Link to download Valeo's illustrations at IAA Mobility 2021:
https://wetransfer.com/downloads/b0fb4c4876002ce24d509ed2fa8601e620210906050729/df7d2d556031415bf82a8099fc2fb62420210906050747/31bfe2
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Valeo addresses the mobility revolution at the IAA Mobility 2021
“Never has the automobile known such a rapid pace of innovation.”

“Before the end of the decade, electric cars will be cheaper than gas cars, there’s no doubt about that. We’re also going to witness the rapid development of driving assistance systems. Never has the automobile known such a rapid pace of innovation.” Jacques Aschenbroich, Paris, July 23, 2021

From September 7-12, 2021, Valeo is taking part in the IAA Mobility event in Munich. This is the first time the international forum is taking place in the Bavarian capital. It is also the first major industry event to be held in Europe since the Covid-19 outbreak.

Another thing making the event so special is the fact that it’s taking place in a year that has seen unprecedented transformation in the mobility sector. At least two new developments illustrate this: on January 1, 2021, the United Nations adopted a regulation allowing the commercialization of level 3 autonomous vehicles, and on July 14, the European Commission announced that from 2035 all new cars in the EU must be zero-emission. This would effectively put an end to gas and diesel-powered cars.

Valeo didn’t wait for the new local, state or supra-state regulations to develop safer, more electrified and more diverse solutions to address the mobility revolution.

In anticipation of these profound changes, it invested heavily in R&D and developed a comprehensive portfolio of products. As a result, Valeo is now the technological leader in three key, rapidly developing sectors: vehicle electrification, advanced driving assistance systems and cabin air treatment.

In just over ten years, Valeo has completely resized its operations and redefined its technological focus: from 2009 to 2021, driving assistance sales increased nine-fold, while vehicle electrification sales expanded 26-fold. This change of scale is supported by two growth businesses in which Valeo is the world leader.

Today, 94% of Valeo’s sales are derived from technologies that help to reduce CO₂ emissions and improve road safety. The transformation is so vast that nearly 60% of the Group’s order intake is for products that didn’t exist three years ago. Valeo will continue to forge ahead in the innovation race.

The innovations presented at the IAA Mobility event in Munich attest to the fact that it has become a major global mobility player. Its broad array of smart technology solutions are designed to equip all forms of mobility, not just cars. No longer designed exclusively for vehicles, the technologies are incorporated into applications in the Group’s three fields of expertise. To encourage the wider use of electric cars, Valeo has developed an innovative range of charging stations. It has also devised connected car park solutions that allow vehicles to navigate in autonomous mode, making parking easier and safer. And to enhance health security in the current Covid-19 context, Valeo has adapted its in-cabin medical diagnostic systems for use in public areas, such as hospitals.

Did you know?
Sales climbed more than 300% in one month. Demand is clearly on the rise!

On Friday, July 2, 2021, Germany’s economics minister Peter Altmaier said: “We are set to reach our target of one million electric cars in July 2021.” At the same time, Germany’s import car brand association VDIK and the Federal Motor Transport Authority KBA announced that in June 2021 alone, sales of electric cars in Germany rose by 311.6%, accounting for 12.2% of new registrations, while hybrid car sales recorded a 191% increase year-on-year.

Sales are up across Europe as well. On July 23, 2021, the European Automobile Manufacturers’ Association (ACEA) announced that the market share of electric cars more than doubled in the second quarter of the year. They accounted for 7.5% of new vehicle sales, compared to 3.5% during the same period a year earlier.
Valeo and the acceleration of vehicle electrification

“The world is going electric. You can see that from our customers and the recent measures adopted by European countries and cities. It’s a great opportunity for Valeo.” Jacques Aschenbroich, Paris, July 23, 2021

In just a few short weeks, the announcements have piled up. Automakers across Europe, Asia and North America have unveiled their plans for electrifying their lineups in the years ahead. Some plan to go all-electric, others intend to maintain their focus on low-emission hybrid vehicles, while others still hope to become global leaders in battery electric vehicles.

Valeo has been anticipating demand for more environmentally friendly mobility for a long time. 60% of the Group’s original equipment sales (equipment sold directly to automakers for new vehicles) are derived from technologies that reduce CO₂ emissions.

As a pioneer and world leader in vehicle electrification, where Valeo has invested more than 10 billion euros over the past ten years, the Group boasts the broadest portfolio of technologies to support this revolution. Its technologies cover all segments and uses, from affordable hybrid solutions to the most powerful systems.

Valeo has become a system-oriented manufacturer in vehicle electrification. At the IAA Mobility 2021 event, the Group will exhibit a comprehensive portfolio of smart, efficient technologies that allow cars to travel far, fast and for a long time, at affordable cost and with optimized in-cabin thermal comfort, without emitting a single gram of CO₂ (in the case of an all-electric vehicle).

Valeo’s electrification strategy extends to powertrains, electronics, software, vehicle energy management, thermal management, and now also, to energy access, thanks to its new range of charging stations.

Did you know?

Carbon neutrality
Is Valeo one step ahead of the European Commission?


The Group has made a commitment to achieve carbon neutrality by 2050 and to reach almost 50% of this objective in just over ten years. By 2030, Valeo’s CO₂ emissions will have decreased by 45% across its entire value chain – including emissions from its suppliers, its own operating activities and the end use of its products – compared with 2019.

On July 14, 2021, the European Commission adopted 12 proposals to reduce greenhouse gas emissions by 55% by 2030 compared to 1990 levels. At a press conference the same day, the President of the European Commission, Ursula von der Leyen, said: “Europe is now the very first continent that presents a comprehensive architecture to meet our climate ambitions. We have the goal, but now we present a roadmap for how we are going to get there.”

Before those target dates, Valeo will continue to invest in its business by developing technologies that contribute to low-carbon mobility in the automotive sector and other areas, across all new forms of electric mobility.

Eight Valeo technological platforms dedicated to the electrification of all types of vehicles

The rise of electric vehicles has changed the architecture of the car, i.e., the technical structure comprising the powertrain, transmission, chassis, running gear and other components.

To adapt to these changes, Valeo has already revamped its technology portfolio. Thanks to significant R&D investments in recent years, the Group has created eight technological platforms for vehicle electrification. It has 12 technological platforms in all, including those dedicated to driving assistance.
They are focused on:
- **Electrification of the powertrain**, which includes motors, inverters (the brains of the system), onboard chargers, eAxles (the unit at the center of the axle that contains the electric motor, transmission and power electronics) and current converters;

- **Intelligent thermal management**, which includes battery thermal management solutions, air conditioning, heat pumps and low-energy comfort and heating systems;

- **Electronics and software**, which ensure the intelligent control of electrical systems and energy flows to provide optimum efficiency. Not a single electron must be lost. Otherwise, it would result in a loss of autonomy.

Solutions are manufactured on a very large scale, which helps reduce their cost. As they are highly modular, they can be adapted to the wide-ranging needs of vehicle manufacturers. The result is that a single product, such as a 48V motor, can be adapted to different systems for specific uses: using a common base, it’s possible to produce the electrical system for a hybrid car or an all-electric motor for a small urban vehicle.

Five out of the eight electrification platforms were developed by Valeo, and three were developed by the Valeo Siemens eAutomotive joint venture for high-voltage (60V-plus) applications.

At end-2020, the order book for Valeo’s electrification technologies – including 48V, high-voltage and the associated thermal systems – amounted to 23.7 billion euros.

- **All-round expertise in high-power solutions through the Valeo-Siemens eAutomotive joint venture**

Through the Valeo Siemens eAutomotive joint venture, Valeo is a world leader in high-voltage (i.e., greater than 60V) systems for electric vehicles.

By end-2022, 90 new cars featuring Valeo Siemens eAutomotive high-voltage technologies will be on the market worldwide.

- **A premium German sedan showcased at the IAA Mobility 2021**

The event will feature the flagship vehicle from a premium German automaker’s electrified range, powered entirely by a Valeo-Siemens eAutomotive system. Air conditioning comes from Valeo.

The electric powertrain is composed of two eAxle systems (*see explanations in paragraph 1 above*) installed at the front and rear of the car (*see photo opposite*). The electric drive system includes the electric motor, the inverter (the brain of the system) and the reducer (the equivalent of the gearbox). The rear eAxle provides 300 kW of power, the front axle 170 kW. The systems can be used separately or together.
- **An electric innovation for small sedans worldwide exhibited in Munich**
Valeo is unveiling an innovation designed by the joint venture’s Chinese R&D teams. A comprehensive all-electric powertrain system of 100 kW, including the electric motor, the inverter and the reducer. While this electric solution is suitable for the small and medium-sized city cars that make up the majority of vehicles in China, it is also suitable for small sedans worldwide. The solution provides vehicles with the performance they need at a reasonable cost.

- **Valeo Siemens eAutomotive presents its new-generation onboard charger**
Valeo Siemens eAutomotive is one of the world’s biggest suppliers of onboard chargers for electric and plug-in hybrid vehicles. The onboard charger is a vital component that transforms the alternating current from a home socket or rapid charging station into direct current in order to charge the battery.

At the IAA 2021 in Munich, Valeo is presenting its fourth-generation onboard charger (OBC Gen4). The technological platform can switch from 400V to 800V and from 7 kW to 22 kW, depending on the automaker’s requirements. Protected by 26 patents, the charger is combined with a DC/DC converter to optimize costs and make it easier to integrate into the vehicle.

The charger is reversible. Not only does it charge the vehicle battery from the charging station, but it can also send electricity from the vehicle either to the existing power grid, using Vehicle to Grid (V2G) technology, or to a specific electric device, using Vehicle to Load (V2L) technology.

- **Valeo, world leader in 48V systems adapted to all new forms of mobility**

Valeo is a pioneer and world leader in 48V automotive systems. Originally designed as affordable hybrid electrification solutions – which they still are – Valeo’s 48V systems were later developed into a fully electric powertrain solution.

Since then, 48V systems have taken off across the world, and Valeo is one of their leading promoters. Valeo has secured over 8 billion euros of orders for these systems. Group sales of 48V solutions increased 2.5-fold between 2019 and 2021.

Valeo’s 48V machines are “modular”. Produced from a common technological base and on a large scale to make them affordable, they may be combined with an internal combustion engine to offer a mild hybrid solution. They can be mounted in different positions on the vehicle’s drive train, depending on the automaker’s requirements. They can also be the sole electric motor of small urban vehicles, all-electric and emitting no CO₂ whatsoever.

The performance of Valeo’s powertrains is adapted to their use: a four-wheeled vehicle powered by Valeo’s 48V system that can carry two people can reach a speed of 100 km/h with a travel range of 150 km. It’s precisely because of its ability to adapt the powertrain for urban use that Valeo was chosen by Citroën to supply the motor for its Ami electric car.
On July 2, 2021, Valeo and Omega Seiki Mobility (OSM) teamed up to accelerate the electrification of two- and three-wheelers in India. Pursuant to the memorandum of understanding, Valeo’s 48V electric powertrain system (reducer, motor and inverter), along with the powertrain control unit, will be fitted on OSM’s cargo three-wheelers “Rage+” and “Rage+ Frost”.

- **48V electric assistance for bikes to be demonstrated in the streets of Munich**

In partnership with Effigear, Valeo has achieved a world first in electrically-assisted bikes. By combining an electric motor, an automatic gearbox and software in a single unit located in the pedal assembly, the novel technology automatically adjusts the intensity of the electric assistance to the cyclist’s needs.

The result is a simplified bike that’s easier to use. No more derailleurs, sprockets or handlebar gear shifts, or all the cables that go with them. The electrically-assisted bike, equipped with Valeo’s Smart e-Bike System, does away with numerous, sometimes fragile, components that require regular maintenance.

The gears shift instantly and seamlessly depending on how flat or steep the route is, without the cyclist’s input. Valeo’s entire expertise in terms of adaptive automatic transmissions for cars can now be integrated into bikes.

Electrically-assisted technology is extremely modular and can be adapted to all needs and uses, including city bikes, mountain bikes and cargo bikes for transporting loads. A cargo bike equipped with Valeo’s electric assistance system allows the cyclist to climb or reverse up a parking garage ramp with little muscular effort while carrying a 150 kg load. Cargo bikes are also fitted with a unique braking energy recovery function.

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**Did you know?**

The coronavirus epidemic is changing the face of cities

“Pop-up bike lanes”, “corona cycle paths” – new phrases for new uses

A study carried out by the Research Institute on Global Commons and Climate Change in Berlin in the first half of 2021 revealed the impact of the Covid-19 pandemic on urban transportation. Depending on the country, bicycle traffic rose between 11% and 48%, with the most densely populated cities recording the highest growth.

In addition, many cities made changes to their road networks as a result of the suspension of transportation during successive lockdowns. On average, European cities have added 11.5 km of bike lanes to their streets. Temporary “pop-up lanes” and “corona cycle paths” are becoming permanent fixtures in an attempt to encourage green mobility.

Bikes, especially electrically-assisted models, have transformed the crisis into a development opportunity, without harming the environment.
Electrification beyond the vehicle – Valeo develops its own charging stations

At the IAA Mobility 2021, Valeo is unveiling its first comprehensive charging solution. It includes equipment, technical support and associated services.

Valeo’s charging stations are designed for electric and plug-in passenger cars and light commercial vehicles, regardless of their voltage, for charging at home, work and in semi-public charging stations. That covers at least 80% of all uses.

Valeo charging stations (7-22 kW with an integrated socket or cable) offer intelligent energy management features. For example, they can charge when electricity is cheapest or when it comes from a green source, such as solar panels or wind power. They can also redistribute electricity not used by the vehicle, either to the power grid or to a specific electric device.

Already present in the charging ecosystem via its onboard charging technologies, Valeo has leveraged its expertise in power electronics and the intelligent control of electric systems to develop cutting-edge stations in terms of connectivity, network integration and interoperability. Thanks to the Connect & Charge system, they are easy to install and can be brought into service quickly.

To further speed up the installation process, Valeo will act as the commercial, distribution and technical assistance interface. The first charging stations are set to be launched in 2022.

No high-performing electric vehicles without adapted thermal systems

As mobility is undergoing a revolution in terms of powertrains, attention is most often focused on electric systems, but we should bear in mind that the revolution would not really be possible without innovative thermal systems. Valeo is playing a key role in the development of the electric vehicle through its comprehensive expertise covering both battery thermal management and in-vehicle comfort.

The stakes are huge. Without such innovative systems, there could be significant impacts on electrical vehicle performance, running costs, operation and comfort. Here’s why.

Valeo has developed technologies to neutralize the following three detrimental phenomena:

1/ When connected to a fast-charging terminal, the battery immediately heats up – and can even overheat. Valeo has developed cooling technologies that are adapted to all battery types and all fast-charging systems. And it has recently designed a new 800V electric compressor with high cooling capacity (12 kW) for battery cooling in electric vehicles with large batteries, a long driving range and fast charging times.
2/ The batteries used in electric vehicles (often lithium-ion) require an operating temperature of less than 45°C.

Vehicle driving range and battery life are directly correlated with the battery temperature, which must be neither too hot nor too cold. Valeo has developed all the technologies needed for battery thermal management, including direct, refrigerant-cooled technology and indirect, water-cooled systems. Going a step further, Valeo has announced that a series of technologies for pre-heating and rapidly charging batteries in winter will be launched in 2022.

3/ Heating, cooling and de-misting systems are the most energy intensive components of a vehicle after the engine. And they run all year round, regardless of whether it’s hot or cold outside. In electric vehicles, these systems draw energy from the batteries, which reduces the electricity available to power the motor and can therefore have a significant impact on the vehicle’s travel range. Valeo has developed several innovative solutions that solve the problem.

Take the Valeo FlexHeater, for example, which made its debut in Europe at the IAA Mobility 2021. A new smart heating technology for electric cars, it consumes 25% less electricity (with four passengers on board) and 50% less when the driver is alone, compared with a traditional heating system.

The consumption gains are due to radiant panels hidden under the cabin linings, which can be integrated into all types of surfaces (plastic, fabric, leather, wood, etc.) and efficiently provide the vehicle’s occupants with optimal comfort.

The technology uses thermal sensors and a camera, which together can define the most suitable temperature depending on the number of people in the car and their physiological condition. Electricity requirements are calculated accordingly, with no loss, helping boost the vehicle’s travel range. It is a comprehensive solution that transforms the electric car cabin into a smart cocoon.

Did you know?
Orders are heating up for Valeo’s thermal systems

In 2020, almost 40% of the orders placed for Valeo thermal systems were for technologies related to vehicle electrification.

Over the past four years, these orders represent a cumulative amount of more than 5 billion euros.
Valeo and the acceleration of driving assistance systems

“In 2021, Valeo has secured two billion euros in orders for ADAS*. We are by far the global leader in driving assistance technology.” Jacques Aschenbroich, Paris, July 23, 2021.

Like electrification, the market for ADAS* is accelerating rapidly, and is expected to triple in size by 2030. Valeo is also the world leader in this field, with one in four new cars currently equipped with its technologies.

By 2025, three in four new vehicles will be fitted with advanced active safety systems that allow the vehicle to precisely monitor its environment and trigger safety maneuvers such as automatic emergency braking. Half of new vehicles will feature level 2 automation functions.

In the race for driving assistance systems, 2021 has already made history, and will be remembered as the year in which the first two cars to reach level 3 automation entered the market: the Honda Legend and the Mercedes S-Class. The two models have something in common – they are both fitted with Valeo’s LiDAR technology, Valeo Scala®, the first series-produced LiDAR on the automotive market.

Valeo has the most extensive portfolio of driving assistance solutions on the market. And some of them are already a part of everyday life for many drivers around the world:

- When a car starts beeping as it approaches an obstacle, there’s a 50% chance that it’s coming from a Valeo ultrasonic sensor.
- When a driver sees the image of their vehicle on the dashboard screen when reversing, there’s a one-in-three chance that it’s coming from a Valeo camera.
- When a vehicle is detecting objects in front of the car, there’s a one-in-four chance that it’s using a Valeo front camera.

Valeo also provides the brains of the technology – the control unit – which combines and processes the data collected. The control unit maps out a detailed 360° image of the vehicle’s surroundings and uses algorithms to detect objects and provide safety functions.

Valeo is the world’s leading systems integrator for technologies that help vehicles to see, sense and understand their environment so that they can travel safely. This is precisely the point of driving assistance systems, and by improving them, mobility will become increasingly safe.

* ADAS: advanced driver assistance systems (above: Valeo’s driving assistance solutions’ detection range)
The Valeo level 3 driving experience, or human-machine interaction, demonstrated at the IAA Mobility

When we talk about vehicle safety, we often think about the outside of the car, and more specifically how the vehicle’s surroundings are taken into consideration. Valeo has opened up new fields of innovation by focusing on the driver. Studies show that in Europe, for example, 20% of fatal accidents can be attributed to driver fatigue or falling asleep at the wheel.

In response to this, Valeo has developed driver alertness detection systems. Interior cameras combined with software allow the vehicle to identify and prevent risky situations (see “Did you know” opposite).

This technology is even essential for cars that are able to drive in autonomous mode (from level 3). The vehicle must be able to ensure that it can safely “hand back” control to the driver. It must also provide the driver with all of the necessary information at the right time. At the Munich event, visitors will be able to try out level 3 automation and see how Valeo’s human-machine interface systems make the transition between autonomous driving and manual driving as safe, smooth and intuitive as possible.

Level 4 driving experience on the streets of Munich with Valeo Drive4U

Valeo is showcasing its Valeo Drive4U autonomous car prototype, driving in automated mode on the open road in and outside the city of Munich (on the Blue Lane).

Equipped exclusively with sensors that are already series produced by Valeo (LiDARs, cameras, radars, ultrasonic sensors, etc.), it is capable of level 4 automation. The vehicle can handle urban and suburban traffic, highway, traffic jams, intersections, traffic lights, pedestrian crossings and road works.

It is equipped with two other safety-enhancing features: a Valeo Drive4U Locate system, which pinpoints the vehicle’s location on the road with centimeter-level precision, whereas the margin of error with a standard GPS system is up to 5 meters; and a Valeo MovePredict.ai system which anticipates the movements of vulnerable people around the car and brakes before they have even moved.

Assistance beyond the vehicle – Valeo’s Automated Valet Parking in partnership with BMW presented at the IAA Mobility

Valeo has teamed up with BMW to offer a fully interoperable system that allows a car to park autonomously in a parking lot. With this function, it can drive to a car wash or charging station located within the same building.

Driver fatigue – the European Union is taking action and Valeo already has the answer

We all know the risk. According to the European Commission, “driver fatigue is a factor in 10-25% of all road crashes in the [European] Union”.

And so the Commission is taking action. Commission Delegated Regulation (EU) 2021/1341 was published in the Official Journal of the European Union on August 16, 2021 and will come into force on July 6, 2022. It “requires motor vehicles of categories M [vehicles with at least four wheels designed to carry passengers] and N [vehicles designed to carry goods (…) essentially lorries and vans] to be equipped with certain advanced vehicle systems, including driver drowsiness and attention warning (“DDAW”) systems”. A major European automaker has ordered precisely such a system from Valeo, which supplies the cameras and all the related software.

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Did you know?

Smart cars – who is actually behind this concept?

On July 13, 2021, Herbert Diess, Chairman of the Volkswagen Group, presented the global automaker's 2030 strategy during a keynote speech. One piece of information stood out: “Based on software, the next much more radical change is the transition towards much safer, smarter and finally autonomous cars”. Valeo is already a system builder of the two key technologies for the car of the future: electric powertrains (Valeo already manufactures the brains of the system with the inverter) and driving assistance systems, which will enable vehicle autonomy.

Valeo’s innovations are all inspired by one commitment: achieving a smarter form of mobility that contributes to the fight against global warming, is greener, assisted and therefore safer, capable of taking care of people and their health, and affordable enough to be easily shared with as many people.
So what’s new about this system? It relies in part on Valeo systems that are installed not only on the vehicle, but also in the infrastructure itself. After charging stations [see page 8 above], this capability further demonstrates Valeo’s position as a technology provider for the entire ecosystem, both inside and outside the car.

➢ Valeo Mobility Kit, the most accessible intelligence

At a time when mobility is taking on new forms and new vehicles are appearing, such as droids and other small delivery robots, Valeo is rolling out its ready-to-use technologies that can be integrated into the new driverless vehicles. The Valeo Mobility Kit consists of sensors, electronic control units and algorithms. It can also be supplemented with perception, geolocation and control software.

This is how driverless logistics solutions, benefiting from Valeo’s “Plug & Play” perception systems (operational as soon as they are installed), can take shape. New business can be created, based on proven technologies, with automotive quality and reliability, at affordable costs thanks to series production.

To date in 2021, more than 40 different customers from outside the automotive industry have placed orders for Valeo Mobility Kits, another sign of the accelerating transformation of mobility.

➢ Assisted driving, protected driving

Increasingly assisted vehicles are equipped with a multitude of sensors that enable them to analyze their surroundings. These sensors need to remain clean at all times. Valeo drew on its expertise in wipers to design systems that ensure that cameras, radars and LiDARs always have a clear field of vision, in all seasons, all weather and all road conditions. It has designed several fully automatic systems that use either fluid-saving cleaning nozzles or centrifugal lenses capable of getting rid of anything that obstructs the sensors’ vision.

➢ Valeo’s 360° lighting as a driving assistance system to ensure safety for all

Visibility systems (lighting and wipers), areas in which Valeo is world leader, are a powerful driver of improved road safety. One figure sums it up: 72% of fatal road accidents occur at night, when visibility is most impaired.

For several years, Valeo has been marketing lighting systems that allow drivers to use their headlamps on high beam in all situations without ever blinding other road users. These headlamps work thanks to a camera, built into the vehicle, that detects oncoming vehicles and dims the light in that area to avoid glaring drivers coming in the opposite direction.

With Valeo PictureBeam Monolithic, the new smart lighting systems go beyond their original function (guiding drivers in the dark) to provide more safety, assistance and driving comfort. To achieve this, Valeo is bringing electronics and artificial intelligence center stage.

Did you know?

Software, the fuel of the future

According to the French national newspaper, Le Monde (April 16, 2021), the findings of surveys carried out by the consulting firm PwC leave no room for doubt about the place that intelligence will take in the automotive industry. In fact, PwC estimates that “by 2030, software will represent 60% of a vehicle’s value, compared to about 20% today”.

Valeo is already working to supply this new fuel for the cars of tomorrow.

Currently, 6,000 of Valeo’s 20,000 R&D engineers are dedicated to software development and another 200 to artificial intelligence. In 2009, Valeo had a total of 6,000 engineers in R&D.

This increase in manpower at Valeo clearly shows the pace at which this technology is accelerating.
Imagine headlamps that can mark out road contours and warn the driver of upcoming turns. The image projected in the driver’s field of vision will help anticipate and facilitate maneuvers. Another idea is to project pictograms or warnings on the ground ahead, which drivers can see without taking their eyes off the road. And what about headlamps that are capable of beaming a virtual crossing on the roadway so that pedestrians can cross, or indicating the safety distances to be observed when overtaking a cyclist.

In 2021, Valeo has also developed a 360° lighting solution that completely surrounds the vehicle, offering new features aimed at all road users. Light projection takes on a new meaning, improving communication to make roads safer.

The technology works by projecting information about upcoming vehicle maneuvers, such as a change in direction or switch to reverse gear, onto the ground. It can also beam welcome messages or door opening signals a short distance around the vehicle. Clear, simple and instantaneous indications enter the field of vision of users in the vicinity of the vehicle. Users targeted include other motorists, but also and above all pedestrians and all users of new mobility solutions, all of whom are vulnerable (cyclists, scooter riders, motor scooter drivers, etc.). Urban congestion and the increasing number of silent electric vehicles add up to increased risks, prompting us to look for new functions to better share the road with other users and make mobility safer.

What really sets Valeo apart is its ability to offer these cutting-edge technologies at prices that are compatible with the car – not only for premium segments, but for all types of vehicles. When autonomous vehicles are driving in traffic, this 360° lighting technology will also give them enhanced and relevant communication possibilities. The solution can already be used to create a sort of link between the car and its passengers, for example by personalizing their arrival in the vehicle cabin with the projection of a “carpet” of light.
Valeo and the acceleration of in-vehicle health and well-being

“Mobility, whether by car, scooter or electric bike, is an individual right that no one wants to question. [...] People want to travel. But they also want to do so in a safe, health-conscious way.” Jacques Aschenbroich, Paris, February 19, 2021 and Aix-en-Provence, July 7, 2021.

- **Valeo’s health shield for traveling well away from viruses**

Safer mobility is a top priority, but the word “safety” has many meanings. In mobility, it applies to several areas:

- with 1.3 million deaths on the roads each year, we need to develop technologies that make vehicles safer [see page 9 above];
- in a world where we must learn to live with viruses (such as Covid-19), there is now the need to ensure health and safety.

Valeo is a world leader in vehicle air treatment systems designed to ensure a healthy cabin environment. Its innovations protect people from all kinds of pollutants, germs, allergens, particles and viruses, transforming the vehicle into a sort of “health shield”.

- **The health shield in cars**

Valeo’s most advanced technologies in this area combine three functions:

1/ Detection. This involves sensors that provide a diagnostic of the interior and exterior air. They detect fine pollution particles, carrying out a diagnostic every second. The sensor automatically activates the recycling mode when particle concentration levels are too high. A premium German automaker is to equip one of its models with this technology starting in 2022.

2/ Protection. Valeo’s highly effective air filters block 96% of allergens and 99.4% of viruses (reduced viral activity certified by the VirHealth laboratory), including coronaviruses.

The filters act as a barrier to entry for air pollution. Thanks to layers of material and a natural coating made up of polyphenols – a type of organic molecule widely found in plants, fruits, vegetables and good oxidants – they block ultra-fine particles, harmful gases, fungi, mold and certain viral particles of more than 0.0003 mm. Thanks to Valeo’s highly effective filters, the air in an average-sized car cabin (3 cu.m) can be purified in under 5 minutes by turning on the air conditioning.

The market for these premium air filters is set to rise 33% per year between 2020 and 2023, with one in two new cars to be fitted out within the next five years.
3) Passenger information. Valeo’s pollution sensors can inform passengers about air quality in real time (via a smartphone or onboard screens). When several vehicles are equipped with this technology, they will together form a data community that can “map” air quality in urban areas and track its fluctuation.

- The health shield on buses and coaches

Valeo has developed an innovative solution to protect public transportation users during their journeys. The Valeo UV Purifier is currently the world’s most powerful air sterilization system for bus and coach cabins. It eliminates more than 95% of viruses, including Covid-19, as well as any bacteria or mold present in the air within vehicles traveling with passengers on board.

Its effectiveness against SARS-CoV-2 has been scientifically proven by the Frankfurt University Hospital and the Institute for Laser Technologies in Medicine and Metrology at the University of Ulm (ILM).

Valeo’s air purifiers are designed to be compatible with buses and coaches of all types and sizes, air-conditioned or not. They can be fitted on new vehicles, as well as those already on the road.

Valeo’s innovative UV Purifier was first brought to market in 2020 and currently equips 2,000 vehicles for some 50 vehicle manufacturers and transport operators around the world.

- The health diagnostic system – automotive industry support for hospitals and public spaces, on display at the IAA Mobility

Valeo’s technologies in the field of health protection are so efficient that they now even go beyond vehicles.

Building on its automotive sensors and cameras, Valeo has developed a vital sign detector, which can evaluate a patient’s health risks and, in particular, assess whether they are likely to have Covid or not.

The reliability of the assessment was validated with the help of several health organizations: the Centre Hospitalier Universitaire de Liège (Belgium), which has been a Valeo partner for five years with a Research Chair in “Health and Well-being in Transportation”; mobile Covid detection centers at the Ecole Polytechnique (Palaiseau – France), in Breves and Huy (Belgium); the Rabin Medical Center in Jerusalem (Israel); and Hôpital Régional Dr Mohamed Ben Salah de Moknine (Tunisia).
Valeo, the technology leader at the epicenter of the transformations shaping mobility

Valeo is a technology company uniquely positioned at the epicenter of the revolutions shaping mobility. Valeo develops technologies that facilitate the shift to cleaner, safer and smarter mobility, with the determination to make them accessible to all.

Valeo is the world leader in vehicle electrification and driving assistance systems (or ADAS) – the two markets set to experience the most growth in the coming years due to regulations and aspirations for safer, cleaner mobility.

Over the past ten years, Valeo has invested more than 10 billion euros in technologies that reduce CO₂ emissions. The Group’s sales (16.4 billion euros in 2020) from technologies that reduce CO₂ emissions have grown 20-fold since 2009 and are set to reach around 10 billion euros in 2021.

Last year, Valeo invested 12% of its original equipment sales in R&D – a ratio comparable with that of the world’s tech giants rather than its industry peers. The Group employs 20,000 engineers in R&D (compared with 6,000 in 2009). Its innovations are protected by a portfolio of 34,000 active patents worldwide.

**Valeo, a leader in each of its businesses**
- Powertrain Systems: world no. 1
- Driving Assistance Systems: world no. 1
- Lighting and Wiper Systems: world no. 1
- Thermal Systems: world no. 2

**Beyond the IAA Mobility in Munich, Valeo in Germany**

Valeo has been present in Germany since 1974 and is a key player in the country’s automotive industry. German customers account for around 30% of the Group’s global sales. Valeo Germany has nearly 7,200 employees at 14 plants and 8 R&D centers. Like at the Group level, innovation is a key focus for Valeo Germany, with 400 patents filed in 2019.