



PLASTIC OMNIUM

PRESS KIT

PLASTIC OMNIUM, AT THE AUTO SHANGHAI 2023

April 2023



At the 20th Shanghai Auto Show, to be held from April 18 to 27, 2023, Plastic Omnium will showcase its technologies that meet the challenges of cleaner, safer and more appealing mobility. With more than 7,000 employees and 12% of revenue generated in China, the Group is accelerating its growth and ability to offer technologies that target today's mobility challenges.

Plastic Omnium has had an operating presence in China since 2006, and generated more than €1 billion in revenues from this market in 2022. With 38 production plants and 4 R&D centers, the Group has a recognized manufacturing base in the country's key automotive hubs to supply the main carmakers and benefit from the Chinese market growth. Its comprehensive portfolio of technologies makes it a major partner for the mobility of today and tomorrow.

THE CHALLENGE OF CLEANER MOBILITY

Plastic Omnium is at the forefront of low-carbon mobility through its battery and hydrogen electrification solutions, and its technology improving aerodynamism. At this year's show, the Group will showcase a broad portfolio of CO₂ emission reduction technologies, including its **onboard battery systems, high-pressure hydrogen storage solutions** and the **fuel cell system**. In January this year, Plastic Omnium made another leap forward in its hydrogen strategy for China with the signature of a joint venture agreement with Shenergy Group subsidiary Rein to manufacture and market high-pressure hydrogen storage systems. A pilot production line will be completed by 2025, to be followed in 2026 by a new mega-plant with an annual production capacity of 60,000 high-pressure hydrogen vessels. Moreover, Plastic Omnium will showcase its **Active Grille Shutter**, a key technology for the aerodynamics integrated in the front-end module of the vehicle and designed to reduce fuel consumption and CO₂ emissions.

THE CHALLENGE OF SAFER MOBILITY

In China, one car in every four is fitted with bumpers made by YFPO, the Plastic Omnium/ Yanfeng joint venture, which recorded a strong growth of more than 18% in 2022, driven by the momentum of new customers in the electric vehicle segment. Bumpers in particular, and exterior body parts in general - for which Plastic Omnium is the world leader - are becoming the focus for a series of technologies offering an increasing number of smart road safety improvement functions. The Group will introduce its **4D imaging radar** designed with Greenerwave, which is integrated into the bumper for a 180° vision to deliver real-time vehicle environment information, regardless of weather conditions. It will also be showing its latest **smart lighting solutions**, which have foresight and information functionality, for safer mobility.

THE CHALLENGE OF A MORE APPEALING AND CUSTOMIZED MOBILITY

Plastic Omnium will showcase at Auto Shanghai 2023 its **Smart Tailgate** with embedded lighting and display module, while enhancing the vehicle's aesthetic. In response to growing demand for vehicle customization, the Plastic Omnium booth will include a **"Trends Wall"** featuring the full range of design and materials possibilities for vehicle body panels, from the most conventional to the most innovative. Customization also includes exploring new uses that Plastic Omnium is revisiting through the functionalities offered by its modules. More specifically, the Group is presenting its **front trunk for electric vehicles, LID charging module** and **front-end module**. One out of five front-end modules worldwide are made by Plastic Omnium, which offers up to 15,000 different combinations of 140 components.

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Profile

Plastic Omnium in the world

Plastic Omnium is a world-leading provider of innovative solutions for a unique, safer and more sustainable mobility experience. Innovation-driven since its creation, the Group develops and produces intelligent exterior systems, customized complex modules, lighting systems, clean energy systems and electrification solutions for all mobility players. With €9.5 billion economic revenue in 2022 and a global network of 150 plants and 43 R&D centers, Plastic Omnium relies on its 40,500 employees to meet the challenges of transforming mobility. Plastic Omnium is listed on Euronext Paris, compartment A.



EUROPE

48%
of revenue*

23 R&D centers
62 plants



NORTH AMERICA

29%
of revenue*

8 R&D centers
24 plants



CHINA

12%
of revenue*

4 R&D centers
38 plants



ASIA (W/O CHINA)

8%
of revenue*

7 R&D centers
16 plants



REST OF THE WORLD
South America/Africa

3%
of revenue*

1 R&D center
10 plants

*Economic revenue

5 ACTIVITIES

- INTELLIGENT EXTERIOR SYSTEMS
- CLEAN ENERGY SYSTEMS
- NEW ENERGIES
- MODULES
- LIGHTING

22M

bumpers produced every year



1 in every 6 vehicles produced is equipped by Plastic Omnium*

1M

tailgates produced every year



1 in every 3 vehicles produced is equipped by Plastic Omnium*

5M

front-end modules produced every year



1 in every 5 front-end modules produced is a Plastic Omnium* front-end module

18M

fuel tanks and emission reduction systems produced every year



1 in every 5 vehicles is equipped by Plastic Omnium*

40,500
employees



43
R&D centers



150
plants



93
customer brands



28
countries



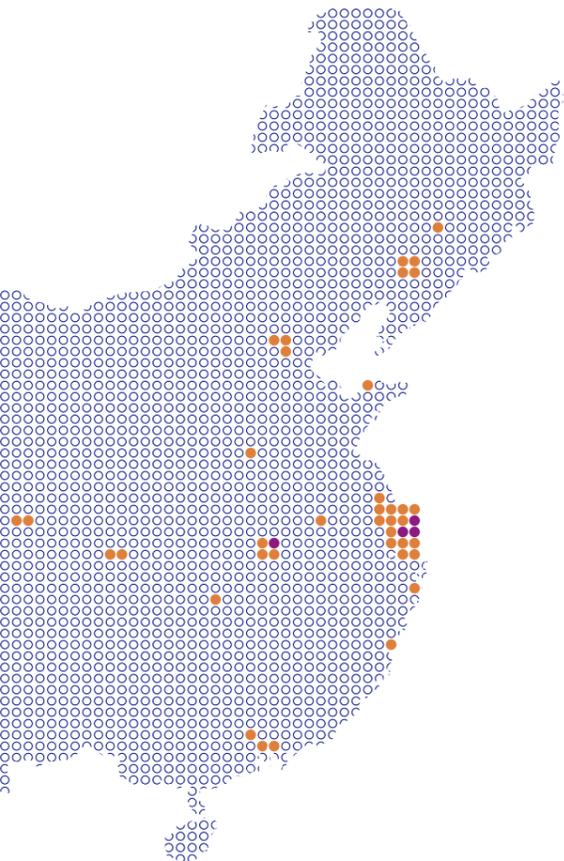
*Source: internal study based on S&P Global Mobility data

Plastic Omnium in China

Plastic Omnium has been present in China since 2006. In 15 years, China has become the Group's largest country in terms of employees (more than 7,000) and has generated revenue of more than one billion euros, representing 12% of Plastic Omnium's total revenue.

The Group now has a recognized production base in the country's main automotive hubs to supply most car manufacturer and support growth in the Chinese market. Plastic Omnium is present in China through its traditional products – body parts, fuel tanks and modules – and is accelerating its development in its new lighting, electrification and hydrogen businesses.

-  Present in China since **2006**
-  **7,000** employees
-  **38** plants and **4** R&D centers
-  **More than 1 billion euros** in sales by 2022
-  **Technology partner** of the largest car manufacturers

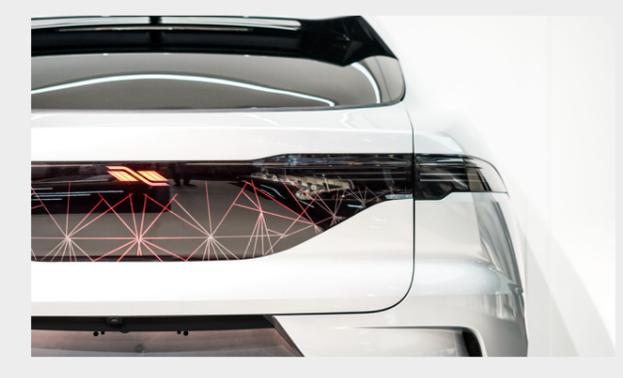


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|-----------|-----------|---------|----------|-----------|
| Anting | Chongqing | Hefei | Ningde | Wuhan |
| Beijing | Dalian | Kunshan | Pudong | Yangzhen |
| Changchun | Daqing | Lingang | Rugao | Yantai |
| Changsha | Dongguan | Nanjing | Shenyang | Yizheng |
| Changshu | Guangzhou | Ningbo | Shunyi | Zhengzhou |



N°1 in bumpers in China

One out of every four cars are equipped with a bumper from YFPO, Plastic Omnium's joint venture with Yanfeng.



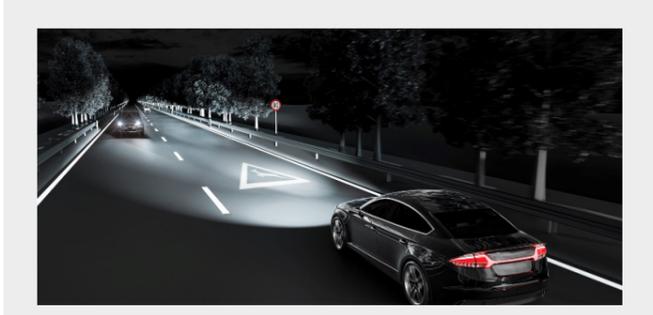
Launch of a hydrogen joint-venture

In 2023, Plastic Omnium and Rein, a subsidiary of Shenergy Group, announced the setting up of a joint venture in Shanghai to produce and market high-pressure hydrogen storage systems for the Chinese commercial vehicle market.



N°2 in modules in China

In 2022, Plastic Omnium opened a new module plant in Lingang Shanghai.



Plastic Omnium accelerates its lighting business in China

Plastic Omnium Lighting in China provides development and manufacturing expertise for lighting modules and electronics.



N°3 in traditional fuel tanks in China

Global leader in onboard energy storage and emission reduction systems, Plastic Omnium develops solutions for every type of powertrain: fuel, diesel, hybrid, plug-in hybrid and allelectric.



Plastic Omnium presents its innovations at the Auto Shanghai 2023

More safety, more enjoyment, less carbon. At the 20th Shanghai Auto Show, Plastic Omnium showcased its innovations for an age where mobility has never been more connected and interconnected, and roads are shared by many different forms of mobility. The Group has the technological and digital expertise to offer solutions that combine frugality with comfort, intelligence and safety. For a sustainable mobility that continues to inspire.

Vehicle body panels are no longer a commodity, they are parts that are packed with technology incorporating complex functions such as advanced lighting solutions and a range of ever more advanced sensors.

Convenience, comfort, looks: mobility is evolving to reflect changing consumer tastes.

The aim? More safety. 

The aim? More enjoyment. 

A **Trends Wall** featuring all the design possibilities for vehicle body panels.



The **Smart Tailgate 2.0**, an intelligent tailgate with communication and lighting functions.



A **front trunk** for electric vehicles that offers new possibilities for consumers.



A **LID charging module**, for a safer and more comfortable charging for users.



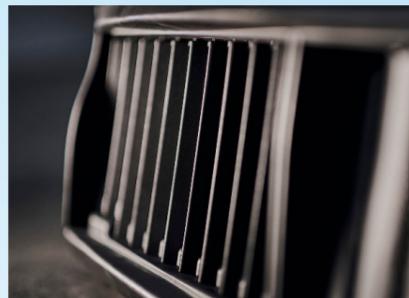
4D imaging radar that can interpret surroundings in 3D and real-time, no matter the weather conditions.



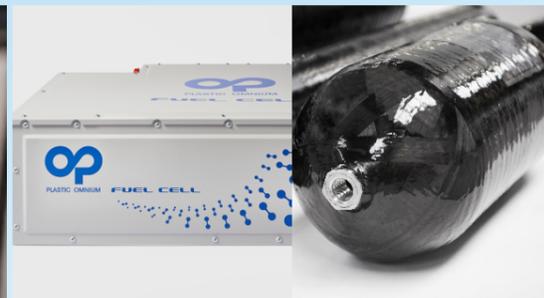
Smart lighting solutions capable of anticipating and informing.



Active Grille Shutter, to improve vehicle aerodynamics and fuel efficiency.



Innovations in **hydrogen**.



Innovations in **batteries and power electronics**.



We are convinced that the energy transition will not use a single type of powertrain but a combination of solutions, and we are ready!

The aim? Reduce CO₂ emissions. 

I. Innovations for a safer mobility

1. Plastic Omnium and Greenerwave transform bodypanels components into a giant radar system using 4D imaging radar

Greener wave. **This is a real revolution.** Bumpers play a very big role in a vehicle's aesthetics as well as their primary function of providing protection. Today, Plastic Omnium and Greenerwave are making use of the large surfaces that bumpers offer to transform them into giant radars offering unmatched real-time 3D imaging capabilities. More than simply a new radar, this innovation means that all body parts are able to house smart surfaces that offer imaging capacities close to lidar, but affordably and without the drawbacks.



Greenerwave has developed wave control technology that paves the way to designing a new generation of automotive radar. Plastic Omnium has mastered the large-scale production of this technology, as well as its integration into plastic body parts.

4D imaging radar is a disruptive technology created by a collaboration between Plastic Omnium and Greenerwave

Greenerwave and Plastic Omnium are fully complementary in the way they work together to develop 4D imaging radar: one partner is expert in electromagnetic waves, the other in industrial processes and vehicle body parts.

Greenerwave is a French deep-tech startup that has developed an innovative electromagnetic wave control technology based on configurable smart reflectors. The technology uses simple, low-cost electronic components that are paired with a series of innovations in control and imaging algorithms.

Plastic Omnium is world leader in the design and manufacture of body panels it renders transparent to radar waves. Plastic Omnium also has significant expertise in the development and production at scale of electronic systems for the automotive industry. It is now leveraging this expertise with its line of 4D radar imaging products.

The Group's current strategy is to design and manufacture radars as a way to increase its added-value by vehicle. The aim? To sell radar components or radar-equipped bumpers directly to automakers.

Plastic Omnium knows how to render a plastic body "transparent" for electromagnetic waves.

Understanding how 4D imaging radar works

The 4D imaging radar is made using a standard radar chipset connected to several antennas located on the vehicle's bodywork. This standard radar creates a wave that is guided to the antennas. The antennas, transmitters and receivers, act as smart electromagnetic reflectors that can reflect the waves in the direction required.

Waves reflected by these smart reflectors spread in front of the vehicle and are reflected as echoes by objects in the surrounding area. Receiving antennas pick up the echoes: specialist algorithms can then reproduce the vehicle's surroundings and categorize the objects found there.

4D imaging radar: a unique technology for the market

- **It offers good resolution:** resolution similar to lidar (0.1° azimuth).
- **It can categorize objects to create images of complex surroundings,** unlike conventional radar which can essentially only detect objects.
- **It is multi-mode,** able to see near and far simultaneously.
- **It is upgradeable:** 4D radar can use the same electronic platform to adapt to a customer's needs across an entire range of vehicles, using the same interface, simply by changing the size and/or number of antennas.
- **It integrates easily into vehicle electronic systems:** the six-antenna 4D radar replaces three radars fitted to a front bumper (one front-end and two for the corners), and simplifies automakers' electronic architecture.
- **It is easy to mechanically integrate into a vehicle:** the fact that the antennas and radar chipset are separate offers a great deal of flexibility in terms of how the system is mechanically integrated into the vehicle, avoiding the styling compromises that using radar can lead to.
- **It reduces repair costs:** separating the radar chipset from the antennas means that in the event of an impact only the damaged antenna needs replacing.
- **It is robust:** If any single antenna is disconnected or broken, the 4D radar can work in degraded mode using the other antennas, meaning that imaging of the surroundings continues to function.
- **It is available:** its imaging capabilities are unaffected by outside conditions (weather, light, etc.), unlike lidar or cameras.
- **It uses little power:** less than 15W for the six-antenna version.



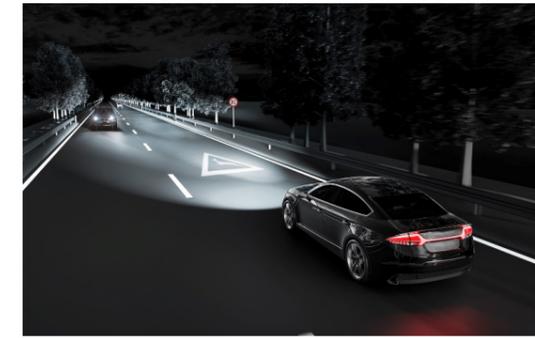
We supply automakers with radar systems that offer Plastic Omnium reveals its Trends Wall and explores the designs of tomorrow excellent resolution (below 0.5°) with a wide field of view (above 180°) and considerably simplify electronic architectures while remaining robust and reliable no matter what the outside conditions are (weather, light, broken antenna from an impact, damage to the bumper, etc.).

4D imaging radar: a response to increasingly strict safety regulations

The regulations Global Safety Regulation (GSR) in Europe, National Highway Traffic Safety Administration (NHSTA) in the USA as well as thirdparty bodies such as EuroNCAP and ChinaNCAP, require the implementation of ever more advanced driver assistance systems (ADAS) in order to improve safety for all road users. These ADAS functions need environment-perception sensors that are more accurate and robust: 4D imaging radar is a response to this requirement.

Plastic Omnium projects that it will begin production of the first 4D imaging radar systems in 2026 and is focusing primarily on premium automakers, robotaxis and self-driving heavy trucks.

This technology has excellent growth prospects: by 2025, it is forecasted to sell 15 million vehicles with Level 2 and a higher driving automation, rising to 22 million by 2032.



In recent years, signal lighting has evolved from a pure safety feature to an important tool for brand signature, upgrading the entire front and rear of a car.

2. Plastic Omnium drives a new generation of mobility lighting



In 2022, Plastic Omnium has formed a new lighting division. Based on the experience of its experts, the new division develops lighting solutions with advanced hardware and software to enable greater design freedom, quality services and driver assistance. From traditional areas, such as headlights and signal lighting, to smart and high-performance products, Plastic Omnium offers a 360° product portfolio for a safer, more sustainable and unique travel experience.

Further expanding the possibilities of traditional vehicle lighting: Front & Signal Lighting Innovations

With its innovative front and signal lighting portfolio, Plastic Omnium offers a wide range of solutions for increased safety and new possibilities for the design of the front and rear of a vehicle.

The showcased portfolio starts with a **Matrix Headlamp** which is already in series and ensures the right illumination of the road at the right time and the right place, providing more comfort for the driver and greater safety for all road users. This is made possible by the constant communication between the vehicle's onboard camera and sensors with the headlamp, which ensures that the LED light sources switch on and off automatically.

The next level is a **Slim Line Adaptive Driving Beam (ADB)** with a 15mm lens offering an extra slim profile for a modern design without compromising on the performance. The front lighting portfolio is round off with a Micro LED Module with more than 20,000 individual addressable pixels that combines intelligent front lighting with semi-HD projections for the display of information onto the road in front of the vehicle.



In signal lighting, **Surface LEDs** are the latest innovation. The patented technology combines an ultra-homogenous OLED look with all the advantages of classic LED light guides: they have a particularly thin design, support multi-color and 3D lighting, and have a longer lifetime. Plastic Omnium's current development, the 3D Surface LED, combines our profound lighting expertise with our know-how in advanced manufacturing technologies and marks the next significant step in signal lighting, further increasing design freedom.

Other Plastic Omnium signal lighting innovations driving the new generation of mobility

Pixelated Rear Light

With 171 individually controllable LEDs, our Pixelated Rear Light allows for various safety and warning signals as well as personalized animations that impress with their high homogeneity from wide viewing angles and different color display.



Dark Lamp

Completely dark when off and very homogeneous when on, our Dark Lamp enables elegant design and significantly reduces power consumption. This is made possible by a high-quality optical system and special foils that maximize efficiency.



Projection Solutions: extending existing lighting functions for more safety and new customization options



Exterior projection systems enhance traditional lighting functions in relevant situations. **Our Dynamic Turn Signal Projection**, for example, projects the turn signal onto the road next to the vehicle to improve visibility and thus provide additional safety for other road users.



Our Dynamic Welcome Light Projection welcomes the driver and all car passengers with animated patterns projected onto the ground as they approach the vehicle. The module that won the CES award 2023, can be installed in the side sill as well as around the entire vehicle. It's based on a Micro-Lens-Array (MLA), a lens system which projects four different graphics independently out of a single unit, thus enabling partial or full surround projection of images or patterns including warning symbols.



The world's first MLA-based projection module for non-static illumination of the ground next to a vehicle.

Customizing of the lighting inside de vehicle



Modern lighting concepts have long been an integral part of a perceived high-quality and appealing ambience. Lighting allows to enhance comfort and well-being and create a feeling of safety. On a functional level, well designed illumination makes it easier for drivers to locate and utilize vehicle functions, particularly at dusk or nighttime.

Plastic Omnium Lighting developed an overhead light console that combines advanced interior lighting functions with an elegant design. The solution is based on the combined expertise of the project partners in smart lighting, plastic processing and injection molding and included, amongst others, a symbol projector.

II. Innovations for a more sustainable mobility

1. Plastic Omnium presents its hydrogen technologies



The partnership between Shenergy and Plastic Omnium, an important step in the development of hydrogen mobility in China

In 2023, Plastic Omnium and Rein, a subsidiary of Shenergy Group, announced the setting up of a joint venture in Shanghai to produce and market high-pressure hydrogen storage systems for the Chinese commercial vehicle market. **The roadmap is ambitious:** a pilot line of high-pressure hydrogen tanks in 2025 and a new mega-plant with an annual capacity of 60,000 high-pressure hydrogen tanks operational from 2026.

The leader in onboard hydrogen mobility systems, Plastic Omnium is presenting its latest innovations at Auto Shanghai: its **high-pressure vessels** and **fuel cell system**. In just over seven years, Plastic Omnium has built an ecosystem covering the entire hydrogen mobility value chain with a comprehensive, cost-effective product line-up at scale that enables the Group to work with all sectors of the market, in heavy and commercial mobility as well as private vehicles.

Plastic Omnium investing in hydrogen

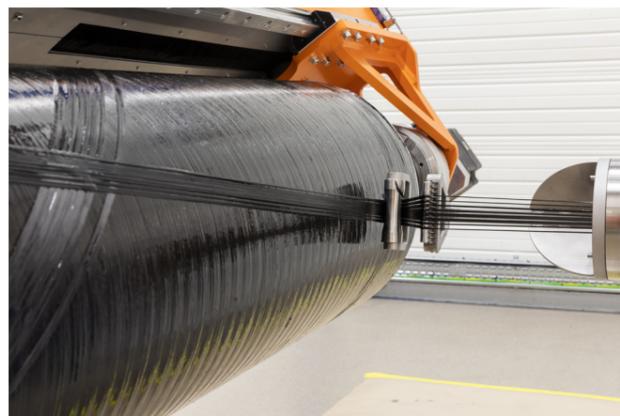
Plastic Omnium is convinced that hydrogen will play a major role in the clean mobility of the future. Since 2015, the Group has invested over €300 million to increase its expertise and industrial footprint across the entire hydrogen value chain. The Group plans to invest an additional €100 million each year in average as it targets revenue of €300 million in 2025 and €3 billion by 2030.

Plastic Omnium presents an extensive range of hydrogen tanks for use by all mobility segments, from small vehicles to heavy trucks

High-pressure hydrogen vessels are designed to store the energy electric vehicles need to move. Type IV hydrogen vessels are made of a plastic liner encased in a carbon fiber winding for resistance.



One of the first stages in the production process is manufacturing the vessel by plastic blow molding – a benchmark technology for manufacturing fuel vessels at Plastic Omnium, based on historical expertise.



The plastic vessel is then wrapped in resin-impregnated carbon fiber to form the vessel's mechanical casing. Using a technique similar to weaving, the winding is produced by crisscrossing carbon fibers uniformly over the entire vessel.

Safety testing is extremely rigorous

Plastic Omnium has spent the past 40 years improving the safety of gasoline tanks and is now in a position to transfer this know-how to designing and developing safe high-pressure hydrogen vessels. The Group has in-depth knowledge of fuel tanks pressure and deformation behaviors in all vehicle scenarios, including in an accident. Plastic Omnium meets extremely exacting regulatory requirements and tests each hydrogen vessel to 2.5 times its service pressure: this means a 700-bar-tank is tested to 1,575 bar. To give an idea of scale, a car tire has a pressure of 3 bar, a metal gas cylinder between 6 and 10 bar, and a high-pressure jet washer between 60 and 80 bars.

Plastic Omnium presents its fuel cell system



This is where it all happens. As its name suggest, the fuel cell system comprises a fuel cell and all the ancillary components needed to make it work.



HOW IT WORKS

- The **fuel cell** acts as the vehicle's power plant, producing electricity that powers the electric motor. It uses a chemical process to combine hydrogen and oxygen in the air to produce electricity, emitting nothing more than water and heat.
- The surrounding **system** comprises over 160 separate components that provide vital additional functions, such as thermal control, electronic management, compressed air, humidity control and voltage conversion.

Fuel cells: a technology introduced to Plastic Omnium's product line-up with the EKPO joint venture

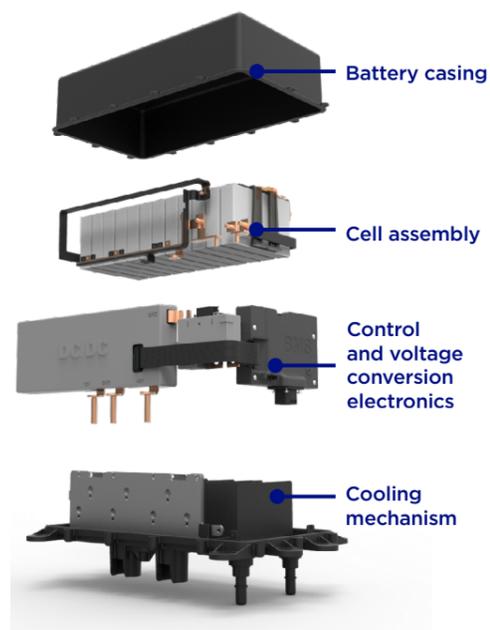
Plastic Omnium and ElringKlinger set up a joint venture called EKPO Fuel Cell Technologies in March 2021. EKPO offers a full range of fuel cells, with power levels from 10kW to 205kW, that comply with automotive industry standards and cover all types of applications, from cars, commercial vehicles, buses and trucks to boats, trains and aircraft.

2. Plastic Omnium presents its expertise in battery systems

Plastic Omnium has become a supplier of onboard mobility battery systems. It designs its electrification solutions holistically: **Plastic Omnium does not advocate any particular electromechanical package, meaning it is able to meet the needs of a highly diverse range of customers, in accordance with their specific applications.**

Plastic Omnium develops power electronics solutions and onboard battery systems for hybrid and all-electric vehicles. The medium-term target? All forms of mobility applications, from car to truck and bus, and all types of electrified industrial vehicles.

Plastic Omnium defines and assembles battery packs by integrating electrochemical components (the cells at the heart of batteries) from different partners, such as disruptive sodium-based solutions from startup Tiamat, and more conventional lithium cells.



Plastic Omnium's added-value? Its excellence as a pack maker

Plastic Omnium builds the system around the cells, the electronics, thermal control and mechanical assemblies. In other words, it assembles various modules around the cells to create a battery system. What it delivers is more than just a product; it delivers complete solutions, leveraging its industrial expertise to provide the market with the best technologies at the best price.

Plastic Omnium aims to provide twin products: a power battery line for mild hybrid vehicles and an energy battery line for 100%-electric vehicles.

Plastic Omnium, a battery and hydrogen systems specialist

Plastic Omnium is highlighting its role as a systems specialist to deliver complete solutions for battery electric vehicles as well as hydrogen electric vehicles. For hydrogen electric vehicles, Plastic Omnium supplies the battery, tanks, fuels cells and the complete system. For battery electric vehicles, Plastic Omnium supplies the complete battery system and the power electronics components.

Offering a comprehensive system incorporating electronics and power electronics

Plastic Omnium's expertise as a systems specialist also extends to key electronics technologies. Voltage converters adapt the 400V-800V of the battery to the 12V-24V needed by a vehicle's onboard network. They fill a bidirectional voltage conversion role. In hydrogen vehicles, they step up the voltage from the fuel cell to match the battery voltage. Inverters transform direct current from the battery to an alternating current to power the electric motor.

3. Plastic Omnium exhibits its Active Grille Shutter to improve vehicle aerodynamics



The Active Grille Shutters (AGS) of Plastic Omnium are ideal for improving a vehicle's aerodynamics - whether the vehicle has a combustion engine or an electric motor.

At high speeds, the shutters automatically close, redirecting air away from the engine compartment and thus enhancing the vehicle's aerodynamic performance. When the engine heats up, the shutters open, allowing air to flow through the engine compartment and cool down the engine.

When a vehicle is moving, air turbulence occurs on its surface - a quiet normal process in aerodynamics. The air flap control ("Active Grille Shutter") from HBPO is integrated in the front-end module according to customer wishes. If the air flaps are closed, air flow around the vehicle is improved and turbulence is reduced, thus significantly reducing fuel consumption and CO₂ emissions.

Depending on the driving situation, the Active Grille Shutter closes or opens the air flaps automatically and guarantees optimum driving conditions. A positive side-effect of this system is the regulation of heat in the engine compartment - depending on requirements and demand, the hot air remains in the engine compartment or is dissipated

When the engine heats up, the shutters open, allowing air to flow through the engine compartment and cool down the engine

The HBPO Active Grille Shutter is integrated into the front module according to the customer's wishes.

Which advantages?

- **Less drag:** closed air flaps smooth out the vehicle front and reduce the drag coefficient. In addition, the engine reaches operating temperature more quickly and remains hot for longer after it has been switched off.
- **CO₂ reduction:** thanks to improved vehicle aerodynamics with the air flaps closed, the fuel consumption and CO₂ emissions are reduced significantly.
- **Less weight:** thanks to lightweight engineering and doing without paint coat, AGS reduces the vehicle weight by an extent relevant for CO₂ emissions and fuel consumption.

III. Innovations for a more appealing and customized mobility

By adding intelligent functions – lighting, sensors, etc. – and extending the scope of what is possible in terms of design, Plastic Omnium is **making cars safer, smarter and more stylish**. Body panels are now packed with technologies that improve the driver experience, safety and vehicle looks.

1. Plastic Omnium presents its Smart Tailgate



The Smart Tailgate 2.0 offers new features and on-board intelligence, through innovative technologies and materials, and advanced design possibilities for lighting and electronics.

Plastic Omnium's Smart Tailgate 2.0 is an intelligent tailgate enriched with communication and lighting functions.

More than a body part, the Smart Tailgate is an intelligent module that illustrates the potential of body design by integrating lighting, decoration and a display module capable of projecting information.

All of these modules are integrated seamlessly, i.e., they are totally transparent and fused with the body's plastic. The architecture of the part is indeed thought upstream so that the modules are an integral part of the body part.

The display module in the center of the tailgate allows the integration of welcome animations or the personalization of the light signature. It is a new means of communication allowing drivers or automated vehicles to exchange information with their direct environment on driving modes, real-time traffic, safety information or shared mobility data.

Lighting is shaping vehicle design more than ever, and the demand for personalization and differentiation will continue to grow in the future.

2. Plastic Omnium reveals its Trends Wall and explores the designs of tomorrow



Body panels, vital to the look of any vehicle

A bumper is what gives a car its final visual appeal. It is a strategic part that expresses a vehicle's personality. Plastic Omnium's core business involves translating the automaker's creative brief into a bodywork part that meets extremely strict specifications and the regulations that apply to the automotive industry.

Operational excellence covering every stage, from initial sketches to final delivery, innovation, quality, the reliability of the products it provides to its customers: these are the hallmarks of everything Plastic Omnium does.

For over 75 years, Plastic Omnium has been a key player in vehicle signatures, going beyond technical skills and regulatory compliance to offer new user experiences through its bodywork parts. Closely in touch with the latest trends, Plastic Omnium anticipates user demands so that it can offer automakers responses to newly emerging trends.



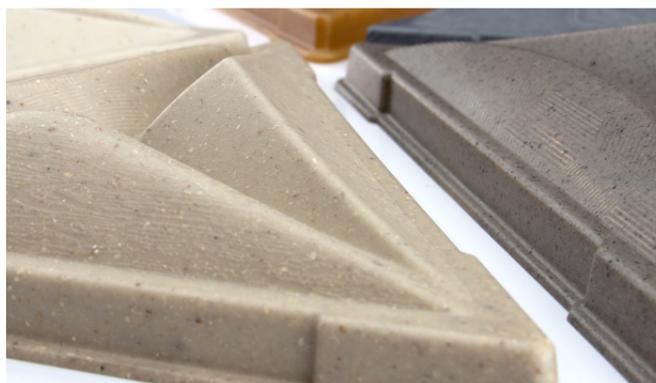
Plastic Omnium's Trends Wall is a display aid used by automotive carmakers to choose combinations of shapes, materials and functions to pave the way for the vehicles of the future. Plastic Omnium introduces new design solutions that meet the customer desire for vehicle customization.

- **All green:** where sustainability, style and performance meet
- **"À la carte":** current trends for no-limits customization
- **All in one:** design teamed up with technologies

Plastic Omnium combines the design-led approach vital to its customers with its expertise in integrated functions. The aim is clear: to make it possible for the client to customize its vehicle, with approved solutions according to the design you choose, while also limiting the impact on the environment.



Today, Plastic Omnium can manufacture a bumper made from up to 50% recycled materials without any compromise in terms of look or finish.



3. Plastic Omnium presents increasingly customizable modules in line with new usages and helps users' daily lives

Vehicle electrification is opening up new opportunities for Plastic Omnium as it continues to increase the added-value it offers. New vehicle architectures bring with them new functions and possibilities for innovating and creating new modules.

Plastic Omnium's watchword is to put itself in the user's shoes in order to offer the best technologies. The Group is showcasing its front trunk - so called "frunk" - and automatic Charge LID, two edifying examples that reflect the strong demand for increasingly customized modules.



Plastic Omnium produces 1-in-5 of all front-end modules worldwide.

Plastic Omnium unveils its intelligent frunk and makes multimodal mobility possible

Plastic Omnium is rethinking the role of the frunk: more than simply a storage space, the front trunk incorporates a series of functions that meet specific needs end-users may have. For example, the fronttrunk means that people living in the city can make the first stage of their journey by car and charge their electric scooter stored in the front trunk - while driving their car.





HOW IT WORKS

The electric car frees up space under the hood: with the disappearance of engines and batteries fitted under the floor, the space at the front of vehicles is ready to take on new roles. Plastic Omnium, via its HBPO division, the leader in complex modules for vehicles, offers a new use for a new space: a front trunk module that goes beyond the traditional storage function.

A front trunk tailor-made to make life easier for users. Originally, frunks were simply enclosed spaces for storing items. Plastic Omnium takes things to the next level, offering a complete service tailored to specific uses: for campers who want to store a cooling box and fold-up table, for urbanites who want to bring their electric scooter along to travel the last mile, or to recharge their tablet while they drive, and so on. The goal? To offer more added value to the end user.

Plastic Omnium exhibits a cutaway version of its frunk to reveal the full extent of its complexity

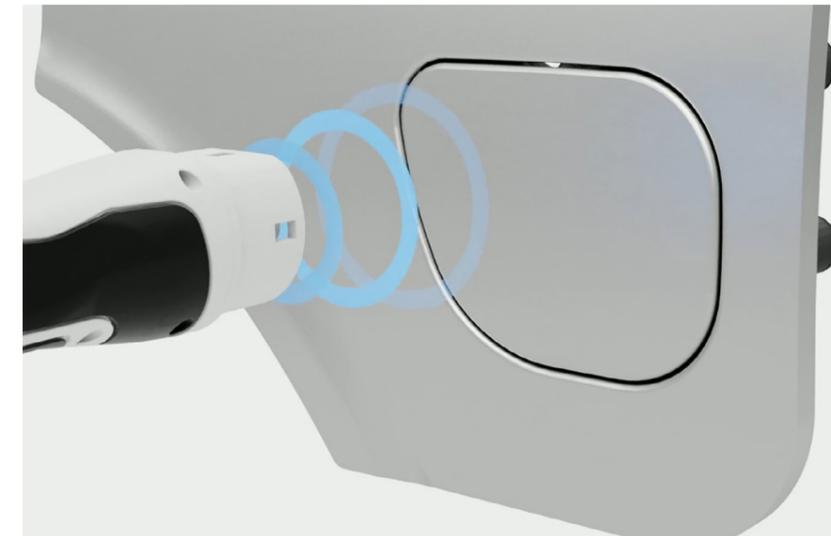
Previously, the frunk was offered to customers as a series of separate elements, not a one-piece solution. Plastic Omnium has created a module that makes it possible to sell a complete ready-to-use solution. Plastic Omnium can rely on the long-standing expertise of its HBPO division in assembling modules of ever greater complexity.

Which functions can be incorporated?

- Built-in solar panels for energy production
- Inductive charging port for micro-mobility vehicles
- Built-in removable cooling bag
- Primary screen wash system with high-pressure pump for cleaning, sensors, headlights and windshield
- Water refills
- Several storage areas

And much more besides...

The automatic Charge LID: from a gadget to a trend



Plastic Omnium's automatic Charge LID system for electric vehicles offers far more than just charging. Plastic Omnium leverages the long-standing expertise of its HBPO division in assembling modules of ever greater complexity to offer a host of technologies packaged into a single module, including an actuator driven lid door, multiple lighting solutions, charge indicator, de-icing function up to personalized ground projections, etc.



The automatic Charge LID is an important solution that supports the rollout of self-driving vehicles.

Plastic Omnium is adding services inside the Charge LID to offer ever more added value:

- A necessary solution to support the development of autonomous driving vehicles. With the development of increasingly autonomous driving, automatic recharging openings are becoming a necessity as no driver will be available.
- Same for **autonomous valet parking solutions, enabling vehicles to park** close to each other, thereby making substantial savings in space and investment. Also here, automatic charging solutions will be a necessity
- **Plastic Omnium integrates lighting** in its module to guide the user when inserting the recharge. Very useful in night conditions!
- **Plastic Omnium integrates a defrosting function of the opening lid by vibration.** The actuator is then powerful enough to open the door. A situation that is not uncommon in cold countries!
- **A comfortable solution:** with it, there is no need to open the door by pushing or pulling. The door opens automatically via a mobile application, a button directly integrated in the car keys or up to a movement recognition.

IV. Plastic Omnium takes major steps towards the “Software Defined Vehicle”



Plastic Omnium has carried out a far-reaching transformation of its product line-up, hand-in-hand with a major increase in the role played by software. This applies particularly to the latest additions to the Plastic Omnium product family: lighting and electrification technologies. Plastic Omnium is moving up a gear as software becomes omnipresent

Plastic Omnium is redesigning the car for a software-based world where mobility is increasingly electric, connected, autonomous and shared. The software-defined vehicle is becoming the rule. Plastic Omnium stands ready to support this trend and offer its advanced expertise. Op’n Soft is the new nerve center for software at Plastic Omnium. It developed from the realization that the Group is home to a range of related skills such as software architecture, coding, integration and validation testing, that are common to several of its activities. A growing number of products from Plastic Omnium incorporate software, such as lighting, radar, and fuel cells. What do they all share? Software and electronics. Plastic Omnium ensures that all its products meet software market standards, and uses the strengths of the products in its line-up to offer unique new services. With Op’n Soft, Plastic Omnium has reorganized all its software-related activities to gain ASPICE¹ certification and offer AUTOSAR² platforms that make access to plug-and-play components easier for its customers. Headquartered in Paris, Op’n Soft will be a key asset for Plastic Omnium as it enters the automotive software market and develops new services and products.



A key issue for Plastic Omnium is to succeed in combining the radar, bumper and lighting software blocks to offer new services. In use, this means the radar detects an object and then sends the information to the lighting solutions, which act accordingly.

¹ ASPICE (Automotive SPICE) is a standardized framework for assessing an organization's ability to deliver software products effectively and reliably.

² AUTOSAR (AUTomotive Open System ARchitecture) is a worldwide development partnership of vehicle manufacturers, suppliers, service providers and companies from the automotive electronics, semiconductor and software industry.



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