jema, an Irizar Group company, operates in power electronics with applications in network and transport quality, in sectors as diverse as buses and coaches, renewables and BESS, nuclear fusion and particle accelerators. Jema also offers solutions in power supplies for Big Science, renewable energy, storage and smart grids.**

In the bus and coach sector, Jema is noteworthy for the application of multiplexed electronic architecture that provides every system with intelligence to provide new functionality and facilitate vehicle diagnostics. Also of note are the AEB-LDW driving assistance systems, the HMI control and console and battery module monitoring for charging management.

The firm's strategy is currently geared towards the development of solutions to improve efficiency and diagnosis of on-board electronics in Irizar vehicles in order to reduce the consumption of electricity, thereby reducing CO2 emissions.

## Efficient electronic solutions

Jema has developed solutions for lower consumption of the interior lighting of buses manufactured by Irizar. Jema has also worked on improving the manufacture of electronic control unit operating in aggressive environments (heat, moisture condensation, etc.), both in the processes and in the materials used to protect the electronics, all with the aim of increasing their efficiency and sustainability.

## In-vehicle electronic diagnostics

Another development line is improvements in the diagnosis of ECUS or control boxes for urban buses through the UDS (Unified Diagnostic System). Improvements that have been implemented in solutions that Irizar e-mobility, Masats and Hispacold currently offer their customers.

The UDS is a communication protocol used in automation based on several ISO regulations. It aims to facilitate off-board diagnosis, using a series of "UDS services" between the client (PC) and the servers (ECUs). These "UDS services" can be used, for example, to read the fault memory or to reprogram the ECU. An additional advantage of the UDS is that the diagnostic functions are implemented on the client rather than on the ECUs, thus enabling the complexity of the latter to be reduced.

Jema is also working on new generations of electronics consisting of several ECUs in a master-slave configuration that will have a human and electronic interface HMI. It is a novel project in that Jema has developed both electronics systems as a single solution applicable to a range of vehicle types, thus guaranteeing the versatility of their electronic solutions.

To this end, the words of Javier Romero, head of the electronics division at Jema Energy, are very revealing: *"Jema is committed to continuous updates and improvements in its electronics products, so that it can offer its customers the best solutions on the market"*

## New projects: AMYA and BMS 2.0

The AMYA project consists of new generations of on-board door and ramp drive control boxes manufactured by Masats. Complying with customer integrity and security requirements in electronics specifications is an exciting challenge for Jema. The first prototypes are currently being completed and the first units of the series will be delivered by the end of 2021.

In terms of electromobility, Jema is still involved in the development of electronic control and monitoring solutions for new generations of BMS batteries, together with CIDETEC.

The BMS is the competitive advantage of batteries in heavy-duty electric vehicles. In other words, the BMS electronics are what determines the responses enables the battery's service useful battery to be optimised and extended, thus making it more efficient.

In 2021, Jema launched the first units of the second generation of BMS on the market.



# Energy







# Energy storage: one more step towards energy efficiency

**With a clear commitment to energy efficiency, Jema develops and integrates energy storage in its solutions for strategic sectors such as renewable energy and electromobility.**

## Electrical energy storage in renewable energies

There has always been energy storage has always existed, for example hydroelectric dams to generate energy. However, technological advances in recent years have made it possible to develop electrical storage systems using batteries, known as BESS (Battery Electrical Storage Systems).

With the development of renewable power plants and their integration into electricity grids, problems arise such as those caused by clouds above solar plants or wind variability, etc. This variability causes small disturbances or power “gaps” in the power grid that are solved using storage.

The challenge today for the electricity sector is to increase the mix of renewable energies without sacrificing network quality.



## Storage for electromobility

At Jema we combine our knowledge and experience in the area of network quality and apply it to charging infrastructures in electromobility, a sector in which batteries store the energy of the vehicle.

Throughout the day the fuel is consumed, and at night, charging takes place, with high demand on the power grid. This requires an increase the power supply to city garages and, in turn, the distribution lines for specific times.

## What do we contribute at Jema?

At Jema we provide turnkey solutions through the installation of batteries in photovoltaic equipment so that when there are rapid power generation dips the battery injects energy into the grid, providing it with higher quality. Greater quality and efficiency in the power grid. The different storage applications in support of the power grid make it possible to increase the proportion of renewable sources in the energy mix.

A clear example is the mix used on islands that are undergoing a genuine transition towards clean energy. Small islands such as

Martinique or Tonga have gone from stabilising the island grids with petrol generators to battery-powered solar plants.

Jema is involved in the European Flexitranstore project, a pioneering undertaking in Europe for a storage system coupled to a wind power plant involving the participation of 28 companies from different countries with the objective of promoting and accelerating the integration of renewable energies in European energy systems.

In emobility, we are involved in the development of energy storage for electric vehicles together with Irizar and Repsol, contributing our extensive knowledge and significant experience in converters connected to the grid and battery charging.

The project focuses on the second life of the batteries used in buses, in order to solve infrastructure problems.

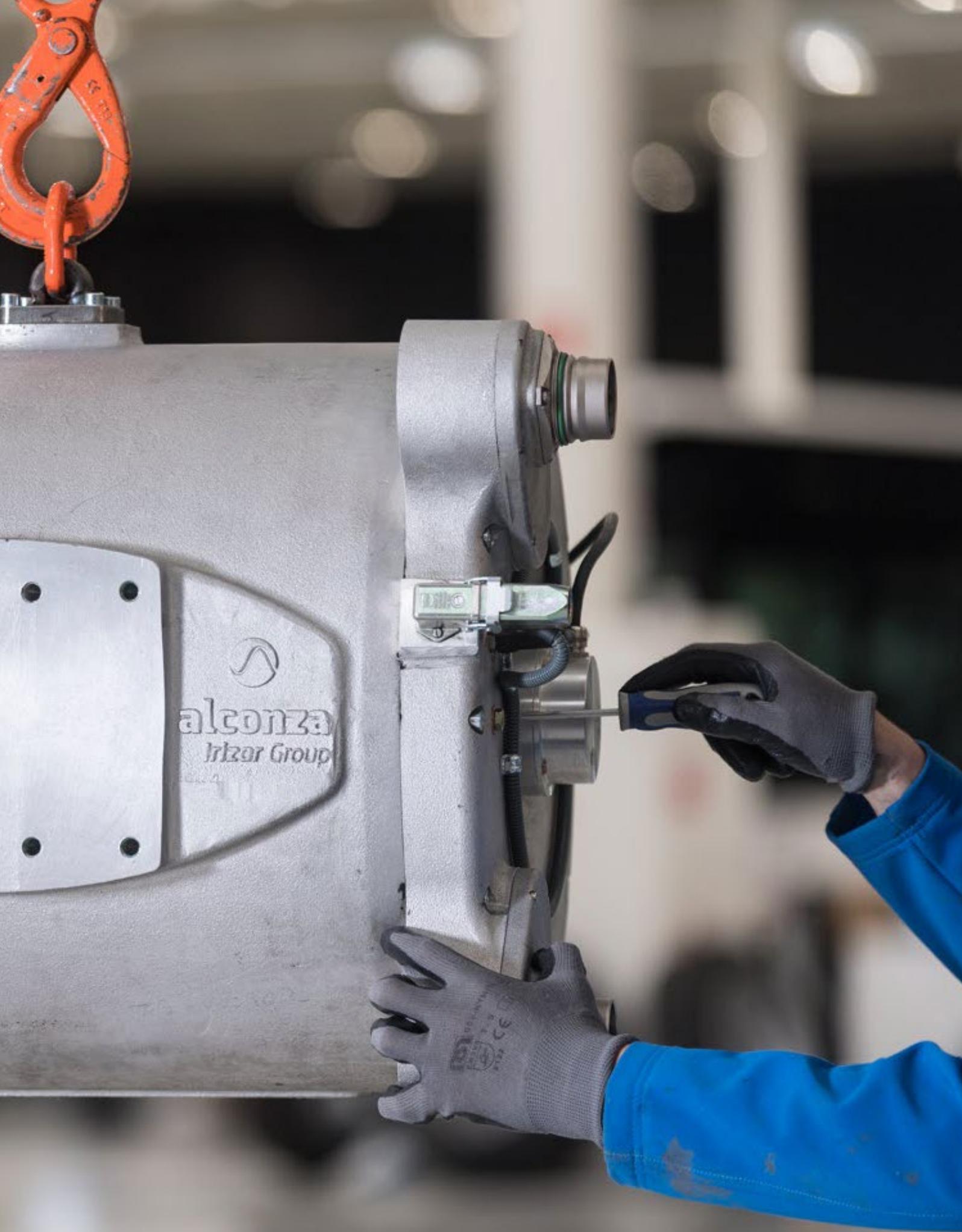
These batteries are used to store energy which is returned to the vehicle during the night charging process in garages.

In a word, we are working to achieve a circular economy, from the generation of clean and sustainable energy, through the establishment of an efficient and quality grid distribution system and the development of emission-free vehicles.

At Jema we are committed to efficiency, we are committed to a sustainable future.

# Electric motors





  
**alconza**  
Irizar Group

# Reduction of emissions in the marine sector

Alconza is now established as a benchmark for electrical motors and generators in the marine, hydroelectrical, electromobility and industrial sector, due to the range of projects it is currently undertaking. It provides its customers with comprehensive flexible solutions for its whole range of electrical motors and generators and offers technical support, maintenance, original spares and training, throughout its product life cycle.

The marine sector plays an important role in terms of environmental responsibility and sustainability, and is expected to grow in the coming years due to the lack of and growing need worldwide for ships with installation capacity proportional to the size of Offshore windmills.

## A wind farm installation vessel

Alconza has recently designed, manufactured and delivered four propulsion engines to Yaskawa Automation & Drives Corp, to equip an Offshore Wind installation vessel, built at the Pax Ocean shipyard for the Penta Ocean company in Japan.

These motors comply with the regulations of the NKK (Nippon Kaiji Kyokai), Classification Society and provide up to 3000 kW each at 1200 rpm. This will provide the ship with high levels of reliability, efficiency and low fuel consumption, one of the most in-demand requirements for this type of ship.



## A 132 metre long RoPax Ferry

In this case, the company will supply the electric propulsion motors, as well as the generators and other components for manoeuvring the RoPax-type ferry on the route between the towns of Heysham, in the north-west of England, and Douglas, in the Isle of Man (United Kingdom).

The boat, currently being built at the Hyundai Mipo Dockyard in South Korea, is a 132-metre long ferry, RoPax type, with capacity to carry roll-on cargo, both cars and lorries or large trailers.

The differentiating feature of these motors is their “Monoblock” type design, consisting of two totally independent stators, with their squirrel cages, in a system that provides high redundancy. They are notable for their reliability, efficiency and low operating costs, characteristics deemed key to the achievement of this project.

The generators to be installed are low voltage (due to the Wartsila Low Cross Concept (LLC) and they offer high electric power and current values, a major challenge for design and manufacture.

## The first electric high-speed ferry

It is also participating in the TrAM project, a European initiative for the design and manufacture of the first electric high-speed ferry, which will operate in Europe. This project is revolutionary due to its condition of zero emissions technology and manufacturing based on advanced modularisation, where weight and volume optimisation are two key aspects.

Led by the Norwegian mobility company Kolumbus, with the participation of major companies in the sector such as Wärtsilä, Fjellstrand and Servogear, Alconza is designing and manufacturing the electric motors which will propel the ferry. These are two high-efficiency, low-weight permanent magnet synchronous motors.

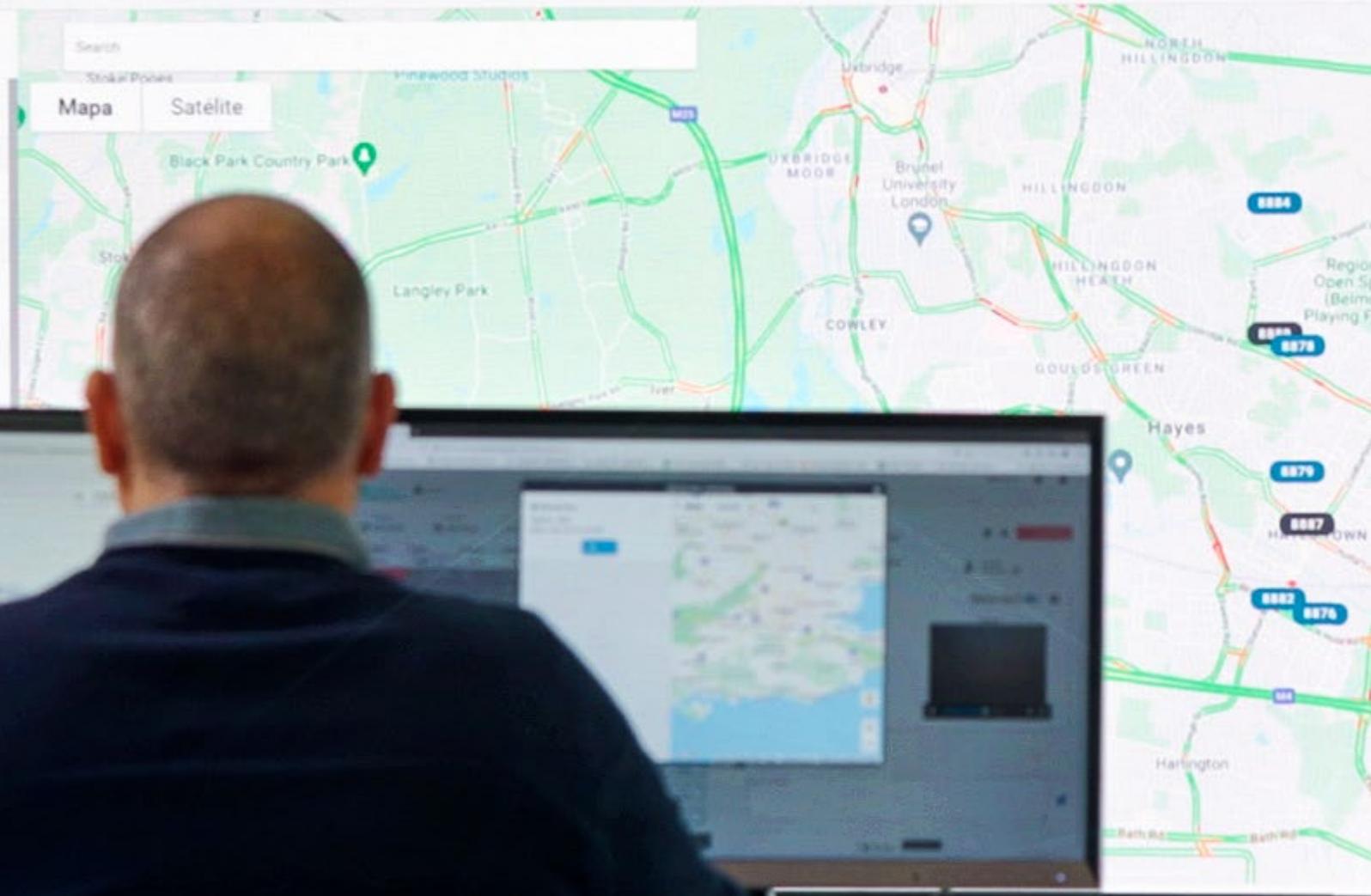
This strategic project is funded by the European Union through its Horizon 2020 programme and is part of the plan of strategic measures adopted by the International Maritime Organisation (IMO) to reduce total annual GHG emissions by at least minus 50% by 2050 compared to 2008.

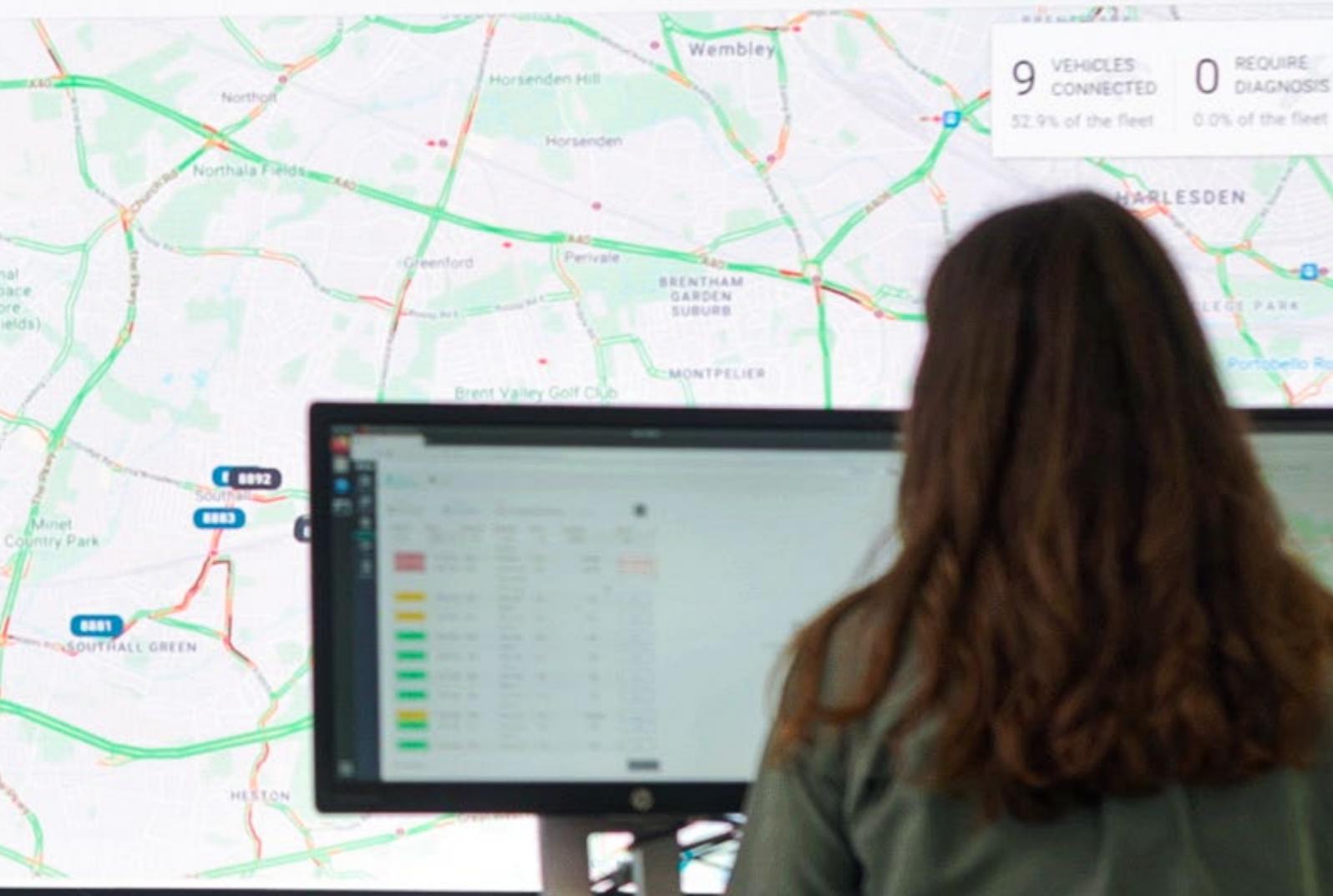
Under the name “Medstraum”, this first demonstrator will be operational in 2022 and will connect the Norwegian cities of Stavanger and Hømmersåk for passenger transport. It will also be used as a reference for the following two case studies with the same type of vessel: passenger transport on the River Thames (London) and freight transport on Belgian canals. Its maximum navigation speed will be 23 knots (equivalent to approximately 43 km / h) and it will be able to carry up to 150 passengers.



# Connectivity

ANALYSIS ECO DRIVING SPEED RESTRICTIONS





Location	Status	Count
Southall	Green	1
Southall Green	Green	1
Heston	Green	1
Minet Country Park	Green	1
Other locations	Green	5

# Expanding advanced technology

**Datik provides services to Transport Operators, both for people and goods, to help them reduce costs, improve quality and increase safety in their operations.**

It equips the vehicles with the DCB (Datik Computing Brain) that centralises the information from the sensors, integrates peripherals and communicates with the cloud service, the iPanel. Datik, through its iPanel platform, sells Operation Assistance Systems (SAE) for Public Transport, electrical and non-electrical fleet monitoring systems to optimise Fleet Management and fleet fatigue accident prevention systems (MagicEye).

Vast experience and knowledge in the creation of high technology systems applied to real life and to the day-to-day life of people, has enabled the latter to embark on various significant projects inside and outside the country.

Datik has been awarded the contract to fit the SAE in 1,350 vehicles (86% of the total fleet) in the AML (Metropolitan Authority of Lisbon). This project is the most ambitious and largest in the history of Datik, and has led to it being positioned as a leader in SAE Solutions in Portugal. The project involves the supply and maintenance of the centralised iPanel Operation Assistance System for Transportes Sul do Tejo, Rodoviária de Lisboa and Viação Alvorada, with the integration of IP voice call systems, video surveillance, passenger counting and passenger information.

At local level, Datik has just finished the project for the installation, integration, start-up and maintenance of an Operation Assistance System for urban buses in the city of Vitoria-Gasteiz. The main objective of this project is to supply a system adapted to the new technologies and applicable standards in the transport sector, which means we can offer a higher quality service and benefits to all the agents involved in the transport system.

It involves the equipment necessary for 85 buses; iPanel SAE's own equipment, on-board screens, people counting sensors, video surveillance, etc. Together with the 13 electric buses (IEB - Intelligent Electric Bus) and more than 130 TFT stops with passenger information, they will complete the comprehensive management of Vitoria's urban transport with Datik solutions.

Datik has also been awarded the supply of an operation assistance and passenger information system, and for the validation and sale of the regular road passenger transport service in Gipuzkoa, in this case for Lurraldebus. It covers the supply of 141 passenger information panels at stops and the centralised content manager with iPanel. Likewise, it will deploy a Smart City system to enable thousands of operations per second so that all systems report and consume information from the same place.

It also plans to obtain approval from TFL (Transport for London) for the installation of comprehensive management systems for the risk of fatigue in driving in approximately 500 buses. This refers to Magic Eye, a new system that has been developed to protect drivers in risky situations due to fatigue or distraction, and warning them before a possible accident.

In this way, Datik is demonstrating its ability to develop and offer advanced technology adapted to the needs of operators and is expanding its presence not only in the national territory, but also internationally.



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Iñigo Odriozola: "The development of our own product with high added value, together with national and international strategic alliances, enables us to compete in modernisation projects for transport management. Our future will involve scalability, compliance with transportation technology standards."

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# Together, for a safer and more sustainable world

**For a number of years, sustainability has been one of the three key priorities of our Group's future strategy, and it drives us forward and commits us to working by contributing to the construction of a better and more sustainable World.**

For a number of years, sustainability has been one of the three key priorities of our Group's future strategy, and it drives us forward and commits us to working by contributing to the construction of a better and more sustainable World.

Sustainability is a factor in strategic decision-making and daily management, in line with the 10 Principles of the Global Compact and we are continuing to make progress in integrating the Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda in our operations as a roadmap for enhancing prosperity for people and the planet.

We are convinced that our sustainable performance inspires confidence and generates competitive advantage in times of change and uncertainty and, at the same time, it pushes us to address the economic, social and environmental challenges faced by Humanity and the Planet.

In the activity sectors in which we operate we are committed to the environment, the well-being and health of people and to the creation of better urban environments. Particular emphasis is placed on reducing noise pollution, obtaining low consumption which reduces costs and developing zero-emission vehicles. These objectives all focus on improving quality of life for the people and environments where we act in the context of the United Nations Sustainable Development Goals.

Our main actions in sustainability include the following:

# Environment

We are committed to protecting the environment and prioritizing actions that minimise possible impacts.

# Climate change

We are designing our route map so that the Irizar Group can become a global player in urban, medium- and long-distance sustainable mobility, which is why we have continued to include sustainability in our strategic plans as a key value for the future. And we seek solutions with high technological content to allow our customers to operate the services they offer more efficiently and sustainably.

We performed the calculation and external verification of the Carbon Footprint of our activity and we are moving forward in making the impact increasingly neutral, focusing efforts on minimizing GHG emissions, based on improving energy efficiency, the use of renewable energy sources and the adoption of a labour model of commitment to optimizing the resources used and seeking to be efficient and reduce the impacts of generation of emissions, discharges and waste.

We are gradually carrying out life cycle analysis (LCA) of our range of buses and coaches. In 2019, we obtained the first Environmental Product Declaration (The International EPD System), which made us the first company in the sector worldwide to achieve this certification.

The investment in the largest photovoltaic solar park in the Basque Country (EKIAN), with the acquisition of three megawatts, makes Irizar e-mobility the first fully sustainable energy electromobility plant in Europe.

We have just signed a contract with Iberdrola for the supply of all our production plants and after-sales service to be highly energy efficient and 100% renewable. The total consumption involves 9,340 MWh, distributed in six facilities in Gipuzkoa; two each in the towns of Ormaiztegui and Salbatore, one in Aduna and the other in Olaberria.

# Circular economy

We are committed to continuing to advance in the circular economy model in the life cycle of our products and in our production cycle. This model prioritises the use of resources reducing the consumption of raw materials.

We innovate and develop our own sustainable and eco-innovation products and technologies with a holistic approach, in order to minimise environmental impact throughout the life cycle, from extraction of the raw materials and manufacture of the components to vehicle use and the entire process until the end of its useful life. We also consider the efficient use and environmental sustainability of materials in our design and manufacturing processes.

We are moving towards a production and consumption model that guarantees sustainable growth over time.

We are integrating and promoting the reuse of surplus materials and waste, in partnership with other organisations. Proof of this is the creation of the IZIR Circular Economy brand at the end of 2019.

We offer a second life to batteries under a partnering agreement with Ibil, by which the batteries that complete the service life cycle can be reused in buses for energy storage, together with the power electronics associated with this application, in the charging infrastructures that Ibil is developing and deploying in Repsol service stations, among others.



## Ethics and transparency

We are a responsible organisation. We are moving forward in transparency, good governance and integrity. We promote and monitor to ensure that this commitment to good practices and transparent, responsible and efficient action is rolled out to other stakeholders (customers, suppliers, external partners, government agencies, etc.). We firmly believe that business activities that respect corporate ethics and sustainability are the only possible foundation for long-term business success.

We make the necessary, truthful information available to everyone.

## Human rights

We safeguard human rights both in our activities and in all our business relationships and with our partners.

## Safety

Safety is an absolute and strategic value at Irizar. For this reason, we are going ever further in guaranteeing the safety of people, customers, passengers and suppliers.

## Personnel employed at the Irizar Group

We have a diverse and committed team of people. We believe in the talent of people and we are committed to their development. We monitor diversity, inclusion and the health and safety of people, all this in an environment of communication, participation and transparency.

We promote training, awareness-raising, communication, leadership, participation and the commitment of all to the adoption and fulfilment of the objectives of the Irizar Sustainability Strategy. All this based on providing the organisation with the appropriate framework and resources and the establishment of environmental objectives.

We currently involved in the Social Innovation project whose main goal is to provide new responses to the challenges and issues we currently face from a social point of view by promoting projects that benefit both Irizar people and society generally.

## Society

At the Irizar Group we play an active role in defending the industry and its high added value. We promote innovation and the creation of our own high technology in strategic sectors with the aim of providing pioneering solutions so that we can anticipate successfully future challenges and positively impact on wealth creation and employment and the development of society and the economy.

We collaborate with the entire network of suppliers, local technology centres, institutions, universities, training schools, etc. to continue feeding the industry and the company. This is how we continue to face major challenges, by strengthening ties and looking for partners with the aim of staying at the cutting edge and continuing to cultivate talent to generate quality jobs and build the future.

“Our relationship with society will be respectful, open and participatory, helping to create wealth and employment, culture, education, and sport in our immediate environment, as well carrying out social work in our immediate surroundings and in the world’s most disadvantaged areas.” This has not been in vain, as we maintained employment even in the most difficult periods of both 2009 and during the crisis of 2020.





***Irizar Group***

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