PRESS KIT

VALEO, A TECHNOLOGY COMPANY AT THE EPICENTER OF SEVERAL AUTOMOTIVE INDUSTRY REVOLUTIONS

CES LAS VEGAS 2018
Contents

Valeo, a technology company at the epicenter of several automotive industry revolutions... 3
The electrification revolution ........................................................................................................... 4
The autonomous and connected car revolution ......................................................................... 6
Valeo, central to the emergence of digital mobility ................................................................. 12
Innovation, at the heart of Valeo’s strategy .............................................................................. 14
Appendix ........................................................................................................................................ 16
A CES participant for the fifth consecutive year, Valeo was one of the first automotive and mobility players to make an appearance at the major Las Vegas new technologies event four years ago. Mobility has since become a major item on the CES agenda. This reflects the magnitude of the three technological and social revolutions that are shaping the biggest ever upheaval in automotive history: electrification, autonomous vehicles, and digital mobility. These three interrelated\(^1\) revolutions are bringing fast\(^2\), radical change to vehicles and the way we use them, with the car gradually giving way to the smartcar in much the same way as the phone has been superseded by the smartphone.

As an innovative company offering systems for CO\(_2\) emissions reduction and intuitive driving, Valeo is at the epicenter of all three revolutions. The Group designs and manufactures technology-packed products destined to play an increasingly essential role in the vehicles of the future. Today, Valeo-developed technology is already helping to speed up the emergence of a new form of digital mobility, with Group innovations enabling companies to deliver new services and invent fresh business models (see page 12). One notable example of this trend is Valeo’s secure virtual key. Transferable from one smartphone to another, it can shake up usage patterns, encourage car sharing, transform the car rental industry and make business easier for corporate fleet managers.

At CES 2018, Valeo is presenting more new technologies conducive to the development of electric, autonomous, connected cars that are widely affordable yet adaptable to individual needs and preferences.

One of the many Valeo innovations on show at CES 2018 is a new low-voltage all-electric solution that is ideally suited to urban mobility (100 km range and 100 km/h top speed) and much more affordable than a high-voltage all-electric system (see page 5).

Valeo is also unveiling a system that measures outside air pollution levels to purify air in the vehicle cabin appropriately, adjusts the interior climate to passengers’ physiology, heart rate and sensitivity to temperature, and diffuses stimulating or soothing fragrances in response to the mood it detects in the driver (see page 8).

Valeo has already launched volume production of several innovations shown at previous CES events, such as the InBlue\(^®\) virtual key presented at CES 2015 and the SCALA\(^®\) laser scanner displayed at CES 2016 (see page 6), which is so far the only laser scanner in mass production. The Valeo innovations highlighted at this year’s show offer further insights into the shape that mobility will take in the future.

\(^1\) For example, it is much easier to automate an all-electric vehicle than an internal combustion one.

\(^2\) Norway, France, the United Kingdom, Germany, Denmark, the Netherlands, India and China have all announced plans to ban the production and sale of internal combustion vehicles, with phase-out dates ranging from 2025 to 2040 (although China has not yet set a date).
The electrification revolution

The pioneer and world number one in vehicle electrification, Valeo fits one in every three vehicles worldwide with electrical systems for reducing CO₂ emissions. From mild hybrid to high-power solutions, Valeo electrification technologies span the full spectrum of requirements across all vehicle segments, from small urban cars through to SUVs and premium sedans.

Valeo invented the Stop-Start system, which today equips millions of vehicles across the world, and produces around 25 million 12V systems per year. Like Stop-Start, these systems also help to improve the efficiency of internal combustion engines, by recovering braking energy.

Valeo has also developed a hybrid system that couples a low-voltage (48V) electric motor with a traditional engine to recover the kinetic energy generated during braking and deceleration and use it to power the vehicle. Twenty-five contracts have already been signed for this mild-hybrid solution, which reduces fuel consumption and CO₂ emissions by around 10% at a highly affordable cost, as the system requires no change to the architecture of the internal combustion vehicle it is fitted on. This is the most affordable solution available to automakers today for introducing hybrid capabilities into existing vehicles.

Through the Valeo Siemens eAutomotive joint venture, Valeo also offers high-power (above 60V) solutions for hybrid, plug-in hybrid and all-electric models. In the first nine months of 2017, Valeo Siemens eAutomotive brought in orders totaling 5.4 billion euros.

With a 15% market share in 2018, Valeo also leads the field in the battery cooling systems needed to ensure satisfactory battery life and performance.

At CES 2018, Valeo is bringing further proof of its flair for designing intelligent, adaptable, affordable electric drive solutions, with its new 48V all-electric prototype, equally capable of powering a small private car or a self-driving robo-taxi.
48V all-electric systems: the future of electric mobility in cities

World première at CES 2018 – Demonstration on North Plaza track

- A smart solution, ideally suited to urban mobility
- A unique low-voltage electric solution
- More economical than existing high-voltage solutions
- Top speed of 100 km/h and range of 100 km

Valeo’s new low-voltage (48V) all-electric prototype is making its world début at CES 2018. As countries and major cites become more and more intent on reducing CO₂ emissions, this system offers a new angle on the future shape of urban mobility.

The small two-seater electric tech demo car, which charges at any EV charging station, delivers a top speed of 100 km/h and offers a range of 100 km, is ideally suited to the short journeys and low speeds of urban driving.

The 48V all-electric car is also, and above all, more economical (by 20%) than a high-voltage all electric solution, largely because it can do without some of the components and systems that a high-voltage system is required to have for user safety reasons. Pricing for a small 48V all-electric car could be as low as 9 000 dollars (around 7,500 euros).

DID YOU KNOW?

This prototype marks something of a turning point for Valeo, because it is the first ever vehicle powered entirely (except for the battery) by Valeo systems. While Valeo had previously designed all the components needed for powertrain and drivetrain operation, it had never before designed the engine itself. So this car is actually Valeo-powered, a development that opens up a whole new area of business and some bright new prospects.

By making the all electric vehicle more affordable, this innovative solution could well lend further momentum to the electrification revolution.

To develop its innovative 48V all-electric drive solution, Valeo has built on its experience and expertise in 48V systems for hybrid applications, a field in which it leads the market.
The autonomous and connected car revolution

The development of the autonomous car involves a series of successive stages, with widespread take-up of automated functions already well under way. The starting point for this revolution is sensors, which allow passenger cars and collective transportation vehicles alike to detect and understand information about the environment in which they are traveling. Valeo offers the automotive industry’s widest range of sensors, comprising ultrasound sensors, cameras, LiDAR (Light Detection and Ranging) systems and radars. These devices act as the vehicle’s eyes and ears. With the SCALA®, Valeo was the first, and is so far the only, automotive manufacturer to mass produce lasers scanners. The SCALA® is the only sensor on the market capable of detecting both stationary and moving objects up to a distance of 150 m and with a 145 degree field of view.

Sensing the vehicle’s environment is one of Valeo’s main specialties. Processing the data captured by those sensors is a further area of expertise. Valeo software merges the data in the same way that the brain processes information from the five senses. Valeo also develops artificial intelligence (AI) systems that give vehicles the ability to learn by themselves. Processing algorithms and artificial intelligence systems are coupled to enable the vehicle to make its own decisions. To further enhance its AI expertise, Valeo this year announced the launch of Valeo.ai, a global research center in artificial intelligence and deep learning dedicated to automotive applications.

Valeo technologies aim to make the car as intuitive as a touch tablet. This means that drivers will gain free time at the wheel, as solutions are developed that enable them to delegate driving to the machine during tiresome phases, such as in traffic jams or parking maneuvers.

World-first runs by Valeo autonomous vehicle demonstrators include 24 hours around the Paris beltway and tours of Europe and the United States.

“Any customer can have a car painted any color that he wants so long as it is black.”

This quote by Henry Ford marked the advent of assembly-line production methods. With more than 16 million units manufactured from 1908 to 1927, the famous Ford Model T was the first universally accessible car and opened the way to widespread vehicle ownership.

Successive revolutions: from cars for all to individualized mobility

A century on, the mobility revolution is taking a fresh turn. Mobility at the eve of the 2020s stands at the crossroads of three major trends: there is a definite shift toward electric powertrains; autonomous driving and vehicle connectivity are gaining ground; and digital services are transforming vehicle usage. We can no longer say that tomorrow’s car will be just the car of today with add-on functions. It will be completely different. Tomorrow’s mobility will be closely matched to individual needs. Vehicles will be precisely sized to actual user needs, shared in some cases, and will emit decreasing amounts of CO₂ in all circumstances.

DID YOU KNOW?
Widespread take-up of Valeo’s advanced technologies

It all began with the production of ultrasound sensors for reversing radars, back in 1991. Since then, Valeo has made a total of 700 million sensors (of all types). In the next five years, it will make over 500 million more. Some 12 million cars worldwide are already fitted with Valeo automated parking systems.

World-first runs by Valeo autonomous vehicle demonstrators include 24 hours around the Paris beltway and tours of Europe and the United States.
For Valeo, a smartcar is a car that can learn from what is happening around it, predict and dynamically anticipate situations, issue suggestions to its driver, make life easier, and ensure driver and passenger safety. The Valeo My Mobius test cockpit features embedded technologies developed in partnership with machine learning specialists CloudMade.

The vehicle records data collected by Valeo sensors on what is happening both outside and inside the car. This data is used to activate vehicle functions without the need for user intervention. For example, the car can select the best route for a given journey and suggest calls and messages without requiring direction or action from the driver. It can set the vehicle cabin mood on the basis of habitual user preferences. It can detect complex situations and suggest driving assistance features accordingly. All told, the Valeo My Mobius demonstrator, implementing CloudMade technologies, can produce made-to-measure journeys for individual users.
Close-up on the Valeo XtraVue innovation, an integral part of My Mobius

Working demonstration on North Plaza track

Valeo XtraVue uses a telematics antenna installed on the car, combined with a laser scanner and Valeo’s computer-vision camera system to show drivers what is happening on the road even outside their line of sight. Video from other connected vehicles and roadside infrastructure cameras is shown on the car’s display. Leveraging existing public 4G and vehicle-to-vehicle (V2V) networks, the technology merges this data and creates a simple, enhanced view of the road. For drivers, it is like being able to see right through the obstacles in front of the vehicle. Enhanced visibility and fuller information affords reassuringly safe conditions for overtaking.

On the way to automated driving in complex environments

One of the challenges for “all-conditions” automated driving is locating the vehicle’s exact position on the road, especially in complex environments such as cities. Urban centers are more difficult to analyze than highways, beltways and bypasses with their clearly marked traffic lanes. City roadway systems abound in less clearly delimited features such as crossroads, roads without markings and intersections without signs. For this reason, one of the technological challenges for automated driving in cities concerns the ability of sensors to identify all other vehicles in the immediate vicinity and anticipate their trajectories in order to ensure the safety of all road users.

Valeo is developing technologies that will make automated driving possible in all such complex situations.

Valeo Drive4U.ai™, learning in action

World première working demonstration on North Plaza track

The Drive4U.ai™ (artificial intelligence) demonstrator is fitted with cameras for analyzing the roadway environment. Working from the all-round 3D view produced by the cameras, Drive4U.ai™ identifies all aspects of the vehicles in the immediate vicinity: shape, size, orientation and direction of motion. In this way, it can anticipate the trajectory of the vehicles, even if one of them slips out of view momentarily, merge the captured data, and make virtually instantaneous decisions on the basis of the analysis. Instead of relying on algorithms alone for achieving such rapid decision-making ability, the Valeo car uses a learning-capable neural network.
Life Presence Detection by Valeo

Demonstration on North Plaza track

At CES 2018, Valeo is showcasing a solution that detects whether the car is occupied when the engine is off. Sensors in the vehicle cabin identify the number, location and morphology of people present. A vehicle fitted with this Valeo technology will trigger a sound and light alarm, and send a message to the user’s smartphone, to ensure that no one is left behind in a stationary car.

Tighter US and European safety regulations

The Self Drive Act passed by the US House of Representatives in September 2017 includes a proposal that would soon make it compulsory for self-driving cars in the United States to feature a rear-seat occupant alert system. The independent European organization Euro NCAP (European New Car Assessment Program) has in turn indicated that it will be including this feature as a criterion in its forthcoming vehicle analysis protocol for determining vehicles’ safety ratings.

Health & Wellbeing, the Valeo take on comfort

World première working demonstration on Gold Lot track

With the emergence of the autonomous car and the increasing number of sensors collecting data outside and inside the car, life on board the vehicle is being re-imagined. Valeo is seizing the opportunity to address the challenge of individualized in-vehicle wellbeing. Looking well beyond standard comfort features such as temperature control, adjustable seats and soundproofing, the aim is to offer personalized traveling conditions adapted to each vehicle occupant, driver and passengers alike.

This approach to wellbeing factors in outside pollution levels and occupant physiology, morphology, heart rate and body temperature. The system purifies the air in the cabin and adjusts temperature, lighting, sound and fragrance on the basis of vehicle occupant mood and physical condition. A personalized in-car ambiance makes for a unique sensory experience. This wellbeing-oriented intelligence is reflected in the vehicle’s capability to adapt to situations and respond to circumstances. In an increasingly connected mobility environment, the Valeo system may one day perform real-time analysis of the in-vehicle situation; interact with the vehicle occupants, learning their habits and preferences, and adapting accordingly; and store the collected data so that it can follow the user from vehicle to vehicle.

Traffic trouble-spots, also pollution trouble-spots

According to a UK survey on atmospheric pollution, the air at traffic light locations in built-up areas contains up to 29 times more harmful particles than on roadways with moving traffic.

Joint research by Duke University (North Carolina, USA), Emory University Emory (Georgia, USA) and Georgia Tech (Georgia, USA) point to time of day and sunlight exposure as two major variables that increase pollution levels.

3 Tragic statistic: over a period of roughly 15 years, from 1998 to 2013, an average of 38 children per year died in the United States from heart failure while forgotten in a locked parked car.
At CES 2018, two Valeo demonstrator vehicles will be offering first-hand insights into this new kind of traveling experience, with an emphasis on health and wellbeing. The Valeo Health & Wellbeing program has three innovation focuses: air quality, thermal comfort and emotional state monitoring.

**Air quality, 98% anti-pollution protection**

Surveys reveal that the air in a vehicle cabin can be up to four times as polluted as the air outside. Air quality improvement is naturally a key component of Valeo’s Health & Wellbeing concept.

Valeo’s innovative system purifies the air that vehicle occupants breathe. This is done using a combination of three devices: a high-efficiency filter that traps 98% of ultrafine particles and toxic gases (which are not detected in today’s vehicles), a high-performance ionizer that cleans and deodorizes the vehicle cabin, and a purifier connected to sensors that detect inside and outside air quality and convey this information via the human-machine interface in real time. Passengers can even switch the air purifier on remotely from their smartphones to pre-condition the cabin before entering the car.

**Thermal comfort**

With the Valeo Health & Wellbeing concept, the thermal management system adapts almost instantly to individual needs in all climate conditions. This operation makes very little demand on vehicle energy, an especially important factor in electric vehicles, as it does not detract from vehicle range. In winter, high-performance radiant surfaces offer fast, silent and comforting heating precisely where each passenger needs it. In summer, the AquAIRius® instantaneous breeze system cools the vehicle occupants down rapidly making limited use of the air conditioning system. The climate control sensation is enhanced by the use of color in the interior lighting, with warm shades for heat and pale shades for cool. Specifically, at equal temperatures, red lighting gives the sensation of a 2°C (~4°F) increase and blue light an impression of a 2°C (~4°F) decrease.

Perhaps the most singular climate-control feature of the Valeo Health & Wellbeing system is its machine learning capability to adjust the interior temperature to the physiological condition of the vehicle occupants. Biosensors and infrared cameras detect heat exchanges between the passengers and the environment as well as passenger heart rates, respiratory rates, types of clothing, age, sex and morphology in order to fine-tune the control of seat heating, air conditioning and radiant surfaces. With this technology, passengers are instantly immersed in a personalized cocoon of comfort.
Choose the perfect temperature without affecting other passengers’ comfort

Current thermal systems control the temperature of the entire cabin, regardless of the number of passengers. While, in certain premium models, the air temperature from face-level vents can be adjusted by compartment and complemented by seat heating, finding the ideal temperature takes time and consumes a lot of energy.

Valeo’s individualized solution offers three key advantages over existing systems:
- Each passenger enjoys comfort tailored to their personal needs, without affecting the temperature selected by other passengers.
- Valeo’s solution is more energy efficient, making it perfectly suited to the challenges of the electric vehicle.
- It is twice as silent as current systems, eliminating between 3 dB and 5 dB of sound intensity by reducing air output from 300 kg/h to 150 kg/h.

The car’s sensors will be able to detect when a driver is drowsy and release an energizing fragrance while intensifying the interior lighting and discharging a flow of cool air. They will also be able to identify driver stress and react by dispensing a relaxing scent, refreshing the passenger environment and ionizing the air.

Valeo ionizers help soothe tension and relieve headaches and travel sickness. Negative ions, which are abundant in nature, have a natural anti-depressant effect. When released in the vehicle cabin, they create a soothing atmosphere that might be likened to that experienced in the country or on the coast.
Valeo, central to the emergence of digital mobility

The digital revolution is paving the way for new forms of mobility. Serving this trend, Valeo’s innovations enable mobility operators to deliver new services, imagine new functionalities and generally simplify their business, as illustrated by the following three examples:

**Autonom Cab, the first urban robo-taxi, featuring the market's first mass-produced LiDAR**

*Working demonstration on North Plaza track*

Visitors to CES 2018 will be able to witness two market premières in one, as France’s Navya presents its all electric, driverless Autonom Cab. As well as being the first robo-taxi, the vehicle is fitted with seven Valeo SCALA® laser scanners. The first and only mass-produced LiDAR on the market, the affordably priced Valeo SCALA® provides the three-dimensional vision the vehicle needs (over a distance of more than 200 m) to maneuver in total safety. The technology delivers guaranteed obstacle detection and accurate vehicle positioning by creating a 3D map of the surrounding environment.

Valeo acquired a stake in Navya in October 2016 to help the company achieve its goal of implementing groundbreaking mobility solutions. In line with ambition, Autonom Cab provides a response to the major challenges of driving in the city, where traffic congestion, population densification and the need to reduce CO₂ emissions combine.

**Mov’InBlue™, a car-sharing and fleet management solution**

*Mov’InBlue™* is a secure vehicle reservation and fleet management solution developed in partnership with Capgemini, a leader in consulting, technology and outsourcing services. Based on Valeo’s InBlue® smart key technology, it allows users to lock and unlock their vehicle and start the engine all from their smartphone, without access to the GSM network.

With *Mov’InBlue™*, car rental companies can offer their customers an end-to-end digital experience from vehicle pick-up to drop-off, eliminating the constraints of face-to-face service such as reception, opening hours, long lines and hard-to-find vehicles. At the same time, *Mov’InBlue™* reduces the amount of time vehicles are off the road for inspections, cleaning, refueling and other maintenance operations, and enables leasers to develop new business models, such as car rentals by the hour.

This solution will enable corporate fleet managers to promote efficient car-sharing by optimizing reservation scheduling and key management, for example. Real-time data collection on maintenance, usage rates and more will also allow them to manage both the size and availability of their fleet.

*Mov’InBlue™* is compatible with more than 95% of vehicles on the road.
Cyber Valet Services, an automatic parking solution

*Cyber Valet Services* is a unique solution jointly developed by Valeo and Cisco, which enables vehicles equipped with *Valeo Park4U®* technology to park safely and autonomously, i.e., without a driver on board, in connected car parks. How it works: the driver simply gets out of his/her vehicle at the car park entrance and activates the automatic parking system using a smartphone. The vehicle then continues its journey in automatic mode until it has finished parking. In just a few clicks, it can be set in motion again to meet the driver at the designated pick-up point in the car park.

The vehicle drives itself inside the car park by combining the power of automated parking technologies (*Valeo Park4U®*), Valeo onboard telematics and secure key systems (*Valeo InBlue®*) with Cisco Parking Controller technologies, which equip car parks with Wi-Fi, video sensors and artificial intelligence-based solutions.

The vehicle sensors, together with the information provided by the equipment installed in the car park, allow the vehicle to map out its environment with a high level of accuracy and anticipate and calculate its journey at any time up to the completion of the parking maneuver. The vehicle is able to navigate complex parking facilities in total safety, even multi-story garages, by processing all of the necessary information with the help of an integrated GPS service and the vehicle’s own sensors.

In addition to the space freed up by optimized parking, equipped car parks will be able to provide customers with convenient new services such as automatic car washing, maintenance and automated electric vehicle charging. For vehicle fleet managers, this service will optimize car park use by reducing the time it takes to drop off and pick up vehicles.
Innovation, at the heart of Valeo’s strategy

Valeo is an automotive supplier, partner to 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 intuitive driving.

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® laser scanner is the only mass-produced device of its kind on the market today. More than 12 million vehicles worldwide are already fitted with Valeo automated parking systems. 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 In’Blue®, a securely shareable virtual smartkey for locking, unlocking and starting a vehicle from a smartphone.

Valeo-designed, Valeo-made high-tech products stand at the intersection of three revolutions disrupting today's automotive industry: vehicle electrification, autonomous vehicles and digital mobility.

Innovation at the heart of the strategy

Innovation is a cornerstone of Valeo’s strategy, with R&D drawing a budget approaching 1.6 billion euros in 2016, i.e., 11% of the Group’s OEM sales. In 2016, Valeo filed more than 1,800 patent applications worldwide and took first place in the intellectual property institute (INPI) ranking of French companies filing patents in France. Innovation is clearly instrumental in driving Valeo’s growth, with products introduced less than three years ago representing 50% of order intake in 2016.

Valeo’s approach to innovation starts with a detailed worldwide analysis of major trends in society (demographics, population aging, urbanization, shifts in mobility needs, etc.) over a timeframe of 30 to 50 years, this providing input for drawing up a detailed ten-year technology roadmap.

Teams at Valeo’s 20 research centers and 38 development centers worldwide harness and continually enrich the most advanced skills in areas such as artificial intelligence, deep learning and big data, working with an agile, flexible startup spirit to design and develop innovative new technological solutions. Valeo also fields a network of 1,000 experts on key subjects, tasked with specifying and sharing best practices in innovation and design.

Across a wide ecosystem spanning universities, laboratories, companies in other industry sectors and startups, Valeo leverages cooperative innovation to diversify its sources of inspiration and streamline its development cycles. Valeo estimates that there are around 30,000 startups whose work in relevant areas may hold particular interest. To help it pinpoint the most promising cooperation opportunities, Valeo invests in capital-risk funds such as Cathay Innovation, which is especially active in the San Francisco Bay Area, China and France.
Valeo key figures:

16.5 billion euros in sales for 2016
⇒ Target: 27 billion euros in sales for 2021

1.596 billion euros in R&D spending in 2016 (11.1% of Valeo’s OEM sales)

23.6 billion euros in order intake in 2016
⇒ 50% of 2016 order intake corresponded to innovative products released less than three years ago

A footprint in 32 countries
⇒ 169 plants, 20 research centers, 38 development centers, 15 distribution platforms

106,000 employees

Visit Valeo at CES

Central Plaza : CP 24
North Plaza : NP 5
Appendix

Follow our latest news on social media

Twitter: https://twitter.com/Valeo_Group

Facebook: https://www.facebook.com/Valeo.Group/timeline

LinkedIn: https://www.linkedin.com/company/valeo/

YouTube: https://www.youtube.com/user/ValeoGroup