

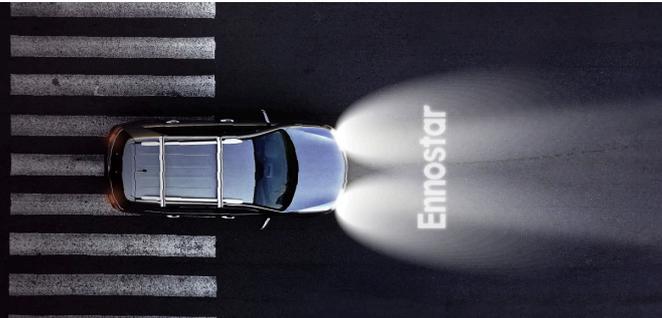
Tue, 30 July 2024
Weekly Newsletter



NEWSLETTER #866

Ennostar

**Expert in Comprehensive
Automotive Lighting Solutions**



Editorial

DVN India Report Goes Live; Workshop Docket Finalized

SAVE THE DATE
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Lighting

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Now it's the end of July, most of us in Europe have summer break centrally in mind. At DVN, we have just finalized the docket for the [India DVN Workshop at Pune, 4-5 September](#). Hit the link to see the agenda, register to attend, find hotel information, and more.

This event will gather most of the Indian OEMs, that country's main lighting suppliers (including their CEOs), and stakeholders from all apposite regulatory sectors for an informative, productive panel discussion.

For the first time, we will have a dedicated session for the 2-wheelers so prevalent in Indian road traffic; around 18 million of them are sold every year in India, versus 4 million passenger cars. So, there will be presentations from 2-wheeler makers and the suppliers who provide their lighting systems.

To prepare for this event, it greatly helps to understand the Indian vehicle and lighting ecosystem, and so I am proud to share our detailed [DVN Report](#) on that very subject.

We're expecting over 300 people at the workshop. If you have the means, I strongly encourage you to attend—whatever your niche in the DVN community. India's is a highly dynamic vehicle lighting market, different to all other markets, poised to grow to what we estimate at €2.7bn by 2030.

And now it is time for summer vacation, to recharge the battery. So, the DVNNewsletter is on hiatus for two weeks. See you back here again on 20 August; enjoy your summer!



Sincerely yours,

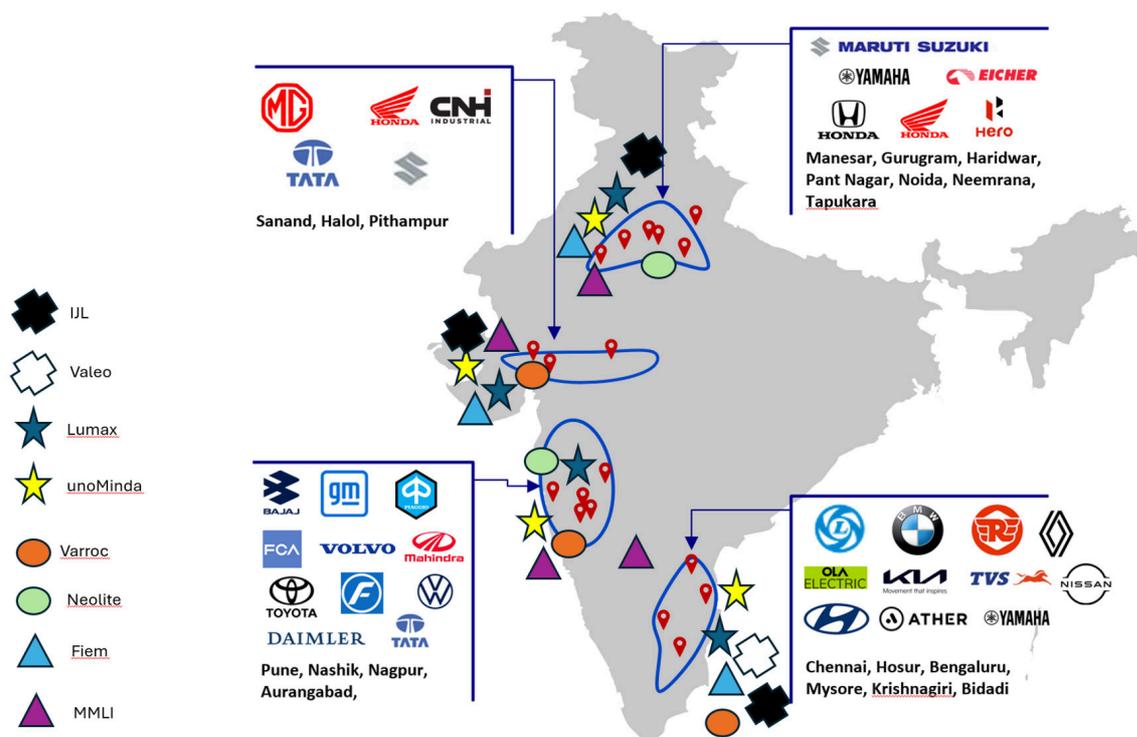
Paul-Henri Matha

DVN Chief Operating Officer and Lighting General Editor

A handwritten signature in blue ink, appearing to read "pammum".

In Depth Lighting Technology

India's Vehicle Lighting Market



India's vehicle market is highly dynamic. In 2023, it represented 24.5 million vehicles with a 10.3-per-cent growth. Two- and three-wheelers together accounted for 76.2 per cent, passenger vehicles accounted for 16.1 per cent, and commercial vehicles accounted for 4.1 per cent. These figures are for vehicles sold within India; the 14 per cent of passenger cars exported outside India raise that category total to 4.7 million.

Vehicle type	FY22-23 sales	FY23-24 sales	Year ÷ year (per cent)
2-wheeler	16,027,411	17,517,173	+ 9.30
3-wheeler	783,257	1,165,699	+ 48.83
E-rickshaw (P)	349,892	490,726	+ 40.25
E-rickshaw with cart (G)	24,076	40,798	+ 69.46
3-wheeler (goods)	90,923	121,506	+ 33.64
3-wheeler (passenger)	317,753	511,754	+ 61.05
3-wheeler (personal)	613	915	+ 49.27
Passenger vehicle	3,640,399	3,948,143	+ 8.45
Trac	829,639	892,313	+ 7.55
Commercial vehicle	960,655	1,007,006	+ 4.82
LCV	567,302	561,097	- 1.09
MCV	62,056	72,907	+ 17.49
HCV	301,421	324,308	+ 7.59
Others	29,876	48,694	+ 62.99
	22,241,361	24,530,334	+ 10.29

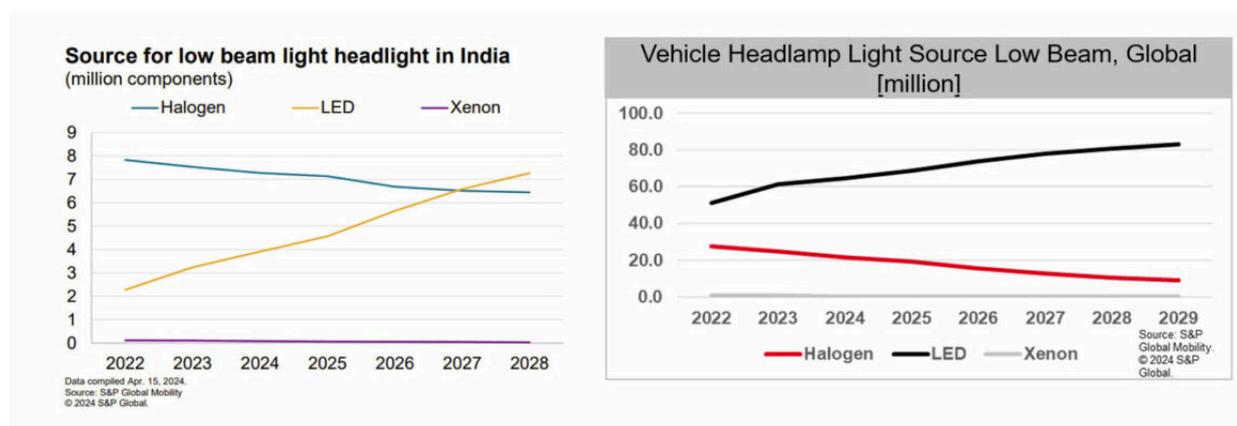
Although the 2-wheeler market is huge, the main value for tier-1s is in the 4-wheeler market (passenger cars and commercial vehicles); according to ACMA, the 4-wheeler market value is of USD \$70bn.



For light vehicles, India is № 3 after China and the US, according to S&P Global in 2023.

The light vehicle market in India should continue to grow, with estimated CAGR of 3.7 per cent between 2023 and '28; this is one of the steepest growth curves in the world.

The LED equipment rate on new passenger cars in India is still very low: 25 per cent have full LED headlamps (versus 75 per cent worldwide). But LEDs are gaining traction even in the highly price-sensitive Indian market; S&P forecast around a 50/50 mix by 2028.



S&P Global, Indian and worldwide LED equipment rate

To prepare our report, we have read a lot of totally different values for the vehicle lighting revenue in India and we decided to do our own calculated forecasts of the lighting market value.

Based on S&P figures, we calculate the average estimated lighting content cost per car as €110 in 2023, €179 in 2030 (in constant 2024 currency). To obtain this average value, we divided the vehicles into four groups in 2023 :

- Very low cost with minimum lighting content (bulb only, no DRL, no foglamp, etc.): ~€57 per car for a 50-per-cent equipment rate
- Bulb + partial LED content with premium design: ~€91 per car and 26-per-cent equipment rate
- Simple LED lamps with basic design: ~€199 per car and 12-per-cent equipment rate
- Premium LED lamp with premium design: ~€295 per car and a 12-per-cent equipment rate

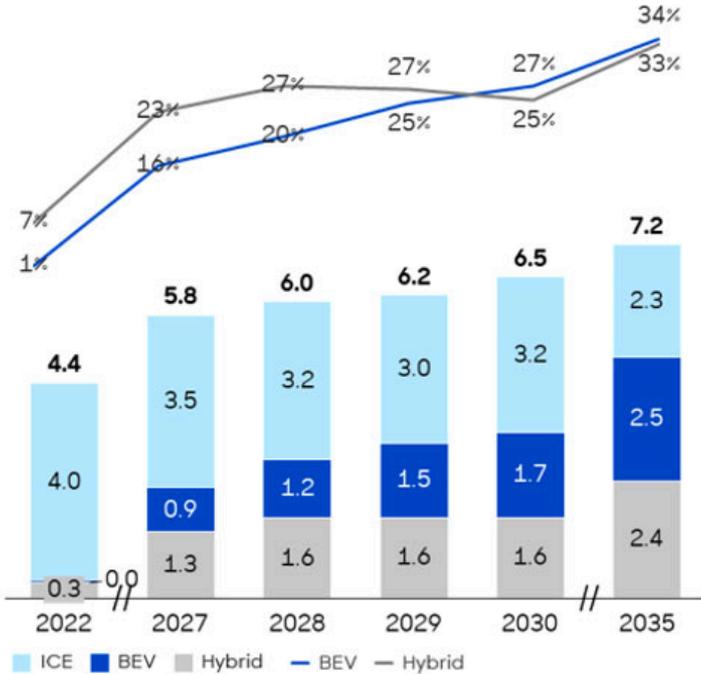
We did the same to estimate the market in 2030 with S&P Global forecast for LED equipment rates. With production of 4.7 million vehicle in 2023 and 6.5 million in 2030, we calculate a passenger car **lighting market worth around €517m in 2023; €1.1bn in 2030** (again, in constant 2024 currency).

For 2- and 3-wheelers we did same calculation with equipment rates split 50/50 between LED and bulb (estimated vehicle-lampset costs of €40 for LED and €10 for bulb). We increase these figures by 10 per cent to account for aftermarket sales, which is the usual aftermarket value in the vehicle lighting business, and by 10 per cent to account value for tooling and other costs, to arrive at this market overview:

Vehicle type	2023	2030
2- & 3-wheelers	€0.50bn	€1.000bn
passenger cars	€0.50bn	€1.100bn
commercial vehicles	€0.11bn	€0.220bn
Aftermarket	€0.11bn	€0.232bn
tooling	€0.10bn	€0.150bn
Total	€1.31bn	€2.702bn

This bottom-up calculation is quite well correlated with the revenue and their estimated market share of the main lighting suppliers in India: Lumax and SL Lumax; Uno Minda; Fiem; Varroc; Magneti Marelli Motherson; IJL; Neolite; Valeo; Forvia Hella, and OPmobility. In the detailed report you will find information of each supplier—plant details, employee counts, main technologies and customers, innovations, etc.

We predict that the Indian lighting market will double in 7 years' time, and growth will continue after 2030. The Roland Berger estimate below shows 10-per-cent growth for the passenger car unit count:



Passenger car production in India (Roland Berger figures)

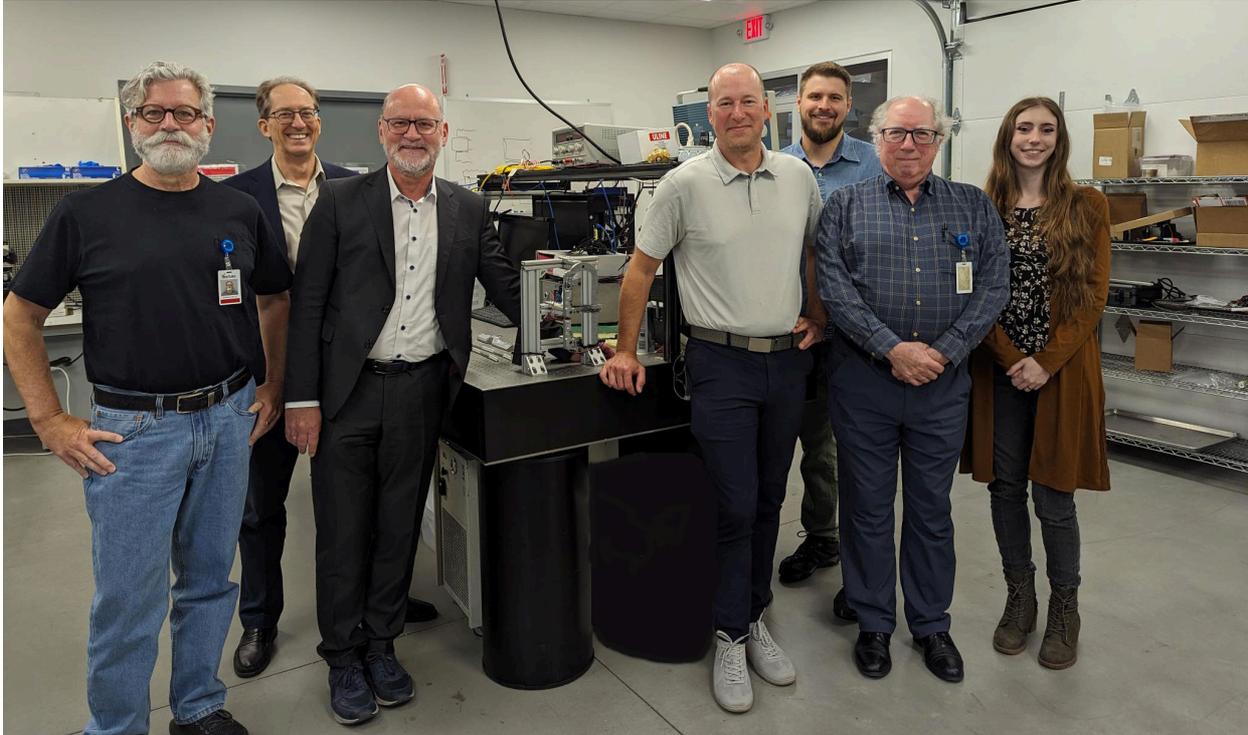
Moreover, LED proliferation will continue to grow. In 2030, LED prevalence in India will be around 60 per cent, with ongoing high growth potential.

See more details in the complete [DVN Report "India's Vehicle Lighting Market"](#)

Lighting News

DVN Deep Dive + Interview: LumenFlow

LIGHTING NEWS



LumenFlow Team in their optical lab: Harold Brunt, Greg Sharp, Michael Hamm (DVN), Tim Sigelko, Zach Fredricks, Paul Bourget, Sydney Kocsis

By Michael Hamm, DVN Senior Advisor

Right after the DVN Workshop in Plymouth, Michigan, I made the short trip to nearby Zeeland, where I visited LumenFlow. They're a company specialized in the development of optical components and manufacturing. I was welcomed by Division Lead Tim Sigelko; Sales Manager Greg Sharp; Lead Optical Engineer Harold Brunt, and company founder Paul Bourget.

Bourget created LumenFlow in 2000 to support other companies with custom optical solutions. From the beginning, photonics problems were addressed by improving the optical simulation software and finding solutions that could be manufactured in a proper way. Besides traditional materials, they created expertise in mouldable optical silicones. This has helped customers in lighting and various consumer markets, both automotive and non-automotive.

In 2019, LumenFlow joined the global Ventura Manufacturing family. Ventura assemble automotive and office furniture components, and they are producing injection-mould silicones, including optical-grade ones. Together, the group are focused on the design and manufacturing of lighting, optical and photonics systems, and subassemblies for diverse industries round the world.

During the visit, I had the chance to see a variety of products made by LumenFlow and Ventura. I was quite interested to see the LED retrofit lamp solution they produce for commercial store lighting (many lumens in a small space). I saw large-volume

precision moulding processes turning out (non-automotive) parts with zero-defect monitoring. I visited their assembly line for surface-mount optics, which uses silicone optics placed directly on a PCB and allows for continuation through the solder reflow oven. The advantage: no need for holders, fasteners, or glue. The moulded optics can also have negative draft angles or undercuts, which can facilitate a variety of kinds of optics, like Fresnel optics, for example. It can stretch and flex out of the mould, enabling single-shot moulding of complex surfaces. Silicone moulded optics (SMO) are also used in automotive as an alternative for light guides, e.g. in door entry lights.

For LumenFlow, optical silicone materials and simulation capabilities offer the chance to enter the high-photon-density world of imaging optics. Together with parent company Ventura Manufacturing, they now address automotive solutions. I had the chance to see low- and high-beam prototypes in the optical lab. LumenFlow's latest innovation covers narrow-aperture modules for low beam, high beam, and fog lamps.



Silicone moulded optics (SMO)

I asked three questions of LumenFlow Division Lead Tim Sigelko:

DVN: Tim, tell me about LumenFlow and Ventura.

Tim Sigelko: LumenFlow is a division of Ventura manufacturing. Founded in 2000, LumenFlow specialized in optics photonics, and lighting design. In 2019 Ventura acquired LumenFlow and now vertically integrates the design capabilities of LumenFlow (including silicone injection moulding operation) into modules and subassemblies for automotive and commercial lighting. Together, there are about 350 employees in Zeeland, Michigan and international locations in Arteaga, Mexico; Budapest, Hungary, and Shanghai, China.

DVN: What are your company's automotive competences?

T.S.: We know what to do meeting FMVSS 108 and other industry requirements, but want to enable our customers' wishes and creative design ideas. Our speciality is the optical engineering, silicone moulding optics for high-photon-density applications, manufacturing of modules and subassemblies, and testing—all of which is located in Zeeland, MI. We are a process-driven organization, utilizing tools like the PFMEA for both high- and low-volume parts. High-volume parts are more suitable for automation and detection, but by following our process development process, we can successfully develop manufacturing processes that ensures zero-defect manufacturing. We have a decade-long relation with software companies like Speos, Zemax, and LucidShape, and as a smaller company we were often the first to test new

versions and help to improve these products. Our optical engineers like to work at the photon level. We are creative group of engineers and capable of developing high volume headlamp modules to niche lighting applications.

DVN: The DVN Workshop was a full panorama. What do you retain?

T.S.: I was at DVN Shanghai, too. The amount of technical content, the lectures are important to see from all parts of the supply chain. The broad exposure to technology of all kinds gives a good feeling about the challenges. You see technical specialists and leaders from all levels; tier-1, -2, -3, and -4. We have several trade shows we can go to; [DVN] is the right audience to network with. We learn on Ethernet and Electronics to make lighting work in automotive world. We will be able to present a fully designed, working headlamp mockup at the next show.

Audi Survey: Adaptive Digital Light Patterns

LIGHTING NEWS



(DVN is happy to support Maximilian Felber's initiative, and so we are republishing this LinkedIn post -- Paul-Henri Matha)

Dear lighting enthusiasts,

My name is Maximilian Felber and I am about to complete my master's degree at Audi AG.

In my master's thesis, I focus on the exploration of adaptive digital light distributions that can significantly enhance the driving experience!

To find out more about your expectations of light distribution, I have created an exciting survey.

The survey is anonymous and your answers will help shape the next generation of lighting technologies. Together we can light up the future of driving!

You can access the survey here:

(Please select your correct continent and let's get started)

Asia (English):

<https://www.netigate.se/a/s.aspx?s=1227133X440563263X51086>

EU (German/English):

<https://www.netigate.se/a/s.aspx?s=1226703X440554152X73097>

USA (English):

<https://www.netigate.se/a/s.aspx?s=1227662X440639505X71031>

Shihu MLA Tech for Affordable Dynamic V2X Interactive Lighting

LIGHTING NEWS



Shihu Technology—DVN members since 2023—are a supplier of microlens arrays (MLA). They provide fast, affordable services to tier-1s and automakers, to make cars more intelligent and aesthetically pleasing.

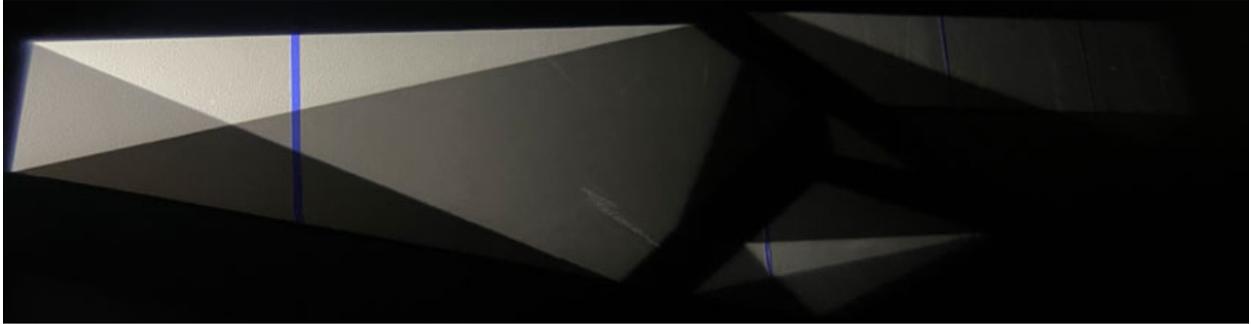
Theirs is a full suite of solutions for automotive projection lighting, which they showcased at ALE last month. Their solutions include dynamic interactive signal ground projections, dynamic welcome light carpet projections, and a free-styled, ultracompact headlight solution based on MLA. It will provide greater flexibility of for vehicle lighting tier-1s as they develop their automotive signal projection and headlamp modules.

As a full value chain provider of design services, mass production, and patent licensing of microoptics for automotive projection lighting, Shihu showed the world's first 3D holographic dynamic projection demo:

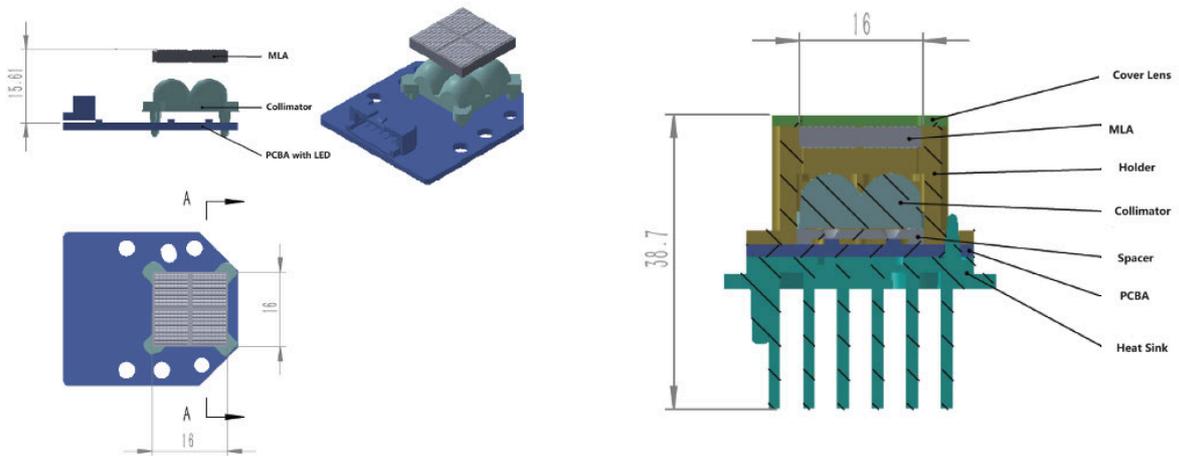


Based on MLA technology, it can easily achieve multi-frame dynamic projection that cannot be achieved by film-based techniques. Similar dynamic projection can be achieved with DLP technology, but at 10 times the cost of the MLA solution.

Shihu also exhibited demos of their dynamic 3D welcome projection and interactive signal projection, derived from one of their MLA patents, and realized by dint of their manufacturing expertise and module experience.



Based on a four-quadrant MLA, it is a compact projection module which can provide a 4-frame animation. Apparently, this module is scalable; six or more zone-based MLA can be deployed to provide more complex animation. The choice of the light source depends on the requirements for illumination and colour.

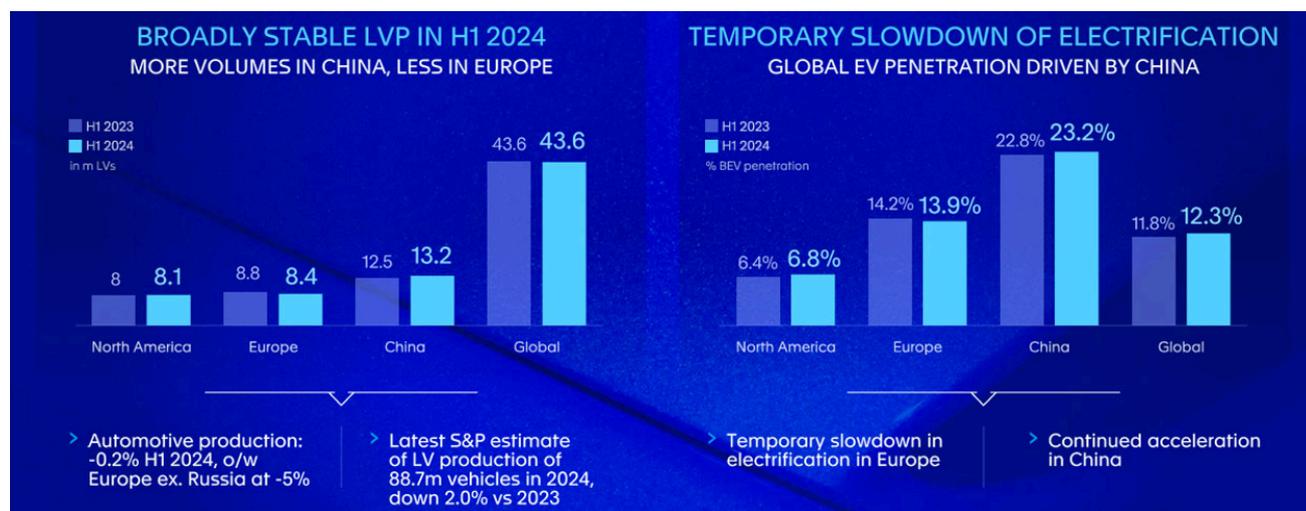


H1-24 Valeo, Forvia and OPmobility results

LIGHTING NEWS



Three major European lighting setmakers have shared their first half results. Overall, the automotive market is down 0.2 per cent compared to H1 2023. In parallel we see a slowdown of electrification.



Infographic from Forvia H1 2024 report

Valeo

- Sales of €11,117m, +1 per cent on a like-for-like basis
- Operating margin +23 per cent to €445m, that is 4 per cent of sales (+0.8 points year on year)

^a Full-year 2024 and '25 objectives: sales objectives revised to account for market conditions; margin and free cash flow objectives reaffirmed, supported by cost-cut measures

Original equipment sales were down by 1 per cent like for like, buoyed by the group's other activities but penalized by the high-voltage electric powertrain activity:

- +6 per cent from the Brain Division (of which ADAS +7 per cent);
- +2 per cent from the Light Division (previously Visibility Systems) ;
- -5 per cent from the Power Division, and -43 per cent from the high-voltage electric powertrain business

The Light Division revenue is €2,853m (versus €2,618m in H1 2023).

The Light Division outperformed automotive production by 2 percentage points. In China and North America, the division's sales were driven by the recent production start of an electrification product for a North American automaker. In Japan, they were affected by low activity due to production stoppages at several Japanese automakers.

The Light Division's EBITDA margin held firm during the period at 12.7 per cent, in a context of high costs to prepare for numerous production launches; low business levels due to production stoppages at several Japanese automakers, and the negative impact on profitability of the yen's depreciation against the euro.

Forvia

- Sales of €13,534m (-0.6 per cent)
- Operating margin up, at 5.2 per cent of sales (versus 5.0 per cent in H1 2023)
- Lighting accounts for €1,968m revenues (15 per cent of total revenue), up 5 per cent versus H1 2023, with operating income of €99m (5 per cent of revenue).

	H1 2023	H1 2024
Sales (€m)	1,874	1,968
YoY reported		+5.0%
YoY organic		-0.3%
Scope effect		+6.7%
Currency effect		-1.4%
Operating income (€m)	91	99
% of sales	4.9%	5.0%

Sales up 5% thanks to scope effect and broadly flat organically

Mid-single digit growth in Europe driven by VW and Nissan-Mitsubishi

Light growth in North America owing to Ford and VW

In China, sales were penalized by end of high-volume production with a major US EV car maker

Consolidation of HBBL joint-venture increased Group exposure to Chinese OEMs

Operating margin at 5.0% of sales

Accretive impact of HBBL consolidation

Forecast for H2 2024 is:

- Operating margin 6 per cent of sales, compared to 5.2 per cent in H1
- Total sales between €27.5bn and €28.5bn

OPmobility

- H1 2024 revenue of €5,939m, +2.1 per cent, outperforming global automotive production by 3.8 points, mainly driven by strong growth in the United States.
- Operating margin of €234m, +12 per cent, driven by more robust activity in H1 2024 compared to H1 2023, as well as controlled cost management. Operating margin is at 4.3 per cent of sales.

The three business groups—Exterior, Modules, and C-Power—reported an improvement in their operating margin year-on-year. Exterior Systems' revenue increased by 0.5 per cent compared to H1 2023. The Exterior business group benefits from a solid order book recorded in recent years. Exterior business group growth more than offset Lighting revenue, which contracted compared to H1 2023, in line with Group forecasts. This decline was due to a lower order book prior to the acquisition of this business group by OPmobility. Lighting order intake is expected to significantly outpace revenue in 2024, ensuring future growth.

In € million By segment ¹⁾	H1 2023	H1 2024	Change	LFL change ²⁾
Exterior Systems	2,833	2,848	+0.5%	+1.5%
Modules	1,606	1,723	+7.3%	+8.3%
Powertrain	1,375	1,368	-0.5%	+1.7%
Economic revenue³⁾	5,815	5,939	+2.1%	+3.5%
Joint ventures	521	526	+0.9%	+5.4%
Exterior Systems	2,499	2,515	+0.6%	+1.2%
Modules	1,420	1,532	+7.9%	+8.4%
Powertrain	1,374	1,366	-0.6%	+1.7%
Consolidated revenue⁴⁾	5,293	5,413	+2.3%	+3.3%

Revenue per segment

In € million By segment ¹⁾		H1 2023	H1 2024	Change
Exterior Systems	Consolidated revenue	2,499	2,515	+0.6%
	Operating margin (as a % of consolidated revenue)	124 5.0%	142 5.6%	+14.5% +0.6pt
Modules	Consolidated revenue	1,420	1,532	+7.9%
	Operating margin (as a % of consolidated revenue)	28 2.0%	33 2.2%	+19.8% +0.2pt
Powertrain	Consolidated revenue	1,374	1,366	-0.6%
	Operating margin (as a % of consolidated revenue)	64 4.7%	62 4.5%	-4.0% -0.2pt
Other ⁴⁾	Operating margin	-6	-2	NA
Total Group	Consolidated revenue	5,293	5,413	+2.3%
	Operating margin	210	234	+11.8%
	(as a % of consolidated revenue)	4.0%	4.3%	+0.3pt

Operating margin per segment

Following stable automotive production and a slowdown in electric vehicle sales in H1 2024, automotive production is expected to decline for the rest of the year. In this context, the Group confirm their position as market leader based on its operational expertise, while adapting their capacities to production volumes in order to maintain good productivity.

Following robust growth in H1 2024 results, OPmobility confirm their annual targets with the aim of outperforming global automotive production and improving all their financial aggregates—operating margin, net result Group share, free cashflow, and net debt—in 2024 compared to 2023.

Huazhong Marelli Turns Ten!

LIGHTING NEWS



In late June, the Huazhong Marelli establishment celebrated a significant milestone: their 10th anniversary!

Created as a joint venture between Hubei Huazhong Photoelectric Science and Technology and the Marelli automotive lighting business, since 2014 the plant has produced more than 20 million vehicle lighting products, ranging from halogen and xenon lamps to LED lights and intelligent interactive lighting systems, serving numerous customers. It has become a primary production and R&D hub for Marelli in China.

More than 200 employees gathered at the Phase II plant in Xiaogan to celebrate this special occasion. The event was graced by distinguished guests, including officials from Xiaogan municipal government and the High-tech Zone Management Committee. Their presence underscored the strong support from various government levels for Huazhong Marelli's development. The management team of Huazhong Changjiang Photoelectric Science and Technology and Marelli also participated in this ceremony.



Tanger Valeo Turns 13!

LIGHTING NEWS



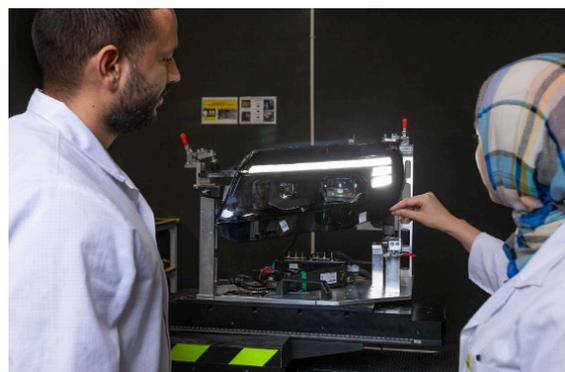
Over 13 years, Valeo Tanger has grown from a small team to more than 2,200 employees. And it's set to expand even more with new production lines to be added in the coming years.

From a small outpost in 2011 to a production powerhouse today, the two Valeo plants in Tanger, Morocco deliver some of the latest automotive technologies to international automakers across all three divisions. More than 17 million products come off the assembly lines there each year.

The Tanger facilities produce thermal and cooling systems, front and rear lamps, wiper systems, steering column modules, and printed circuit boards for lighting systems.

Mehdi Benkirane and Philippe Barmasse are the site general managers. They say, "It's really impressive when you look at where we started and where we are now. Today, Valeo is a top tech company in Morocco, known for our quality standards, technology, and great work atmosphere".

They describe the Valeo Tanger employee cohort as "Committed, enthusiastic, and determined".



Driver Assistance News

Waymo-Zeekr Robotaxi Comes to San Francisco

DRIVER ASSISTANCE NEWS



Waymo first announced plans to build an electric autonomous ride-hail vehicle with Zeekr for the U.S. market in December 2021. Now they have started testing, on public roads in San Francisco, a robotaxi built by Chinese EV maker Zeekr.

Up to now, Waymo's robotaxis have been Jaguar I-Pace cars, equipped with the fifth-generation Waymo Driver system. Nevertheless, this custom-built robotaxi heralds a next phase of the Alphabet-owned (Google) company's autonomous vehicle technology journey.

The new vehicle, which appears to be modelled after Zeekr's upcoming Zeekr 009 minivan, is outfitted with Waymo's sixth-generation hardware—a less expensive set of sensors than previous versions that is also designed to operate in winter environments.

Waymo's fleet of Zeekr test vehicles is still small. In San Francisco, Waymo said it has less than a handful of Zeekrs on the road today. And they are not yet operating them in autonomous mode.

The Waymo-Zeekr vehicle doesn't include software or sensors produced by Zeekr. The vehicles are designed and engineered in Sweden, and the prototype vehicles are manufactured in China. The Waymo Driver, which includes hardware and software, is integrated into the base vehicles in the U.S.

The Zeekr prototype vehicle has a removable steering wheel, and the goal down the line is to operate it without one.