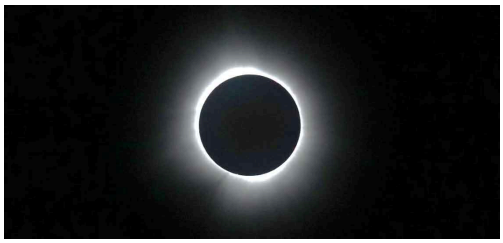
Tue, 16 April 2024
Weekly Newsletter

DVN
Lighting & ADAS

NEWSLETTER #851

Editorial

A Fruitful Week In USA



I spent the whole of last week in the States to meet with DVN members, and immerse myself in the trends in the North American vehicle lighting market. We estimate this market was worth around $7.5bn in 2023, making it the world's third market after China and Europe, and we forecast growth of up to 5 per cent per year through 2030.

My starting point was the solar eclipse we saw in Nashville, Tennessee at around 3pm. Strange to see all vehicles with low beam on by day (especially in a country where daytime running lights are not required).

Battery electric vehicles don't have radiators, so the grille gives way to grilleboards—and in America, there are no regulatory restrictions like in Europe and China about logo size, minimum distance between left and right lamps, etc. So, it is a clear trend here to have lit grilleboards and logos. The Cadillac Lyriq, Dodge Charger, Hummer EV, and Rivian R1T/R1S are good examples.

DVN was invited by SPE, the Society of Plastic Engineers, to their EAV event in Troy, Michigan, to present our views on these trends and the challenges for OEMs and suppliers. It was really interesting to discuss with raw material supplier about the challenges, requirements, and legal constraints on lamp design.

I've also had time at the SAE Lighting System Group meeting in Nashville, where we had interesting discussion about testing and compliance with FMVSS 108 (front decorative lamps per SAE J3098, plastic materials per SAE J576, exterior lighting for use in park condition per SAE J3283, and road projections per SAE J3088).

Paul-Henri Matha
DVN Chief Operating Officer and Lighting General Editor

In Depth Lighting Technology

SPE EAV: Plastics in EVs and AVs

Around 200 people gathered in Troy, Michigan, to talk about plastics in electric and autonomous vehicles.

Among the sessions—battery and thermal management, manufacturing, material innovation, interior, noise and vibration, ADAS, sustainability—one session was dedicated to exterior and lighting. DVN was invited to give a presentation about the design trends and challenges of exterior lighting, including front and rear fascia.

There were interesting presentations from OEMs like GM, tier-1s like Magna and Valeo, and material and coating suppliers like Momentive, Sabic, Lyondellbasell, and Radici.

Body Exterior Design Trends for Electric Vehicles
Tom Pickett, *General Motors*

The presentation highlights the Body Exterior Design Trends for Electric Vehicles (EV). The main drivers influencing exterior design trends are identified and explained such as Aerodynamic Body Profile for lower wind resistance allowing EVs to obtain longer range per charge. In addition, Brand Identity, Lower Mass and Cost, and Sustainability are drivers influencing the Body Exterior Design for EVs.

Revolutionizing Automotive Aesthetics: Evolving Functions Enhance Design Freedom
Michael Angelo Osero, *SABIC*

PLACEHOLDER Use of recycled resins in main stream applications will be increasing in the coming years. Using recycled post-consumer resin as a replacement for virgin resin is the goal of many initiatives. Recycling PCR has added complexity over post-industrial material that will be explored. Green Group Consulting uses several industry and government studies to inform our discussion. There are benefits and drawbacks of both mechanical and chemical recycling that will be explored.

Integrated Tailgate Storage Compartment
Mary Reiber, Tanner Ivey
General Motors

This First OEM Execution Integrated Tailgate Compartment offers an additional 1200in³ of easily accessible, lockable storage to the pickup box. Panels compression molded with in-line compounded direct long fiber thermoplastic polypropylene (DLFT) enable approximately 5lbs of weight savings compared to a steel construction. Low cycle time DLFT construction made possible via electromagnetic plastic welding process that leaves no witness marks on visible surfaces with no fasteners used. High volume production on GM Midsize Trucks since 2023.

Evolving Rear Access Solutions – Lighter and Cleaner
Daniel Lee, Gillard Laurent
Magna Exteriors

Sustainability and electrification continue to shape the mobility landscape and provide opportunities for innovation. Lightweighting, integration, and convenience are impacting both current trends and the future of rear access solutions. Our portfolio of thermoplastic rear access solutions provides vital weight and investment savings, with enhanced styling potentials.

Innovations in Automotive Exterior Lighting
Tom Pickett, *General Motors*

Automotive Exterior Lighting has become more prominent and a brand identifier for vehicles. Innovations in design, plastic materials, tooling, and processing are key enablers in Automotive Exterior Lighting. This presentation will highlight these innovations.

Uniformly Lit Animated Tail Lamps
Steve Ganado, *Magna Lighting*

Animation in lighting is increasingly defining vehicle signature looks. This presentation explains the technology behind the uniformly lit animated taillamps on the 2024 Heavy-Duty GMC and Sierra pick-up trucks. These lamps were the first to use DBM Reflex's Texilit™ technology which is a mold finish with pseudo-random micro-structures with pre-defined slope angles generated by a computer algorithm. The combination of the randomness, small size and high average spread angles of these micro-optics results in very homogenous illumination. The system requires nothing more than a lens with Texilit™ in front of direct facing LEDs.

Advancement in Translucent TPOs Enabling Innovative Lighting Design
Dan Zhang, *LyondellBasell*

Innovative lighting design for electrical and autonomous vehicles has lately become an important styling differentiator, which enhances safety through improved vehicle visibility and improve communication among the user, the vehicle, and its environment. LyondellBasell has actively worked with OEMs and Tiers to develop TPO compounds for various EV applications especially liftgates and fascia, where hidden lighting designs are active innovation focus for several OEMs and Tier 1s. The presentation will touch upon the challenges and considerations involved in developing TPO compounds for EV lighting applications, demonstrate developmental efforts on TPO formulations for their translucency and mechanical properties demanded for applications, and share the latest development results.

Environmental Stewardship through Implementation of Thermoset Recycling in Automotive Lighting
Bob Fraizer, *Valeo*

Through collaborative development Valeo Lighting Systems and LyondellBasell successfully introduced a breakthrough methodology to recover and introduce recycled content in thermoset BMC, a non-traditional recycled material. The aim of this development project was to change the paradigm that thermoset BMC materials could be recycled supporting material sustainability and circular economy. This presentation will focus on the challenges of developing recycling methodologies to recover and convert thermoset BMC and scrap PMMA lenses into a thermoset BMC formulation that replaces a metal bracket. This technology supports Valeo's CAP50 initiatives for carbon neutrality & LyondellBasell sustainability goals by enabling recovery of scrap that would have been sent to landfill. This Innovation will change the thermoset industry by now enabling material sustainability in a non-traditional recycled material.

Coating Systems for Lighting
Dr. Andreas Haeuseler, *Momentive*

Enabling Plastics, Enabling Innovation – Momentive's PFAS-free protective and functional coatings enable the use of plastics, such as polycarbonate, in demanding automotive exterior applications by offering excellent scratch, abrasion and weathering resistance, while maintaining high optical clarity. For example, premium front-end-modules for electric vehicles that replace traditional air intake grilles offer unique design possibilities with the integration of decorative lighting and additional functionality with the integration of ADAS sensors. Momentive's coatings are approved and adopted by leading automotive OEMs globally for the protection of these new innovative parts. Additional emerging technologies will also be presented, including easy-to-clean coatings, anti-fingerprint coatings and protective coatings with improved sustainability benefits that are all PFAS-free.

Sustainable Polyamide Solutions: Solutions for Global Challenges
Bernd Henkelmann, *Radici Group*

Polyamides are typically used for parts requiring high stiffness and strength. Mechanically recycled Polyamides usually show significantly reduced tensile strength and larger variations. If multiple global regions are involved, variations tend to increase, because of limited and changing feedstock.

The presentation will show solutions for the use of recycled Polyamides in global applications. We will also show successful applications realized in sustainable Polyamides.

Finally, we'll touch on the topic of post-consumer-recycled Polyamides and bio-based products.

Electrical Architecture, the New Challenge of Automotive Lighting
Paul Henri Matha, *DVN*

The goal of my presentation will be to explain the exterior lighting new trend with integration of "ISD" (interactive social Display) in exterior. Trend is coming from China and is now coming in Europe and USA.

For BEV, grills can be hidden and replaced by new front panels, including lighting. Kia ev9, Cadillac Lyriq are some examples of what is in USA today. I want to show the trend, the challenges for lighting and bumper companies : new raw materials, new injection machine, electrification of front panel, the need of joining force between lighting and bumper tier1. I will also provide an overview of the legal constraints we can have in USAm Europe and China to be able to deliver these new designs.

- Magna: Homogeneous tail lamp with very efficient Texilit solution
- Momentive: Thermal coating solution for ADAS application
- Valeo: recycled BMC including PMMA for headlamp bracket systems
- LyondellBasell: translucent TPO material for lit bumper like on the Geely Galexy E8
- Sabic: How to design front panel including film, heating, and coating, with focus on radar transparency
- Antolin: In-mold structural electronics (IMSE) solution for interiors

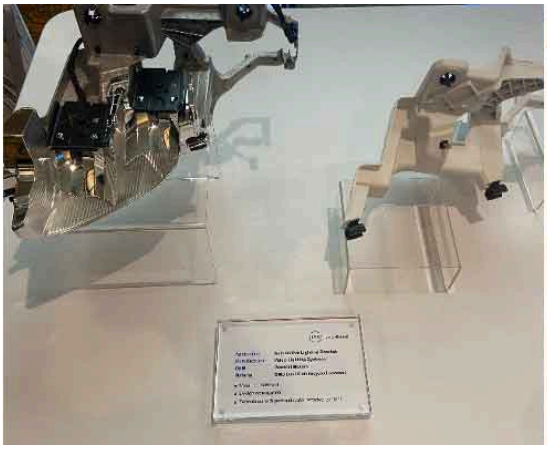
In my presentation on behalf of DVN, I focused on the challenges for the lighting industry with the new front fascias:

- Bigger tools, robots, and validation fixtures
- Additional complexity with 3K – 4K tools
- Control of the gap and fitment (injection compression)
- In-mold film, electronics, and coatings
- New tooling concepts to develop
- New machines to invest in (for tier-1s)
- Innovation to simplify and sharply reduce cost
- New kinds of partnerships among headlamp, grille, and bumper suppliers
- New kinds of relationships among automakers, tier-1s, and tier-2s

In the expo booth area, I found interesting solutions for lamp application:

- Recycled PBT material for bezel and bracket system from LG Chemical

- Recycled BMC for bracket system (Valeo + LYB)



- PC for front fascia from Sabic

- Recycled PMMA from Trinseo for lens applications. They recently launched recyclate-based Altuglas (Europe) / Plexiglas (Americas) 'R-Life' products for automotive applications in colourless and red versions, both containing 50 per cent chemically-recycled MMA. Mechanically-recycled black versions are available, as well.

Lighting News

SAE Lighting Group @ Nashville

LIGHTING NEWS

Around 70 people from the U.S., Europe, Canada and Asia gathered for three days in Nashville, Tennessee.

Main takeaways of this meeting:

- Interest about the turquoise AD-signal lamp by the UNECE GRVA. During their session in Michigan in May, that group will see a Mercedes equipped with this AD-lamp.
- Discussion about possible modification of SAE standard J3098 for decorative lamps to also cater for rear decorative lamps. Discussion included the need to include age/degradation testing, including possible modification of SAE J576 (plastic material).
- Road projection discussion possibilities under FMVSS 108, accounting for the risk of impairment
- Exterior lighting use during the park condition (SAE J3283) discussion about a possible alignment with new UNECE R48 09 serie requirement.
- FMVSS ADB discussion about ongoing test method (SAE J3288)
- Road and signaling projection part of low beam, ADB, turn indicator and reversing lamp. With a potential specificity in US with red turn indicator.

It was three days of really good and fruitful discussion toward group agreements on complex topics.

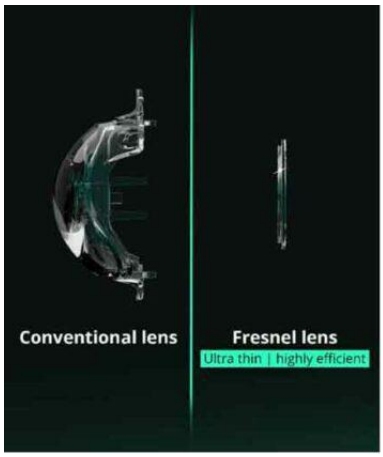
"Use Less" by Forvia Hella

LIGHTING NEWS

Hella are sharing this week more information about their 'Use Less' concept, presented at CES to cut part weight by 60 per cent. To that end, Hella focus on three pillars:

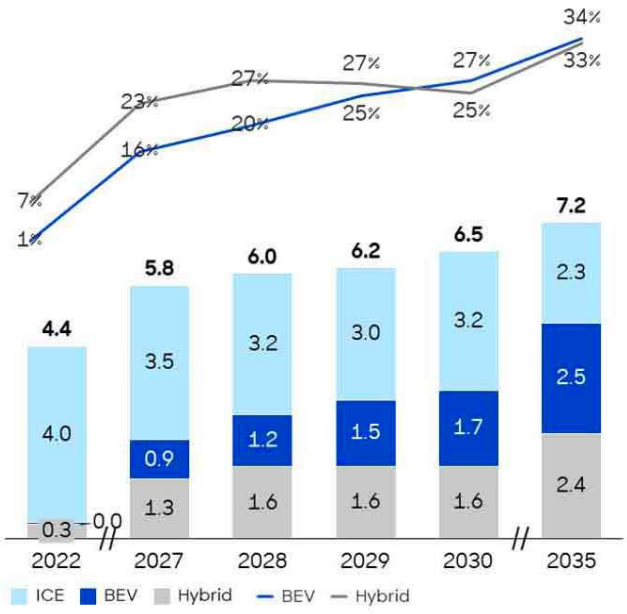
- Reduction of components and parts by merging decorative and functional components. Like combining the support and cover frame into a single, customizable piece.
- Usage of recycled, bio-based, and single-grade materials while avoiding coated and painted materials, for example with an all-aluminium carrier frame and reflectors, wherein nearly all parts can be easily separated and recycled.
- Weight reduction: 80-per-cent lighter Fresnel lens and foam-injected housings play a key role in making an exceptionally lightweight headlamp which delivers superior light quality.

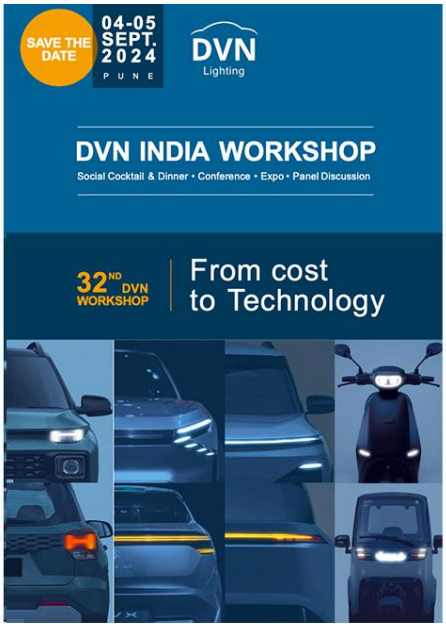
DVN comment: *We are clearly headed in the right direction! We're keen to learn more about this concept, especially what solution Hella have developed to avoid UV coating on the outer lens.*



Call For Papers: Indian Market focus @ DVN

LIGHTING NEWS





The DVN team will focus this year on the Indian market. We will hold a **DVN Workshop in Pune** on 4-5 September. For that event, themed *From Cost to Technology*, we are launching a **call for papers** to gather lecture proposals and build the docket. Feel free to send us your abstract to my email: phmatha@drivingvisionnews.com .

We have defined three sessions:

- Indian vehicle and vehicle lighting market: design & technical trends, LEDification, Softwarisation
- 2- and 3-wheeler lighting specification: design, technology, cost
- India-specific lighting requirements: design, reliability, contamination, usage

We will also propose three panel discussions:

- Regulation with participation from GTB, ARAI, ICAT, and India GRE delegate
- Design, with automaker designers
- Tier-1 CEO round table

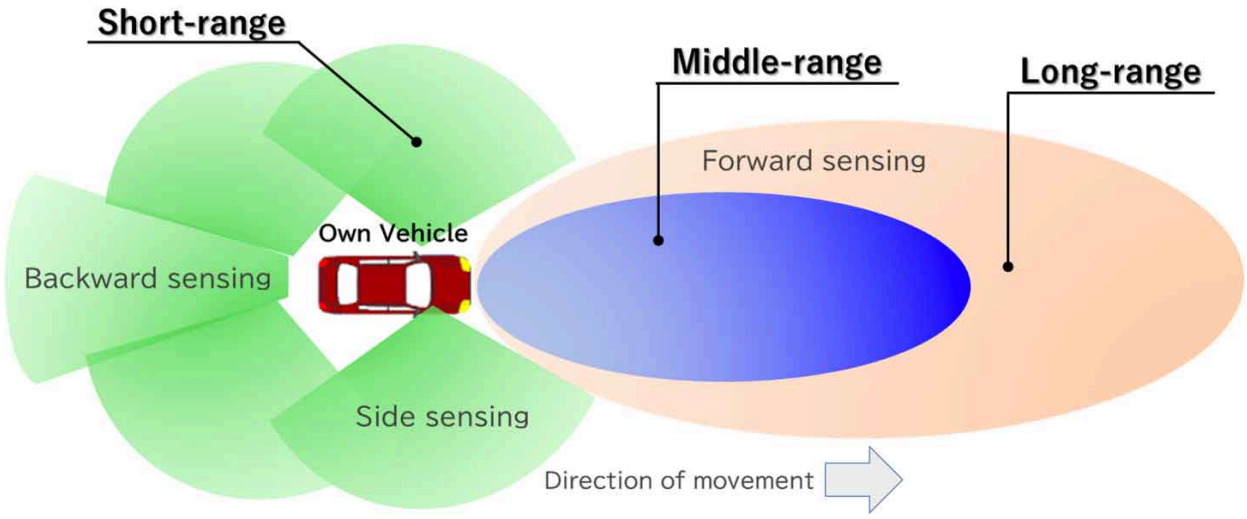
And a couple of months before that event, in July we will put out a full DVN **Report** about that country's vehicle lighting market and ecosystem, updating from our previous report on that subject in 2016—much has changed since then. According to Roland Berger figures, the Indian automotive market is really dynamic. In 2023, there were around 4.5 million passenger cars produced, about 20 million 2-wheelers, and about a million 3-wheelers.

The vehicle lighting business in India currently represents between $2bn and $3bn, with strong growth potential; expected growth from 2023 to 2030 is around 8 per cent per year.

Driver Assistance News

Koito's Short-Range Lidar Finds Favour

DRIVER ASSISTANCE NEWS



Koito have developed a short-range automobile lidar, and won a new order for it from an automaker. The Japan-based supplier have been launching attractive products that contribute to safety and security in the next-generation mobility society. As a part of this effort, they have developed and established a mass production system for lidar.

The new short-range lidar, co-developed with Cepton, has been chosen for use in monitoring the area around an L^4 vehicle. It uses Cepton's MMT (Micro Motion Technology), and has excellent features such as durable architecture that enables a frictionless and rotation-free lidar solution. Koito's production expertise accumulated as a lighting tier-1 has enabled a high level of QCD (Quality, Cost, Delivery), which eased the new lidar's selection.

In addition to the short-range lidar, Koito will offer a lineup of medium- and long-range lidars to meet the needs for all types of mobility.

Canatu, Denso Make Breakthrough in Carbon Nanotube Production

DRIVER ASSISTANCE NEWS

Canatu and Denso have started up their new, jointly developed carbon nanotube reactor at the Canatu factory in Finland. The new high-performance reactor was developed to scale up carbon nanotube film manufacturing to meet increasing demand to address the needs of the ADAS market. This way, Canatu and Denso can triple the throughput of Canatu carbon nanotube (Canatu CNT) films while maintaining record-high performance.

Carbon nanotubes hold immense potential. Their unparalleled properties are increasingly suitable for a range of applications. However, a major obstacle to their widespread application is the challenge of controlling their growth and variation during mass production. Canatu and Denso have significantly progressed in scaling and controlling the chemistry of Canatu's proprietary CNT synthesis process. This enables large-scale production of Canatu CNT films with consistent quality.

The joint development program focused on improving the reactor design, process controls, and serviceability. Key design changes included sizing up the reactor and its components and implementing a novel, parallel-furnace design to multiply the synthesis process yield. Optimal carbon nanotube growth conditions to maximize yield were realized through modular reactor prototypes and system-scale simulations. The new reactor cluster is equipped for in-situ monitoring of carbon nanotube growth, and a new collection chamber design, that together ensures low ADAS heater-to-heater variation. This helps ensure consistent product uniformity. Finally, thanks to improved serviceability, the operating rate target of 90 per cent has been achieved, with service time reduced to 4 per cent of operating time.

The newest reactor will be expanded into a reactor platform for carbon nanotube products. High-performance reactors are now integrated into the fully automated roll-to-roll Canatu CNT film manufacturing line, and deployed during mass-production. Canatu CNT film throughput can be further scaled by integrating up to four additional high-performance reactors into the step-and-repeat film manufacturing line.

Canatu focuses on creating the most advanced carbon nanotubes for highly engineered solutions, where opto-electronic performance and reliability are crucial. For the automotive industry, Canatu make CNT film heaters for ADAS cameras and lidars. Additionally, Canatu's 3D touch sensors facilitate making surfaces interactive in automotive interiors, enabling design freedom and an intuitive user experience.

General News

Alfa Romeo Milano

GENERAL NEWS

The Alfa Romeo Milano is a small SUV on the same platform as the Fiat 600, Jeep Avenger, Peugeot 2008, and Vauxhall Corsa.

The Milano will be offered as a BEV or hybrid. We notice about the exterior design:

- Different grilles for the BEV and Hybrid, but no illuminated grille or logo.
- BiLED module for low and high beam, with Matrix as option
- Full-width rear light band
- Front and rear signature with three L-shaped elements per lamp.

The lamps are designed for the regulations in force outside the North American regulatory island—no side marker light or reflector—and no word on if the Milano will be offered in America.

Mercedes EQS Update

GENERAL NEWS

Mercedes have shown an update of their EQS with two major exterior and ADAS changes.

A distinguishing feature of the car has been its deep black grilleboard, which connects seamlessly with the headlamps. Now, the big EV has a new one with chrome accents as standard in the Electric Art Line. The flush-mounted chrome slats create an elegant contrast to the deep black surroundings. This panel is combined with a stand-up hood ornament.

And now there's automatic lane changing on two-lane highways. The Automatic Lane Change (ALC) function is described as a further development of L^2 driving assistance systems available in Europe. ALC is supported on motorways with two structurally separate lanes and a speed limit of not more than 140 km/h.

The ALC system is part of the Active Distance Assist 'Distronic' package with Active Steering Assist. At speeds of between 80 and 140 km/h, if a slower vehicle is driving ahead, an EQS with MBUX navigation can initiate the overtaking manœuvre itself. If the radars detect sufficient space and lane markings are identified, it can overtake the slower vehicle in front completely automatically.

The system does not require any input from the driver to carry out the automatic lane change, but responsibility for driving the vehicle remains with the driver. Lane changes must therefore be monitored continuously. Mercedes-Benz already offers automatic lane changing for some models in the U.S. and Canada.

Chery Working Toward Building Cars in Spain

GENERAL NEWS

Chery Auto are looking to begin assembling cars in Europe, and might use a plant in Barcelona, Spain that was shut down by Nissan in 2021.

Since Nissan shut down the plant, local electric motorcycle manufacturer Silence have been operating there, as have engineering groups QEV and EV Motors, who have full corporate control of the hub and have been engaged in talks with Chery.

If a deal is reached, EV Motors will continue to operate out of the factory and may make production and commercial deals with Chery to produce their Ebro-branded pickups and electric vans.

It is not yet clear which models Chery intend to make in Europe, nor how many units they expect to produce annually. They were known to be in talks with the Italian Government and had considered setting up a European base there, but—according to an industry source talking with Auto News—there's been little feedback from the Italians, and Chery now favour Spain.