PRESS KIT

ON SHOW IN CHINA – THE VALEO INNOVATIONS AT THE EPICENTER OF THE REVOLUTIONS SHAPING MOBILITY

2019 SHANGHAI AUTO SHOW
### Press Kit

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Valeo at the 2019 Shanghai international auto show

The 18th Shanghai international auto show opens to the public from 18 to 25 April 2019 with the theme “Create a better life”. According to announcements, the 12 halls at the Shanghai National Exhibition and Congress Center (NECC) will be bustling with innovations on vehicle electrification, autonomous driving and connected cars and artificial intelligence for the automotive industry.

These innovations sound strikingly familiar to the tech products designed and manufactured by Valeo. Which is why in Shanghai this year, Valeo is presenting its innovations that are at the epicenter of the revolutions shaping mobility. These technologies are transforming our way of life, the way we travel and where we choose to live. The three revolutions shaping today’s automotive industry are also shaping social trends.

Vehicle electrical systems are becoming an integral part of mechanical systems – they are even becoming intertwined with cities’ electrical networks. At the Shanghai auto show, Valeo is demonstrating how electric vehicles can be integrated in city power grids. As the world leader in CO₂ emissions reduction, Valeo is working on innovative 48 V electrical systems that help cut vehicle energy consumption. With their affordable installation costs, these solutions help broaden the reach of hybrid and electric vehicles, which are making mobility cleaner.

In Shanghai, Valeo is also unveiling its latest advances in all-season, all-weather comfort and thermal control solutions for electric vehicles, proving that the vehicle electrification revolution does not stop at the powertrain.

In autonomous driving, Valeo is pursuing the same goal of making its advanced technologies more widely accessible. It boasts the automotive industry’s largest portfolio of sensors – ultrasonic sensors, cameras, radars and LiDARs – that act as the eyes and ears of the autonomous car. Valeo also has unique expertise in the cleaning systems that ensure these sensors work reliably in all weather and road conditions.

As behaviors are evolving with digital tools opening up access to new forms of mobility, Valeo is developing technologies that promote the rise of intelligent mobility. One example is the dynamic monitoring of cabin air quality. In Shanghai, Valeo is presenting digital services capable of measuring pollution levels, taking preventive measures inside the vehicle cabin, and anticipating maintenance.

Innovation is at the heart of Valeo’s strategy, with over 2 billion euros, or close to 13% of original equipment sales, invested in Research and Development in 2018. Valeo’s innovative solutions offer clear insights into the shape of mobility to come and are all conducive to the development of electric, autonomous, connected cars that are widely affordable and closely matched to individual needs. This is especially apparent in China, the world’s largest car producer. A total of 28 million units were manufactured in the country in 2018, representing one-third of global production. With this in mind, the 2019 Shanghai auto show is a key event. The innovations being showcased in Shanghai, initially designed to address local issues, take on an acute relevance well beyond the Chinese market, wherever increasing urbanization is driving a need for clean mobility.
China and Valeo leading the way in the vehicle electrification revolution

Valeo is a world number-one in vehicle electrification, fitting one in every three cars worldwide with electrical systems. It develops technologies spanning all vehicle segments and all uses, from small urban cars to premium sedans and SUVs. Valeo’s advanced systems range from low-voltage solutions to high-power motors with outputs of 347 kW (more than 470 hp), manufactured by the Valeo-Siemens eAutomotive joint venture (see “Did you know?” on the next page).

Valeo also invented the Stop-Start system that now equips millions of vehicles across the world. And Valeo leads the field both in micro hybridization, producing around 25 million 12 V units per year, and mild hybridization, with its 48V systems.

Did you know?

China, world leader in electric vehicles

China is pursuing a pro-active policy on vehicle electrification. This started with subsidies that led to a rapid increase in the number of electric and hybrid vehicles on the road, with sales rising 62% in 2018. More than half of the electric vehicles sold worldwide in 2018 were sold in China – that’s around a million cars. China’s goal is for one in every five vehicles sold in the country to be electric by 2025.

It has already set up a vast network of 266,000 electric charging stations, which is 43% more than in the United States and Europe combined1, and accounted for 47% of the global electric vehicle market in 2018.

An all-electric urban vehicle prototype powered by a 48 V Valeo motor

At the Shanghai auto show, Valeo is presenting its low-voltage (48 V) all-electric vehicle prototype. At a time when countries and major cities are taking an ever-harder line on reducing CO₂ emissions, Valeo is offering a new angle on the future shape of urban mobility.

The prototype is a fully functional two-seater electric vehicle capable of speeds of up to 100 km/h, with a travel range of up to 150 km. It can be charged at any power socket. The technological demonstrator is perfectly sized and ideally suited to the short distances and low speeds of urban driving.

The 48 V all-electric prototype is also, and above all, more economical (20% cheaper) than a high-voltage all-electric solution, largely because it can do without some of the components and systems that a high-voltage system needs.

Valeo 48 V technology, the electrification solution to fit all vehicles

Valeo has extended the scope of its 48 V technology to various types of vehicle, as we see with these prototypes:

- an all-electric six-seater robotaxi;
- an 125-cc equivalent electric scooter;
- a hybrid delivery truck offering a 5% to 10% reduction in fuel consumption and CO\textsubscript{2} emissions;
- a family-sized plug-in hybrid. Valeo provides the end-to-end system, including electric powertrain, motor, onboard charger and converter. The 48 V system offers savings of around 40% compared with conventional high-voltage technology. The vehicle provides the best of both worlds: it can drive 40 km in all-electric mode at speeds of up to 70 km/h in urban environments, and switch to the internal combustion engine for longer distances or on highways.

The Valeo 48 V hybrid system recovers energy during braking and deceleration phases for use in powering the vehicle.

It offers major benefits for automakers, and above all for vehicle users. The reduction of around 10\%\footnote{Average based on Valeo simulations.} in fuel consumption and CO\textsubscript{2} emissions is achieved without major vehicle modification costs. It is to date the most affordable way for automakers to add efficient hybrid capabilities to existing models.

DID YOU KNOW?

By 2023, four to five million vehicles in China will be fitted with Valeo 48 V systems.

Valeo is also asserting global market leadership in the high-power segment, through the joint venture set up with Siemens in December 2016. The joint venture recorded more than 10 billion euros in order intake in its first few months, a unique and unprecedented industrial achievement. And 50\% of those orders came from China.

\[ \text{Average based on Valeo simulations.} \]
Valeo’s reversible charger.
The vehicle becomes a link in the power grid

When an electric vehicle connects to a charging station, it is usually to draw power for charging its batteries.

But one of the Valeo innovations on show in Shanghai this year offers a new take on the connection between electric vehicles and the power grid. Not only does Valeo’s reversible charger charge the vehicle batteries, 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.

To illustrate these capabilities, an electric vehicle prototype with a reversible charger is on display at the Valeo stand:
- Connected to a charging station developed jointly with the Chinese company Xcharge, it shows how electricity from the batteries can be reinjected into the power grid.
- Connected to a kettle and a tea bar at the Valeo stand, it shows how the reversible charger can use the electricity from the vehicle’s batteries to power electrical appliances.

This marks a major step forward for technologies designed to store electricity, especially that generated by low-emission systems such as solar panels and wind turbines. This is important because energy from these renewable sources, which are increasingly used in China, is intermittent, meaning sometimes there is too much of it, and others there is not enough. There is currently no solution for storing unused energy. So in becoming an integral part of the power grid, electric vehicles will play a vital role in electrical power management.

Using Valeo’s ingenious reversible charging system, electric vehicle batteries will be able to store excess electricity and return it to the grid when needed.

Innovative V2G technology will therefore:
- contribute to the development of renewable energies, by helping to solve the electricity storage problem, without generating CO₂ emissions or the need for additional investment, since the batteries have already been fitted (and paid for);
- provide support to energy utility companies, who in some situations will be able to smooth out demand peaks and manage them locally using V2G capabilities;
- enable automakers and charging station suppliers to develop new features and new services revolving around electric vehicles.

China’s share of the global electric vehicle market could well top 60% by 2030, with target sales of 16 million electric vehicles. By this date, there could be more than 40 million electric vehicles on the roads of China. If all of these vehicles were to be equipped with this feature (3 kW per vehicle), they could provide capacity of up to 120 GW (see “Did you know?” on the next page).

DID YOU KNOW?

Electricity consumption tends to peak around the end of the working day, as people return to their homes at around the same time. The same phenomenon is observed all over the world. And it’s even more pronounced in winter, when heating, lighting and domestic appliances are running at the same time, and when energy is no longer being produced through solar power. This is where electric vehicles can come into play, by injecting into the power grid the energy they have built up during the day.
Did you know?

V2G for generating gigawatts. 
Like in Back to the Future Part II?

“What? What the hell is a gigawatt?” That was the question a terrified Marty McFly (Michael J. Fox) asked Emmett “Doc” Brown (Christopher Lloyd) in Robert Zemeckis’ Back to the Future sequel in 1989, on discovering that the 1.21 GW power rating of his DeLorean car meant it could travel in time.

To answer his question, a gigawatt in electricity consumption corresponds to:
4 million hours of television;
1 million fridges running 24 hours a day;
1 million washing machine cycles;
It’s also the power of 3,021 eighth-generation Porsche 911 Carrera S cars, each developing 331 kW, or the combined output of 333 wind turbines.

So if all the electric vehicles on the roads of China in 2030 had V2G capabilities, the Chinese electricity grid would benefit from all of this power, multiplied by 120. That’s 120 GW!
Comfort and thermal management solutions for electric vehicles, made in China, for China

At the 2019 Shanghai auto show, Valeo is exhibiting its latest advances in all-weather, all-season thermal and comfort solutions for electric vehicles. The vehicle electrification revolution does not stop at the powertrain. Whenever batteries are used as a vehicle power source, battery operating temperature is an important factor in optimizing travel range and service life. And in-vehicle comfort is a key driver of user satisfaction.

The Thermal & Comfort demonstrator on show at the Valeo stand in Shanghai illustrates a number of solutions. Its innovative battery cooling system, heat pump system and cabin air quality solutions are all designed, developed and made by Valeo entities in China.

Thermal Systems for electric vehicles in all conditions and climates

When it is cold outside, how can you warm up the inside of a car that doesn’t have a combustion engine providing energy? And how can you cool it down when it is hot outside, without reducing vehicle travel range? These are the sort of questions that have to be solved on electric vehicles to ensure that users enjoy not only the best comfort, but also sufficient travel range, even when they live in extreme climates. Given the variability of the Chinese climate (ranging from 16°C to -28°C in winter), electric vehicles need thermal systems which ensure performance, range and comfort for many different use cases and seasonal changes.

The Valeo demo car features precisely this type of system, comprising:

- an innovative heat pump architecture using refrigerant to transform available air energy to efficiently heat, cool and demist the cabin with a minimal impact on electric vehicle range. When fully optimized, these technologies can extend electric vehicle range by up to 30% in winter and 20% in summer. With the Valeo heat pump, users no longer have to choose between heat or range – they can enjoy both.

3 Source: Valeo THS China
- a battery cooling system and chiller which are used to keep a consistent temperature across the battery cells. These systems protect and ensure the maximum performance of the high voltage batteries, which account for nearly half of the value of an electric vehicle.

Valeo is developing a full heat pump system for a leading European original equipment manufacturer for its Chinese electric vehicle platform. Start of production will begin in 2019 in Valeo plants located in Foshan, Changchun and Jingzhou.

**DID YOU KNOW?**

**10°C, the critical threshold…**

Electric batteries are sensitive to changes in temperature, particularly when charging. For optimal service life and performance, batteries must be kept at between 15°C and 35°C, with a consistent temperature across the cells. An increase of just 10°C above the specified battery temperature will halve its service life.

**Air quality for better health, all year round**

The electric revolution is well underway in China, but for the time being, driving in urban and industrial areas often still means getting around in polluted areas. Despite drastic improvements in air quality in recent years, thanks to measures in major Chinese cities to reduce pollutants, air quality still remains a major concern for the Chinese population, who actively protect themselves against pollution in their cars.

The Valeo demo car combines a number of solutions to detect and neutralize harmful pollutants. It features the following technology:

- a very high efficiency cabin air filter, the cornerstone of the filtration process; The Valeo demo car features a PM 2.5 & VOC (volatile organic compound) filter which provides the ultimate protection, eliminating 98% of fine particles, absorbing almost 100% of harmful gases. These filters are produced at our Valeo site in Jingzhou;
- pollution sensors, which detect the level of very fine particles inside and outside the cabin. The PM 2.5 sensor automatically activates the recycling mode when particle concentration levels are too high. For additional protection, Valeo also offers an in-cabin purification system;
- an ioniser which diffuses negative ions to clean the cabin as well as fragrances to customize cabin olfactory ambience.

Leveraging our expertise in dynamic pollution mapping, Valeo is also developing a number of digital services to enable users to better monitor pollution levels, take preventive measures in the cabin as well as anticipate any required maintenance actions.

A recent market research study reveals rising consumer concerns about air quality in China. 42% of Chinese respondents have a poor perception of air quality levels in their cities. 65% of Chinese respondents said they use personal protection against pollution in their car cabin, a sharp increase from 40% in 2016.

DID YOU KNOW?

In Beijing, air pollutants have been lowered by 25-83% (depending on the pollutant) since 2013. Measures include controls on coal-fired boilers, cleaner domestic fuels and industrial restructuring. But PM 2.5 concentration levels still exceed levels recommended by the World Health Organization.

Valeo observed similar concerns in a consumer study led with Ipsos in 2018. The top four air quality concerns cited by Chinese panelists were formaldehyde from car plastics, bacteria from uncleaned car accessories, fine particles and unpleasant odors.

Contributing to the rise in autonomous vehicles

China has also issued an ambitious national roadmap for autonomous and connected vehicles. According to forecasts by the National Development and Reform Commission, level-2 semi-autonomous driving systems are expected to equip half of all new vehicles by 2020. And by 2030, 10% of new cars could come with level-4 and level-5 systems.

All partially and fully autonomous vehicles will require sensors, which act as their eyes and ears, enabling the vehicle to analyze its surroundings

Valeo, global leader in driving assistance sensors

Valeo is the world's leading manufacturer of driving assistance sensors. It entered the market in 1991, with the first ultrasonic sensors for parking maneuvers. Today, Valeo offers the most comprehensive portfolio of driving assistance sensors on the market, comprising ultrasonic sensors, radars, cameras, and the automotive industry’s first and only series-produced LiDAR (Light Detection And Ranging) scanner, Valeo SCALA®.

The Group has already produced around one billion sensors, of all types, and will produce over a billion more in the next four years. Valeo is also specialized in aggregating and processing the data from these sensors for autonomous driving.

DID YOU KNOW?

In 2018, 1 billion euros’ worth of Valeo’s order intake was for products featuring artificial intelligence (AI), such as sensors, cameras and image processing systems. In practical terms, Valeo’s AI will enable ultrasonic sensors to interpret any obstacles they identify, such as walls, people and other vehicles. Valeo also recorded 1 billion euros in order intake for products designed for robotaxis. AI is becoming a key component in autonomous vehicles and, in turn, Valeo’s business, with over 200 Valeo engineers across the world working on AI.
In fall 2018, Valeo put on a world-first demonstration of its unique expertise in this field. The Valeo Drive4U autonomous vehicle, fitted exclusively with series-produced sensors, completed a test drive in the dense and complex urban traffic conditions of the streets of Paris. This operation marked a major milestone along the path to fully autonomous driving.

While sensors play an essential role in autonomous vehicles, sensor cleaning systems are equally important...

**Valeo everView: ensuring that sensors are always operational for autonomous driving**

Autonomous vehicles are equipped with a multitude of sensors that enable them to analyze their surroundings. As these sensors need to be able to work at all times and in all types of weather, it is vital that they be clean at all times. With this in mind, Valeo has developed a range of three fully automated cleaning systems for all types of cameras and LiDARs:

- the cleaning systems for cameras include several types of nozzle, usually with a small retractable arm, that spray just the right amount of cleaning fluid onto the external lens. These can be combined with drying systems, and Valeo also offers a de-icing feature to ensure maximum performance in winter.

- **Valeo everView Centricam** is Valeo’s latest innovation to keep the camera’s field of view constantly clear. Rain, mud, dust, etc. are removed by centrifugation.

- **Valeo has also developed LiDAR everView**, a cleaning technology for LiDAR sensors that uses just 25 ml of cleaning fluid, versus 100 ml for the non-automatic systems of its competitors. From 2020, it will be fitted on the vehicles of a leading German brand.

**DID YOU KNOW?**

**Autonomous driving, a global safety challenge**

In late 2018, the World Health Organization (WHO) published a report on the growing number of road accident fatalities, currently estimated at 1.35 million each year. Road traffic accidents are now the main cause of death among children and young adults in the aged 5 to 29. As WHO Director-General, Dr. Tedros Adhanom Ghebreyesus, commented, "These deaths are an unacceptable price to pay for mobility. There is no excuse for inaction. This report is a call for governments and partners to take much greater action..."

The development of autonomous vehicles will improve road safety by reducing the risk of human error, the main cause of accidents.
Improved vision, a key factor in safety for autonomous vehicles of the future... and for cars on the road today

At the 2019 Shanghai auto show, Valeo will also be presenting Valeo PictureBeam Monolithic. The new system generates a high definition beam of light without ever blinding other road users. But that’s not all – it can also project information and images onto the pavement.

The innovation is the product of the partnership between Valeo and CREE, the US market leader in the manufacture of light emitting diodes (LEDs). CREE developed the LED Monolithic chip while Valeo contributed all of its technology in automotive lighting.

In the case of Valeo PictureBeam Monolithic, the pixels of the light beams are formed directly at source on the chip. The module is therefore smaller and weighs less than other HD lighting systems on the market, making it easier to integrate into cars. This new type of LED chip means a definition of several thousand pixels. Each pixel can be lit, switched off or adjusted at will, and is entirely controlled by an electronic system designed by Valeo.

Valeo’s aim is to offer a solution that improves road safety as well as offering new features for customization and comfort.
Strategic partnerships on developing autonomous driving in China

In addition to advanced technology, the development of autonomous vehicles is also driven by partnerships with key players in passenger and goods mobility. In China, Valeo works in close cooperation with a number of these key players, including Baidu and Meituan.

In 2018, Valeo announced a strategic cooperation with Apollo, the open autonomous driving platform created by Baidu, the leading Chinese-language internet search provider. Valeo contributions on this program include expertise in sensors and related intelligence.

In January 2019, Valeo also signed a strategic cooperation agreement in last-mile autonomous delivery services with Meituan, China’s leading on-demand food delivery platform.

These partnerships illustrate Valeo’s open innovation approach, and its ambition to remain positioned at the epicenter of the autonomous and connected mobility revolution.
Valeo, the automotive supplier driving the mobility revolutions

Valeo partners all automakers worldwide. As a technology company, Valeo proposes innovative products and systems that contribute to the reduction of CO₂ emissions and to the development of autonomous and connected cars. Valeo-designed, Valeo-made high-tech products stand at the intersection of the three revolutions disrupting today’s automotive industry now more than ever before: vehicle electrification, autonomous vehicles and digital mobility.

One in every three vehicles worldwide is fitted with a Valeo electric system that reduces CO₂ emissions. In intuitive driving, Valeo boasts the widest range of sensors on the market. Its SCALA® is the only automotive-specific LiDAR (Light Detection And Ranging) scanner in series production today. World-first runs by Valeo autonomous vehicle demonstrators include 24 hours around the Paris beltway and tours of Europe and the United States.

Valeo also develops digital solutions that improve everyday convenience for vehicle users, such as Valeo InBlue®, a secure shareable virtual smartkey for locking, unlocking and starting a vehicle from a smartphone.

Innovation at the heart of Valeo’s strategy

In April 2019, Valeo took first place in France’s 2018 INPI industrial property institute rankings, for the third year running. It filed 1,355 patents in 2018, up from 1,110 in 2017, consolidating its position as the most innovative company in France.

Also for the third year running, Valeo was named the top French patent filer with the European Patent Office (EPO), with 784 patents filed in 2018 (18th worldwide). These two rankings underline Valeo’s commitment to protecting the cornerstone of its strategy: innovation.

Innovation is at the heart of Valeo’s strategy. In 2018, Valeo’s Research and Development expenditure totaled 2.073 billion euros, or almost 13% of the Group’s original equipment sales. A third of this amount was on autonomous vehicle technologies, and half on technologies for reducing CO₂ emissions. Valeo has 59 R&D centers worldwide and some 20,000 R&D engineers among its 113,000 or so employees. Innovation is without a doubt the driving force behind the Group’s growth, with innovative products (those that didn’t exist three years ago) representing 53% of total order intake in 2018, or 60% including Valeo Siemens eAutomotive.

Valeo has 21 centers specializing in fundamental research, advanced engineering and new technologies, along with 38 development centers. Through the study and analysis of major social trends, Valeo is developing a technology roadmap looking 10 years into the future, which anticipates the future demands of customers and end users.

For more than 10 years now, Valeo has been working to develop its innovation ecosystem, built on partnerships with universities, laboratories and research centers, start-ups and pioneers from other industries. Through multi-party development programs, participants pool their knowledge, reducing costs, development cycles and time to market.
**Key figures in 2018**
- China accounted for 15% of Valeo’s total original equipment sales, and 25% of its order intake.
- Chinese automakers accounted for 32% of Valeo’s sales in China and 44% of its order intake in China.

**Teams & industrial operations**
- 20,000 employees – Valeo’s largest country in terms of employees
- 36 plants
- 14 R&D centers
- 4 distribution platforms