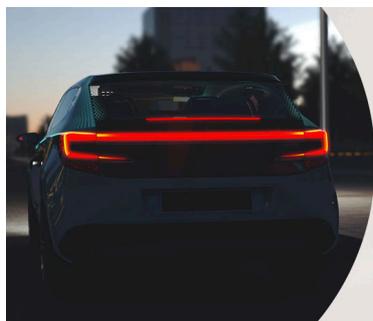


Tue, 10 September
2024
Weekly Newsletter



NEWSLETTER #870



SYNIOS® P 2222: new
standard platform for
automotive signaling

amul **OSRAM**

Editorial

DVN @ Pune: Lighting Matters In India's Fast-Moving Market



The DVN Event at Pune was our return to India after nine years. It was the culmination of eight months' diligent work to renew my contact I had when I was responsible for Dacia lighting development in Romania, including development for Renault in India, and to activate our local DVN network there.

The event was really fantastic with more than 450 people—the biggest lighting event ever held in India. During the last three months I was in contact with a lot of stakeholders to be able to release the report we published in July about the lighting market there. Even so, I did not sufficiently realize the importance of lighting performance and technology for Indians.

Road safety is the № 1 topical priority in India now. You must have good headlight performance, and you can get it much more easily with LEDs.

Sustainability is № 2, because pollution is a real problem in India. Among the 50 biggest cities in the world, 40 of the most polluted ones are in India. Reduced power consumption and increased sustainability are not just nice-to-have wish material there, but absolute musts. That is one reason why DRLs are not mandatory in India for

passenger cars, because it would increase power consumption—though this goes against that safety priority, so as you can see, there are tricky balances to achieve.

Design is № 3; really important in India. They like slim lamps and welcome/farewell animations. Despite strong local focus on (low) cost, customers want technology—even on motorbikes and 3-wheelers—and nothing advertises a car's technology like its lighting. I see fertile ground and heavy interest for European and Asian technology to gain traction fast in India. Good thing that with LEDs, we can have high performance and low power consumption, with resultant low CO₂ emissions—though of course it is also possible to have high-power, therefore high-emitting LED systems.

The pic at the top of this editorial is a TVS 3-wheeler. Scroll back up and take a closer look—see the LED headlamps and signals!

Sincerely yours,

Paul-Henri Matha

DVN Chief Operating Officer and Lighting General Editor



In Depth Lighting Technology

Vehicle Lighting in India: Main Takeaways



By Paul-Henri MATHA, DVN CEO

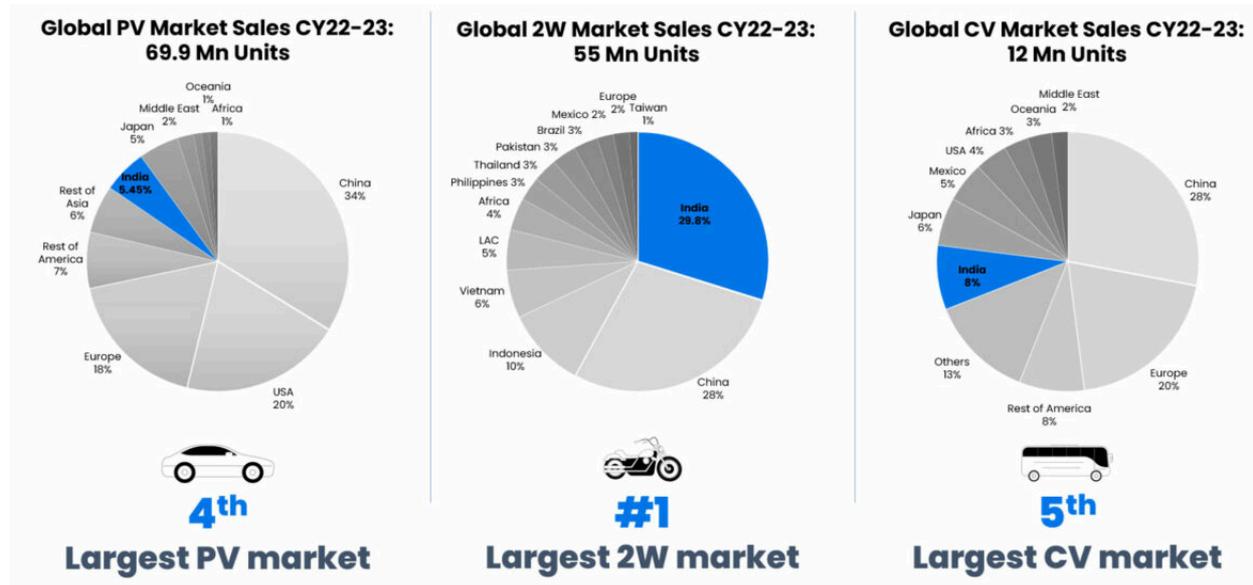
This picture is from the DVN Pune Event keynote presentation by Indian tier-1 lighting supplier Neolite. I picked it deliberately to put here, to give an impression of what Indian road conditions are like. This right here is why seeing and being seen are major concerns for anyone buying, driving, or riding in a vehicle—whether it be a truck, a car, a motorbike, or a 3-wheeler.

Lighting is something of a luxury design feature in the cities of Europe, Japan, or China with a lot of traffic lights, 5G connectivity, and ADAS features to handle the heavy lifting. In India, most of those amenities aren't present, so vehicle-based lighting has a constant big job to do: survive in the chaotic traffic turmoil. Drivers depend on their lights to see the road, detect the potholes, bicycles, motorbikes, pedestrians, animals, almost-invisible parked vehicles...and then add in very low visibility due to dust, heavy rain, thick smoke, fog, or smog, and glare from other drivers using their high beams to try to see. These are the night drive conditions in India.

With that as the backdrop, here are my main takeaways from the DVN Pune Event last week:

Market Insight

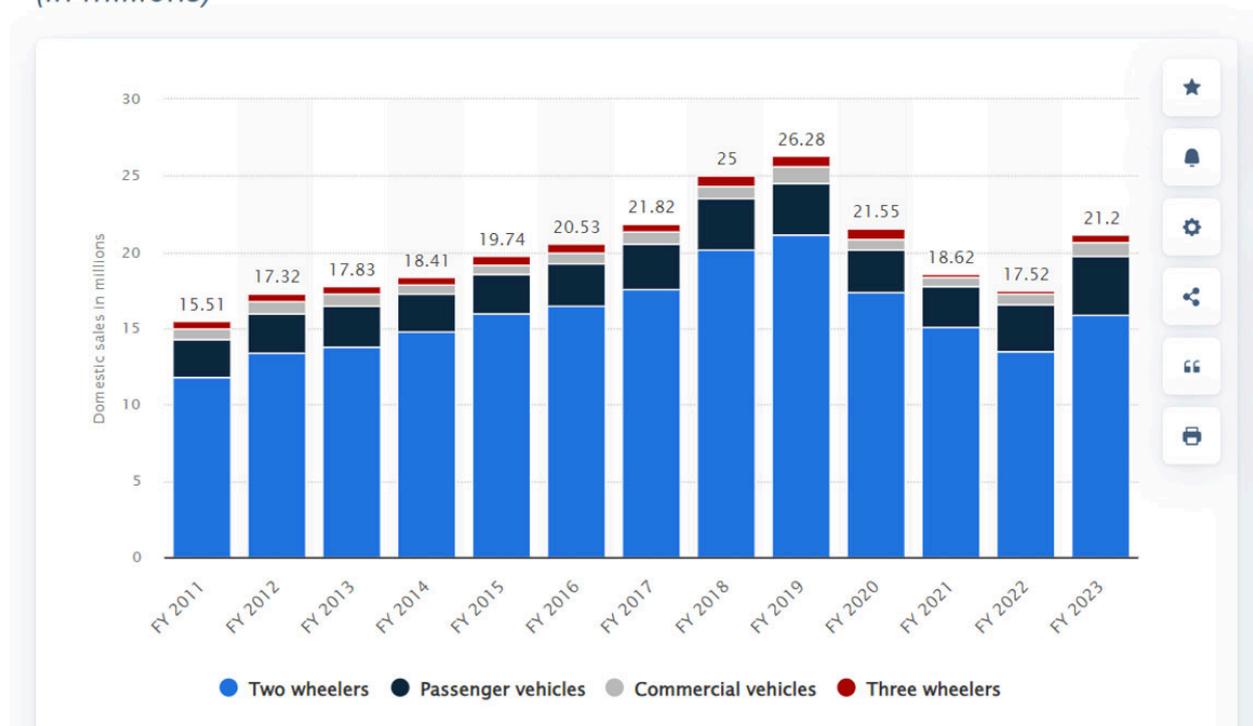
The Indian market is considered the № 3 or № 4 market in the world for vehicles, depending how we count (sale or production; just passenger cars or all vehicles).



Data from UnoMinda lecture

India is indeed № 4 for passenger car sales, and № 1 for 2-wheeler sales—that show the importance of this market in India, which is five times bigger in volume compared to passenger cars.

Sales of automobiles in India from financial year 2011 to 2023 (in millions)

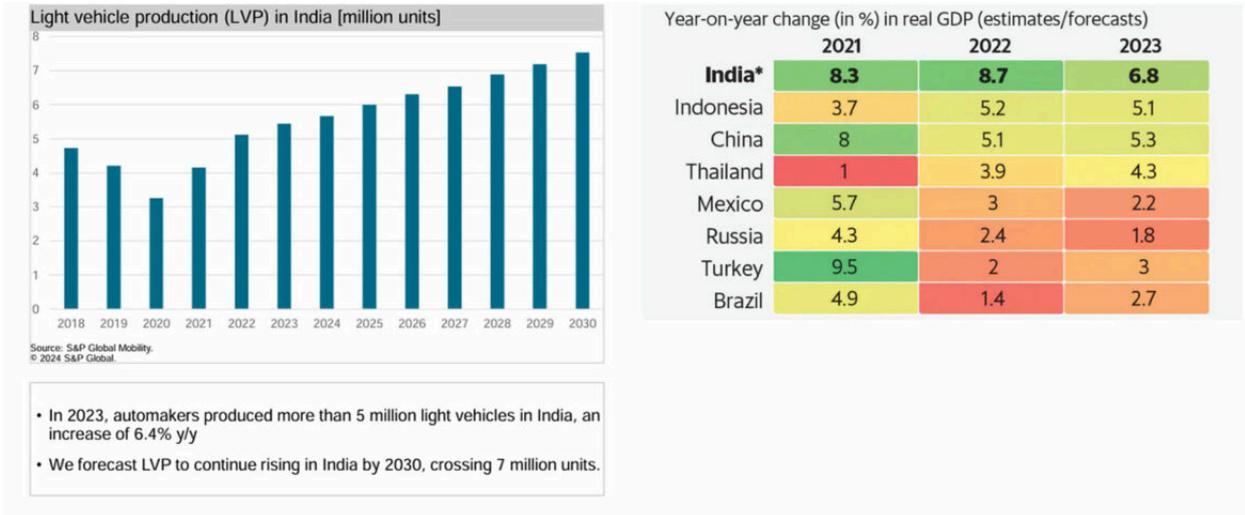


Data from HeroMotorcorp lecture

The automotive industry represented 7.3 per cent of India's national GDP in 2023, with 37 million people employed in the industry—8 per cent of total R&D value in India. The

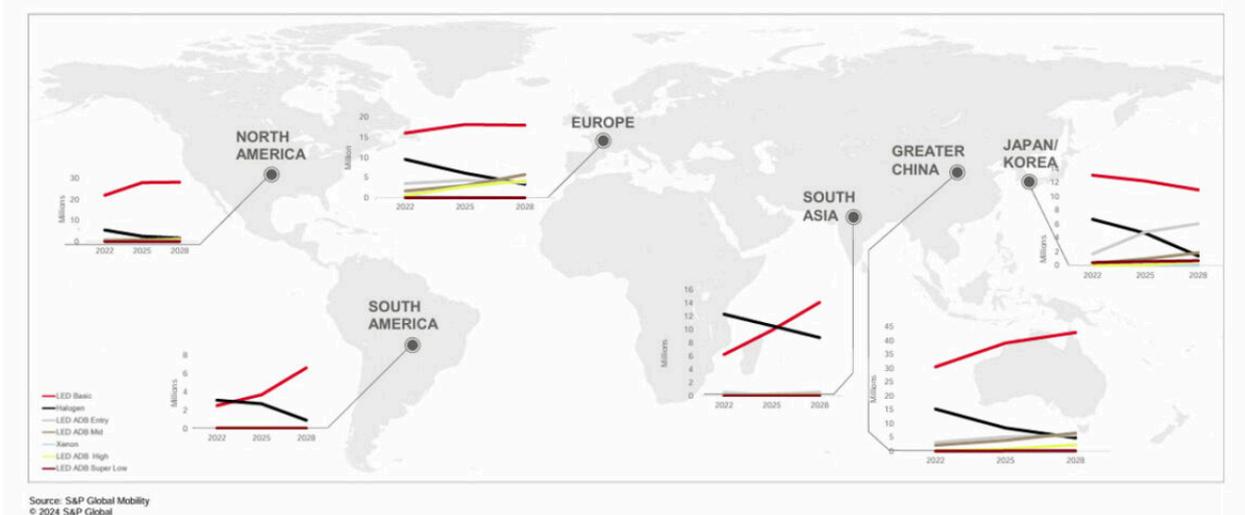
total business for automotive in India reached USD \$250bn in 2023, up from \$175bn in 2017 and headed for a predicted \$600bn in 2035.

This fast evolution is especially due to the rapid growth of car ownership: 22 cars per 1,000 people in 2023, and the International Energy Agency predicts that passenger car ownership will grow over the next 7 years to 100 cars per 1,000 people in 2030 (date from UnoMinda presentation). This is in greater context of overall Indian GDP evolution; it was the fastest growing economy in the world in 2021, 2022, and 2023.



figures from S&P Mobility presentation

4-wheel vehicle sales are dominated in India by SUVs (42 per cent); hatchbacks (21 per cent), sedans (12 per cent) and MPV/minivans (11 per cent). The lighting market is growing faster than the vehicle market due to LED uptake increasing. In South Asia, LED proliferation was quite low until recently, but now is galloping.

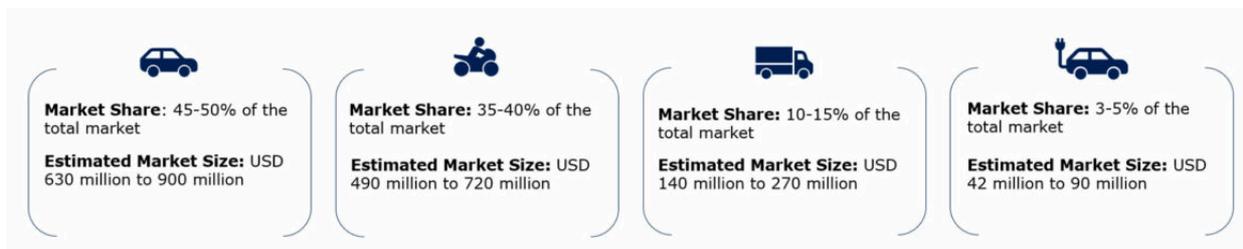


S&P Global's estimates for lighting technology on new vehicles in India for 2023 are 75 per cent halogen and 25 per cent LED low beam headlamps; for rear lamps the 2023 estimates are 35 per cent all-bulb; 20 per cent partial LED, and 45 per cent full LED. Their forecast for 2028 is a 50/50 mix of halogen and LED headlamps; 65 per cent full-LED rear lamps, 20 per cent partial LED, and 15 per cent all-bulb.

S&P Global's forecast is a CAGR of 6 to 9 per cent per year from 2024 to 2030. During DVN events, some tier-1 suppliers have predicted a higher CAGR; Ichikoh says 12.9 per cent for headlamps.

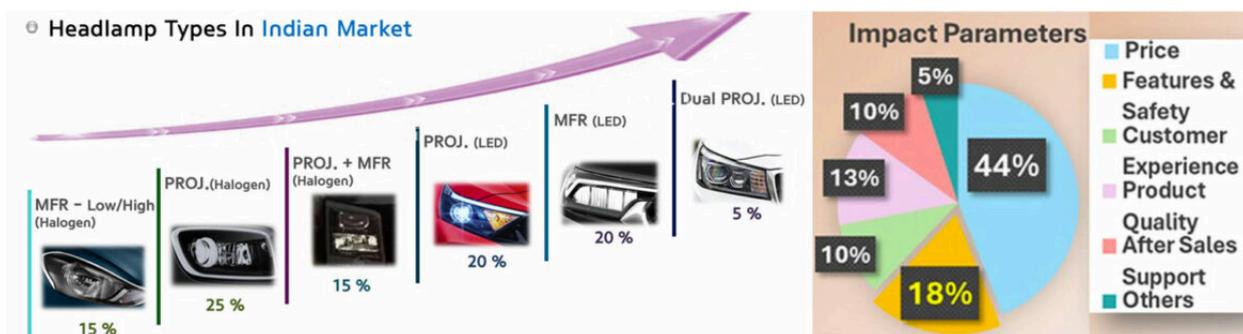
The Indian lighting market value is estimated today at around €1,2bn, and the forecast is for that to double by 2030. Varroc presented a further step in their keynote, giving

information about market value per segment.



Data from Varroc lecture

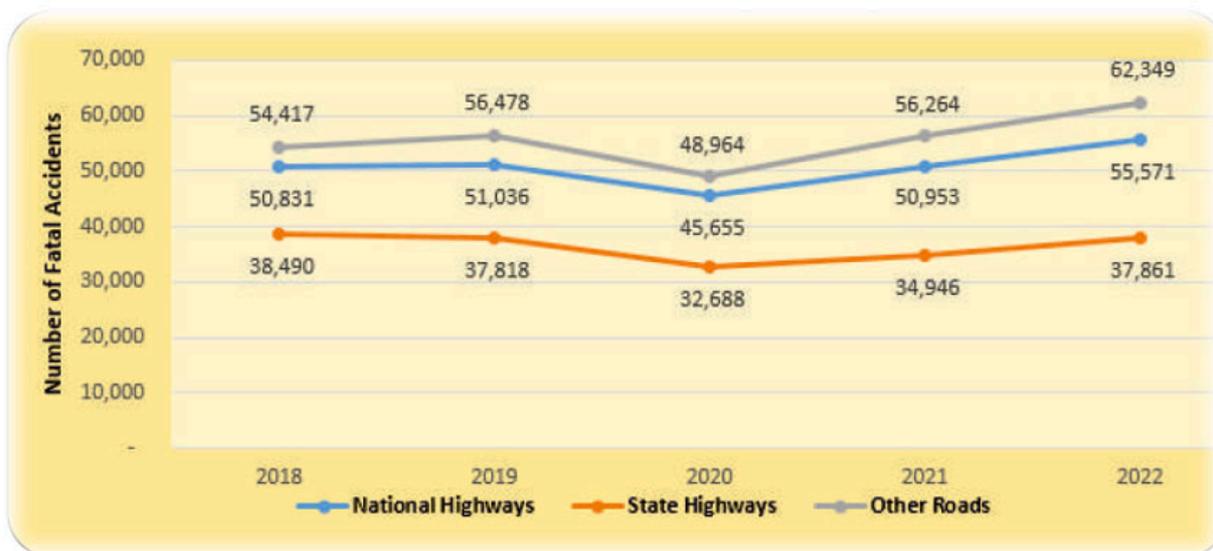
Hyundai presented an interesting study about the different types of headlamps in India –halogen, LED + bulb, LED reflector, LED projector—and what is important for a customer when he buys a car. First is price, but second is features and safety. Lighting has a foot in each of those three categories.



Data from Hyundai lecture

Vehicle safety

Fatal car crashes are a big problem in India, where there were more than 140,000 of them in 2022.



Data from Neolite lecture

Driving at night is 3 times more dangerous than in daylight; according to ARAI, in India 60 per cent of fatal crashes occur after dark, despite there being only 10 to 15 per cent of the traffic volume. India ranks № 3 in the world for traffic-related deaths; a person dies every four minutes due to a road accident in India.

On top of that, around 80 per cent of crashes are due to driver error. ARAI and ICAT, during the regulatory session at the DVN Event, clearly indicated that ADAS

requirements must increase to save lives.

Road conditions, traffic density, and driver behaviour are all contributions to the high crash and fatality rate.



And so are poor visibility, wrong parking, and bad lighting—especially due to poor condition of lamps on vehicles in use, and/or or poor quality (often aftermarket) replacement lamps installed.

There is a great deal of glare when driving at night in India, because drivers tend to use their high beam by default, even when other drivers are nearby. They're trying to work around poor low beam performance. This rampant misuse of high beams is known by everybody, even in parliament. Changing old acculturated habits is very difficult, but so far there has been no effort to quantify the crashes caused by glare.

Discussion in parliament...

2609. SHRIMATI PRATIBHA SINGH:

Will the Minister of ROAD TRANSPORT AND HIGHWAYS

सड़क परिवहन और राजमार्ग मंत्री

be pleased to state:

(a) whether the Government is aware of increased road accidents on National Highways at night due to the use of high-beam lights and if so, the details thereof along with the percentage of accidents caused as a result thereof;

(b) the total number of such fatalities along with the penalties imposed on violators during the last three years, State/UT-wise;

(c) the steps being taken by the Government to prevent such fatalities and spread awareness about the hazards of high-beam lights;

(d) whether the Government has drawn any plan to deal with this issue especially in narrow road/ hilly areas and if so, the details thereof; and

(e) the details of funds allocated for improving existing road conditions and safety in Himachal Pradesh during the last three years and the current year?

ANSWER

THE MINISTER OF ROAD TRANSPORT AND HIGHWAYS

(SHRI NITIN JAIRAM GADKARI)

(a) to (d) Ministry of Road Transport and Highways collects and compiles the road accident data from police department of all States/UTs. Accordingly, Ministry brings out annual publication "Road Accident in India" providing data/information on various facets of road accidents in the Country. However, Ministry does not collect and compile information on road accidents occurred due to use of high beam light. Further, as per Para 11.2.1 of IRC SP 21: Guidelines on Landscaping and Tree Plantation, one of the objectives of planting on highways is the prevention of glare from the headlights of incoming vehicles. Also, as per para 6.14.2. of IRC SP 44-

We don't even track the numbers!

from Neolite presentation

It is said that 85 per cent of Indian drivers misuse their high beams. Some people are requesting to change the regulation to require automatic high/low beam switching, or mandatory ADB. For sure those measures would improve the situation (eventually; in a highly price-sensitive market like India's, vehicles tend to stay on the road as long as they can be kept on the road). But at the same time, it is difficult to detect oncoming motorbikes with current cameras, and even harder to install a camera on a motorbike to have automatic beam switching. In Varroc's presentation, they mentioned that camera capabilities for oncoming vehicles are around 89 per cent for cars, but only 70 per cent for bikes.

Another problem, according to authorities, is insufficient and poorly-regulated parked-vehicle conspicuity; many crashes are happening with parked vehicles. The Indian Government is pushing authorities to improve the situation. Perhaps US-style side marker lights and reflectors would help; take a look at the large proportion of hit-from-side crashes:



Table 1.5: Road Accidents by type of collision- 2022 vis-à-vis 2021

Type of collision	2021			2022			% change in 2022 over 2021		
	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Hit and Run	57,415	25,938	45,355	67,387	30,486	54,726	17.4	17.5	20.7
% share	13.9	16.8	11.8	14.6	18.1	12.3			
With parked Vehicle	11,611	4,925	10,302	14,139	6,012	12,666	21.8	22.1	22.9
% share	2.82	3.2	2.68	3.1	3.6	2.9			
Hit from Back	87,368	28,712	81,800	98,668	32,907	95,241	12.9	14.6	16.4
% share	21.2	18.6	21.3	21.4	19.5	21.5			
Hit from side	60,221	18,299	59,396	71,146	20,357	72,190	18.1	11.2	21.5
% share	14.6	11.9	15.4	15.4	12.1	16.3			
Run off Road	19,478	9,150	19,077	20,590	9,862	20,170	5.7	7.8	5.7
% share	4.7	5.9	5.0	4.5	5.9	4.5			
Fixed object	14,436	6,600	12,665	15,368	7,307	14,829	6.5	10.7	17.1
% share	3.5	4.3	3.3	3.3	4.3	3.3			
Vehicle overturn	19,303	9,122	19,336	20,070	9,827	21,138	4.0	7.7	9.3
% share	4.7	5.9	5.0	4.4	5.8	4.8			
Head on collision	76,304	27,248	78,502	77,886	26,413	83,580	2.1	-3.1	6.5
% share	18.5	17.7	20.4	16.9	15.7	18.9			
Others	66,296	23,978	58,015	76,058	25,320	68,826	14.7	5.6	18.6
% share	16.1	15.6	15.1	16.5	15.0	15.5			
Total	4,12,432	1,53,972	3,84,448	4,61,312	1,68,491	4,43,366	11.9	9.4	15.3

Importance of Lighting during vehicle running as well during parking

- With Parked vehicle
- Hit from Back
- Hit from side
- Head on Collision
- About 57.12 %

Lighting performance

India's roads have a lot of potholes!

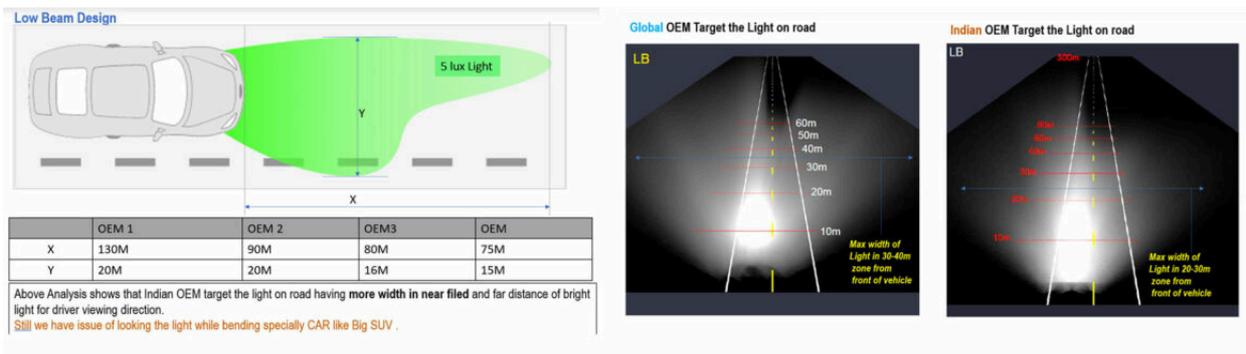


In India, there is no driving at 200 km/h or more on a motorway, so drivers do not need a high beam to send light 600 metres up the road. No, what is needed is *wide* beams with plenty of near-field light. This was beautifully explained by Lumax and UnoMinda in their presentations. Indian automakers are requesting specific developments for projectors, or a modification of global automakers' specifications—low beam width 40 metres at 35 m distance, for example.

European Market

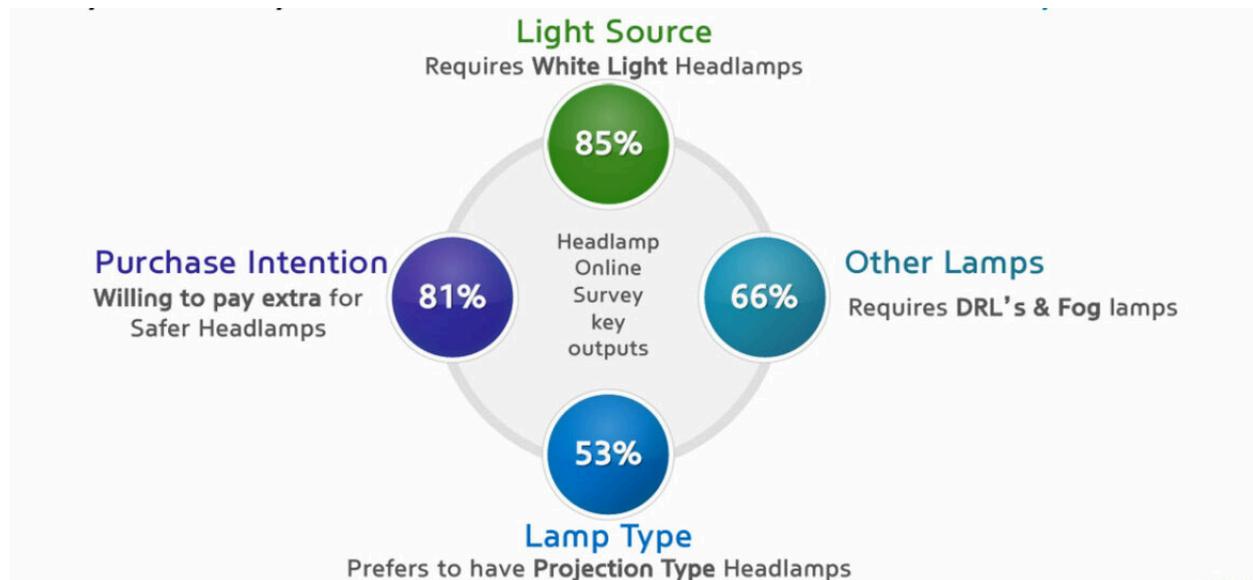
India Market

Reduce Illumination in Far Distance Intended for Higher Speeds



from UnoMinda presentation

Hyundai presented a 1,000-person survey of customer wants. 81 per cent expressed willingness to pay extra for safer headlamps; 85 per cent said they want a "white" (that is, LED) light colour, and 66 per cent said they want other lamps, like DRLs and fog lamps. Interestingly, 53 per cent said they prefer projector type headlamps—that is not really a measure or direct predictor of lighting performance, so is probably a style preference, or perhaps a perceived performance advantage.



2-wheelers

The 2-wheeler business is very important in India, with 17 millions units sold in 2023—accounting for half the country's vehicle lighting business. Safety is an important main topic, even more so than with cars. On 2-wheelers, DRL or low beam with ignition is mandatory to increase safety; daytime lighting is merely optional on other kinds of vehicles.

Nitin Gadkari: Auto manufacturers needs to enhance safety features to reduce deaths in road accidents

At 75,000, record number of bike risk

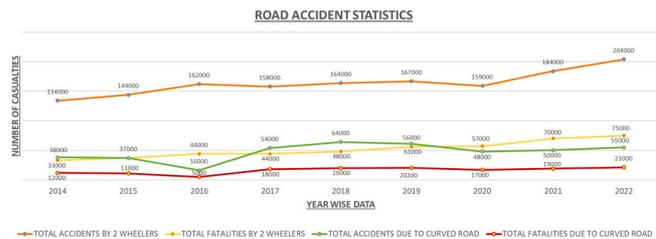
WHEELER DEATHS IN INDIA

Top 2 States

TN (12,828) MH (12,146)
 UP (15,906) MN (5,285)
 GP (6,474) MP (5,339)
 RJ (2,127) UP (6,431)

TRENDING

Auto manufacturers need to enhance safety features to reduce deaths in road accidents from Gadkari



from HeroMotorCorp presentation

Design is really important, and LED uptake is much greater compared to passenger cars. Lit Logos already exist



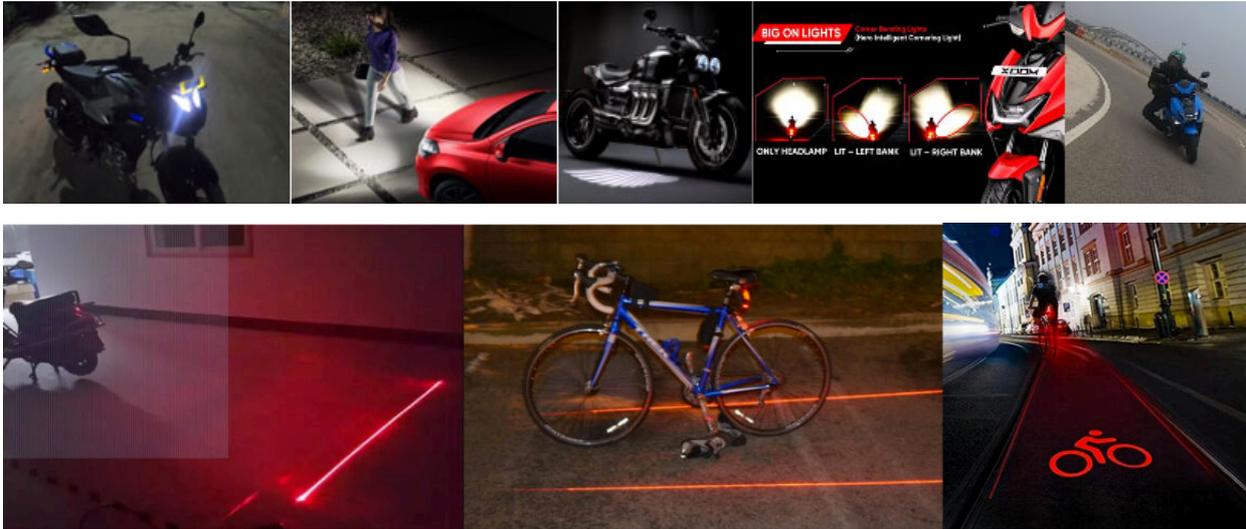
Complexity has increased drastically over the last 10 years, in parallel with R&D cost and part price.

Sr. No	Specification	GEN 1 Bulb Type	GEN 2 LED Hardwired Type	GEN 3 Embedded Hardwired Type	GEN 4 CAN LIN Type	GEN 5 FSM Type	GEN 6 IoT Type	
1	Design & Development Time	10 ~ 12 Months	12 ~ 15 Months	14 ~ 16 Months	15 ~ 16 Months	18 ~ 24 Months	20 to 26 Months	
2	COST	Product Cost	0.4 X	X	~1.2X	~1.4X	1.5X~2X	2X ~ 3X
		Development Cost	0.5 X	X	~1.3X	~1.5X	3X ~ 5X	5X ~ 9X

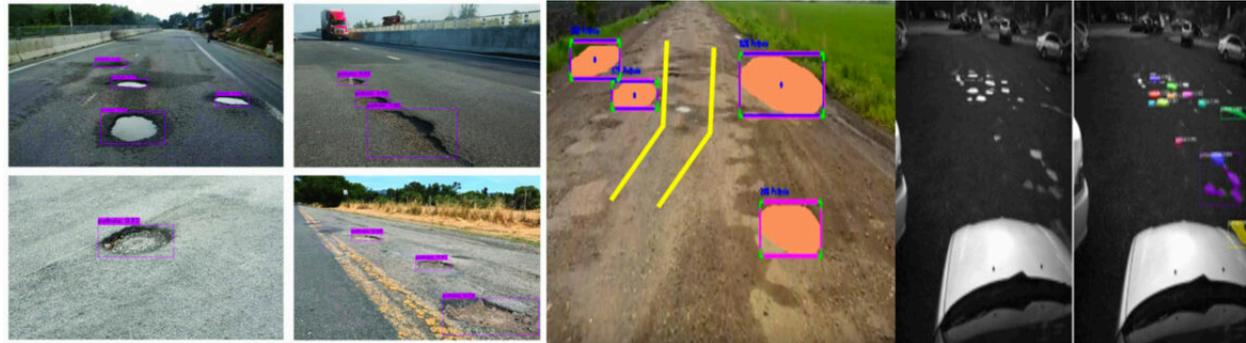
from UnoMinda presentation

Module size is a central concern for lamp makers to fit the low and high beam projectors into often-tight packaging areas.

Development of lighting functions is being accelerated and reinforced in a positive feedback loop with strong customer interest in features like follow-me-home; cornering lights, welcome scenarios with carpet light, and road-projected signalling.



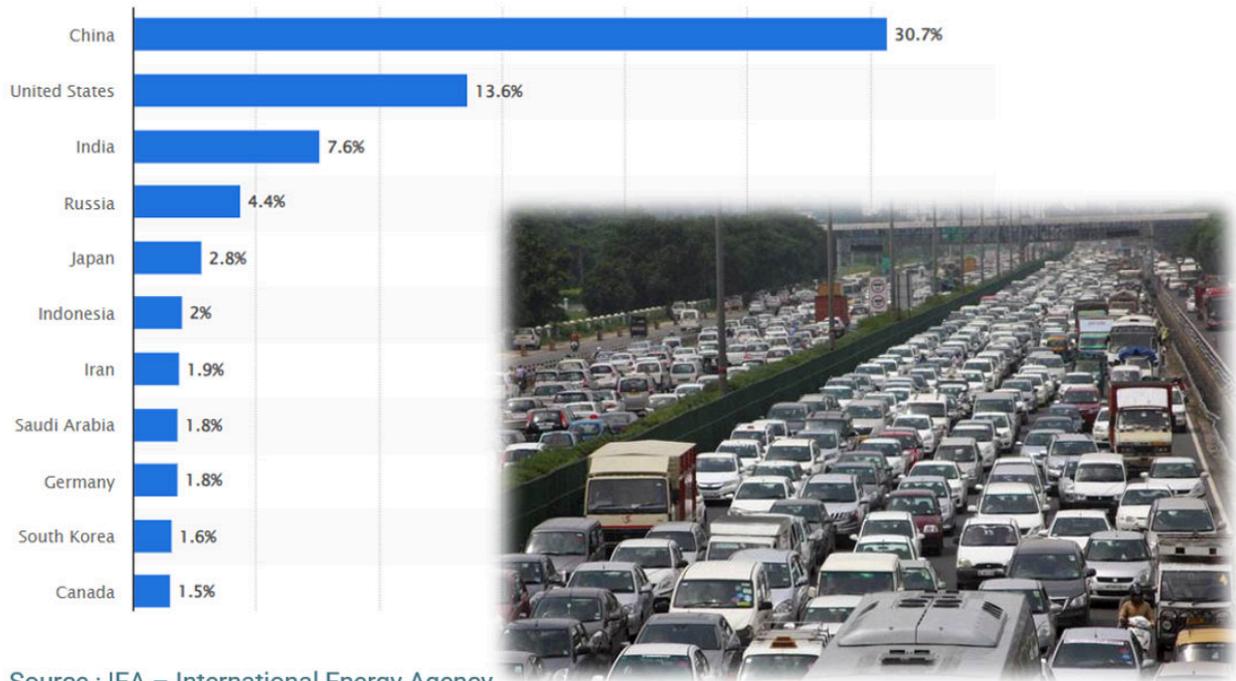
Pothole detection is a major challenge, and HD lighting may help a lot if it can be made cost-compatible with the Indian market. For motorbikes there is no competition between road projection and head-up displays (no displays on a bike).



For all these new features, EE architecture is also evolving on motorbikes. New 2 wheelers Lamps have now ECU, LIN, or CAN interface. ADB is an obvious next step, but not easy to implement because there is no camera on a motorbike. Should we implement a camera in the lamp, then...? Maybe that would be a good idea.

Sustainability

India is the world's № 3 country for CO₂ emission, after China and the United States.



Source : IEA – International Energy Agency

from Maruti presentation

The Indian Government is tackling the problem and is adopting a CAFE target (Corporate Average Fuel Economy, a scheme in place in the United States for many decades) that will hasten EV deployment and power consumption restriction, even for lamps.

CAFÉ II: w.e.f. 2022; CO₂ Target 113 gm/Km

CAFÉ III: w.e.f. 2027; CO₂ Target 91.7 gm/Km

CAFÉ IV: w.e.f. 2032; CO₂ Target 70 gm/Km

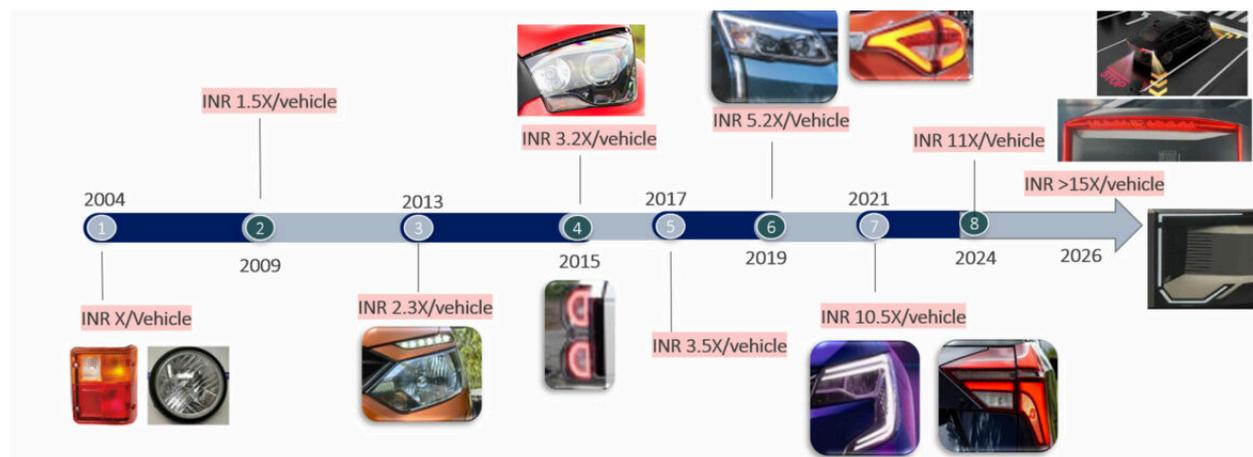
Also more and more focus is put on use of recycled material and bio-based materials by Indian vehicle makers. This was highlighted in Mahindra's presentation, with descriptions of purchasing requirements—among others like localization of PCBs, connectors, semiconductors, LEDs, and tooling.

Design and cost · design to cost · cost to design

India is a highly price-sensitive market; compared to Europe or Japan, China or North America, a large proportion of buyers in India don't have a lot of money to spend on a vehicle. Nevertheless, a significant trend is to put a lot of effort into lamp design, including welcome and farewell animation sequences.



However, as mentioned by Mahindra, lamp cost has risen *elevenfold* over the last two decades' time, and they foresee this trend continuing and accelerating.



Lighting is clearly a significant identifier in India for vehicle design and safety performance. The market is evolving very fast. Lighting teams at vehicle makers and at tier-1 suppliers have greatly improved their skills over the last decade; I was favourably impressed by the level of the technical presentations, the detailed discussions during the event, and the motivation of Indian engineers to learn, improve, and grow.

Lighting News

Refreshed Volvo XC90 Gets New Tech, Front Lights

LIGHTING NEWS



Volvo have updated the 10-year-old second-generation XC90 with upgraded technology and revised appearance. Out front there's a new fascia; inside, a larger infotainment system. The car's new face looks much more like that of the electric EX90. There's a larger grille with diagonal chrome slats. Smack in the middle of it is an attractive round logo placard, complete with a small upward-rightward arrow harking back to earlier renditions of Volvo's logo. This same placard neatly hides a brace of front sensors discreetly peeking through their window below the name callout.





Updated 'Thor's Hammer'-themed LED DRLs also light up in amber to provide the front turn signals in the new headlamps.

The LED rear lights are shaped similarly to the previous ones, but with a revised lit appearance.

Triangularity Reigns in Cupra Terramar Lights

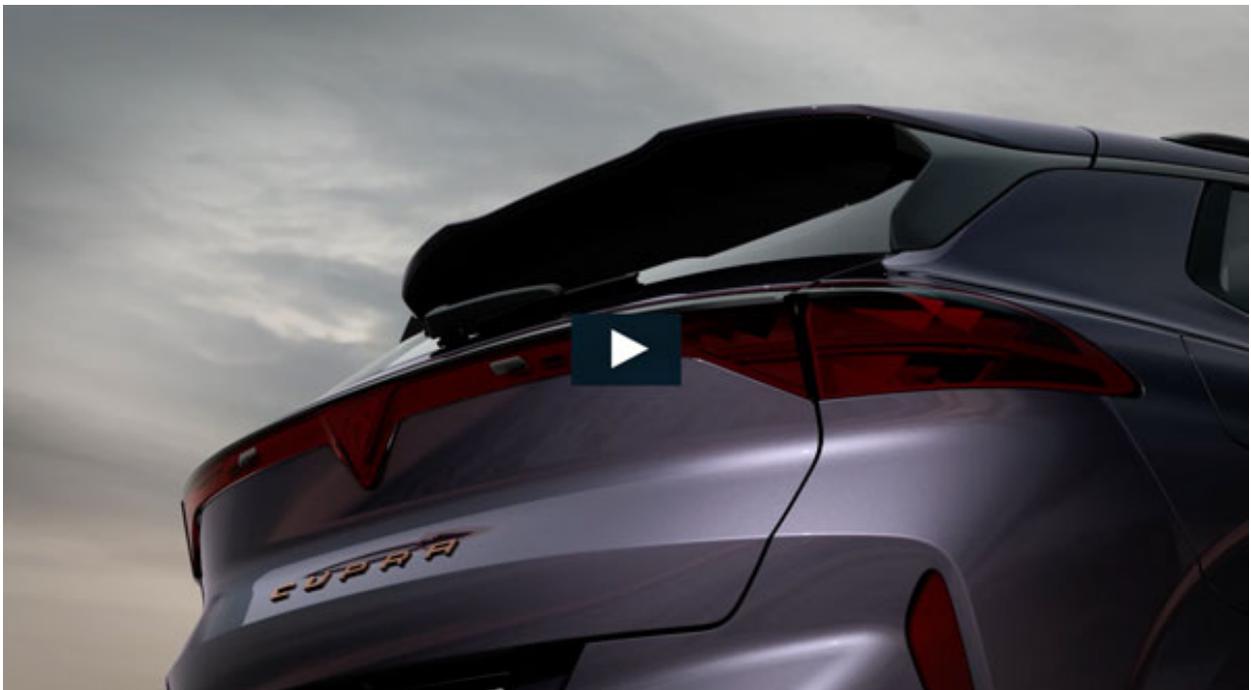
LIGHTING NEWS



Cupra have unveiled their new Terramar CUV, built on the same Modular Transverse (MQB Evo) platform as other Volkswagen Group models including the VW Tiguan and Golf; the Audi Q2, Cupra Formentor, and Škoda Superb.

Its design and lighting and details create visual family ties to Cupra's Formentor and Tavascan. Up front there's no transverse light band or lit logo, but a strong delta theme from the triangular DRL elements in the headlamps.

Front and rear lights present multiple lit triangles. There's a full-width red rear light band, zagging down centrally to form a vee around a red-lit Cupra logo in the middle. There's considerable animation built in, as this Cupra video shows:



Forvia Hella Book Big US Automaker Orders

LIGHTING NEWS



Forvia Hella have received multiple major orders from a leading US car manufacturer, totalling over €2bn. The projects involve advanced electronics and lighting systems, with production to start over the next four years at the supplier's Mexican manufacturing facilities.

The requisitions include secure, hands-free vehicle access systems with ultra-wideband and Bluetooth Channel Sounding technology, and the first 'phygital' front grilleboard to be commercialized in America, with a 1.8-metre illuminated front module – the largest of its kind to date.

Additional projects include lighting electronics, LED headlamps and rear lamps, and illuminated grilles.

Forvia Hella CEO Bernard Schäferbarthold said the new bunch of orders "emphasize our central strategic orientation of consistently expanding our business share in markets outside Europe. The fact that we have won these projects for key automotive technologies of the future is primarily due to the high level of commitment of our global teams".

DVN comment: It is interesting to see big illuminated front modules – grilleboards – coming to the American market after growing in popularity in China on models like the like Changan CD701.

Renault's 17 Coupé Restomod

LIGHTING NEWS



Renault have presented an electric show car riffing on the Renault 17 2-door coupé model launched in 1971. After the electric R5 and the Twingo in a 1990s design, Renault continue to surf the retro waves. Over 92,000 R17s were sold between 1971 and 1979, but in this case, there will be only the one single show car.



The R17 Electric Restomod was created in collaboration with French design firm Ora-ïto. The body is reminiscent of the historic R17, but newly developed for the show car. The quad yellow front lights remind us that from 1937 until 1993, all road-illumination lamps—headlamps, fog lamps, driving lamps—on vehicles registered in France had to produce yellow light, not white.



The electric restomod show car was unveiled at Maison5 in Paris on 4 September, and will be on display at the Renault stand at the Paris Motor Show from 14 to 20 October.



Even though it's a one-off show car, the lighting seems production-feasible with small adaptations. With slimline design and homogeneously lit appearance, the lights fits perfectly with current design trends.



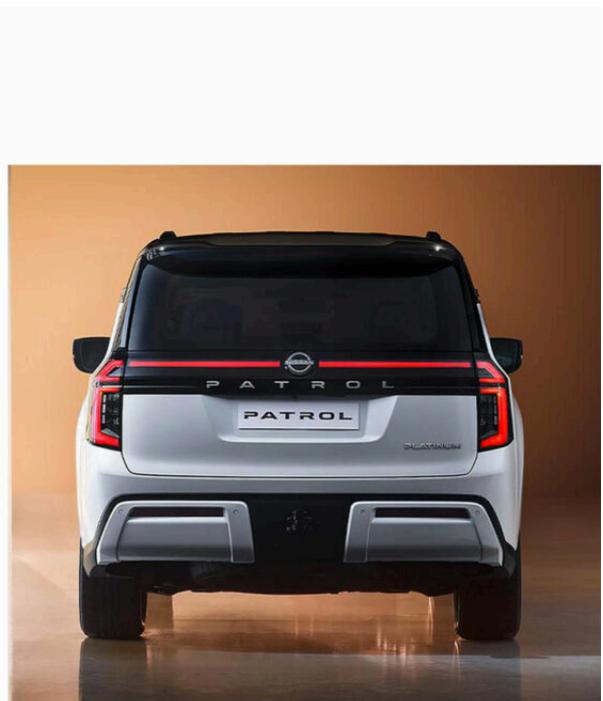
Nissan's New Patrol Goes On Patrol

LIGHTING NEWS



Nissan have launched their newest Patrol in the UAE. The seventh-generation model—badged as the Armada in the US and Canada—was unveiled by Nissan President and CEO Makoto Uchida at an exclusive event in Abu Dhabi. In attendance were royals, VIPs, global Nissan executives, dealers, partners, media, customers, and employees.

The grille is massive; it's wider and taller than before. Either side of it there are double-c-shaped DRLs built into ADB headlamps. Chrome strips traverse the grille, looking almost like full-width light bands. In back, there is a full-width red light band, interrupted only by the apparently-unlit Nissan logo, and double-c-shaped taillights echoing the front light design.

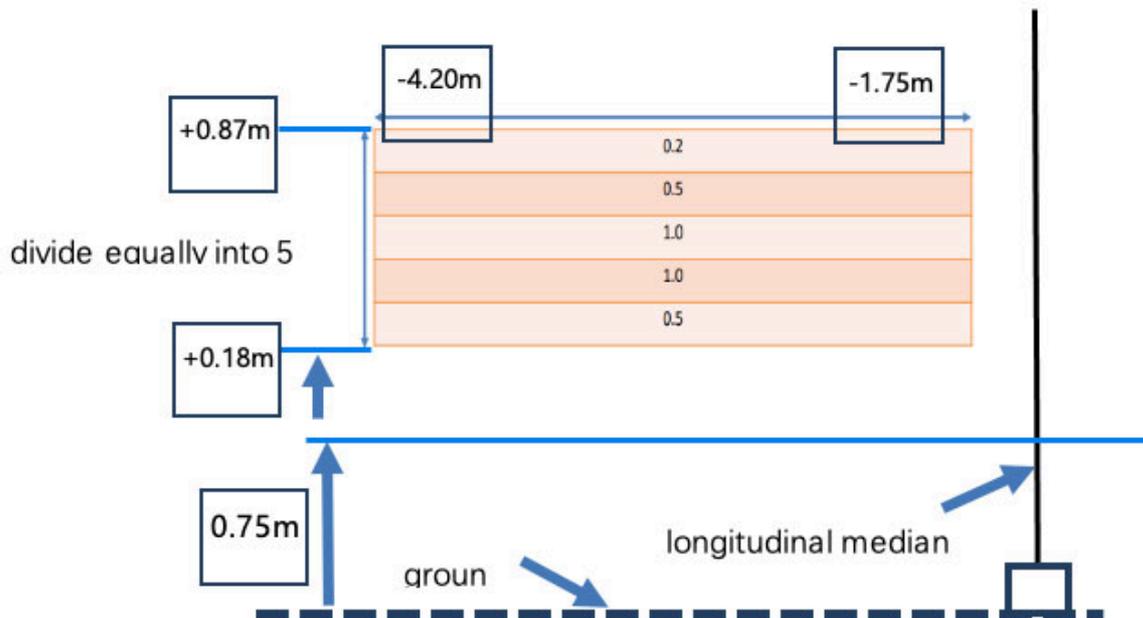


Puddle lights activate automatically as the vehicle is approached with the key fob, or on unlocking the doors. These lamps illuminate a throwback motif featuring the iconic Nissan Patrol silhouette in the desert, and the text "Since 1951" signifying the SUV's production history.



The C-NCAP Perspective on Headlight Glare

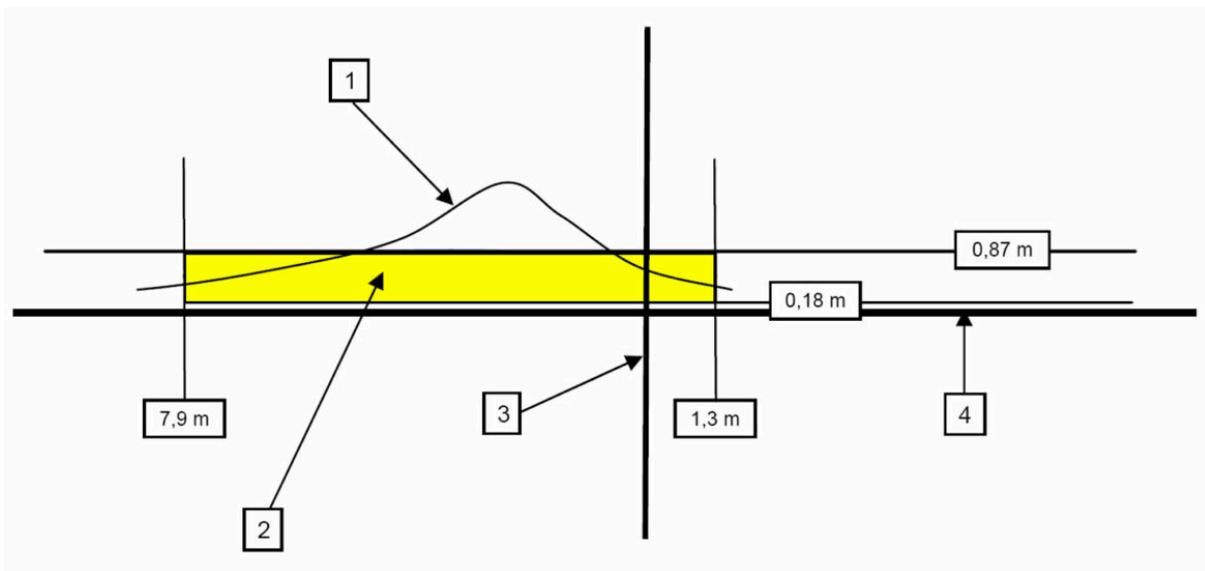
LIGHTING NEWS



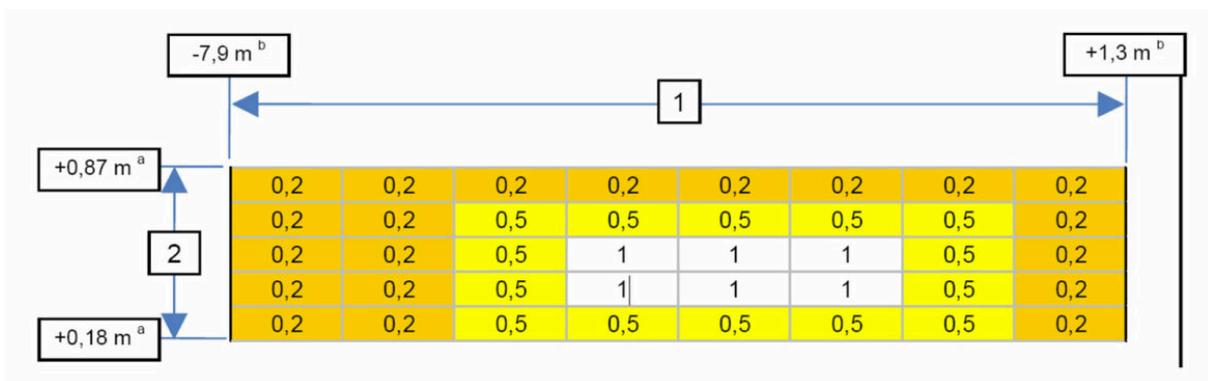
In DVN's ongoing open-forum discussion about headlight glare, we are pleased to present these remarks from Bin Zhao, Chief Engineer of CATARC Europe—the European operation of CATARC, the China Automotive Technology And Research Centre:

Lighting and glare evaluation are two important indices in road lighting, one related to the direct effect of road lighting, and the other directly related to the glare perception of the opposite driver. Glare has always been the most controversial and complex evaluation index in road lighting, because the effect of glare is not only related to the direct lighting of the headlights, but also related to the subjective feeling of the human eye, the brightness of the environment. It is difficult to reproduce, and to effectively evaluate with a direct physical index. How to strike a good balance and coordination between adequate front lighting and avoiding glare to opposite drivers has been a controversial and unsolved problem in the automotive industry for many years.

Because of the importance and complexity of glare evaluation, countries around the world have conducted a lot of research on its evaluation methods. SAE set up a working group to conduct research, and released technical report [J2829](#), Pedestrian Visibility - Low Beam Optimization to Reduce Night-time Fatalities (DVN note: a great deal of expertise went into creating J2829, by renowned experts including Geoffrey Draper. J2829 was "stabilized" in 2011, meaning it is no longer periodically reviewed and updated). GTB also set up a joint working group to conduct in-depth research and release the technical report [CIE 188-2010](#), Performance Assessment Method for Vehicle Headlighting Systems. The SAE and CIE research are both based on the zone shown here:



Layout of the glare test zone on a vertical plane 50 m from the headlamp



Detail of the glare zone and the weighting factors

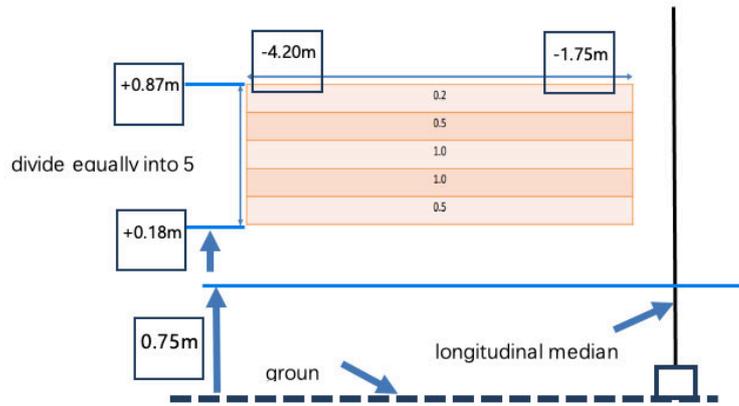
The glare zone is divided into smaller zones and given different weighting factors, as shown in the figure, according to the placement probability of the opposite driver's eyes—the greater the chance of occurrence, the greater the weight coefficient.

In 2017, CATARC found that the glare flux was usually less than 1.28 lm in the glare region, and in our test database of more than 100 headlamps, the maximum value at 99.5-per-cent probability was 1.23 lm, consistent with the maximum glare value of 1.2 lm given in SAE J2829-2009.

C-NCAP quantified the glare in the glare zone based on the regulatory requirements, combined with the test results databases. In the 2021 version of C-NCAP protocol, the weighted light flux is used as the index of the potential glare of the front lighting system by calculating the weighted light flux in the glare evaluation area. If the illuminance flux in all the test areas is not between 0.26 lm and 0.63 lm or the total flux of the test areas with weight factor 1 in the figure above exceeds 0.38 lm, the score will be reduced by 1 point.

The new 2024 protocol differs to the 2021 version:

- The requirements for the glare evaluation of the passing beam were adjusted. The glare evaluation of ADB basic passing beam is added, and the evaluation area is shown here:



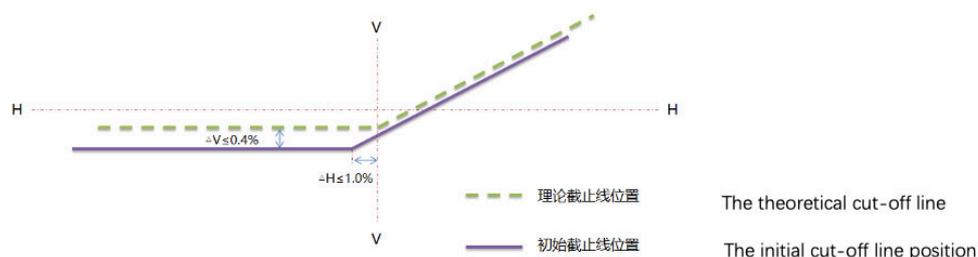
Glare evaluation area for ADB function

- Two penalty levels are given for the glare evaluation. For vehicles without ADB, if the measured flux of the passing beam in the glare area ranges from 0.26 to 0.63 lm and the flux of all weight-1 test areas in the evaluation area does not exceed 0.38 lm, no penalty is assessed. If the relevant flux is between 0.63 and 0.77 lm and the flux of all weight-1 test areas does not exceed 0.38 lm, half of a point is deducted from the system score. And if the glare-area flux exceeds 0.77 lm, one penalty point is assessed.

For vehicles *with* ADB, the light system is put into ADB mode, and the flux of the glare area is measured. If the flux does not exceed 0.30 lm, no points will be deducted, otherwise 0.4 points will be deducted.

- Evaluation of the initial position of the cutoff line was introduced. The initial position is adjusted before the delivery of the vehicle, but in reality, many vehicles have a large deviation of the initial position. This deviation has a serious impact on the safety of road lighting, and will cause poor lighting or extreme glare.

So the actual cutoff line position is measured and recorded, and a calculation is made of the variation from the required vertical and horizontal initial position. If the variation between actual and required initial position exceeds 0.4 per cent vertically, or 1 per cent horizontally, 0.25 penalty point is assessed for each direction as shown here:



Testing the actual initial position of the cutoff line

- Sharpness evaluation of the cutoff line is introduced. Based on accepted theory, a high or low sharpness of cutoff line is not conducive to good vision. Low sharpness means a fuzzy cutoff line, and the lighting effect is not good. On the other hand, an excessively sharp cutoff may cause visual fatigue, and since radiant energy is concentrated near the cutoff line, the lens is apt to be heated locally, so deformation of the lens may occur—especially if the lamp is dirty.

After aiming and measuring the cutoff position, its sharpness is measured 2.5 degrees to the left of V-V. If the gradient value is greater than 0.48, a quarter of a penalty point is assessed for each side.

- In the case of ADB, the flux of the glare area is measured in a static mode in laboratory. The responding time of ADB is also a critical factor in practical use, when the camera detects an oncoming car, it will be crucial to block out the glare on the oncoming driver in time, usually the shorter the better. The minimum responding time is 2 seconds. The responding time of ADB is assessed by C-NCAP by driving test in a test track. When the test vehicle is driven to 500 meters ahead of a trigger vehicle, the headlight of the trigger vehicle will be lit. The trigger vehicle should be detected by the test vehicle at minimum 400 meters from the trigger vehicle, and the glare to the opposite driver should be covered within 2 seconds, otherwise 1 bonus point won't be granted.

Other concerning for the future : In practical use of vehicle, the loading state is also a key factor to Glare to oncoming driver. Despite the regulation, the aiming of passing beam should be adjusted manually or automatically with the load of the vehicle. For vehicles that can be automatically adjusted, just like the initial aiming, its performance may be difficult to achieve satisfactory results in practical use, which may produce obviously unreasonable glare. Therefore, C-NCAP will consider whether to evaluate the adjustment performance of the aiming of the passing beam with the vehicle load. The evaluation may only consider the worst conditions, such as luggage filling to reach the maximum design load of the rear axle.