PRESS KIT

VALEO’S INNOVATIONS IN THE RAPIDLY CHANGING WORLD OF TRANSPORTATION

IAA Commercial Vehicles 2018 – Hanover
Press kit
Contents

Valeo at the IAA CV 2018 .................................................................................................................. 3
Challenge no. 1: reducing CO₂ emissions ......................................................................................... 4
Challenge no. 2: improving operational efficiency in transportation ............................................ 6
Challenge no. 3: improving on-board comfort and safety ................................................................. 8
Challenge no. 4: bringing the digital revolution to the world of transportation ......................... 11
Innovation: at the heart of Valeo’s strategy ......................................................................................... 12
Valeo at the IAA CV 2018

From September 20 to 27, 2018, Valeo is taking part in the 67th IAA International Motor Show for commercial vehicles (IAA CV 2018) in Hanover. The Group is presenting its latest technological innovations at the epicenter of the revolutions disrupting the world of transportation. The technology transforming the automotive industry is also a game changer for vans, trucks, buses and coaches, with electrical systems becoming an integral part of mechanical systems, driving assistance technology increasingly put to use for safer, more autonomous vehicles, and digital solutions paving the way for the development of new functions.

As the world leader in CO₂ emissions reduction, Valeo is showcasing its range of 48 V electrification systems, which contribute to reducing fuel consumption in commercial vehicles (see page 4). With their affordable price tag, these solutions help make hybrid and electric vehicles – synonymous with cleaner mobility – more broadly accessible.

Other avenues for saving fuel include more efficient transmission systems and effective heat flow management inside the vehicle. Valeo has developed air conditioning units for buses and coaches that are equally effective in extending vehicle driving range and reducing CO₂ emissions (see page 6). Used alongside electrification solutions, these innovations work together to reduce the vehicles’ total operating costs.

In autonomous driving, Valeo is pursuing the same goal of making its advanced technologies more widely available. The Group already boasts the automotive industry’s largest range of sensors, comprising ultrasonic sensors, cameras, radars and LiDAR (Light Detection And Ranging) systems. These technologies act as the vehicle’s eyes and ears. At the 2018 motor show in Hanover, Valeo is presenting its sensors specifically developed for trucks, designed to make self-driving easier. In particular, these include Solid-State LiDAR technology and a number of systems installed inside the truck’s cabin (see page 8), aimed at enhancing safety by scanning what is happening both outside and inside the vehicle. As these sensors need to work at all times and in all types of weather, the Group is also presenting Valeo everView Sensor Cleaning, an automatic LiDAR cleaning device, at the IAA CV 2018 (see page 8).

Lastly, since vehicle sharing is already common practice in the road transportation sector, Valeo is exhibiting a unique digital solution based on its virtual smartkey system (Valeo InBlue®) to make sharing even easier, with an unprecedented level of security (see page 11).

DID YOU KNOW?

65 BILLION PACKAGES DELIVERED WORLDWIDE...
AND YET DIESEL DELIVERY VEHICLES ARE DENIED ACCESS TO CERTAIN CITIES

This is a real quandary for delivery companies.

According to a study by international transaction company Pitney Bowes (2017 Parcel Shipping Index), deliveries of packages worldwide have increased by nearly 48% in two years, from 44 billion units in 2014 to 65 billion in 2016. This reflects the development of e-commerce. The study predicts that growth in home deliveries could reach around 30% by 2025, which seems inevitable given that consumers are becoming more and more connected. Nearly 45% of the world’s population currently has access to the Internet, compared with 7% in 2000.

However, cities are increasingly restricting access to vehicles, especially delivery trucks, with diesel engines or CO₂ emissions above a certain threshold. Last-mile logistics are becoming more complicated – and this is where Valeo’s innovative vehicle electrification solutions using affordable technology such as 48 V really demonstrate their value. These systems, presented at the IAA CV 2018 in Hanover, bring together seemingly irreconcilable requirements.
Challenge no. 1: reducing CO₂ emissions

At the IAA CV 2018, Valeo is showcasing innovations that leverage its automotive expertise to help reduce fuel consumption and CO₂ emissions in commercial vehicles.

DID YOU KNOW?

At the center of its stand at the Hanover 2018 motor show, Valeo is exhibiting a demonstration truck equipped with 48 V starter-alternator technology. This 19-metric ton, 8-liter truck, which has already been road-tested, has had its conventional alternator replaced by a Valeo 48 V integrated Belt Starter Generator (iBSG) with a 48 V, 300 Wh battery and a DC/DC converter. This allows instant fuel savings of 3% to 5%, depending on the driving cycle, compared to the vehicle’s original configuration. *

* Therefore, for a standard 19-metric ton truck covering approximately 100,000 kilometers per year and consuming 20 liters/100 kilometers in a conventional configuration, annual savings could represent 1,000 liters, or around 900 euros.

Reducing CO₂ emissions through electrification

As a pioneer and world leader in electrification, with one in every three cars worldwide fitted with a Valeo system, the Group is also putting its expertise to use in commercial vehicles.

Valeo has developed a hybrid system combining low-voltage (less than 60 V) electric motors with traditional combustion engines. Since the technology can be easily adapted to all engine types and manufactured in series to deliver economies of scale, it offers the advantage of affordability.

Two hybrid systems are being presented at the IAA CV 2018.

1. **Valeo 48 V iBSG system – Starter-alternator with integrated electronics**

   The Valeo 48 V integrated Belt Starter Generator (iBSG) is available in two versions, 4 kW or 8 kW of continuous power. It also recovers the vehicle’s kinetic energy during braking and deceleration and stores it as electrical energy in a 48 V battery to reuse in two different ways:
   - To boost the engine during acceleration.
   - To power various electrical components.

   Valeo’s iBSG system helps reduce fuel consumption by 3% to 5%¹ in medium duty vehicles and 5% to 10%¹ in light commercial vehicles, depending on the drive cycle.

2. **The Valeo 48 V GMG system – Gearbox motor generator**

   To take energy savings one step further, Valeo has developed a new gearbox motor generator (GMG), rated at 48 V and 15 kW peak. This innovative device reduces fuel consumption by 5% to 8% in medium duty vehicles and 10% to 20% in light commercial vehicles, depending on usage conditions and driving patterns.

---

¹ All averages established based on Valeo simulations.
Reducing CO$_2$ emissions through automated transmission systems

Vehicle manufacturers are increasingly turning to semi-automatic transmission systems, which have a number of advantages over conventional gearboxes, most notably improved total cost of ownership (TCO) of fleets, with:

- Significant fuel savings of 3% to 5%, as the choice of gear is constantly optimized in relation to the operating point, which also reduces CO$_2$ emissions.
- Easier, less costly driver recruitment, thanks to lower training requirements and improved driver loyalty.

These semi-automatic transmission devices go hand in hand with engine downspeeding systems. All these new technologies call for innovative transmission systems. This is because the mechanics of downspeeding bring about increased torque, intense and sometimes noisy vibration, and stress on the gearbox.

To address these problems, Valeo has developed its revolutionary High Torque Low Stiffness (HTLS) clutch disk technology for optimal flexibility, even at high torque. The device can improve dampening performance by 40% while delivering torque of up to 4,200 newton meters, thereby reducing engine speed by up to 200 RPM and generating fuel savings of between 1% and 2%$^2$.

---

$^2$ All averages established based on Valeo simulations.
Challenge no. 2: improving operational efficiency in transportation

Light commercial vehicles, trucks, buses, coaches and farm machinery must be able to operate for as long as possible with minimal maintenance. Some of these vehicles may even cover millions of kilometers in their lifetime. In industries where supply chains follow a just-in-time method, it is vital to ensure that equipment is highly dependable.

At the IAA CV 2018, Valeo is exhibiting its innovative thermal systems to help ensure that these vehicles are efficient, robust and durable.

Climate control compressors... that can also compress operating costs

Valeo is presenting its TM series of compressors in Hanover. These products all meet Euro 6 environmental standards and help reduce operating costs for transportation companies.

Their technical features are as follows:
- No oil change required.
- 50% lighter than conventional compressors.
- Up to 40% fewer parts.
- Significantly reduced noise and vibration.

Three innovative air conditioning systems for buses

1. Valeo REVO-E pro: an answer to the climate control challenge in electrobuses

In a world first, Valeo is unveiling the Valeo REVO-E pro rooftop air conditioning unit for electrobuses, featuring heat pump technology.

Thanks to its high-efficiency, fully automatic defrosting feature, the Valeo REVO-E pro heat pump is able to function even at temperatures as low as -15°C, which makes the Valeo system unique.

DID YOU KNOW?

In urban driving conditions in winter, a vehicle operating in all-electric mode uses practically as much energy to heat the cabin as it does to drive.

In this situation, the thermal management challenge is to ensure passengers enjoy the level of comfort they expect while using as little energy as possible. For this reason, Valeo develops various heat pump architectures that deliver optimal cabin heating and superior air conditioning performance, with a minimal impact on electric vehicle driving range.
2. **Valeo Thermo plus: a heating unit with low CO\(_2\) emissions**

   The new Valeo Thermo plus heating unit is high on performance and low on emissions. It can be used in buses with internal combustion engines and also in electrobuses, for which it can provide additional heating for use at very low outside temperatures, without having to draw on the vehicle’s electrical energy reserves. This allows the vehicle to remain autonomous and for its passengers to benefit from a heating unit with very low CO\(_2\) emissions.

3. **Valeo SPump range: enhancing the performance of electric and hybrid buses worldwide**

   Valeo is presenting its extended line of Valeo SPump water pumps, among the smallest and lightest models on the market. Specially developed for electric, hybrid and plug-in hybrid buses, they have a wide range of applications, including the cooling of electrical components. Their breadth of temperatures, from -40°C to 95°C, means they can adapt to any situation.

---

**DID YOU KNOW?**

**NEARLY 6.7 BILLION PEOPLE WILL BE LIVING IN CITIES IN 2050, COMPARED WITH 7.6 BILLION PEOPLE IN TOTAL ON THE PLANET TODAY**

Urban areas are set to undergo profound changes, and buses will need to adapt accordingly. The United Nations (UN) predicts that the number of city dwellers worldwide will increase by 70% by 2050, to represent a total of nearly 6.7 billion people. By 2035, metropolitan New York is expected to have a population of 21 million, but will be the only Western city among the planet’s top 15 megacities, with the 14 other major metropolises located mainly in Asia, South America and Africa. According to the UN, Delhi is set to take the lead with 43 million citizens, followed by Tokyo (36 million), Shanghai (34 million), Dhaka (31 million) and Cairo (29 million).

Urban and peri-urban mobility will be an essential part of these cities’ development policies, with public transportation and buses taking on a vital role in driving the societal revolution forward. This is where Valeo’s innovations come in, with technologies for saving on fuel and reducing CO\(_2\) emissions that are suitable for roll-out all over the world.
**Challenge no. 3: improving on-board comfort and safety**

At the IAA CV 2018, Valeo is presenting driver assistance systems for better safety, comfort, ease of use and quality of life in vehicles.

**Solid-State LiDAR beam sensor for trucks**

In the area of driving assistance, Valeo boasts the automotive industry’s widest range of sensors, comprising ultrasonic sensors, cameras, radars and LiDAR (Light Detection And Ranging) systems. These technologies act as the vehicle’s eyes and ears. At the Hanover 2018 motor show, Valeo is showcasing its Solid-State multi-beam fixed LiDAR system, which greatly improves safety for truck drivers.

With a range of up to 100 meters, the sensor is able to detect vehicles approaching from the front as well as surrounding pedestrians, bicycles, motorcycles and cars. It can work at night or in poorly lit areas and in adverse weather conditions such as rain or fog.

Using its field of vision, the sensor can activate various functions such as automated emergency braking (AEB) and turning assistance, eliminating the blind spots specific to drivers of large trucks. It can also contribute to other automated driving functions, including traffic jam assist and automated parking.

**Valeo everView Sensor Cleaning, to keep sensors running smoothly**

Seeing and perceiving in any situation and in all weather conditions is the first decisive step to smooth sensor operation. That is why Valeo has launched Valeo everView, the first fully automatic cleaning device for LiDAR sensors, a key component for the development of autonomous driving.
Valeo Driver Monitoring, safety through eyes

Valeo Driver Monitoring can identify the driver, monitor his or her attentiveness and quickly ensure good control of the vehicle when it switches from automated to manual driving mode.

The system works through a dash-fitted camera pointed at the driver’s face. An integrated control unit analyzes how open the eyelids are, where the pupils and eyes are positioned, and how the head moves. By combining these data with indicators about the vehicle's trajectory, software is then able to determine how attentive or distracted the driver is and, if necessary, alerts the driver. The system therefore helps improve road safety, since it can prevent drivers from falling asleep or getting distracted. In fact, it is set to become an essential feature of highly automated vehicles.

Lastly, additional software can identify the direction of the driver’s gaze, allowing him or her to activate interfaces or context menus without physical contact, which also contributes to enhanced safety.

Valeo Hands On/Off Detection, safety through hands

The Valeo Hands On/Off Detection (HOD) system also ensures a safer transition between automated and manual driving mode by detecting whether the driver’s hands are on the steering wheel.

Light-up strips on the wheel indicate the current level of automated driving and communicate safety information to the driver.

While systems currently available on the market use independent sensors for this safety function, Valeo’s device can be integrated directly into heated steering wheels (an increasingly popular option) by any vehicle manufacturer to reduce installation costs.
Valeo Steering Wheel Switches, safety at your fingertips

Valeo has developed innovative, easier-to-use steering wheel switches (SWS) designed to improve driving comfort and incorporate new functionalities. Valeo SWS uses touchpads instead of mechanical push buttons, with a single touchpad replacing multiple push buttons to control several functions. By making such functions easier to use without the driver having to look away from the road, this device adds a further layer of safety.

A healthier, more comfortable interior

A leader in cabin air filters, Valeo provides a range of technologies to cleanse the air inside vehicles, depending on the type of outside pollution.

These innovative technologies are particularly important as applied to truck drivers who, since they spend so much time in their vehicles, are exposed to air pollution in their daily working life.

Valeo is presenting these solutions at the IAA CV 2018:
- Made from tight-knit reinforced fibers, the high-efficiency Valeo PM 2.5 filter traps 98% of ultrafine particles and toxic gases, which currently available filters are unable to catch. Valeo also makes a filter with additional anti-allergen properties to neutralize allergens such as pollen as air enters the cabin.
- To enhance well-being inside the vehicle, Valeo has developed a multi-fragrance diffuser, with scents that are more than just pleasant for the people on board: they are also designed to increase driver attentiveness or prevent drowsiness and motion sickness. The diffuser can even soothe symptoms of a cold (by means of a eucalyptus fragrance, for example).
Challenge no. 4: bringing the digital revolution to the world of transportation

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

Vehicle sharing is already common practice in the world of transportation, and Mov’InBlue™ brings it up to date with an unprecedented level of security. This secure fleet management solution was 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.

Mov’InBlue™ gives fleet managers a digital experience from vehicle pick-up to drop-off, with no need for users (for example, two drivers who share the same truck) to physically meet to hand over the key.

At the same time, Mov’InBlue™ reduces the amount of time vehicles are off the road for inspections, refueling and other maintenance operations, and enables lesasers to develop new business models, such as vehicle rentals by the hour.

This solution is an efficient way to share trucks 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.
Innovation: at the heart of Valeo’s strategy

Valéo is an automotive supplier, partner to all vehicle makers worldwide. As a technology company, Valéo proposes innovative products and systems that contribute to the reduction of CO₂ emissions and the development of autonomous driving.

One in every three vehicles worldwide is equipped with a Valéo electric system. In autonomous driving, Valéo boasts the widest range of sensors on the market. Its SCALA® is the only LiDAR (Light Detection And Ranging) scanner in series production today. SCALA® won a 2018 Automotive News PACE (Premier Automotive Suppliers’ Contribution to Excellence) Award, a prestigious international accolade that recognizes innovation, at the prize ceremony on April 9, 2018 in the United States. More than 12 million vehicles worldwide are already fitted with Valéo automated parking systems. World-first runs by Valéo autonomous vehicle demonstrators include 24 hours around the Paris beltway and tours of Europe and the United States.

Valéo also develops digital solutions that improve everyday convenience for vehicle users, such as Valéo In’Blue®, a securely shareable virtual smartkey for locking, unlocking and starting a vehicle from a smartphone.

Valéo-designed, Valéo-made high-tech products place the Group at the epicenter of the three revolutions disrupting today’s automotive industry: electrification, autonomous vehicles and digital mobility.

Innovation at the heart of the strategy

Innovation is a cornerstone of Valéo’s strategy, with R&D drawing a budget approaching 1.9 billion euros in 2017, i.e., nearly 12% of the Group’s OEM sales. In 2017, Valéo filed more than 2,000 patents worldwide and for the second year in a row took first place in the intellectual property institute (INPI) ranking of French companies filing patents in France. Innovation is clearly instrumental in driving Valéo’s growth, with products introduced less than three years ago representing 50% of order intake in 2017.

Valéo’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, providing input for drawing up a detailed ten-year technology roadmap.

Teams at Valéo’s 20 research centers and 35 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.

Valéo 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, Valéo leverages cooperative innovation to diversify its sources of inspiration and streamline its development cycles. Valéo 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 venture capital funds such as Cathay Innovation, which is especially active in the San Francisco Bay Area, China and France.

In December 2017, Valeo announced that it had invested 375 million Chinese renminbi (around 50 million euros) in the Cathay CarTech fund, the first renminbi-denominated fund launched by Cathay Capital specializing in automotives and mobility in China. Cathay CarTech expects to invest up to 1.5 billion Chinese renminbi (around 200 million euros) in innovative companies and start-ups.

China is the world’s largest automotive market and is leading the new mobility sector, while pursuing a strategic roadmap in the three revolutions taking place in the automotive industry: electrification, autonomous vehicles and digital mobility.

**Valeo key figures:**

- 18.6 billion euros in sales in 2017
- 1.895 billion euros in R&D spending in 2017 (nearly 12% of the Group’s OEM sales)
- 27.6 billion euros in order intake in 2017 and 6.1 billion euros for the Valeo-Siemens joint venture, created in December 2016
- 50% of 2017 order intake was for innovative products introduced less than three years ago
- A footprint in 33 countries
- 185 plants
- 20 research centers.
- 35 development centers
- 15 distribution platforms
- 113,600 employees