



SUSTAINABILITY ENGINE

Start

05

**Stories of excellence,
experiences of sustainability**

**MAGNETI
MARELLI**

COLOPHON

This publication has been produced by the Magneti Marelli sustainability team
with the methodological support of Avanzi and the creativity of Ideificio.

For further information

Magneti Marelli S.p.A.
sustainability@magnetimarelli.com
Viale Aldo Borletti 61/63
20011 Corbetta (MI), Italy

INDEX

START 05

01

OUR SUSTAINABILITY

6 Strategic sustainability for innovation

02
PRODUCTS

12 Birth of a high-end rear lamp

03
PROCESSES

20 Industry 4.0: a team dedicated to the growth of digitalisation

04
STAKEHOLDER

24 Improves: a pilot project for the car of the future
25 Muner: transferring know-how
26 Cluj: in Romania, a research and development hub for the future of mobility
28 Sustainable Supply Chain Program

05
IMPACTS

30 India: growing together
32 Indicators
34 Magneti Marelli around the world
34 Business Line

SPRAZZI E BAGLIORI

36 The spirit of the time and a glimpse of the future

START05 | READER'S GUIDE

Start “re-start” from 5.

Now in its fifth edition, Start continues to present Magneti Marelli's commitment to sustainability, an active decision to accompany the official FCA Group Sustainability Report. This publication presents information and data from 2017 which, as was the case with previous editions, make reference to the indicators set out by the international guidelines of the GRI (Global Reporting Initiative) Standards.

This year, our aim is to present our commitment through the voices of those who experience sustainability on a daily basis, thus presenting a range of stories which set out the four pillars of our strategy - products, processes, stakeholders, impact - through real-life experiences and first-hand accounts.

From the story of a journey to discover how a product of excellence is created, we look at how Magneti Marelli is experiencing its digital transformation in its plants, to then pass the word to our stakeholders. This year we are focusing mainly on partnerships with Universities, demonstrating the active commitment of our Company to pass on know-how to young people and to promote their growth, along with that of the community and the concept of mobility itself.

Our suppliers play a fundamental role in all of this, in that have to ensure the maintenance of our sustainability standards throughout the value chain. We explain how this can be measured with a view to reciprocal growth. The commitment made by a global company with regards to sustainability can also be measured by the impact it makes in the local community. This year we have chosen India to present the impact that Magneti Marelli continues to have on the growth of the areas in which it operates.

The issue is completed with a historical and cultural presentation which examines the story of the glorious Company magazine “Sprazzi e Bagliori” (Flashes and Glows), directed and illustrated by Noël Quintavalle, who designed no less than the figure elected to be the troubadour of our centenary, which we are celebrating in 2019!

This and more can also be viewed online, on the website dedicated to Start05. Videos and other multimedia content will provide more detail and a face to the stories presented here. And that's not all. This year it will be possible to download an application from the website which will provide simple access to all the indicators for Magneti Marelli's sustainability performance.

Happy reading and happy navigation.

WEBSITE

 sustainability.magnetimarelli.com

INDICATORS APP

 [Link to download the 2017 key numbers](#)

01

OUR SUSTAINABILITY

The demands of future mobility and the instruments used to satisfy them will be very different from those of today. We will have fewer private vehicles, and more shared modes of transport. Above all, we will have vehicles which will not only transport us, but which will allow us to do things that are hard even to imagine nowadays - they will be hyper-connected with the outside world. They will have clean and intelligent drive systems. All of these changes set enormous challenges from a scientific, technological, industrial and, above all, cultural point of view. Our sector is facing a transition period of historical importance. Magneti Marelli has the resources to play a lead role in this change: the people, the knowledge and the skills. We want to bring all of these resources into play, in order to be at the head of the innovation race. For us, sustainability is all of this. It is neither a limit nor a constraint, but rather an extraordinary opportunity to do what we do in the best possible manner, contributing to making a better future for all.



STRATEGIC SUSTAINABILITY FOR INNOVATION

Development, people, innovation: our priorities.

Sustainability for Magneti Marelli means the future. Because new forms of mobility invest in intelligent systems and innovative solutions which, in this period of significant evolution, call for environmental sustainability, safety and quality of life on board the vehicles. In this light, strategic priorities are based on manufacturing processes which are ever-increasingly efficient and environmentally compatible; on placing people at the centre, recognising them as the most valuable resource for company growth and guaranteeing them safety and protection in the plants; on valorising the communities in which the company is present, in order to contribute to economic and social development which is solid and stable over time. Constant communication and openness between car makers, suppliers and consumers is a fundamental and essential element

for the identification and inclusion of elements necessary for developing sustainability and defining a medium- and long-term strategy. The fundamental role that companies will assume in the promotion of sustainable development is also the direction indicated by the 2030 Agenda published in 2015 by the United Nations and signed by 193 countries world-wide. With its 17 Sustainable Development Goals, it seeks to “ensure that all human beings can enjoy prosperous and fulfilling lives and that economic, social and technological progress occurs in harmony

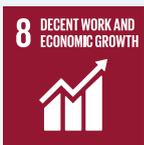
with nature”. Everyone, governments, businesses, civil society organisations and even individual citizens, is called on to make their contribution to reaching these ambitious goals. Businesses play an important role. Such ambitious goals in fact call for competence, resources and financial availabil-

The strategic priorities are founded on ever-increasingly efficient and environmentally compatible productive processes, and on placing people at the centre, recognising them as the most valuable resource for the company growth and guaranteeing them safety and protection in the plants.

ity which the private sector can efficiently mobilise. Last year, Magneti Marelli analysed the Sustainable Development Goals in order to identify those on which its activities have the most impact and therefore where it is necessary to take concrete action.

MAGNETI MARELLI'S CONTRIBUTION TO SDG

SUSTAINABLE DEVELOPMENT GOALS



DECENT WORK AND ECONOMIC GROWTH

Ensure the highest standards of health and safety and protection of human rights in all of its manufacturing sites.



INDUSTRY, INNOVATION AND INFRASTRUCTURE

Valorise its own capacities for innovation not only for efficiency and profitability, but also to improve the quality of life for the citizens and communities.



SUSTAINABLE CITIES AND COMMUNITIES

Work towards a form of mobility which renders cities safer and better to live in and contribute to the economic and social development of all of the countries in which it operates.



RESPONSIBLE CONSUMPTION AND PRODUCTION

Render its manufacturing processes ever more efficient and environmentally compatible, and supply products which render vehicles less polluting and safer.



CLIMATE ACTION

Promote the reduction of both direct and indirect climate-altering gas emissions.



PARTNERSHIP FOR THE GOALS

Share - with governments, private sectors and society - visions, principles, values and objectives that place people and the planet at the centre of attention.

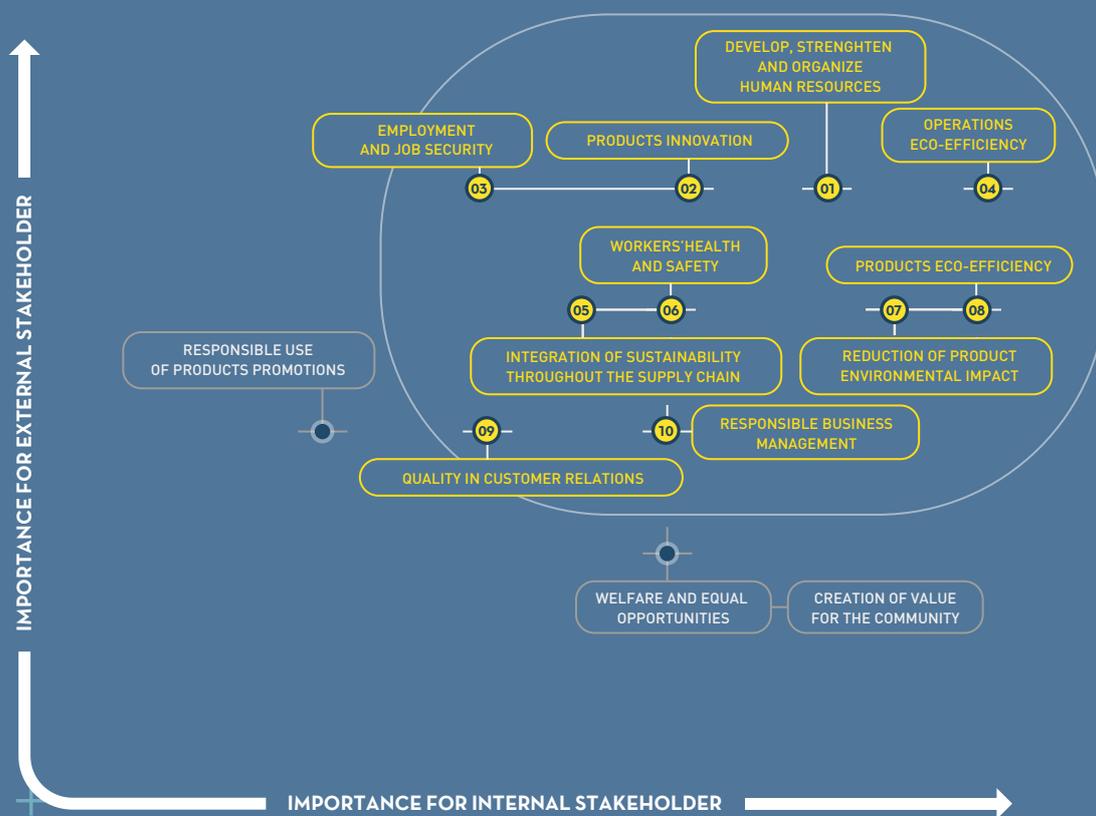
In order to translate these aims into concrete actions, last year also saw the Company carry out materiality analysis, a process which allows the identification of themes which are important for business, in other words themes which are capable of influencing either positively or negatively the capacity of the business to create value over time. With reference to these themes, the company plans and develops actions to be taken in the short- and medium-term.



GOVERNANCE

In order to increasingly integrate sustainability into business practices, Magneti Marelli has set up governance which intervenes at all levels of the organisation. Each Business Line has the task of bringing forward and organising the projects and initiatives created, in order to transform them into shared assets on an international level, in cooperation with the central team which reports directly to the Company Board.

THE COMMITMENT TO MATERIAL THEMES



01 DEVELOP, STRENGTHEN AND ORGANIZE HUMAN RESOURCES

The development of people and trust in the company are the keys to growth. This is why Magneti Marelli creates a range of initiatives aimed at personal improvement and the improvement of the entire system, favouring collaboration and exchange of experiences not only within the Company, among the Business Lines, but also with the various players surrounding the business.

02 PRODUCTS INNOVATION

The development of efficient, safe and interconnected products is the result of a constant commitment in terms of research and innovation. Research and development departments are present in all business areas. Together with collaboration with Universities and Centres of Excellence, they represent a competitive advantage for Magneti Marelli.

03 EMPLOYMENT AND JOB SECURITY

Magneti Marelli strives to keep a steady growth in terms of level of employment: people represent one of the main resources for innovation.

04 OPERATIONS ECO-EFFICIENCY

Rendering processes efficient allows for a reduction in the consuming of resources, rendering them more sustainable on an environmental level. This takes place through the use of advanced technology and an ever-increased focus on reducing the impact of activities on the environment.

05

INTEGRATION OF SUSTAINABILITY THROUGHOUT THE SUPPLY CHAIN

Through the activity of awareness-raising among suppliers with regards to criteria of sustainability, focus is placed on the resilience, the growth and the efficiency of the companies themselves.

07

REDUCTION OF PRODUCT ENVIRONMENTAL IMPACT

Magneti Marelli is aware of the impact that its products have on the environment right from the design and manufacturing stages, and throughout their life cycle. This is why the company has, for some time, been adopting innovative methods of evaluation of the impact of new materials and technologies.

09

QUALITY IN CUSTOMER RELATIONS

The close relationship with clients allows the Company to anticipate and accommodate implicit expectations and needs. This is why Magneti Marelli aims to continuously involve and collaborate with clients, in order to create solutions which generate value.

06

WORKERS' HEALTH AND SAFETY

A healthy and safe working environment contributes to protecting the people within the Company. In this respect, the Company promotes health and safety through World Class Manufacturing methods and specific management systems.

08

PRODUCTS ECO-EFFICIENCY

Product innovation contributes to making vehicles safe and sustainable, at the same time responding to the demands of end users and the requirement for lower environmental impact.

10

RESPONSIBLE BUSINESS MANAGEMENT

Magneti Marelli interprets responsibility as the protection of the legitimate interests of stakeholders.

MAP OF THE STAKEHOLDERS



SUPPLIERS & PARTNERS

CLIENTS

- BtoB clients
- Consumers
- Support networks
- Drivers



COMMUNITY

- Local community
- Non-profit and non-governmental organisations
- Religious, cultural, professional, social-political, and scientific and technological research groups
- Health system
- Schools and Universities
- Journalists and media



INSTITUTIONS

- Governments, local organisations and public administration
- Regulatory bodies
- European Community institutions
- Sector associations



ENVIRONMENT

- Environment
- Environmental institutions and associations
- Sector groups

INVESTORS

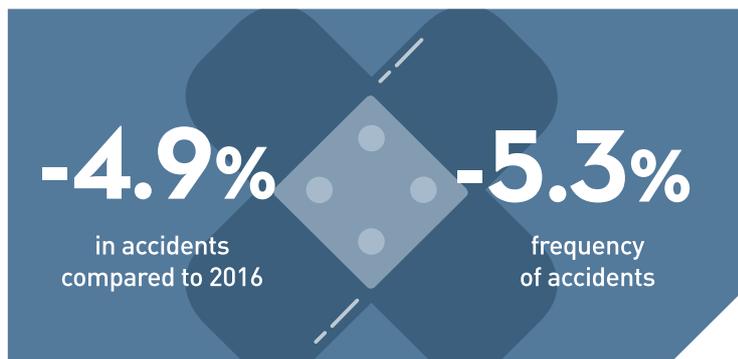
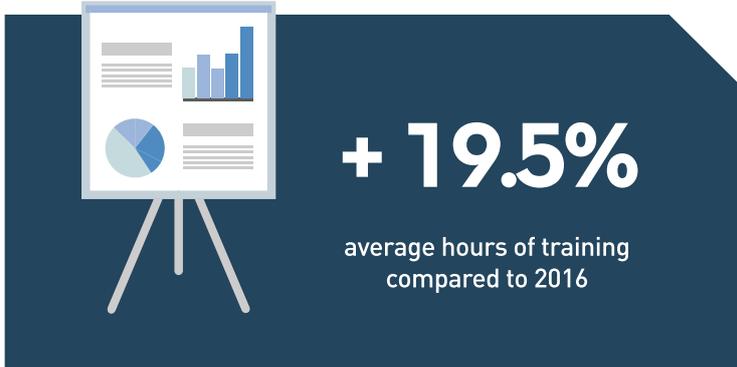
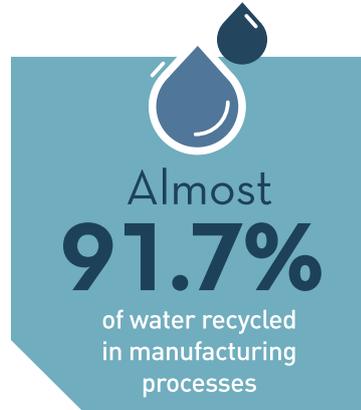
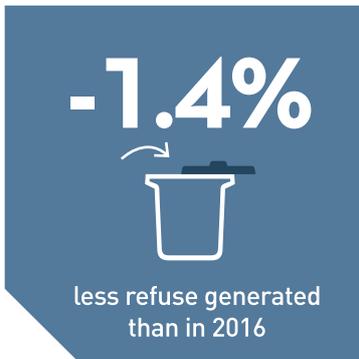
- Traditional investors
- Financial community
- Socially-responsible investors



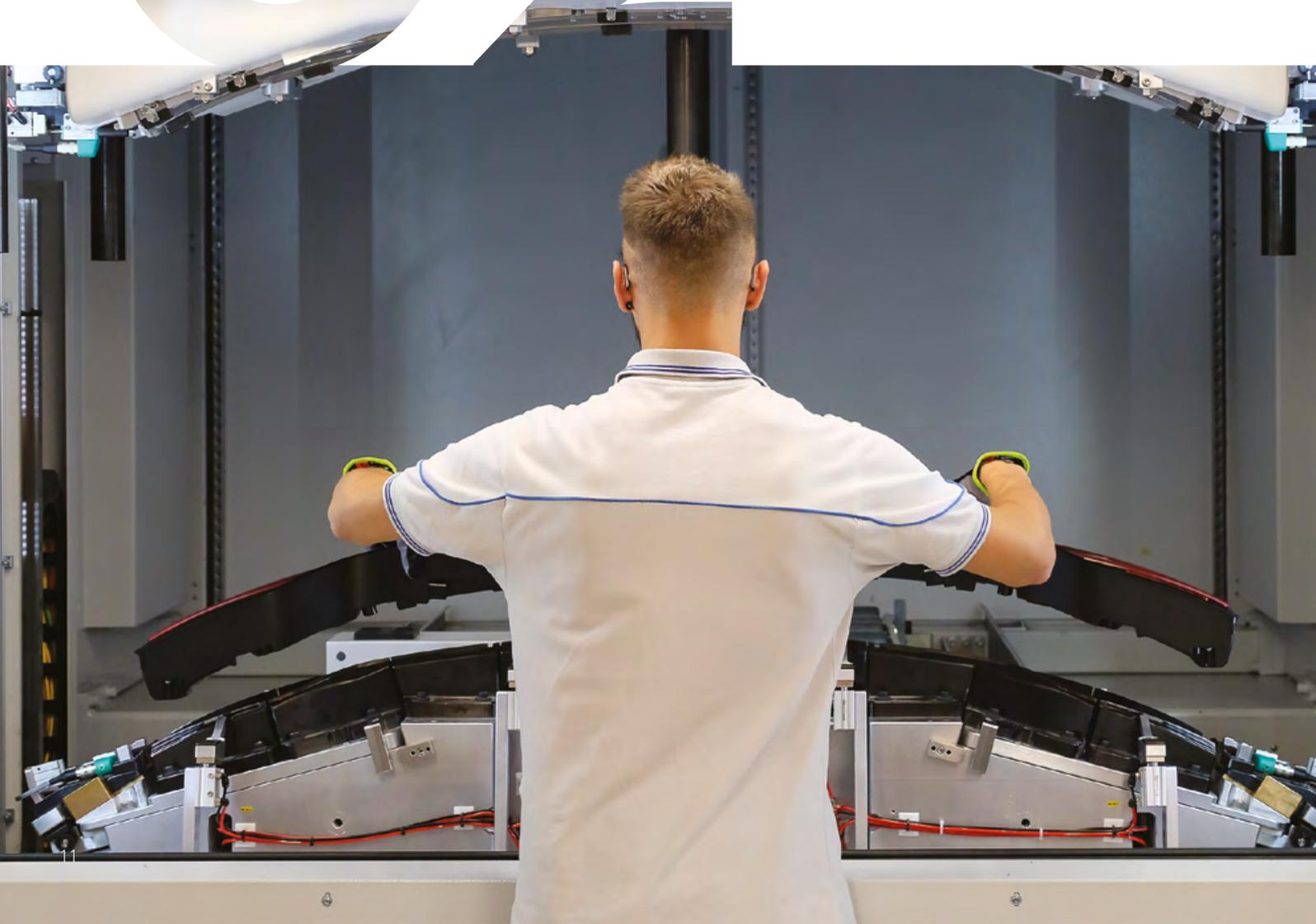
EMPLOYEES

- Employees and collaborators
- Trade union organisations
- Employees' families
- Professional company organisations and groups

HIGHLIGHTS 2017



Eco-efficient, safe and interconnected products are the result of the constant commitment that we promote throughout the value chain.



PRODUCTS



BIRTH OF A HIGH-END REAR LAMP

REPORTAGE A journey through the Automotive Lighting plant in Tolmezzo, from the production lines to a meeting with the figures involved in the creation of the rear lamp produced for the Porsche Cayenne. StartO5 tells the story of a key product in technological innovation characterised with important elements of sustainability.

Tolmezzo, the sun-light illuminates the light-blue gates of the Automotive Lighting plant: Start is here to discover all of the steps that led to the creation of the rear lamp for the Porsche Cayenne, which won at the "Volkswagen Group Awards 2018". The Tolmezzo plant sits harmoniously in the midst of a crown of green and rocky peaks. Right from the moment it was designed, the plant has always been characterised by innovation and continuity with the surrounding area, with a large community of more than one thousand workers, and therefore a lot of families. We pass through warehouse areas. Everything is in order and is spotlessly clean. Blue t-shirts and white shirts move swiftly between the offices and the production lines. There is the sound of fork-lift trucks, large articulated trucks, and the silence and image of those "blocks" that make up the plant, where a constant flow rolls with meticulous precision, every day producing, imagining and designing.

THE INNOVATION IN THE PRODUCT

01

LAYOUT:

as well as the intensity, a requirement of the European market, a minimum illuminated surface area for the stop lights and indicators was also guaranteed in order to comply with the US market.

02

CHOICE OF MATERIALS:

in order to comply with the US market, different materials were used which, through alternative optical technology, guaranteed a level of functionality and aesthetics in line with that supplied to the European market. This led to the filing of five strategic patents for optics.

03

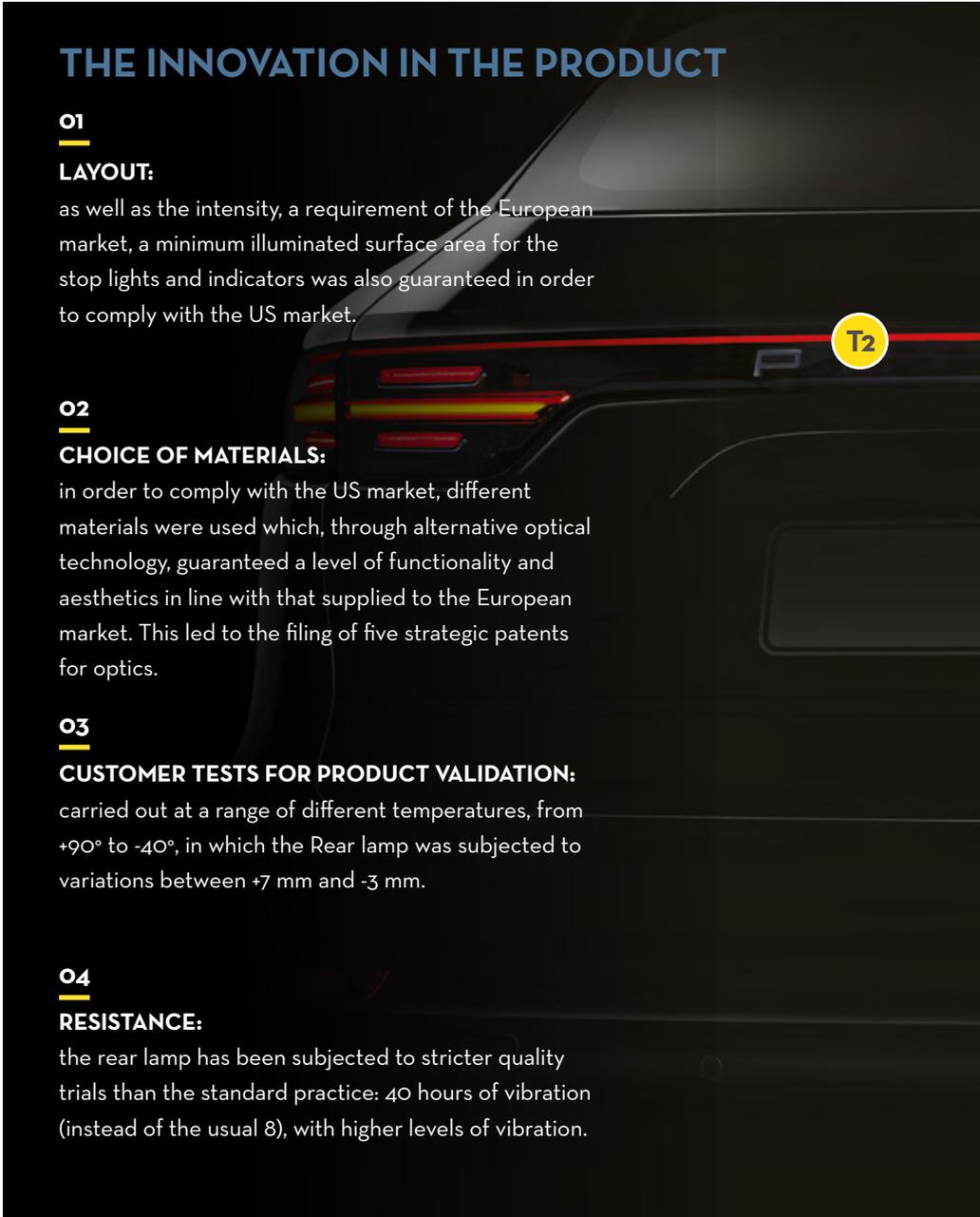
CUSTOMER TESTS FOR PRODUCT VALIDATION:

carried out at a range of different temperatures, from +90° to -40°, in which the Rear lamp was subjected to variations between +7 mm and -3 mm.

04

RESISTANCE:

the rear lamp has been subjected to stricter quality trials than the standard practice: 40 hours of vibration (instead of the usual 8), with higher levels of vibration.



T2

PROTOTYPE AND DESIGN

September 2015

The prototype stage for the materials and technology chosen to make the product. The design, mechanical, electric, electronic and testing stages all required innovative working methods. The need emerged for the construction of two new lines in the plant.

MASS PRODUCTION

August 2017

The first series was launched, and the next step was to launch production on the two lines, developed according to criteria of sustainability and work ergonomics.



CROSS-DEPARTMENT TEAM AND TENDER

July 2014

Magneti Marelli took part in the call for tender and began working on the project for the Porsche Cayenne rear lamp. The R&D area brought together a planning team which studied and responded to the requirements of the customer.

TESTING AND INDUSTRIALISATION

September 2016

Numerous validation and homologation tests began on the product, together with works for the preparation of the manufacturing lines for mass production.

07

SINGLE ILLUMINATED STRIP FOR THE POSITION LIGHTS: allowing for increased visibility.

09

38 ELECTRONIC CIRCUIT BOARDS (BETWEEN THE US AND THE EU): 20 circuit boards are needed to make a vehicle's rear lamp. 18 of them are tailor-made for the EU market, just as many are produced specifically for the US market. 2 circuit boards are the same for both the US and the EU.

05

THE PORSCHE BRAND INCLUDED IN THE REAR LAMP DESIGN: the application of debossed letters allows the quality and aesthetic requirements to be satisfied.

08

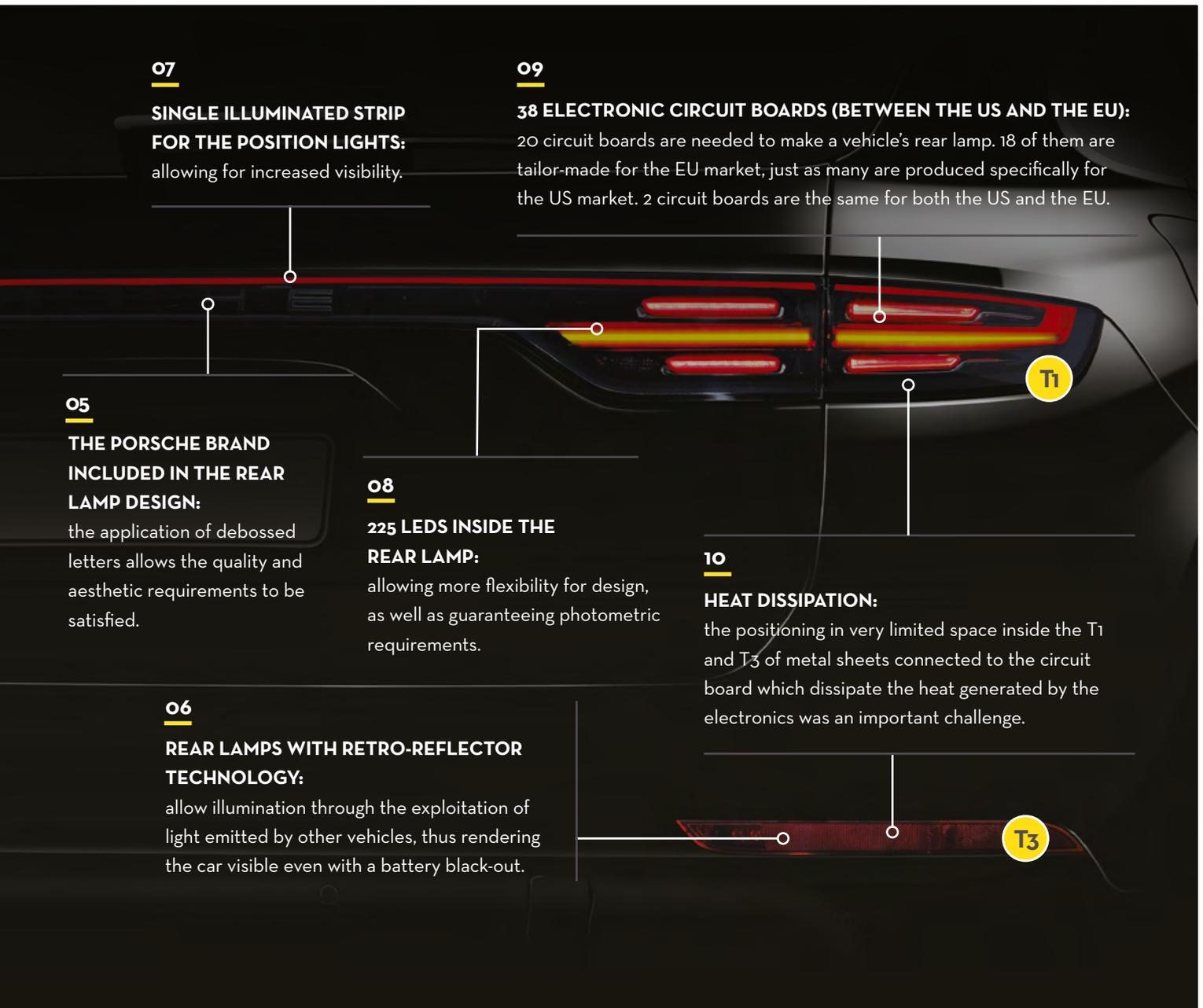
225 LEDS INSIDE THE REAR LAMP: allowing more flexibility for design, as well as guaranteeing photometric requirements.

06

REAR LAMPS WITH RETRO-REFLECTOR TECHNOLOGY: allow illumination through the exploitation of light emitted by other vehicles, thus rendering the car visible even with a battery black-out.

10

HEAT DISSIPATION: the positioning in very limited space inside the T1 and T3 of metal sheets connected to the circuit board which dissipate the heat generated by the electronics was an important challenge.



Hospitality and a meeting: an atmosphere of teamwork

But let's take this one step at a time. In a room belonging to the team led by Stefano Marchesin - in the Research and Development (R&D) department - we find ourselves with five of the specialists who have created a rear lamp which is revolutionary in terms of the requirements set out by the customer and for the innovative design of the product. Marchesin, the R&D Manager of Automotive Lighting Italy, tells us how the concept of the Porsche rear lamp was the result of ongoing study of market trends by the entire team. "We started as far back as 2013 to analyse what the future trends could be, involving the entire Market Research, Innovation and Product Planning team - he tells us. Through the visions of the concept cars produced by the various car manufacturers, we imagined that one of the trends would have been a rear lamp that extended right across the back of the vehicle". This prediction was soon proved to be accurate. The project began in August 2014. The call for tender organised by Porsche gave six months' time to come up with a project. Magneti Marelli's team spirit proved to be victorious. Production began in the summer of 2017, and to date there are already more than 70 thousand vehicles on the road. A small miracle, even in terms of production time, which called for radical changes to take place, even in terms of the structure of part of the plant.

Design and sustainability, innovation as a guide

The rear lamp is made up of three distinct parts (see the image on page 13): T1, the part which is divided into two on the left and right sides of the car, T2, which is the longer, narrower part which runs right across the boot, and lastly T3, which forms part of the bumper. "Design is undoubtedly a guiding element in client requests in the development of new rear lamps - explains Fabio Lupieri, Project Engineer in R&D. Another element is sustainability, because the customer request is for a reduction in the weight of the product, as well as the use of new plastic blends. These are two factors that often lead to designs which change the way of producing components, with further positive consequences for the entire process". In the case of the Porsche Cayenne, there were various challenges in the research and development stage: a central component which was longer than usual, with a problem to be resolved in terms of heat dissipation; the positioning of the LEDs; the creation of the moulds and presses; the internal logistics and all the relative transportation, as well as understanding what the effects of all of this would have been on those having to handle the product on the line. "As Project Manager - explained Mauro Franceschinis - I was responsible for the comprehensive management of the project, in terms of timing, cost and quality. Porsche is an extremely demanding customer, and this led us to form a multi-functional team. As

well as R&D - mechanical, electronic and optical designers - we involved areas for validation, industrialisation and quality. On a management

«The key element is to work in a harmonious manner, bringing together skills and finding solutions required by the product, the process and the customer.»

Andrea Cavicchia
Plant Manager

level, besides rather challenging timing requirements, we managed the multiple style changes requested by the customer which impacted both on product design and on the 2 assembly lines. We restructured a large area of the plant with innovative LED lighting in order to have improved visibility for the visual control of

the product and satisfy the aesthetic requirements of the client, as well as to provide each worker with support which could be useful both in terms of safety and to reduce the fatigue caused by the weight and dimensions of the out of standard T2 rear lamp part."



SPECIAL MACHINES TO GUARANTEE QUALITY:

in order to monitor cleanliness and reduce dust in accordance with parameters that are superior to those achieved up until now.



ECOLOGICALLY EFFICIENT MACHINERY WITH LOW ENERGY CONSUMPTION:

these have allowed a reduction in energy consumption.

On the right, a detail of a rear lamp being assembled on line S26.

Below, a specialised worker finishes polishing a mould.

Da Vinci's law and new solutions

Try and try again, as Leonardo da Vinci said. This ever-relevant principle was more than useful in the story of the Porsche Cayenne rear lamp. One example concerned the five patents that Magneti Marelli registered thanks to the innovations in the field of optics that emerged from solutions regarding the product and the requests of the customer. As Marco Svetini, the Optical R&D Engineer, explains: "The five patents were the result of solutions to a problem: how to introduce to the American market a technical solution which guaranteed a high level of evenness in lighting without the use of materials which are not permitted in the USA. After various unsuccessful attempts, I had a brainwave. I understood that a solution which used diacaustics, an important method of illumination related to refraction, could be an ideal alternative in the creation of an equivalent product



INNOVATION ON THE PRODUCTION LINE



REUSABLE INTERNAL PACKAGING:

with zero impact, providing increased protection of the items.



ERGONOMIC STUDIES FOR THE WORKERS:

ergonomic studies carried out in order to safeguard workers' health, particularly in the assembly stages.



MOULDS:

larger machinery with more complex moulds.



ENERGY SAVING:

the introduction of LED lighting on the lines and in the final quality testing station, in order to save energy and be able to better see defects regarding aesthetics.



TRANSPORTATION CARTS:

the size of the rear lamp led to a study to create carts capable of moving the semi-finished items, which will also be used for future generations of strip lighting.

for the USA market. We constructed a theoretical model, we tested it, and the customer financed a mould for the creation of the prototype. Everything worked perfectly and so as well as finding a solution to the problem, we put this technology into mass production through a main patent which in turn LED to another four". On the table is a display of the models for the rear lamp, either in section or dismantlable, allowing for the details to be seen. Gabriele Gentilini, Electronic Project Leader, explains another challenge won with regards to the electronics of the product: "One example was the handling of the dissipation of power which is managed by the volume of electronics in the rear lamp, where there is very limited space. This led to various hours of laboratory testing followed by the fine tuning of the electronics. Another aspect - he adds - was undoubtedly the managing of the 38 main components of the rear lamp, according to whether the model was American or European. The circuit boards are mounted on 14 different panels, something which has never been seen before".

A plant within the plant: UPS25,UPS26

PLANT INFORMATION

COUNTRY:
Tolmezzo, Italy
BUSINESS LINE:
Automotive Lighting

THE PLANT IN NUMBERS
NUMBER OF EMPLOYEES: **949**
BLUE COLLAR: **640**
WHITE COLLAR: **309**
INJURIES FREQUENCY RATE: **0,14**
INDEX OF WASTE RECOVERED/
GENERATED: **100%**

Andrea Cavicchia is the Plant Manager. He speaks calmly, and you can sense his pride for the way the rear lamp was put into production. The complexity of this product with a totally innovative design led to the creation of two dedicated lines for manufacturing. A product which included the creation of 36 moulds with extremely high-quality standards, above all in terms of the level of cleanliness necessary in order to eliminate the dust which could seriously threaten the quality of the rear lamp. Given the particular nature of the central section (1.4 m in length) which goes way beyond any standard, special customised carts

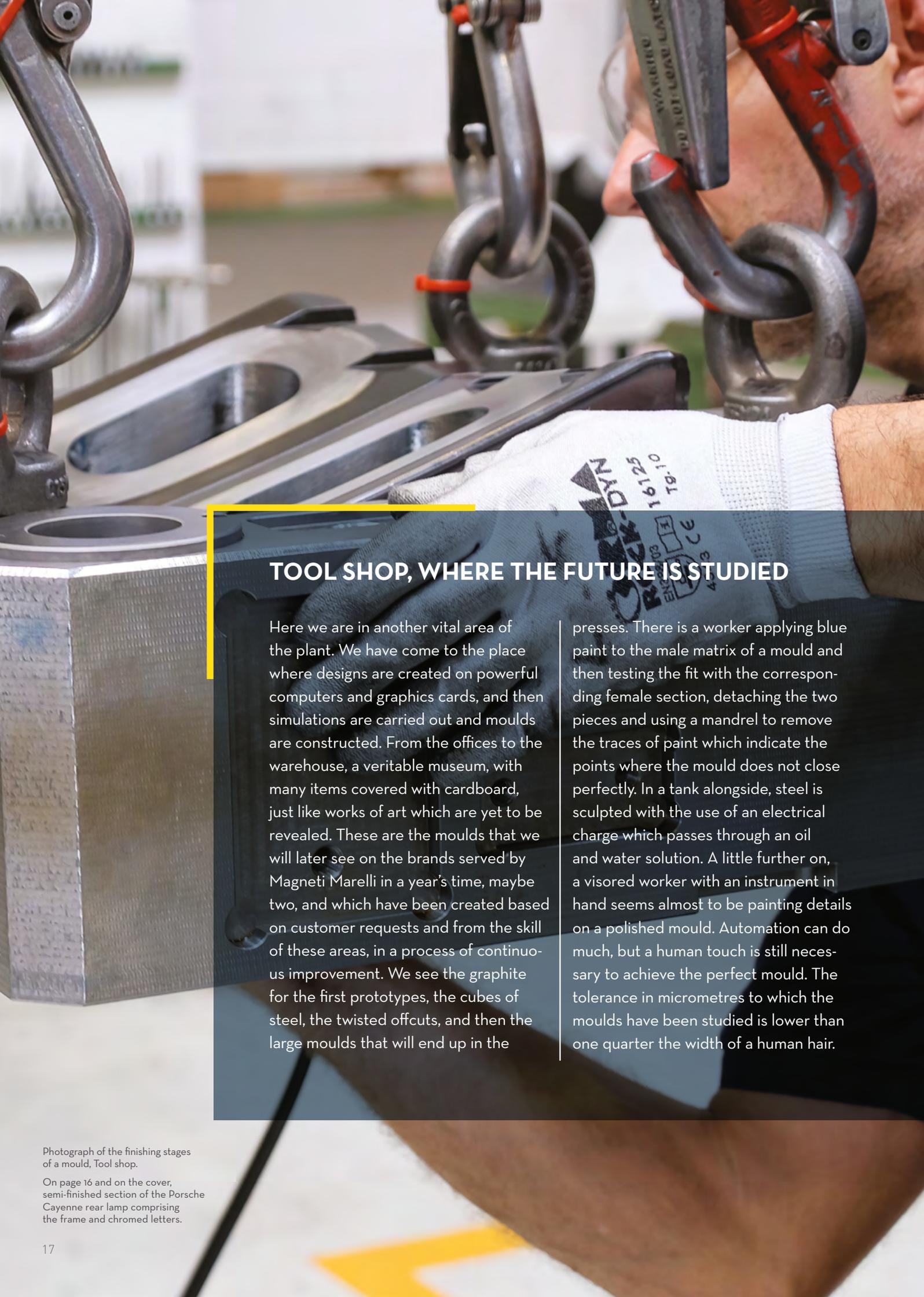


were designed and constructed with a concept that may also prove to be useful in the future. Furthermore, an innovative laser welding system was used to guarantee better results in fixing and therefore in safety. Large presses were needed which use low energy-consuming eco-drive systems, and thus produce less noise, less heat-loss, significant savings in water and oil use spread further over time. "One of the most important aspects of this site - he tells us - is having all the necessary skills right here, from research to moulding, from design to the operative aspect. The key element is to work in a harmonious manner, bringing together skills and finding solutions required by the product, the process and the customer".

Safety and impact

There is an element in everything we are seeing which is treated in such a natural manner that it almost goes unnoticed, and that is a level of attention for safety which has clearly become part of the personnel's behaviour. There are messages echoed by monitors located in various areas of the plant which invite the staff to respect all of the basic rules. The figures presented by the Plant Manager Andrea Cavicchia are the result of a level of attention





TOOL SHOP, WHERE THE FUTURE IS STUDIED

Here we are in another vital area of the plant. We have come to the place where designs are created on powerful computers and graphics cards, and then simulations are carried out and moulds are constructed. From the offices to the warehouse, a veritable museum, with many items covered with cardboard, just like works of art which are yet to be revealed. These are the moulds that we will later see on the brands served by Magneti Marelli in a year's time, maybe two, and which have been created based on customer requests and from the skill of these areas, in a process of continuous improvement. We see the graphite for the first prototypes, the cubes of steel, the twisted offcuts, and then the large moulds that will end up in the

presses. There is a worker applying blue paint to the male matrix of a mould and then testing the fit with the corresponding female section, detaching the two pieces and using a mandrel to remove the traces of paint which indicate the points where the mould does not close perfectly. In a tank alongside, steel is sculpted with the use of an electrical charge which passes through an oil and water solution. A little further on, a visored worker with an instrument in hand seems almost to be painting details on a polished mould. Automation can do much, but a human touch is still necessary to achieve the perfect mould. The tolerance in micrometres to which the moulds have been studied is lower than one quarter the width of a human hair.

Photograph of the finishing stages of a mould, Tool shop.

On page 16 and on the cover, semi-finished section of the Porsche Cayenne rear lamp comprising the frame and chromed letters.



Above, worker on the rear lamp assembly line UPS26.

which focuses on impact. The data regarding water consumption is impressive: by 2019 it will reach zero, because everything will be recycled thanks to investments made on the cooling systems. Over the last few years, energy consumption has been reduced by 20%, while CO₂ emissions are down by 17%.

The tour of the plant

We come to a door, we wipe our safety footwear on a mat of metal brushes, and a monitor tells us we can proceed. Respect for all the safety regulations is a recurring factor during our visit, from the canteen to the assembly line. We go in. The light inside is white and all LED, the signs on the floor show us the way to go, and they also guide the automated carts which transport materials between the various areas. We follow the production process in reverse, from the finished rear lamp to its origins. Finally we see the new carts, designed to hold pieces of one metre forty in length, and the component assembly benches. The workers are aided by instruments which have again been studied and designed in the plant in order to avoid stress and fatigue when moving pieces of significant weight. The height of the

bench and the supports on which the individual pieces are rested in order for the various components to be added in each phase are all adjustable and easy to handle. Gestures are repeated with accuracy. The slightest imprecision and the item is discarded. A press opens and closes its metal mouth and the worker lifts a part of the rear lamp with surprising delicacy and agility and moves it to the cart. It is fixed into place and once the door has closed, it is all moved off to the next step. The two parts of the mould slowly move together and then, as the press applies full pressure, the plastic is injected in.

The pride of Tolmezzo

Returning towards the door from where we entered, we take another look at a large photograph printed on a plastic sheet. It shows an important moment, when Porsche, represented by its Director Quality Purchased Parts, came to thank all the workers who participated in production. A group photo. It was a sunny day that 26 October 2017. At the centre the plant management and the guest of honour are surrounded by the workers in their blue t-shirts, work clothes



LAUNCH OF THE YEAR

Shown on the left is the prize for the “Launch of the year” category presented to Automotive Lighting for the creation of the Porsche Cayenne rear lamp. The award was presented during the annual prize ceremony held at “Kraftwerk Berlin” in May of 2018. The award acknowledges the know-how, technological capacity and effort made by the entire team responsible for the development and manufacture of the product, and the fact that the results were achieved while respecting the challenging deadlines that had been set.

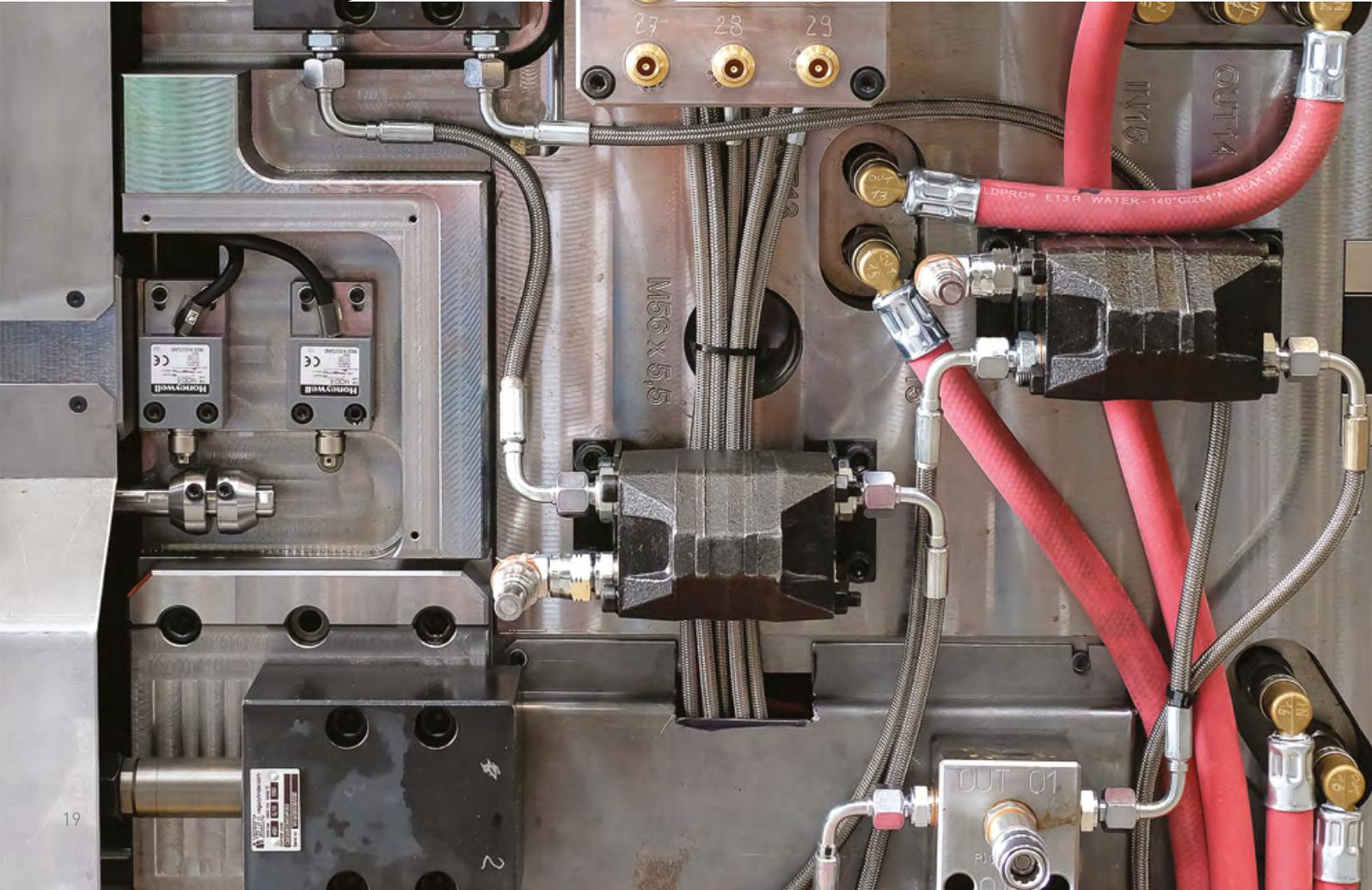


and safety footwear. It is a photograph that everyone remembers because for this product of excellence an important representative of the customer came in person to thank each and every one of the people who had taken part in the project. Today, the rear lamp of the Porsche Cayenne shines in the TV adverts and photographs shown all around the world. It is no coincidence that it is a car which is often presented from behind, right where there is a shining example of the excellence born right here, under the stark peaks and green trees of Tolmezzo.

Technology, safety and efficiency are the key words used to describe our manufacturing processes, and they guide our activities in respect for the environment that surrounds us.



PROCESSES



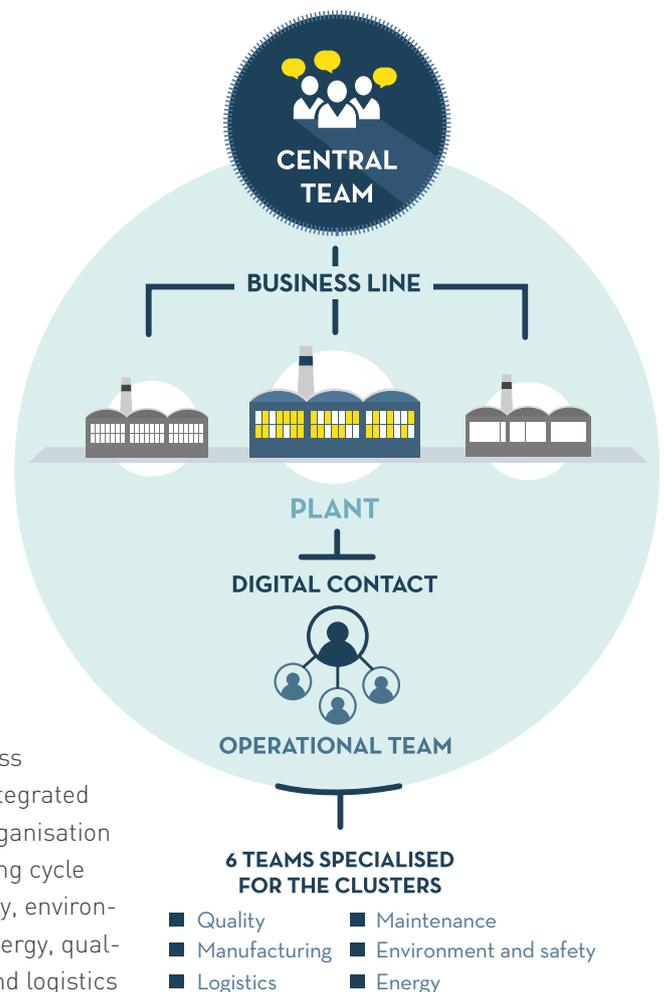
INDUSTRY 4.0: A TEAM DEDICATED TO THE GROWTH OF DIGITALISATION

Field communication, Manufacturing Execution System and the Cloud: these are the environments of Magneti Marelli's Industry 4.0 programme.

The fourth industrial revolution is involving all of Magneti Marelli's Business Lines, redesigning processes which are ever-increasingly supported by digitalisation. There are two fundamental results which we are aiming to achieve: quality in products and efficiency in terms of productivity and profitability. These objectives are reached through the substantial improvement of manufacturing processes which make use of enabling technologies for Industry 4.0, analysis of the large amounts of data which are generated by systems,

and support for workers' decision-making processes. The digital revolution affects all areas of the Company, beginning with the most advanced plants in terms of World Class Manufacturing - integrated methods for the organisation of the manufacturing cycle which protect safety, environmental aspects, energy, quality, maintenance and logistics

INDUSTRY 4.0 THE ORGANISATIONAL STRUCTURE



GENERATION OF IDEAS

In order to involve Manufacturing workers from all levels of the organisation in the Industry 4.0 programme, an idea generation programme, based on a bottom-up approach has been launched. Initially 15 plants were involved, in which each operative group - with support from the six central clusters - was called on to propose innovative ideas (use cases) which respond to specific requirements. The generation and selection of ideas is “continuous” and requires the periodical organisation of workshops. As of today, hundreds of ideas have been generated, selected through criteria of economic sustainability according to cost/benefit analysis. Of these, testing and implemen-

tation will take place for those ideas which, as well as providing economic benefits, stand out for their possible replication in other plants. The company aims to create digital application models which bring together diverse use cases to adapt according to the particular requirements of each manufacturing unit. The applications developed mainly concern predictive maintenance and quality, the allocation of personnel on production lines, logistics and production management. The aim of the Company is to extend the project to all of the plants.

The generation and selection of ideas is continuous and requires the periodical organisation of workshops.

in the plants - which therefore have access to a more stable foundation for the reaching of advanced objectives. In order to face up to the process of digitalisation, the company has created a dedicated internal organisation consisting of a central work group which collaborates with Business Line contacts who in turn liaise with the plants. There is a digital contact in each plant with skills regarding the IoT (Internet of Things) who works with an operational group that has detailed knowledge of the factory processes. This structure is assisted

on a central level by six specialised groups, each dedicated to a specific “cluster” (quality, manufacturing, logistics, maintenance, environment and safety, energy) which support and facilitate the implementation of the programme at all levels of the organisation. Magneti Marelli’s Industry 4.0 programme is aimed at reaching 3 evolutionary steps:

► **Field communication:** this involves fitting systems with sensors and devices capable of collecting and organising data from machines, sending them to superior systems and receiving information in return

which allows the machines to respond automatically or to communicate with operators. This step also includes innovative systems for data processing, so-called Edge Computing, provided with intelligent algorithms which are installed in the machines. Not all plants have the same level of progress. The plants which are required to innovate manufacturing machinery more frequently have more up-to-date technology than those with consolidated processes, where digitalisation would lead to more invasive changes.

► **Manufacturing Execution System (MES):** a computer system dedicated to the management of the production system. Magneti Marelli is committed to the designing and implementation of important innovations in the areas of maintenance, quality, internal logistics and production planning.

► **Cloud:** this is where the data are processed and shared on a central level and with all of the people connected to the system. It represents one of the enabling factors of Industry 4.0, in that it allows for the processing

and archiving of large quantities of data in real time, with a considerable increase in processing capacity. These functions facilitate the identification of new technological trends and result in increased flexibility for the company, which is capable of responding more rapidly to changes in the market. Magneti Marelli examines digital innovation in partnership with research centres, universities and suppliers, with which it sets up collaborations which are capable of strengthening and accelerating the capacity for internal innovation.

THE TRANSITION TOWARDS NEW ISO 14001 AND ISO 45001 CERTIFICATION

Magneti Marelli has chosen to certify its plants according to the most up-to-date management systems, adopting a unified approach. Through global guidelines, it is committed to extending ISO certification to all manufacturing plants by 2020. With regards to environmental management, the company refers to the ISO 14001 standard. The transition towards the new scheme which was launched in 2015 is managed independently by each individual site: a gap analysis allows for the identification of any shortfalls detected above all on the context analysis, in the Life Cycle Perspective and in the involvement of stakeholders required by the new standard and is accompanied by constant auditing

activity by the certification organisation. Two areas for specific in-depth examination have been identified: the management of refuse, with reference to the environmental aspects, and the management of chemical product safety sheets for the Health & Safety area. Magneti Marelli is also taking on the transition process from OHSAS 18001, Health & Safety standard certification, to the new ISO 45001 system which, as well as requiring analysis of context, the participation of management and that of employees, also



leads to increased focus on risks and consequently on processes. To this end, Magneti Marelli is modifying centralised system procedures, seeking correspondence between existing guidelines and the regulatory indications from ISO 45001, as well as providing support to individual plants through the process of gap analysis. The new regulation also promotes increased attention to the supply chain, thus moving in line with the most important companies valorised by the Sustainable Supply Chain Programme.

Collaboration and the exchange of experiences are key factors for us in the creation of value. The finished product is founded on a process of sharing which involves our stakeholders.

STAKEHOLDER 4





INPROVES: A PILOT PROJECT FOR THE CAR OF THE FUTURE

30 months of studies for a new electric engine.

Inproves is a pilot project which will contribute to the creation of the car of the future, with more efficient and lighter engines which will allow for reduced CO₂ emissions into the atmosphere. Established as part of the 2014-2020 Regional Operative Programme, it is the result of a partnership between the head company Brembo, Magneti Marelli, who provided a team of 12 people, the Politecnico di Milano, the University of Bergamo and five highly innovative small and medium sized companies, with the support of the Lombardy Mobility Cluster and financed mostly by the Lombardy Region. The development of the so-called brushless electric engine, which is devoid of electrical brush contacts and instead uses permanent magnets, is one of the aims of Inproves. The partnerships with Universities and research centres have provided significant theoretical support to the technical research and development which Magneti Marelli transforms into applied research. The small and mediumsized companies provide

sector specialisation and know-how for the manufacturing processes. One single objective which, at the same time, responds to two different requirements. Firstly, the creation of a new product, a braking system designed for a new Brembo line, and the second, related to Industry 4.0, concerns the improvement of development processes for Magneti Marelli traction and energy recovery systems. The real difference with this project lies in the integration between product and process, as the new engines will be realised thanks to a production line which exploits the potential of digitalisation and the Internet of Things. This will allow for a much higher level of efficiency and control over the entire manufacturing process as well as lower costs. By the end of the 30 months of forecasted work, the prototype of a brushless motor will be completed. The final deadline for the project has been set for November 2019. Inproves represents a concrete opportunity for Magneti Marelli. The absence of limits set by race regulations and deadlines imposed

by client requests provides a unique opportunity for the realisation of new technologies which are currently in the prototype stage, but which have a future application with road-going vehicles.

THE BENEFITS OF COLLABORATION



The bringing together of technology for both product and process which is useful for the growth of all project partners.



The sharing of know-how and the creation of networks, strengthening relationships with Universities and discovering new business opportunities.

MUNER: TRANSFERRING KNOW-HOW

Skills and technologies aimed at developing the professional figures of the future.

Young people are at the centre of one of the most challenging SDGs, that of ensuring inclusive and equitable quality education and making them architects of their own future. Magneti Marelli contributes to the achievement of this objective by offering its know-how and experience in innovation through the MUNER project - Motorvehicle University of Emilia-Romagna - the campus created through a partnership with Automobili Lamborghini, Dallara, Ducati, Ferrari, HaasF1Team, HPE COXA, Maserati, Pagani, Scuderia Toro Rosso, and with the support of the Universities of Bologna, Modena and Reggio Emilia, Ferrara and Parma. The aim is to provide specific know-how and the most innovative technologies through dedicated University courses, thus rendering Muner a highly-specialised training centre for future sector professionals. Magneti Marelli is participating in the



**MOTORVEHICLE
UNIVERSITY OF
EMILIA-ROMAGNA**

«The added value is the opportunity to learn and then experiment. The knowledge that I am studying themes and technologies which are currently of interest to prestigious companies such as Magneti Marelli, Ferrari and all the other Muner partners makes this course fantastic».

Luca Pascale - Advanced Powertrain student

Advanced Powertrain programme through the Powertrain and Motorsport business lines, focusing on innovation in technology for vehicle traction and motors, which means managing and rendering more efficient batteries and inverters. The Company not only transfers knowledge, but also - and above all - proposes internal methodology and procedures for the design process to the students. As well as visiting Magneti Marelli plants, the students can also benefit from a six-month internship, during which they are given the opportunity to complete their specialist degree

thesis by counting on a practical approach. There are also seminars and lessons in theory for the students held by Company experts during the course.

«I chose Muner because it seemed to me to be an unconventional course of study, where theory and experience in the field coexist. The prestige of the University and the partner Companies completed the picture».

Salvatore Calasso -
Advanced Powertrain student

CLUJ: IN ROMANIA, A RESEARCH AND DEVELOPMENT HUB FOR THE FUTURE OF MOBILITY

A strategic position and specialisation of personnel. These are the strengths of Cluj.



With the opening of the Cluj research and development centre, Magneti Marelli is taking its first steps in Romania, a Country in Eastern Europe, which over the last decade has made significant investments in IT innovation and research and development. In Cluj, Magneti Marelli focuses on the development of components, software, electronics and mechanics, in coordination with the departments present throughout Europe. The Automotive Lighting, Electronic Systems and Powertrain Business Lines are present here,

and through a process of continuous innovation based on the sharing of skills look to the future of mobility in terms of autonomous driving, connectivity, Human Machine Interface, hybridisation and electrification. The “Cluj project” has been set up as a point of reference for the development of experts in the automotive sector, with the aim of reaching levels of excellence in the development of systems and components, thus contributing to the development of sustainable mobility. It is based on two main principles. The first is a location which is in proximity to Magneti Marelli’s other European development centres, thus simpli-

WHY CLUJ?

A few elements regarding the context...



A STRATEGIC POSITION IN EUROPE



QUALIFIED UNIVERSITIES



THE EUROPEAN YOUTH CAPITAL IN 2015



ELEVATED LOCAL SKILL LEVELS IN THE FIELD OF INFORMATION TECHNOLOGY



ifying the exchange of information, coordination and product development, while the second is represented by the know-how of the local personnel, who have a respectable university education and good levels of specialisation in the fields of information technology and electronics. In order to provide younger employees with an even more vertical form of training, Magneti Marelli has provided 37 newly-qualified engineers the possibility to take part in an Academy programme. Following two months of theoretical courses, the training takes the form of active participation in existing development projects, thus allowing the young engineers to complete their preparation through on-the-job training.

FEELING AT HOME

The offices in the Research & Development plant in Cluj have been designed according to the idea of “Magneti Marelli Home”. The spaces have been projected and created with the idea of placing people at the centre of the design and are therefore personalised in such a way as to render the working environment a familiar and pleasant space, just like “at home”. Giving everyone the possibility to personalise the space around them creates value both for individuals and for the Company as a whole. Furthermore, the sharing of spaces and work, the ease of communication and the relaxation areas which enjoy a studied panoramic view all promote a sense of belonging within the Company and increase the well-being of the individuals within the workplace.



SUSTAINABLE SUPPLY CHAIN PROGRAM

The strategic role of sustainability throughout the supply chain.

The quality of products is closely tied to the quality of suppliers. This is why the entire supply chain is subject to a structured process which includes sustainability among the requirements taken into account for their qualification. The Sustainable Supply Chain Program was set up in 2012 with the aim of mapping supplier performances as well as their awareness about topics related to sustainability. According to the program, all suppliers, except for those providing services, are required to complete an annual questionnaire made up of 65 questions, subdivided into 5 macro areas: Ethics & Compliance, Human Rights, Health & Safety, the Environment and Energy. After receiving the self-assessment questionnaires, Magneti Marelli analyses the documenta-



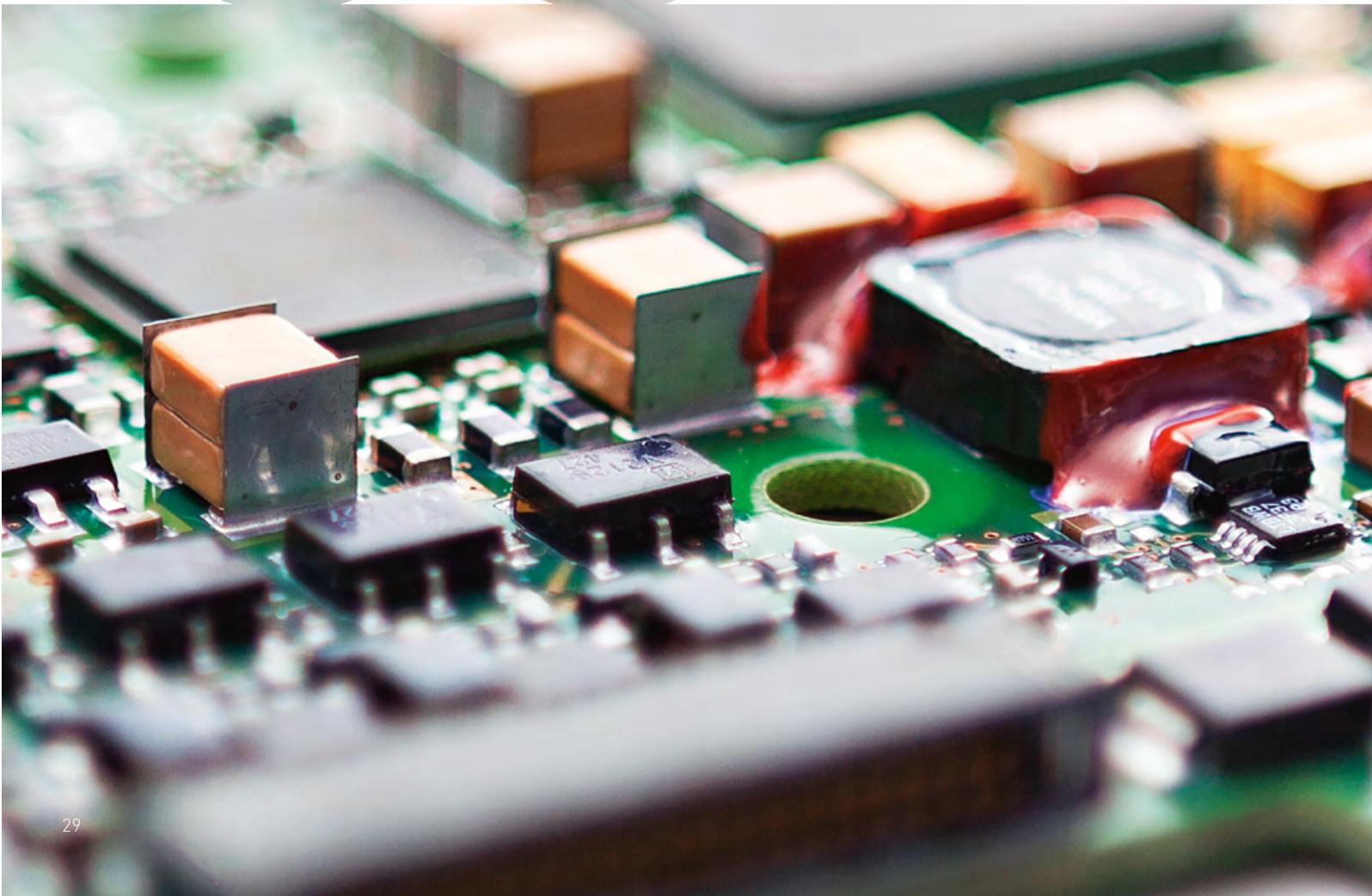
tion obtained and identifies which companies are the most important from a strategic point of view. In addition, if the supplier comply with particular socio-environmental requirements, he acquires a “bonus” that will increase his quality performance evaluation, one of the criteria taken in consideration for sourcing decision. On site audits are also part of the Sustainabil-

ity Program, cause it is crucial to check the consistency and the veracity of the answers provided in the questionnaire. Another key element is reflected in the fact that this process provides Magneti Marelli with more detailed knowledge of its suppliers and consolidates relationships, fostering a mutual opportunity for growth. Magneti Marelli does not simply analyse and verify the answers but encourages activities towards its suppliers, which promote their involvement and awareness-raising in order to solve critical aspects. The Sustainable Supply Chain Program is an initiative which aims at fully considering sustainability performances as a selection criterion in decisions regarding sourcing and reinforces Magneti Marelli’s role as a “promoter of sustainability” throughout the value chain.

We recognise the value of community relations in the areas in which we operate. This is why we set up long term sustainable and mutually beneficial relationships with stakeholders which see the community grow together with us.

CS5

IMPACTS



INDIA: GROWING TOGETHER



Mapping of community needs and a careful selection of partners. The commitment of Magneti Marelli is highlighted through two stories from Gurugram.

Respect, involvement and dialogue: these are the values which inspire and guide Magneti Marelli while engaging with local communities in which it operates.

In India, the Company impacts the lives of more than 5000 children and youth as part of the Company's Social Responsibility initiatives. The programme of investments in the community regards the promotion of education, the development of skills, health and growth within the community in line with the law on local businesses (2013) and the development guidelines set out by the Indian government. The law in fact requires companies which operate within the territory to invest 2% of their average profits over the last three years for the development

of the local community. In 2017, the Company implemented over 25 initiatives in India through 11 local partners. In order to set up projects in the community, there is a standard, well-structured operational procedure which defines the roadmap, from the mapping and identification of local requirements to the measuring of the impact of the activities. Partners are selected through detailed due diligence which assesses specific competences and past experiences.

Gairatpur Baas Panchayat School, Gurugram

Situated in the north of the country in the Aravalli hills in the rural area of Gurugram, the Gairatpur Baas Panchayat School was set up in 2008 by



«We aim to create opportunities for the most vulnerable sections of society through community projects. Our aim is to enable and empower communities in difficulty, with particular focus on children and youngsters, rendering them self-sufficient through long-term social projects.»

Mr. Saju Mookken, Country Manager, Magneti Marelli India



Martin Howard. Magneti Marelli has been supporting the school for last three years, providing funds for teacher salaries and supporting the infrastructure development which benefits over 380 young students. Furthermore, the Company has set up an Art & Craft Centre, created to promote and stimulate creativity in younger children. Following the positive experience of the information technology library, the Company focused on setting up Smart Education in the school, a hi-tech, low cost solution developed by HP. The first stage of the project consists in the conversion of four traditional classes into intelligent and interactive classrooms. Magneti Marelli is also promoting another initiative which provides for the installation in the school of a 7.5 KVA solar energy system, which will not only help to

reduce costs for electricity for the school but will ensure that the institute has a constant power supply.

Integrated School Improvement Program, Gurugram

In 2017, Magneti Marelli contributed to the setting up of the School Improvement Programme in collaboration with Society for All Round Development (SARD), a non-profit organisation committed to the promotion of development for minority groups and disadvantaged communities, as well as the strategic support of CESVI, an Italian non-governmental organisation. The programme has provided support for the improvement of the infrastructure of public schools and has guaranteed access to modern

amenities to young people affected by economic problems. Magneti Marelli has provided support for the restructuring of the primary school complex in the village of Bas Lambi, and the upper school in the village of Mokulwas, in Manesar, renovating the classrooms and toilets, installing water purifiers and coolers and providing didactic tools. It has also set up the Child Resource Centre, a place in which primary school children are educated with innovative and interactive methods. Thanks to the contribution of the Company, more than 500 students from the Mokulwas upper school have benefited from the Integrated Science Lab and the ICT Lab. Magneti Marelli has in fact become a promoter of sport and hygiene education, donating Sport Kits and Wash Kits to both schools.



DECENT WORK AND ECONOMIC GROWTH

TOTAL EMPLOYEES (n.)



EMPLOYEES BY AGE (n.)

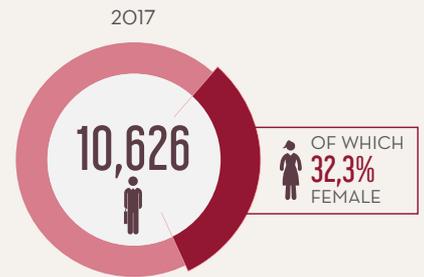


■ up to 30 ■ from 31 to 40
■ from 41 to 50 ■ over 50

AVERAGE NUMBER OF HOURS OF TRAINING PER EMPLOYEE (n.)

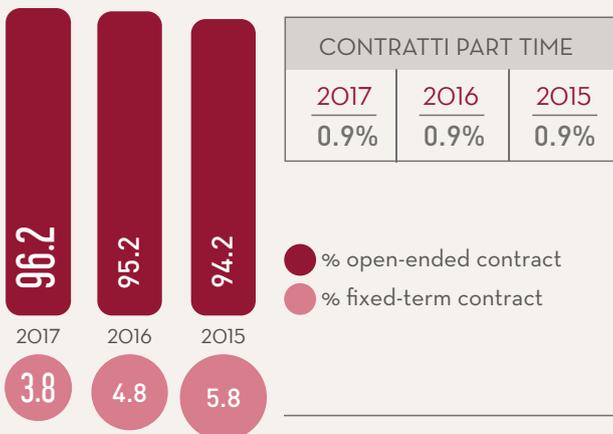


NEW EMPLOYEES (n.)



TOT. NEW EMPLOYEES (n.)	% of which female
2016 12,574	2016 33.5%
2015 9,323	2015 32%

EMPLOYEES BY TYPE OF CONTRACT (%)



TALENT ATTRACTION

	2017	2016	2015
N°. OF RECENT GRADUATES EMPLOYED	513	328	466
N°. OF APPRENTICESHIPS (INCLUDING TRAINING)	1,026	1,145	1,256
N°. OF SCHOLARSHIPS GRANTED	160	91	228
VALUE OF SCHOLARSHIPS GRANTED (€)	149,226	115,189	197,829

INJURIES



INJURY FREQUENCY INDEX



SUSTAINABLE CITIES AND COMMUNITIES

INVESTMENT IN THE COMMUNITY (M€)



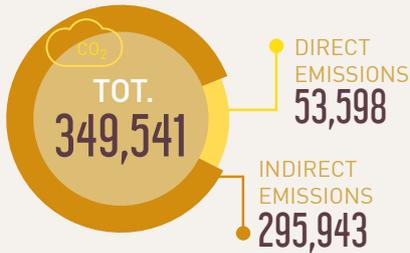


RESPONSIBLE CONSUMPTION AND PRODUCTION

ECO-EFFICIENCY OF OPERATIONS

DIRECT AND INDIRECT EMISSIONS (tCO₂)

2017



	2016	2015
DIRECT CO₂ EMISSIONS	49,880	48,639
INDIRECT CO₂ EMISSIONS	298,309	289,657
TOT. CO₂ EMISSIONS	348,190	338,296

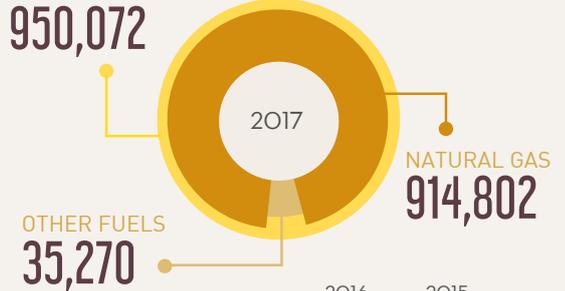
DIRECT AND INDIRECT EMISSIONS OF CO₂ PER HOUR OF PRODUCTION
 *tCO₂/Good - Hour - Produced



ENERGY EFFICIENCY

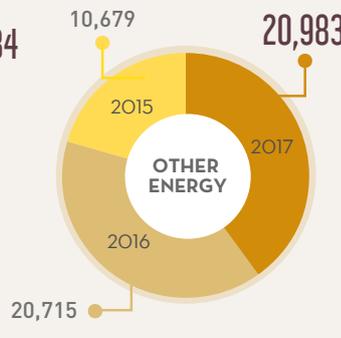
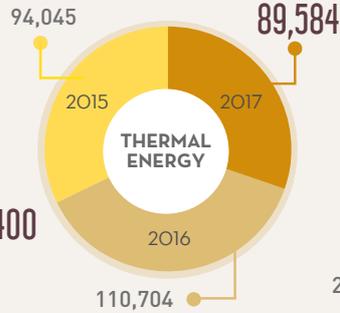
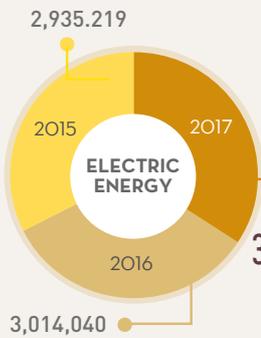
DIRECT ENERGY CONSUMPTION PER SOURCE (GJ)

TOTAL NON-RENEWABLE SOURCES



	2016	2015
NATURAL GAS	850,692	806,821
OTHER FUELS	33,340	52,697
TOTAL NON-RENEWABLE FUELS	884,032	859,518

INDIRECT ENERGY CONSUMPTION BY SOURCE (GJ)



TOTAL CONSUMPTION OF ENERGY (GJ)



TOTAL INDIRECT CONSUMPTION OF ENERGY (GJ)



DIRECT AND INDIRECT CONSUMPTION OF ENERGY PER HOUR OF PRODUCTION
 *GJ/Good - Hour - Produced



GENERATION AND MANAGEMENT OF WASTE

WASTE GENERATED (t)



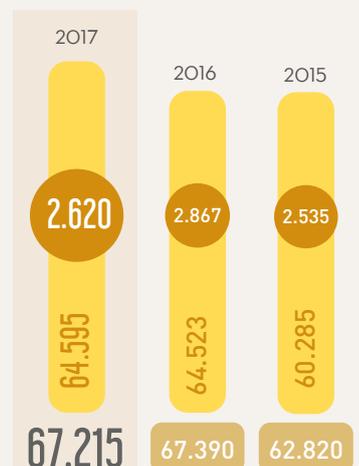
WASTE GENERATED PER HOUR OF PRODUCTION
 *Kg/Good - Hour - Produced



WASTE DISPOSED (t)



REFUSE RECYCLED (t)



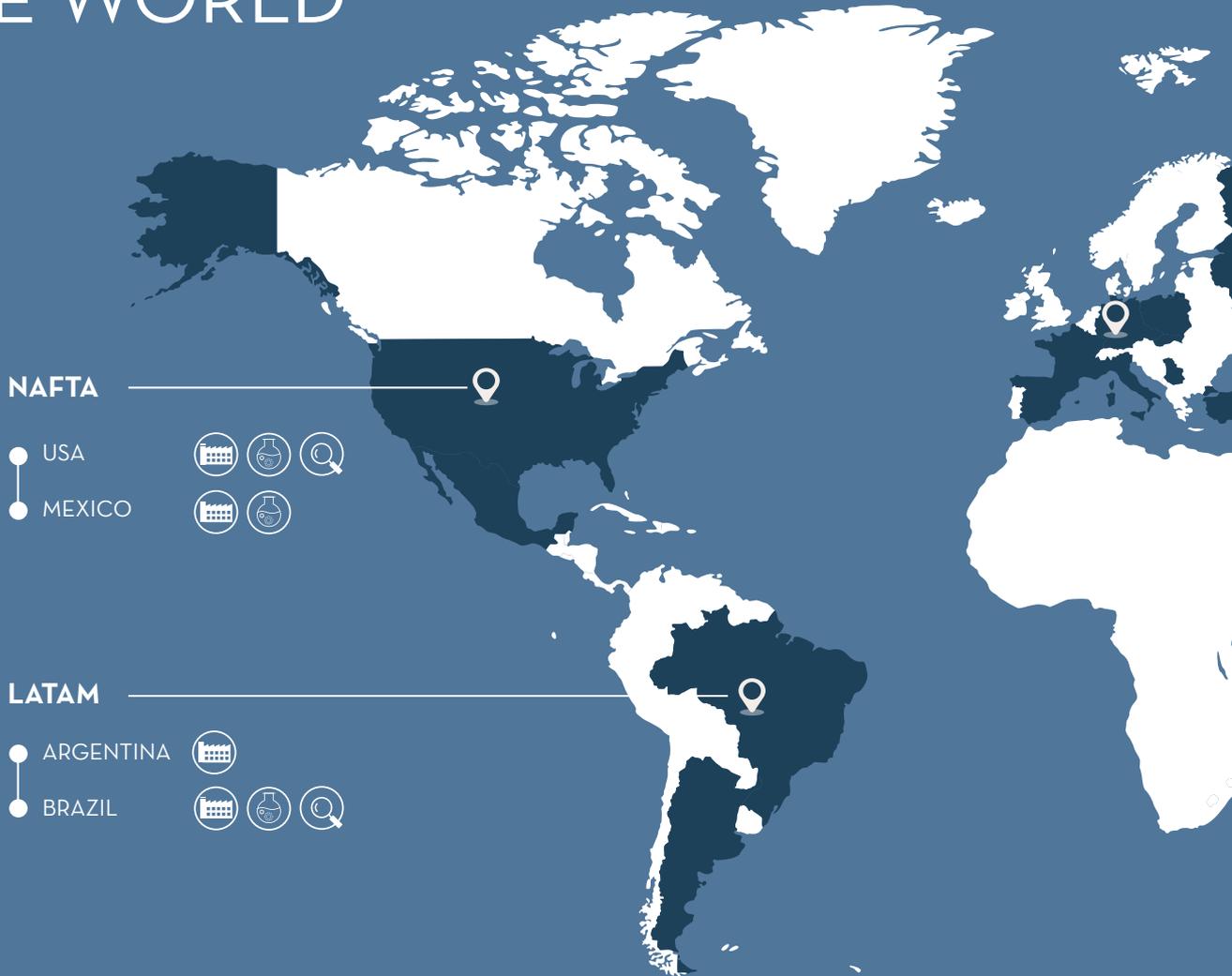
- HAZARDOUS WASTE GENERATED
- NON-HAZARDOUS WASTE GENERATED
- TOTAL WASTE GENERATED

- TREATED
- DUMPED
- TOT. WASTE DISPOSED OF

- INCINERATION
- REFUSE RECYCLED
- TOT. REFUSE RECYCLED

* Good hours produced = Number of good pieces x Cycle time

MAGNETI MARELLI AROUND THE WORLD



**BUSINESS
LINE**

AUTOMOTIVE LIGHTING



POWERTRAIN



SUSPENSION SYSTEMS AND SHOCK ABSORBERS



ELECTRONIC SYSTEMS





EMEA

APAC

- ITALY   
- UK
- FRANCE   
- SPAIN  
- GERMANY   
- POLAND  
- ROMANIA  
- CZECH REP.  
- SLOVAKIA 
- SERBIA 
- TURKEY  
- RUSSIA  
- JAPAN 
- CINA  
- MALAYSIA  
- INDIA   

 PRODUCTION PLANT  APPLICATION CENTRES  R&D CENTRES

EXHAUST SYSTEMS



PLASTIC COMPONENTS AND MODULES



AFTER MARKET PARTS & SERVICES



MOTORSPORT





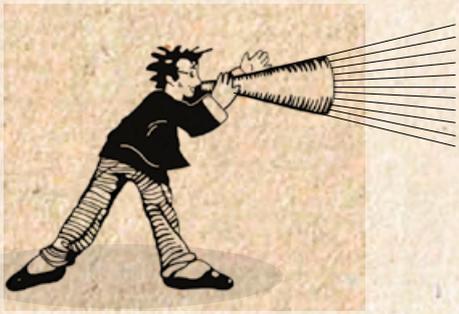
THE SPIRIT OF THE TIME AND A GLIMPSE OF THE FUTURE



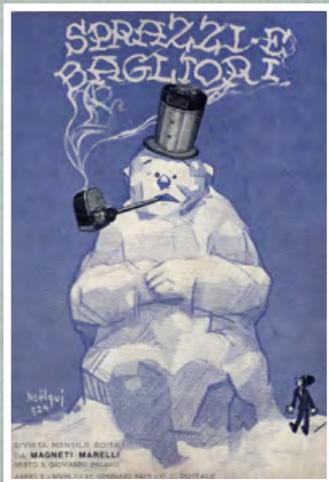
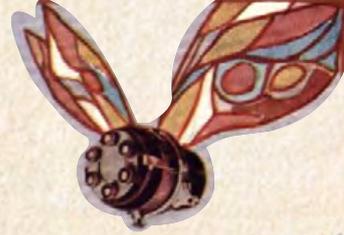
That which a publication in 1924 represented for Magneti Marelli is clearly written on the opening pages of the magazine: “With this magazine, we are opening the doors to our home so that our friends both near and far can see us in our familiar environment. On reading the magazine, they will understand that they are not doing business with Marelli, but rather they are being warmly welcomed by the Marelli family”.

Modern articles and manuals on internal and external communication could probably not have said it better.

The publication “Sprazzi e Bagliori” (Flashes and Glows) represented a vision, a reflection of a way of seeing its mission so clearly as to dedicate various sections to various subjects, with notable variations over time of style and materials, while always maintaining the communicative nature of products, a view of contemporary society and, no mean feat, a brilliant stroke of intuition in the various forms of graphics, where illustration was one of the main methods of communication. Drawings, photographs and cartoons were all used to clearly explain mechanisms, while the articles were designed to make the reading of the magazine more enjoyable, with news and interesting information. For example, let’s look back again to 1924, the director’s position had been filled



The “man with the megaphone”, another creation by Noël Quintavalle, has been elected to present the glorious centenary of Magneti Marelli, which is celebrated in 2019. He originally introduced the “Domando la Parola (Let me speak?)” column in the legendary Company magazine “Sprazzi e Bagliori”, providing a space for reader’s questions or requests for information.



by Noël Quintavalle, who was to hold the post until the publication was discontinued nineteen years later. There was the “Technical article”, the subject of which was not hard to understand, while the article “At home” provided information on Company life. There was room for a “Novella”, with stories of escapes which often had lead characters who travelled by car. The “News section” and “Our people” spoke about Company life, also in an ironic manner similar to the particular style of the illustrations, cartoons and graphics which were the work of the director himself.

A project which was as lively as its director, who invented witty puns, for example through a series of stories in which Dr. Ry-Medio gave technical and scientific lessons to his pupil

MagneTILDE. The passing of the years saw an increase in the number of photographs, as well as in the illustrations which are a demonstration of all of the creativity

of the director, who was capable of personally interpreting the style of other graphic artists of the time and continuously come up with new ideas for a magazine which now seems to us to be a kind of representation of Italian graphic design from the 1920s onwards. In his eclectic manner, with his refined taste and his ability to combine cartoons and cars, airplane mechanics and curiosities, stories and novellas, NoëlQui - as he signed his drawings - knew how to create something useful and absorbing.

Graphics, illustrations and a selection of covers from “Sprazzi e Bagliori” between 1924 and 1942.



magnetimarelli.com.cn/wechat

