

EV CONNECT

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**Mr. Nishchal
Chaudhary**
Founder, BattRE
Electric Mobility

PG: 22



Mr. Atul Gupta
Co – Founder &
Director, e-Sprinto

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B. KARTIKEYA

Hello my dear Readers,

This editorial for July-August focuses on the newest technological advancements, commercial developments, and other news in the electric car industry. EV Connect is a genuine catalyst for conversation and interaction, giving fresh insights into future technologies as it tracks new technological developments from significant participants in the electric car sector.

You will learn about the newest information by turning the pages, such as “ZEROVA Technologies Unveils New EV Charging Capabilities with DQ480” and “LG Energy Solution and Hyundai Motor Group to Establish Battery Cell Manufacturing Joint Venture in the U.S.” A notable order from Vijayanand Travels for 50 Magna 13.5-meter buses was also received by Tata Motors, according to the company's announcement. According to the deal's conditions, Vijayanand Travels will get the cutting-edge Magna buses, renowned for their exceptional design and cutting-edge features, in phases. The intercity transportation industry's expectations for comfort, fuel efficiency, and dependability are about to be completely redefined by these fully constructed BS6 diesel buses.

Two of the most prominent figures in the EV sector are interviewed in the Cover Interview segment. The first interview is with Mr. Atul Gupta, co-founder and director of e-Sprinto. He discusses e-Sprinto's newest advances, difficulties, and prospects in the 2023 EV market. The founder of BattRE Electric Mobility, Mr. Nishchal Chaudhary, is the subject of the following interview. He refers to the areas that BattRE emphasizes and their impact on your progress.

Read the two substantial cover articles in the magazine's Special Feature section. You will learn a lot about the pioneers and innovators bringing the paradigm shift to electric transportation to life after reading this most recent issue of the top electromobility publication.

Kartikeya

HUBER+SUHNER ANNOUNCES BREAKTHROUGH INNOVATION IN MEGAWATT CHARGING FOR COMMERCIAL VEHICLES

As the leading supplier of cooled cable technology for the high power charging (HPC) market with its renowned RADOX® HPC500, HUBER+SUHNER is proud to announce that it has successfully qualified its RADOX MCS1500 system in multiple field tests. The RADOX MCS1500 is designed to deliver continuous charging up to 2,250 kW (1,500 Amps) for heavy-duty electric vehicles. With this unique solution, HUBER+SUHNER is expanding its product range into megawatt charging by utilizing its scalable direct-liquid cooled technology platform, offering best-in-class performance in all conditions. In addition, HUBER+SUHNER is developing a 4,500 kW (3,000 Amps) solution to cover even



higher power needs in the future.

“With the development of the RADOX® MCS1500, we are once again one step ahead, establishing our leadership in the emerging megawatt charging market,” said Max Goeldi, Vice President Market Management HPC at HUBER+SUHNER. “This innovation will help to fast-charge



the EV revolution.”

“By introducing the missing link between vehicle and infrastructure, we enable our customers to provide a safe, efficient and ultra-fast charging experience for heavy duty vehicles,” added Stefan Buri, Vice President Market Management Industrials at HUBER+SUHNER.

StarCharge to Showcase Innovative EV Charging and Energy Solutions at Smarter E Europe

As part of its global expansion strategy, StarCharge is actively participating in various industry events and exhibitions this 2023.

“At StarCharge, we are passionate about driving the transition to a sustainable and electric future,” said Echo, Chairlady at StarCharge, “We believe that The smarter E Europe 2023 provides the perfect opportunity for us to demonstrate our commitment to innovation and showcase our industry-leading total energy solutions, including smart charging and energy hardware, reliable software, and worry-free services.”

As the demand for electric vehicles continues to rise, the need for efficient and reliable EV charging infrastructure becomes paramount. StarCharge is at the forefront of developing state-of-the-art charging solutions that cater to the evolving needs of electric vehicle owners. With a strong commitment to sustainability and



innovation, StarCharge aims to shape the future of EV charging.

With the global shift towards renewable energy and sustainable practices, there is a growing demand for efficient energy solutions that enable consumers to harness clean power and reduce their carbon footprint. StarCharge has been at the forefront of the EV charging industry, and now the company is expanding its portfolio to include comprehensive energy solutions for residential and commercial applications.

StarCharge took its first exhibition from May 29-31 at Adnec, Abu Dhabi

National Exhibition Center in the EVIS Summit, visitors experienced interactive demonstrations, explored cutting-edge charging solutions, and engaged with the company’s knowledgeable team of experts. These events provide excellent platforms for StarCharge to engage with industry professionals and highlight the advancements, we are also excited to extend an invitation to the EVIS and The Smarter E Europe 2023 at Hall C3.160, where we will unveil our latest products and demonstrate our commitment to shaping a greener future of electric mobility and energy.

VOLVO CARS PARTNERS UP WITH THE TECHNOLOGY INVESTOR AND INNOVATION PLATFORM DRIVER PLUG AND PLAY

Volvo Cars and the global innovation platform driver Plug and Play have teamed up to bring cutting-edge technology for sustainable mobility closer to the dynamic Scandinavian region. As a first tangible result of the partnership, Plug and Play has opened a new innovation platform in Volvo Cars' hometown of Gothenburg, Sweden. Volvo Cars is a founding partner of the new platform, which is expected to engage more than 500 startups every year, and additional partners will be joining over time.

Plug and Play helps blue chip companies around the globe connect with a collection of strategically selected startups. With over 50 locations globally, the company oversees an ecosystem of more than 50,000 startups and 500 partners with an impressive list of alumni, such as Dropbox, Paypal, Trulioo, and Rappi.

This approach complements our own ambitions to lead the transformation of a rapidly changing automotive industry. The Volvo cars of the future will be fully electric by 2030, software-defined, increasingly sold online, powered by cutting-edge core computers, and will become better over time thanks to over-the-air software updates.

"To stay on top of the transformation needed to achieve our bold ambitions, we're continually pushing the boundaries of technology," says Javier Varela, our chief operating officer and deputy CEO. "To succeed, we need to work with the best, and partnering with Plug and Play certainly brings us closer to our aspired position."

A vibrant network of startups

By partnering with Plug and Play, we hope to create a vibrant network of startups from all over the world. Having the opportunity to interact and work with startups in a more efficient and structured way will help us in our ongoing tech transformation. But as well to work closer with our partners along the value chain.

We're entering this partnership through our corporate venture capital arm, the Volvo



We're very pleased to team up with Volvo Cars and open the doors to this new innovation platform in Gothenburg," says Saeed Amidi, Founder and CEO of Plug and Play Tech Center. "The location, right at the centre of events and literally packed with tech-savvy companies and automotive heritage, is no coincidence, and we're confident it will become an innovation powerhouse for startups and corporates."

Cars Tech Fund, a strategic partner of choice for both startups and potential partners who want to lead future technology development. Through the Volvo Cars Tech Fund, we make strategic investments in startups, always looking for the next breakthrough that will shape the future of transportation and mobility. For example, our investment in Luminar successfully resulted in the lidar technology on our new flagship SUV, the Volvo EX90 that we launched late last year.

The Gothenburg innovation platform will focus on sustainability and digital

mobility. Located at Lindholmen, one of the city's most knowledge-intensive and expansive areas, it will enable Swedish companies to connect with startups developing just the kind of cutting-edge and high-potential technology that is needed to solve the challenges of tomorrow. We also expect our partnership with Plug and Play to provide a unique perspective on the latest tech trends, as well as access to a network of industry leaders and top-level executives sharing best practices and lessons learned in a compliant fashion.

NEW VOLVO CAR DESIGN STUDIO IN SHANGHAI STRENGTHENS OUR GLOBAL DESIGN NETWORK

The Shanghai studio aims to be one of the most comprehensive design studios of global car brands in Asia. Mirroring our design headquarters in Gothenburg, the Shanghai studio has all the functions needed to facilitate the whole design process – from concept to production. The impressive capabilities allow for producing scale to full-size models for interior, exterior, colour and material, as well as UX design. On top of milling machines, 3D printers and fully equipped workshops for producing accurate models more efficiently than ever, the Shanghai designers also have access to VR environments where they can explore designs in the virtual world. With the opening of Design Studio Shanghai, we're also reinforcing our strategic investment and long-term development in China, on top of our R&D centre in Shanghai and our plants in Chengdu, Daqing and Taizhou.

The architecture – Scandinavia meets Asia

Our new design studio certainly is a space that encourages innovations and inspires creative ideas. With large floor-to-ceiling windows, sweeping staircases and high ceilings, the two-storey building offers a stylish workspace with plenty of open space. Optimised for collaboration, the 5,500 square metre studio provides a top-notch space to seat more than 100 designers and creative engineers. Work areas are kept clean and simplistic to ignite just the kind of inspiration that can help push the boundaries of how we design cars.

The interior is clean and bright with many thoughtful design details and carefully selected materials fulfilling the high Volvo Cars standards. At the centre of it all, you find the grand 1,000 square metre show hall which is equipped with optimal lighting and features an outdoor viewing garden. All in all, the architecture of our new design studio is a stunning blend of our Scandinavian



“Our Shanghai design team is a crucial and integrated part of our global design network,” says Jeremy Offer, our head of global design. “The new premises and the latest technologies help strengthen the collaboration across our three design studios globally, as we continue to take Volvo Cars’ premium Scandinavian design to the next level.”

design heritage and inspiring East Asian influences.

The team – local expertise, global footprint

The Shanghai design team, established in 2010, boasts talents with strong expertise from diverse backgrounds. Energetic, enthusiastic and creative, they have become a vital part of our global design family, and they continuously deliver outstanding creative design for all projects. One of the first design projects the team took lead on is the Volvo EX90 Excellence. Revealed last month in Shanghai, this limited edition and top-of-the-line variant of our all-electric

flagship SUV, the Volvo EX90, takes the premium experience to the next level. As the safest four-seater ever from Volvo Cars, the Volvo EX90 Excellence allows you to travel in ultimate, first-class style and comfort.

“The Volvo EX90 Excellence is a fantastic example of the fast-growing capabilities and competence of our Shanghai design team,” says Sophie Li, our head of design for the Asia Pacific region. “With the aim to bring premium Scandinavian design closer to our customers in Asia Pacific, our team draws inspiration from both Scandinavian nature and Asian art to ensure our products attract and resonate with consumers in these markets.”

HSBC INDIA PARTNERS WITH TATA MOTORS TO PROMOTE MASS ADOPTION OF ELECTRIC VEHICLES



H SBC India announced that it has partnered with Tata Motors, India's leading automobile manufacturer and the pioneer of EV revolution in the country, for a corporate employee financing solution to accelerate the adoption of zero emission Electric Vehicles. This partnership is in line with the shared vision of the two conscientious organizations to promote sustainability and de-carbonize road transport, paving the way for a greener and cleaner future.

Consumers holding a salaried account with HSBC India will get a chance to apply for this one-of-a-kind tailor made loan to purchase an electric vehicle of their choice from Tata Motors' EV portfolio. As a part of this scheme, customers will be able to apply for a loan with zero down payment, no hypothecation, low processing fee and no documentation charges, amongst others, making the overall EV buying procedure not only simple but highly attractive for all prospective customers. Furthermore, as an added advantage, customers opting for this loan will also get a special accessory kit for their Tata EVs.

Commenting on the partnership, Shri Suman Bery, Hon'ble Vice Chairman,

"The road transportation sector in India is a significant contributor to the overall quantum of carbon emissions in the country. It is therefore, imperative that we move quickly and support the mass adoption of electric vehicles. For this to happen, all the stakeholders in the ecosystem need to come together as a unifying force and support this transition. Our partnership with Tata Motors, India's leading EV maker, will help leverage the synergies of vision and help drive a sustainable transition towards a net zero economy."

Commenting on this new offering, Hitendra Dave, CEO, HSBC India

NITI Aayog said, "De-carbonization is a key agenda for our Government which is reflected in the country's updated Nationally Determined Contributions. In line with the Panchamrit Goals articulated by the Hon'ble Prime Minister Narendra Modi, the Government has taken significant measures to promote Electric Vehicles (EVs) as well as other clean mobility solutions. India has the capability of becoming the number one EV manufacturing hub in the world. We are focused on growing this ecosystem across the country which, in turn, will provide a fillip to the adoption of EVs and propel our transition towards clean and green mobility. While we are focused on building momentum and creating enabling infrastructure, we look forward to the support of corporates in this endeavour.

We welcome the efforts of HSBC India and Tata Motors in creating awareness and promoting access to EVs, along with their commitment to India's larger vision of transitioning towards green mobility solutions."

Commenting on this partnership, Mr. Shailesh Chandra, MD, Tata Motors Passenger Vehicles and Tata Passenger Electric Mobility said, "We are delighted to partner with HSBC India as we work towards accelerating the mass adoption of sustainable mobility in the country. With over 85,000 EVs on road, Tata Motors is the leader in this fast-growing segment. Our new age vehicles offer customers with the choice to select the EV that best meets their purpose. This partnering with HSBC India will further expand the appeal and reach of customers preferring to Go.ev"



MAGNACHIP STARTS MASS PRODUCTION OF 40V MXT MOSFET FOR AUTOMOTIVE ENERGY RECOVERY SYSTEMS

Magnachip Semiconductor Corporation announced that the Company has begun mass production of its new 40V MXT Metal-Oxide-Semiconductor Field-Effect Transistor (MOSFET) for automotive energy recovery systems. This product is used in the automobile of a global automaker.

An automotive energy recovery system stores a vehicle's kinetic energy while braking and uses the recovered energy for functions such as air conditioning or audio systems afterwards. Therefore, this feature improves fuel economy and reduces emissions.

Built on a Power Dual Flat No-lead (PDFN) 56 package with enhanced design of the core cells and terminations, the 40V MXT MOSFET (AMDU040N014VRH) offers

We are pleased to deliver another innovative automotive power solution, which is fully AEC - Q101 qualified for its performance and stability," said YJ Kim, CEO of Magnachip. "Leveraging our heritage of innovative technology, Magnachip will continue to develop premium products that satisfy the diverse and changing market requirements of the automotive market."

RDS(on) as low as 1.4mΩ to enhance the efficiency of kinetic energy recovery. In addition, a guaranteed operating junction temperature up to 175°C and a high level of avalanche ruggedness increase the power density and efficiency of the energy recovery system.

With the application of the PDFN56 package, the size of this

new MOSFET was reduced by approximately 80%, as compared to other 40V MOSFET products designed with a Decawatt Package (DPAK). As a PDFN56 package is widely used in the automotive sector, the new product is well-suited for various applications such as reverse voltage protection circuits and brushless direct current motors of internal combustion engines and regenerative braking systems of electric vehicles.

1 MXT MOSFET (Magnachip eXtreme Trench MOSFET): Magnachip's cutting-edge product portfolio of trench MOSFETs, including low and medium voltage (12V to 200V) MOSFETs 2 RDS(on): On resistance, the resistance between the drain and the source of MOSFETs during on-state operation.

TOYOTA TO BUILD NEW AUTOMOTIVE BATTERY LAB AT MICHIGAN R&D HEADQUARTERS, EXPANDING ELECTRIFIED VEHICLE DEVELOPMENT CAPABILITY IN THE U.S.



Toyota Motor North America, Inc. announced that it will invest nearly \$50 million to construct a new laboratory facility at its North American R&D headquarters in York Township, Mich. to evaluate batteries for electric and electrified vehicles in North America. As part of its evaluation process, the new Michigan battery lab will ensure that Toyota's batteries meet North American customer requirements by confirming performance, quality and durability of automotive batteries made by Toyota. Operations at the new battery lab are expected to begin in 2025.

"This new investment in our North American R&D operation, which has been a key pillar of the Michigan automotive industry for more than 50 years, shows Toyota's directional shift towards electrification for all," said Shinichi Yasui, executive vice president of Toyota Motor North America (TMNA), Research and Development. "By adding these critical evaluation capabilities around automotive batteries, our team is positioned to better serve the needs of our customers, including Toyota Battery Manufacturing North Carolina and Toyota Motor Manufacturing Kentucky, the latter of which will soon be assembling the recently announced all-new, three-row, battery electric SUV."

With increasing production for electrification coming to North America, it's important to have local supporting infrastructure, but more importantly it enables us to invest in team members and technology development," said Jordan Choby, group vice president of Powertrain at TMNA R&D. "This new facility also enables us to experiment and pursue new opportunities as technology and business needs advance."

The team will also work with other North American partner suppliers to incorporate locally-produced battery parts and materials in support of Toyota's multi-pathway approach to reducing carbon emissions through its portfolio of hybrid, plug-in hybrid, fuel cell and battery electric product offerings.

Beyond battery development, other lab activities are expected to include evaluations using Level 2 and Level 3 charging as well as connectivity to power sources and infrastructure. Further, chassis dynamometers at both Toyota R&D campuses in York Township and Ann Arbor are being upgraded to accommodate full battery electric vehicle evaluations.

In addition to working with current battery production, lab engineers will

explore new battery configurations for future products. Their research may also contribute to Toyota's development of new electrified vehicle architectures. Toyota will explore further expansion of the lab's capabilities and opportunities for supporting the needs of the battery and BEV ecosystem.

The new facility will be included in Toyota's enrollment in DTE Energy's MIGreenPower program. This voluntary renewable energy program enables all of Toyota's Research and Development operations in Michigan to attribute 100% of its electricity use to renewable energy projects starting in 2026.

"Today's investment by Toyota demonstrates Michigan's leadership in pioneering the future of mobility," said Governor Whitmer. "The \$50 million investment in a new laboratory facility to evaluate electric vehicle batteries will create high-skilled, good-paying jobs in Saline and support efforts to help electric vehicles run longer and go farther than ever before. Last week, I announced the Make It In Michigan plan, a strategy to compete for projects, invest in people, and revitalize places. Let's continue working to grow Michigan's economy, bring supply chains home, and lead the future of batteries and electric vehicles."

AUTEL'S MAXICHARGER DC FAST AND MAXICHARGER DC COMPACT CHARGERS EARN ENERGY STAR® CERTIFICATION

Autel Energy announced its MaxiCharger DC Fast and DC Compact chargers earned ENERGY STAR® certification, signifying that the chargers use 40% less energy in standby mode than a standard electric vehicle (EV) charger and are eligible for ENERGY STAR® related government grants, resources, and tax incentives. Autel Energy is a leading provider of EV charging equipment and networked charging services.

“As a company vested in Powering the Planet we are always trying to find the most efficient ways possible to exceed our commitment to continuous improvement and raising the bar. By having products that meet the very stringent requirements of ENERGY STAR® it demonstrates our continued commitment to squeezing out every ounce of energy used in our products and to position our company as a market leader,” said John Thomas, Autel Chief Operating Officer.

ENERGY STAR® certification demonstrates the MaxiCharger DC Fast and MaxiCharger DC Compact chargers have met or exceeded the ENERGY STAR® requirements for Electric Vehicle Supply Equipment (EVSE) Program. The DC Fast and the DC Compact are the latest chargers in the Autel family of residential and commercial MaxiChargers to have earned ENERGY STAR® certification. In addition, these chargers have been safety tested and offer connected functionality, including supporting participation in utility demand response programs through open communication protocols.

The US Environmental Protection Agency administers the ENERGY STAR® program. Thousands of organizations—including nearly 40% of the Fortune 500®—partner with ENERGY STAR®. Together with EPA, they deliver cost-saving energy efficiency solutions that protect the climate, improve air quality,



Advancing energy-efficient and cost-saving technologies and bringing them to market is at the heart of what we do at Autel Energy. So, we are proud that our commercial MaxiCharger DC Fast and MaxiCharger DC Compact chargers have joined our residential products in earning the right to carry the Energy Star logo, which has become so easily recognized as a standard for energy efficiency and safety by consumers.

John Thomas, Autel's Chief Operating Officer.

and protect public health. Relative to the program's focus on EV chargers, its website offers: “If all EV chargers sold in the US met ENERGY STAR requirements, the

savings in energy costs would grow to more than \$17 million and 280 million pounds of greenhouse gas emissions would be avoided.

SK SIGNET CELEBRATES GRAND OPENING OF NEW PLANO-BASED EV CHARGER MANUFACTURING FACILITY

SK Signet celebrated the grand opening of its EV charger manufacturing facility in Plano, joined by Plano Mayor John Muns as well as Adriana Cruz, Texas Executive Director, Economic Development and Tourism, and other officials from the State of Texas. This facility will expand U.S.-based manufacturing and R&D for cutting-edge electric vehicle charging equipment to support the growth of America's EV infrastructure. The project was originally announced in November 2022 by SK Signet and the City of Plano.

The ribbon cutting marked the opening of SK Signet's first manufacturing facility in the United States. At full capacity, the facility will be able to produce more than 10,000 ultra-fast chargers per year and is expected to create up to 183 jobs by 2026.

"SK Signet is thrilled to be opening this facility in Texas," said SK Signet CEO Jung Ho Shin. "The opening of the SK Signet factory means new jobs for Texas and more chargers for American EV owners. We couldn't have accomplished this without the close partnership of the State of Texas and the City of Plano."

"We are proud that SK Signet has chosen Plano, Texas, for this significant investment," Governor Greg Abbott said in a press statement. «The company's new state-of-the-art facility will not only create new manufacturing jobs for hardworking Texans, but will advance critical EV infrastructure for our state and the nation. Thanks to innovative leaders like SK Signet, Texas is leading the way on future technology which will power the Texas of tomorrow.»

The event included a factory tour, and Mayor Muns and Seung-June (SJ) Oh, President of SK Signet America, led a demonstration of SK Signet's new V2 charger, which will be made at the Plano facility later this year. The V2 product, which was unveiled at CES 2023, provides a maximum power output of 400



We are very excited for the grand opening of SK Signet in the City of Plano," said Mayor Muns, in remarks at the event. "Their investment in our community represents a significant milestone that holds immense promise for our community and beyond. The company's innovative technology and EV charging capabilities are remarkable, and we are thrilled to be home to their first manufacturing facility in the United States."

kW and can charge an EV up to 80% in 15 minutes – 3 minutes faster than existing chargers. The demonstration showcased the simultaneous charging of two EVs, reaching the impressive top output of 400 kW.

The grand opening was attended by more than 180 guests, including business partners, government officials and members of the local community, underscoring the broad interest in building out the infrastructure to support EVs. SK Signet welcomed representatives from key customers, such as EVgo, Electrify America, Applegreen Electric, Electric Era, Revel and TeraWatt Infrastructure.

SK Signet will make a range of ultra-fast chargers at the Plano facility – from standalone dispensers to power cabinets that support multiple dispensers – for use

by U.S.-based public charging operators, along with commercial companies with EV fleets and traditional gas stations or convenience stores that are expanding their offerings. SK Signet will also manufacture its 350 kW ultra-fast charger, which can fully charge EV batteries from 20% to 80% in just 18 minutes.

These chargers, which supply EV users with faster and more versatile charging solutions, support the buildout of a national EV charging network and are aligned with the goals of the Infrastructure Investment and Jobs Act (IIJA) and National Electric Vehicle Infrastructure (NEVI) program. SK Signet's investment in Texas reinforces the leadership role that the U.S. has taken in the EV transition, and the importance of training American workers to succeed in the highly skilled jobs that have been created as a result.

TAIGA PARTNERS WITH A NEW SERVICE PROVIDER TO DELIVER ITS AWARD-WINNING 100% ELECTRIC PERSONAL WATERCRAFT IN TEXAS



The industry-leading off-road electric vehicle (EV) manufacturer, Taiga Motors Corporation is thrilled to announce that Austin-based boat-rental company, Float On, is now an official Taiga Service Provider (TSP). Taiga is excited about bringing sustainable water exploration to the Lone Star State.

“We are pleased to welcome Float On as a Taiga Service Provider, not only because they’re a top-rated boat rental company in Austin, but because they’re an established family-owned business offering a premium experience with a local perspective,” explains Sam Bruneau, CEO and Co-Founder of Taiga Motors. “Texas was a premier choice for Taiga because it has one of the highest levels of EV adoption in the U.S. whilst being a key boating market.”

Austin: endless possibilities

Taiga operates a hybrid direct-to-consumer model, meaning customers purchase their vehicles directly from

the manufacturer, with TSPs like Float On acting as local points of contact for Taiga customers and accompanying them on their off-road electric vehicle adventures. Taiga carefully evaluates each provider to ensure they have solid industry experience, a commitment to the growth of EVs, compliance with Taiga standards of excellence and an unmatched dedication to what matters most: the customer.

Equipped with the necessary tools, parts, accessories and training, Float On will handle delivery, perform pre-delivery inspections (PDIs) and provide after-sales service to assist customers through the ownership of their new watercraft. Indeed, Taiga’s 100% electric vehicles require low maintenance, most of which can be delivered through remote service and Over-the-Air (OTA) updates.

“When we started Float On, we set out to redefine the boating experience and provide our customers with unforgettable experiences,” says Float On owner David Callejas. “As a Taiga Service Provider, we

can do just that. We are excited to help Taiga expand the EV motorsports market by making an electric personal watercraft like Orca Carbon accessible to Austinites that want to prioritize sustainable water exploration.”

While TSPs have thus far typically been powersports dealers, Taiga continues to push the boundaries of the direct-to-consumer model in its mission to electrify motorsports by onboarding the established boat rental company, Float On, as its latest Taiga Service Provider.

Orca Carbon: sustainable water exploration without compromise

Orca™ Carbon is a fully electric personal watercraft equipped with a powerful electric motor and a unique lightweight carbon fibre hull and top deck. It can also deliver up to two hours of play time on the water. Orca Carbon is extremely manoeuvrable and agile on the water, making it perfect for thrill seekers and water sports enthusiasts.

NOODOE UNVEILS NEXT-GENERATION ELECTRIC FLEET MANAGEMENT TO SUPERCHARGE ELECTRIFICATION EFFORTS

As companies grapple with the complexities of electrifying their gas-powered fleets, Noodoe, world leading electric vehicle (EV) charging solutions provider announced its supercharged Electric Fleet Management Solution, ushering in a new generation of fleet management, custom-built for the electric era. The announcement was made by Jennifer Chang, Noodoe's CEO: "The ever-increasing intricacies of fleet management brought about by the EV revolution have disrupted the way companies worldwide do business. Noodoe's advanced Fleet Management Solution streamlines electrification efforts, easing the transition to electric vehicles."

Fleets around the world are stepping into the EV epoch and need a system built for this next generation of fleet management. Noodoe offers unparalleled support to businesses transitioning to their first or integrating their last electric vehicle. In Noodoe EV OS, Noodoe's innovative cloud-based operating system for managing all aspects of EV charging services, setting up a new electric fleet, rolling an existing one onto the system, or managing a mixed fleet in the process of transitioning could not be easier. Fleet integration happens in a few clicks, and administrators can easily manage vehicles, telematics devices, and EV charging stations. Managers can assign and reassign telematics devices, moving them from gas-powered to electric vehicles seamlessly. Noodoe EV OS makes managing already electrified or transitioning fleets truly frictionless.

Noodoe's Fleet Solution kicks off the next generation of fleet management. By meeting the needs of fleet managers throughout the electrification process, Noodoe answers some of the biggest worries transitioning fleets have. (1) Businesses no longer need to worry about tracking a vehicle's potential range or state of charge. The Noodoe Fleet Management Solution integrates with new and existing



telematics devices (even those attached to gas-powered vehicles) to provide the live status of every fleet vehicle, including its current battery level when in the field or the amount of energy already transferred when charging. (2) Managers need not worry about potential complications from adding EV chargers. Noodoe EV OS manages both the fleet vehicles and the business' charging stations, giving dispatchers a complete overview of their entire operation from a single platform. (3) Fleet managers do not need to be concerned with calculating vehicle charging and departure times. Integrated dynamic load balancing and advanced smart scheduling

make it easy to manage fleet charging times autonomously. Set a departure time, and the system will automatically arrange its power distribution priorities to ensure each vehicle meets its deadline.

Noodoe has committed itself to advancing the worldwide adoption of electric vehicles. Its next-generation electric Fleet Solution makes the transition to electrified fleets simple. Offering end-to-end support and a team of committed EV charging experts ready to support businesses throughout their transition, Noodoe has doubled down on providing the best EV charging experience to every fleet operator.



PLENITUDE AND ENERGICA TOGETHER TO PROVIDE NEW INNOVATIVE SOLUTIONS FOR ELECTRIC MOBILITY



Plenitude (Eni), through its subsidiary Be Charge –which specializes in the dissemination of infrastructure and charging services for electric mobility, and Energica Inside, Energica’s business unit dedicated to providing innovative solutions for the e-mobility, have signed a new agreement to develop new cutting-edge projects.

The first goal of the agreement is to apply electric mobility to the nautical sector through a joint innovative project for the installation of charging stations in Italian ports, to offer customers new displacement options also in water.

The synergy between the two companies has already made possible the development of a new maritime vehicle. The first joint project revolves around the creation of a prototype of electricjet ski, the Runabout model, which will feature technology by Energica Inside and a collaboration with Electric Revolution, a startup created

by Roberto Minnucci and Roberto Mariani (Freestyle Jetski World Champion).

Paolo Martini, Plenitude Head of e-mobility and Be Charge CEO: “The signing of this agreement marks the beginning of a new important journey for us as we can expand the concept of E-Mobility to the nautical sector. As always, we’re driven by the will to be pioneers by using technology as a key tool to always be innovative in our

services.”

Livia Cevolini, CEO of Energica Motor Company, says: “This agreement represents an important chapter for us to expand our activities, and it is also an incredible opportunity to boost the electrification process in new industries. This is a result that follows on the Energica brand vision towards the expanding of the Italian Electric Valley.”

PLENITUDE

Plenitude (Eni) is a Benefit corporation present on the market with a unique business model that integrates production from renewables, energy sale, energy services and a vast network of charging stations for electric vehicles. In the electric mobility sector, it currently has a network of more than 15 thousand charging stations, which will be further increased both in Italy and in Europe, with the goal of reaching around 30 thousand stations by 2026.

**ENERGICA**

ZEROVA Technologies Unveils New EV Charging Capabilities with DQ480

ZEROVA Technologies, a recently spun-off electric vehicle charger maker under Phihong Technology announced its innovative new 480kW standalone DC charger, DQ480. Debuting this charger marks a key milestone for the brand's commitment to delivering diversified charging solutions for the burgeoning EV market.

DQ480: Streamlined quad charging

The 480kW standalone DC charger DQ480 raises the bar for EV charging capabilities with its capacity to charge four vehicles simultaneously via four charging guns. With lower average installation costs per car, DQ480 is a highly economical solution that is ideal for space-limited urban environments — such as fleets, busy petrol stations, commercial buildings, or shopping malls — and its aesthetics further contribute to this, delivering a streamlined, geometric design with minimalist elements.

It also offers the ability to customize cooling systems, with the flexibility to install two liquid-cooled and two air-cooled charging guns. Users can choose from 4 layout arrangements and have the freedom to select from 2 alternative cooling systems. The two 500-amp water-cooled guns offer higher output power, shorter charging time, and better cooling efficiency, as well as a thinner cable design for a lighter weight and improved user experience. The two 300-amp air-cooled guns come with a boost mode that can increase the output power quickly during peak hours.

In addition, the front panel display provides three distinct types of media screen layouts — 7-inch, 7-inch + 21.5-inch, or 32-inch. The 7-inch screen is used for the operation interface, while the 21.5-inch screen displays advertisements. This provides a platform for customers to advertise themselves or to rent



advertisement space to local businesses and brands.

Designed around optimal user experience, DQ480 also offers a smart

cable-management system, and the gun weight can be adjusted for maximal user comfort. Lastly, DQ480 is equipped with both a card reader and a RFID system.

LG Energy Solution and Hyundai Motor Group to Establish Battery Cell Manufacturing Joint Venture in the U.S.

LG Energy Solution (LGES) and Hyundai Motor Group announced an EV battery cell manufacturing joint venture in the U.S. LGES and Hyundai Motor Group signed a memorandum of understanding to produce EV batteries in the U.S. and further accelerate the Group's electrification efforts in North America. The signing ceremony took place in LGES's headquarters in Seoul on May 26 with the attendance of Youngsoo Kwon, CEO of LG Energy Solution and Jaehoon Chang, President and CEO of Hyundai Motor Company.

LGES and Hyundai Motor Group will each hold a 50 percent stake in the JV, which will involve the investment of over USD 4.3 billion (KRW 5.7 trillion).

"Two strong leaders in the auto and battery industries have joined hands, and together we are ready to drive the EV transition in America," said Youngsoo Kwon, CEO of LG Energy Solution. "By further advancing our product competitiveness and global operational expertise, LG Energy Solution will commit our best efforts to offering the ultimate sustainable energy solutions to our customers."

"Hyundai Motor Group is focusing on its electrification efforts to secure a leadership position in the global auto industry. We will create a strong foundation to lead the global EV transition through establishing a new EV battery cell plant with LG Energy Solution, a leading global battery producer and long-time partner," said Jaehoon Chang, President and CEO of Hyundai Motor Company.

The annual production capacity of the new joint venture is at 30 GWh, able to support the production of 300,000 units of EVs annually. The facility will be in Bryan County, Savannah, Georgia adjacent to Hyundai Motor Group Metaplant America, currently under construction.

Starting construction in the second half of 2023, the joint venture plans to start battery production at the end of 2025 at



the earliest. Hyundai Mobis will assemble battery packs using cells from the plant, then supply them to the Group's U.S. manufacturing facilities for production of Hyundai, Kia and Genesis EV models. The new facility will help create a stable supply of batteries in the region and allow the Group to respond fast to the soaring EV demand in the U.S. market.

With this JV, LGES now has seven battery plants currently operating or being constructed in the U.S., where the company is concentrating most of its resources to expand the production capacity. By ramping up its local production, LGES aims to provide innovative products both in scale and

with speed, thereby expediting the clean energy transition in the U.S.

LGES and Hyundai Motor Group have long been partners in the field of electrification having worked on the supplies of EV batteries for vehicles, including Elantra Hybrid, Kona Electric, and IONIQ 6 dedicated EV. The Hyundai Elantra Hybrid, LPi hybrid vehicle introduced in 2009, was the Group's first electrified model. In 2021, both started construction of the Indonesia battery cell JV which is set to start production in the first half of 2024.

LGES and Hyundai Motor Group aim to further strengthen the ties going forward with the EV battery cooperation.



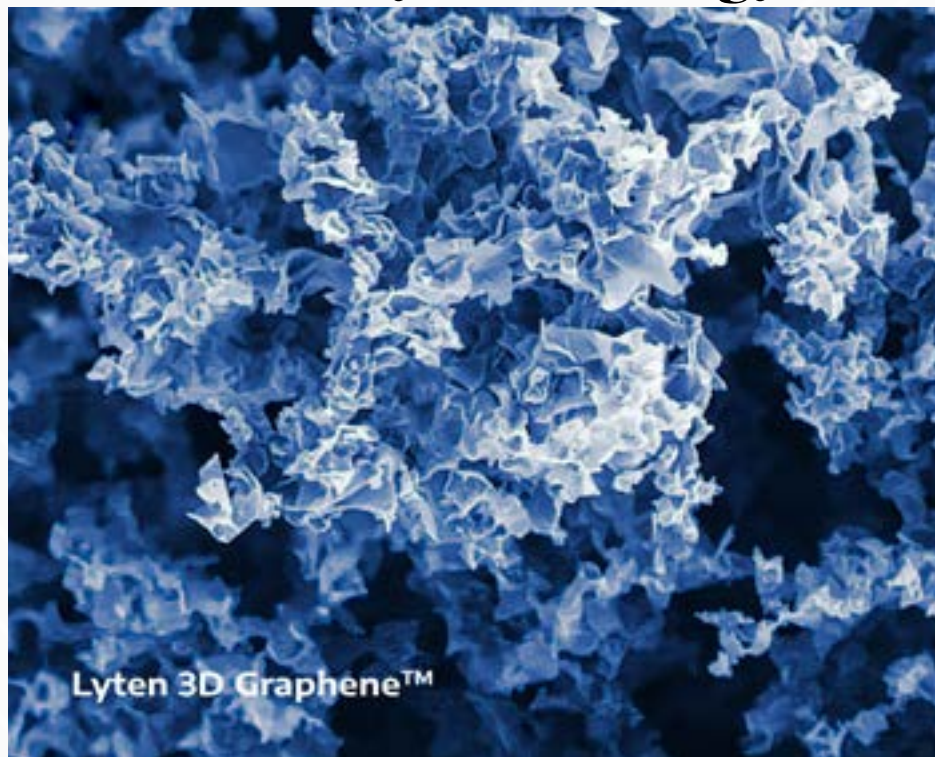
Stellantis Invests in Lyten's Breakthrough Lithium-sulfur EV Battery Technology

Stellantis N.V. and Lyten, Inc. announced that Stellantis Ventures, the corporate venture fund of Stellantis, invested in Lyten to accelerate the commercialization of Lyten 3D Graphene applications for the mobility industry, including the LytCell lithium-sulfur EV battery, lightweighting composites and novel on-board sensing. Lyten, a pioneer of 3D Graphene, will leverage the unique tunability of the material to enable enhanced vehicle performance and customer experience while decarbonizing the transportation sector.

Lyten's tunable materials platform has demonstrated significant reductions in greenhouse gas emissions and will advance the transition to sustainable mobility.

Unlike traditional lithium-ion batteries, Lyten's lithium-sulfur batteries do not use nickel, cobalt or manganese, resulting in an estimated 60% lower carbon footprint than today's best-in-class batteries and a pathway to achieve the lowest emissions EV battery on the global market. Raw materials for lithium-sulfur batteries have the potential to be sourced and produced locally in North America or Europe, enhancing regional supply sovereignty. This technology will meet the needs of industries seeking lightweight and energy-dense batteries that are free from supply chain disruptions.

Stellantis launched Stellantis Ventures in 2022 as a venture capital fund committed to investing in early and later-stage startup companies developing innovative and sustainable technologies within the automotive and mobility sectors. Stellantis Ventures, powered by an initial €300 million in funding, is a key component of the company's Dare Forward 2030 strategic plan, which sets out core targets for Stellantis, including deep emission cuts to slash CO₂ in half by 2030, benchmarking the 2021 metrics, and achieving carbon net zero by 2038 with



single-digit percentage compensation of the remaining emissions.

"We are delighted that Stellantis Ventures, as the venture investment arm of a global automotive innovator, has demonstrated a strong belief in our company and our Lyten 3D Graphene decarbonizing supermaterials," said Dan Cook, president and CEO of Lyten. "Among the automotive product innovations being transformed by Lyten 3D Graphene are lithium-sulfur batteries with the potential to deliver more than twice the energy density of lithium-ion, payload-improving lightweighted vehicle composites, and new modes of sensing that do not require chips, batteries or wires. We are committed to advancing each of these applications to Stellantis and the automotive market."

Cook continued: "Unlike two-dimensional forms of graphene, the production of our tunable Lyten 3D Graphene has been independently verified to be carbon neutral at scale. We are

converting greenhouse gases into a new class of high-performance, high-value carbon materials and are incorporating these tuned materials into applications that will decarbonize the hardest to abate sectors on the planet."

"Having recently visited Lyten together with our CTO Ned Curic and our head of Stellantis Ventures Adam Bazih, we walked away impressed by the potential of this technology to help drive clean, safe and affordable mobility," said Carlos Tavares, Stellantis CEO. "Lyten's materials platform is a key investment for Stellantis Ventures, in line with our Dare Forward 2030 goal to accelerate deployment of innovative, customer-centric technologies. Specifically, Lyten's lithium-sulfur battery has the potential to be a key ingredient in enabling mass-market EV adoption globally, and their material technology is equally well positioned to help reduce vehicle weight, which is all necessary for our industry to achieve carbon net zero goals."

DuPont™ Kapton® MT+ based Slot Liner Solution Improves Thermal Management and Efficiency in High-Voltage E-Motors



DuPont Interconnect Solutions, part of the Electronics & Industrial business segment announced that a leading provider of mobility system solutions has integrated DuPont™ Kapton® MT+ based NKN (Nomex®/Kapton®/Nomex®) slot liners into 800V e-motors for a high-end electric vehicle (EV) manufacturer. This design win represents the successful implementation of the NKN slot-liner solution, thanks to the high thermal conductivity of the Kapton® MT+ polyimide film and electrical insulation from Nomex® paper.

DuPont collaborated with an e-motor developer and a leading electrical insulation system provider to develop a slot-liner solution. Slot liners protect the copper wires in the e-motor from the outer steel wall, dissipating heat to the outside and enabling the motor to operate efficiently at a cooler temperature. In



addition, the NKN laminate sandwiches Kapton® MT+ film between two layers of DuPont™ Nomex® paper for electrical insulation, making it ideally suited for this application.

“With global demand for EVs continuing to accelerate, e-motors must run as safely as possible with the highest energy efficiency,” said Greg Randisi, Automotive Global Marketing & Business Development Leader with DuPont Interconnect Solutions. “This collaborative solution signals a significant win for our Kapton® MT+ based high thermal conductivity NKN slot liners that we plan to make available to other EV OEMs as companies build out their more advanced

e-motor offerings.”

Failure in the field is not an option. Just as designers of high-speed traction motors and other high-performing motors have trusted in DuPont solutions for decades, EV design engineers can rely on the Kapton® MT+ based NKN slot liner solution to prevent failures in critical eMotor systems. The DuPont™ Kapton® MT+ based slot liners can be proliferated to other EV OEMs as part of motor providers' e-motor/powertrain offerings, as their high thermal performance enables OEMs to make more compact, better-performing e-motors with superior heat dissipation. Additionally, Kapton® MT+ provides superior voltage endurance, enabling longer life of e-motors at high voltages, 800V+. DuPont offers a variety of thicknesses of Kapton® MT+ film that can effectively dissipate heat in larger e-motors such as those used in trucks and novel aircraft.

Samsung Electro-Mechanics develops the world's highest capacity MLCC for electric vehicles

Samsung Electro-Mechanics announced on the 16th that it has succeeded in realizing the industry's highest capacity in terms of high-pressure MLCC applicable to electric vehicles and has started market targeting by expanding its line-up for high-end level automotive electronic components.

The MLCCs developed this time are products that have the characteristics of 250V class 33nF (nanofarad) with low capacitance change rate according to temperature and 100V class 10μF (microfarad) for 125°C and they are products with the industry's highest capacity in terms of high-pressure MLCC in the same voltage class. Each product is used in electric systems and LED headlamps, which are key devices for electric vehicles.

Electric vehicles operate based on high-voltage battery systems such as battery management systems (BMS) and on-board chargers (OBC). MLCCs used in electric vehicles must be able to withstand the high output voltages transmitted from the battery for ultra-fast charging and power delivery. In addition, as the number of electronic components used in electric vehicles increases, semiconductors must also have high-capacity characteristics so that they can operate stably.

The 250V class · 33nF product developed this time boasts the highest capacity in the industry at the same voltage level. 22nF was the highest capacity for the existing 250V class products. This product improves battery stability by removing high-frequency noise inside the battery module while having the durability to withstand high voltages.

In addition, the 100V class · 10μF product is used in LED headlamps for electric vehicles and its electric capacity has been doubled compared to the previous product. Semiconductors used in LED headlamps require high power consumption, so high-capacity MLCCs that can store a lot of energy and supply



it to semiconductors quickly and stably while having high voltage durability are essential.

In general, it is difficult for MLCCs to satisfy both voltage and capacitance characteristics at the same time. Designing thicker dielectrics to increase voltage characteristics reduces the number of internal electrodes that can be stacked, making it difficult to increase capacity. Samsung Electro-Mechanics has realized high capacity by refining dielectrics as core raw material in the form of nano-level fine powder. The company also explained that its proprietary surface coating method minimizes agglomeration between powders, enabling stable operation at high voltages.

Meanwhile, the MLCCs developed this time satisfies AEC-Q200, a reliability test standard for automotive electronic components, enabling them to be used in other applications such as ADAS, body, chassis, and infotainment in vehicles.

Samsung Electro-Mechanics CEO Chang Duckhyun said that «Samsung Electro-Mechanics has established the whole line-up for automotive MLCC by developing electric vehicle products, and that Samsung Electro-Mechanics will develop and manufacture core raw materials for MLCCs on its own to enhance technological competitiveness, and expand its market share for electronic device MLCCs by internalizing facilities

and strengthening production capacity.

Samsung Electro-Mechanics has been developing and producing MLCCs since 1988 and has the world's second largest market share in the IT sector. Samsung Electro-Mechanics is strengthening its lineup of high-temperature, high-pressure, and high-reliability electronic device products based on its technological prowess in the ultra-small and ultra-high-capacity MLCC sector, and is expanding its MLCC supply to global automotive component manufacturers and automobile manufacturers.

Samsung Electro-Mechanics has newly established organizations dedicated to automotive electronic components in its major business divisions following the expansion of the automotive electronic components market to continuously develop technologies for automotive electronic components in areas such as MLCC, camera module, and semiconductor package substrate, and is expanding its business proportion. Samsung Electro-Mechanics CEO Chang Duckhyun said at the shareholders meeting last March, «Electric vehicles and autonomous driving are opportunities for Samsung Electro-Mechanics,» and that We will emerge as an automotive component company by joining the development trends of automotive electronic components market.

Tata Motors wins order for 50 Magna 13.5-metre buses from Vijayanand Travels



Image for representation purpose only

Tata Motors announced that it has bagged a prestigious order for 50 Magna 13.5-metre buses from Vijayanand Travels. The state-of-the-art Magna buses, known for their superior design and advanced features, will be delivered to Vijayanand Travels in a phased manner, in accordance with the agreed contract terms. These fully built BS6 diesel buses are set to redefine the standards of comfort, fuel efficiency, and reliability in the inter-city transportation sector.

Expressing his enthusiasm, Mr. Shiva Sankeshwar, Managing Director, Vijayanand Travels Private Limited said, "We are thrilled to partner with Tata Motors and induct their state-of-the-art Magna buses into our fleet. These buses align perfectly with our vision of offering a comfortable and reliable travel experience to our valued

passengers. We are particularly interested in the Magna buses' advanced comfort features which will help to ensure the safety and comfort of our passengers and our drivers. We look forward to working with them to provide our passengers with the best possible travel experience and to a successful partnership with Tata Motors."

Commenting on the occasion, Mr. Rohit Srivastava, Vice President, Product Line – Buses, Tata Motors said, "We are excited to partner with Vijayanand Travels and provide them with our best-in-class Magna buses. This order further strengthens our commitment to delivering exceptional quality, performance, and customer satisfaction. We are confident that our buses will not only meet, but exceed the expectations of Vijayanand Travels and its esteemed passengers. We have a long history of providing high-quality, reliable vehicles

to the transportation industry, engineered specifically as per the customers' needs. We are confident that our partnership will be a fruitful one for both parties."

The 13.5-metre Tata Motors Magna bus is equipped with the futuristic Cummins 6-cylinder engine which delivers exceptional performance. ABS and anti-roll bar provide passengers with total peace of mind while the parabolic leaf-spring and rear air suspension guarantee superior comfort throughout the journey. The bus is equipped with advanced technological amenities like a gear shift advisor and Tata Motors' Fleet Edge connectivity system. Tata Motors is committed to quality as well as, unparalleled passenger comfort, exceptional fuel efficiency, and economical total cost of ownership. Tata Motors Magna bus comes with a warranty of 4 years / 4 lakh kilometres.



EV Connect Editor Kartikeya in Conversation with

Mr. Nishchal Chaudhary

Founder, BattRE Electric Mobility



Q Tell us about your experience in the field of EVs and what were the fields of expertise before venturing into EVs?

A I have over 19 years of rich and diverse experience in leadership positions at some of the biggest telecom brands in the Indian industry. Prior to starting BattRE, I was the head of business operations at the Broadband Business for Essel. I have also been associated with Bharati Airtel and headed the marketing in Rajasthan and Gujarat. I hold an MBA degree from Amity Business School and have completed an Executive Program in Business Management from the Indian Institute of Management (IIM) Calcutta.

However, over the years, the desire to do something to make the planet a better place to live in and touch the lives of billions of people in India, set me off in a new journey in a different direction.

Air Pollution was and remains one of the biggest issues that affect the entire population. We need to bring a significant change in the way we live and work today so that a commercially viable solution to this looming problem of pollution can be addressed. With this thought, I began my journey to do my part in improving vehicular pollution levels in India.

When I began, electric mobility was a budding industry where the pressing issues of sustainable development was being addressed. I decided to make my passion for pollution free vehicles the mission of my life and embarked on this e-mobility journey.

With this, BattRE Electric Mobility Private Limited was born in 2017

with a goal to create affordable and clean technology mobility solutions for the Indian market.

Q What are the products currently offered by BattRE & its specifications?

A Since its launch, the company has launched three e-scooter models namely BattRE ONE, LO:EV & Stor:ie. These e-scooters are designed to help boost EV adoption in the country.

BattRE ONE was our first entry level electric scooter that was launched in June 2019. It includes features such as detachable LFP battery, 3 riding modes, dual disk brakes, reverse gear, cruise control, projector headlamp, USB Charge & Remote Key & anti-theft alarm. BattRE ONE is a mix of retro design with contemporary styling targeted at youth.

BattRE LO:EV is our premium entry level electric scooter segment which is quick and can slip through heavy traffic enabling an easy and comfortable ride. It runs on lithium ferro phosphate battery. BattRE LoEV showcases outstanding features such as cruise control, dual disc brakes, remote key, anti-theft alarm system and reverse gear. It also receives a wheel immobilizer, LED display and LED DRLs.

BattRE Stor:ie is our tall boy e-scooter which is smart, safe, robust yet affordable and stylish. Stor:ie, which comes in eight scintillating colors, is a perfect blend of the classic and the contemporary. It has a range of 132 kms per charge, a top speed of 65 kmph, and only 5 hours of full charging time. The scooter has a powerful 2kW IP 67 rated BLDC hub motor and is equipped with metal panels

to provide robustness and strength and comes with a 5-inch Bluetooth TFT smart screen. The Stor:ie has neo sync with an interconnected motor, controller, battery, and a dedicated app offering riders comprehensive, AI-backed analytics with the TFT screen bringing features such as distance-to-empty, nav assist, call notifications, telematics, etc., to the customer.

Apart from e-vehicles, BattRE is also playing an important role in contributing towards setting up the required infrastructure to support e-mobility. It has installed affordable recharging stations, provided effective roadside assistance, and supported its customers with segment-leading extended warranties, all aimed at making e-scooters accessible to everyone.

Q What do you see as the biggest opportunities in Indian EV Industry?

A Electric vehicles have gained rampant acceptance in recent years. There is a collective awareness towards environmental issues which has given rise to a demand for cleaner and more efficient alternative to traditional fuel-powered cars.

According to a McKinsey report, the sale of two-wheeler e-vehicles could reach between 8 and 9 million units by 2030 wherein they would account for about 35 to 40 percent of all two-wheeler vehicles sold. We, as manufacturers, are witnessing a willingness among consumers to buy e-vehicles.

Furthermore, since the Indian government has set a target to achieve 30 percent electrification of the country's vehicle fleet by 2030, and has introduced several



incentives and policies to support the growth of the EV industry, the shift in demand towards greener options is inevitable.

After decades of prevalence of fuel- powered vehicles, consumers are slowly getting familiar and comfortable with the idea of investing in electric vehicles. With years to come, as more EVs hit the road, these environment-friendly mobility solutions will undeniably become the norm of Indian roads.

Q What are the challenges faced by the EV manufacturers?

A Key challenges faced by EV manufacturers in India include:

Consumer awareness and acceptance: EV Adoption is ~5% to the total sales of 2W it shows that awareness and acceptance of EVs among consumers in India are relatively low, with concerns about technology, charging infrastructure, and overall ownership experience.

High upfront costs: EVs are costlier due to expensive battery, making affordability and competitive pricing a challenge, especially in price-sensitive markets like India. Also in consumers mind the comparison vs ICE is on the initial cost of purchase & not on the total cost of ownership

Limited charging infrastructure: Charging infrastructure in India is limited and unevenly distributed, with majority of stations concentrated in urban areas.

Range limitations: Despite improvement, EVs still have limited driving range, posing a challenge for potential buyers accustomed to conventional





vehicles with longer range.

Battery technology and supply chain: Advancements in battery technology impact the performance, range, and cost of EVs, but require significant investments in R&D and a robust supply chain for raw materials, components, and manufacturing.

There is a collective effort by the Government and the manufacturers in the areas of battery advancements technology, growing network of charging infrastructure and intense R&D to make EVs a safe, affordable and viable option for customers across India.

Q Is there sufficient infrastructure in Tier 2 & 3 Cities in India?

A Contrary to the popular belief, there is an increased adoption of electric vehicles in Tier-2 and Tier-3 cities. These are the regions which will drive the e-mobility ecosystem of the country. There is a lot of scope in Tier 2 & Tier 3 and they are going to be the growth drivers of the electric mobility revolution in the country in the future.

BattRE has ~65% contribution from Tier 2 and Tier 3 cities. We are expecting it to grow exponentially in these regions in the future.

The transition to electric vehicles will drastically cut down India's dependence on fossil fuel, bringing down the import bills, reducing the impending air pollution and creating a self-reliant and sustainable ecosystem.

Q Which are the regions BattRE currently focusing on and what will be their



contribution in your overall growth?

A BattRE sold its first scooter in July of 2019 and since then, the company has built a network of over 400 dealerships in over 350 towns in more than 21 states across India. Since its inception, Batt:RE has achieved sales in excess of 40,000 units.

We are constantly focused on expanding our footprints. We have achieved a strong hold in West and South regions and are now expanding our efforts in the North and East regions of India.

As the population is becoming more environmentally aware, we are witnessing a huge shift in the acceptance of electric vehicles in India. This ubiquitous change in mindset will play a major role in boosting the e-mobility space in India.

Q What is your mid -to long -term outlook for the Indian Market?

A Up until a few years ago, electric mobility was considered a nascent industry. Since then, the e-mobility manufacturers have made huge strides into the automotive market to capture a significant share of the overall industry. Various market reports share a positive growth forecast for the industry.

We believe that the market is going to witness a significant growth in the future and pave its way towards the electric revolution in the country. We as manufacturers, are expecting that the market will reach a 10-million-unit mark by 2030 which is close to 40% of the overall two-wheeler market.

Batt+RE



Furthermore, the technological advancements in battery technology which is bringing down the e-vehicle cost, is an added stimulant for customers to make their switch to e-vehicles.

Significant efforts are being made across India to build a robust network of charging infrastructure which will further build confidence among customers to adopt an e-mobility lifestyle.

Exide Technologies leads the way in Energy Storage Systems, pioneering a sustainable future

Exide Technologies, an international leader in battery storage solutions is revolutionizing the energy industry with its unwavering commitment to innovation and sustainability. With a legacy spanning over 135 years, Exide Technologies has become a trusted partner for industries worldwide, seamlessly integrating renewable energy into their offerings. Exide Technologies offers an extensive portfolio of cutting-edge battery storage solutions and customized energy systems powered by lithium-ion technology. These advanced systems empower businesses and communities to stabilize the grid, optimize energy usage, enhance operational efficiency, and minimize environmental impact.

In the pursuit of a net-zero world, energy management and storage solutions play a crucial role. Exide's Customized Energy Systems (CES), built on advanced lithium-ion battery technology, offering comprehensive solutions for stationary and mobile energy storage needs. These systems provide efficient energy management, grid stabilization, backup power, demand response capabilities, and seamless integration with renewable energy sources, reducing carbon emissions and the environmental footprint.

Exide Technologies leads the industry in battery storage solutions, championing innovation, sustainability, and the transition to an eco-friendly energy landscape. With their cutting-edge offerings and dedication to customer satisfaction, Exide Technologies is shaping the future of energy storage and contributing to a more sustainable and resilient world.

Exide Technologies' Customized Energy Systems (CES) play a pivotal role in:

Storage Capacity: Providing substantial storage capacities to retain surplus energy from renewable sources

Grid Stability and Reliability: Acting as a buffer against supply-demand imbalances and grid fluctuations



Power Boosting, Peak Shaving and Load Management: Ultra-fast-charging, mitigating peak energy requirements, reducing strain on the grid, and lowering costs

Frequency Regulation: Offering prompt response to stabilize grid frequency

Backup Power: Ensuring uninterrupted power supply to critical loads, enhancing system resilience

Renewable Integration: Enabling seamless integration of renewable energy sources into the grid

Microgrid Support: Enhancing stability and resilience in localized energy systems

Energy Trading and Arbitrage: Participating in energy markets, offering economic benefits to grid operators and owners

Environmental Sustainability: Contributing to the transition to a low-carbon energy system

Innovative modular approach in Energy Solutions: Exide Technologies' Energy Solutions division delivers turnkey, easily installable energy storage solutions tailored to specific customer requirements. Leveraging a modular approach and state-of-the-art lithium-ion battery technology, CES provides cost-effective storage systems with plug-and-play installation and predictive software control. Core brands are Solition Powerbooster and Solition Mega series. Exide's Solition Powerbooster and Solition Mega offer businesses the opportunity to enhance energy efficiency, support electric vehicle growth, and embrace sustainable energy practices.

Solition Powerbooster

The Solition Powerbooster is an

innovative solution for the electric evolution, helping to buffer power from the grid and reduce high-energy costs. The modular system effectively eliminates peaks in energy demand, while also supporting EV charging during periods of high demand. The lithium-ion technology provides exceptional durability, efficiency, and seamless integration into existing energy infrastructures – indoors and outdoors.

Solition Mega

The Solition Mega series, Exide's containerized energy storage systems, represents the culmination of our experience, knowledge, and leadership in addressing the challenges of today's energy market. Lithium-ion technology enables Exide to offer versatile solutions for both Front-Of- and Behind-The-Meter applications, delivering significant benefits to energy users and the wider energy market. The range of containerized systems includes 10 feet, 20 feet, and 40 feet sizes, offer reliable and efficient energy storage for a wide range of needs, including microgrid deployment, frequency regulation, peak shaving, back-up power, energy trading, and self-consumption. With a compact and flexible design, the system can easily be installed in various locations, adapting to changing local conditions.

"As a trusted industry leader, Exide Technologies combines a legacy of trustworthiness with pioneering expertise in energy storage systems. Our commitment to excellence propels us to unparalleled heights in the rapidly growing energy storage landscape", says Michael Geiger, Senior Vice President of Energy Solutions at Exide Technologies.

MOVIN introduces Electric Vehicles in Delhi NCR for its first and last mile deliveries



MOVIN, a logistics brand launched as a joint venture between UPS and InterGlobe Enterprises adds Electric Vehicles (EV) to its fleet for first and last-mile deliveries. With the objective to reduce carbon emissions, aligning with its long-term sustainability goals, the deployment of the EVs begins with Delhi-NCR and will subsequently be covering Mumbai, Chennai, Bangalore, Kolkata and Pune by end of 2023.

The EVs were flagged off by JB Singh, Director MOVIN Express and Gregory Goba-Ble, Vice President for UPS in the Indian subcontinent, Middle East and Africa and Director for MOVIN Express from the Bilaspur Hub in Gurugram.

The government's focus towards sustainable logistics solutions and the growing adoption of EVs have been instrumental in propelling MOVIN to include EVs in its operations. With the gradual strengthening of the charging infrastructure by the state governments, MOVIN will plan to grow its fleet size in its key markets.

MOVIN is aiming to mitigate 200 tons of CO2 emissions within the next 12 months with the EV deployment. Each EV has the capacity to carry weight up to 850 kgs and

can effortlessly cover a remarkable distance of 120 kilometres on a single charge.

JB Singh, Director, MOVIN Express said, «As a new age climate-conscious brand launched in 2022, we are excited to announce the introduction of commercial EVs as our first and last mile fleet in the five metros by December 2023. As a company, we deeply focus on our customers' needs and our environmental impact, we recognize the immense potential of EVs in revolutionizing the way we approach transportation by road. By embracing this transition towards adopting an electric fleet from ICEs, we not only contribute to a cleaner and greener future but also enhance the efficiency and reliability of our logistics operations. This strategic initiative aligns perfectly with our core values, showcasing our unwavering dedication to delivering sustainable solutions. With every mile driven by our EVs, we reaffirm our commitment towards building a more environmentally conscious and sustainable future»

On the launch of the EVs, Gregory Goba Ble, Vice President for UPS in the Indian subcontinent, Middle East and Africa and Director for MOVIN Express said, «This is an exciting new chapter for us. We're speeding up our journey to decarbonize our operations at MOVIN Express. At UPS, we are continually exploring ways to reduce

emissions across our global operations and deliver 'good' in the world, including achieving 100% carbon neutrality by 2050. Our global fleet today includes over 15,600 alternate fuel and advanced technology vehicles. Impactful, climate-conscious solutions like this are good for our business, good for our customers and good for the world we all live in.»

Demonstrating its unwavering commitment to the community, MOVIN actively engages in outreach programs within and around its hubs, extending support to the local communities. From providing internship in partnership with CII for the students in the field of supply chain & logistics management across India, to organizing impactful initiatives such as tree plantations, book painting for donation, motivational talks, meal preparations, and classroom painting for underprivileged children, MOVIN consistently strives to make a positive difference in society.

MOVIN caters to customers spanning diverse sectors such as IT & electronic peripherals, apparels, healthcare equipment, auto components, e-Commerce, pharma, consumer durables and FMCG. The company has expanded its Express End-of-Day network from three markets (Delhi, Mumbai and Bengaluru) at its launch to 49 cities across India, within a year.

Garrett's Next-Generation Electric Compressor Technology Debuts in Hydrogen Fuel Cell Vehicle



Garrett Motion Inc., a differentiated technology leader for the automotive industry, is supporting BMW Group's commitment to developing zero-emission hydrogen fuel cell vehicles with an advanced electric fuel cell compressor (FCC) developed by Garrett's R&D team. BMW Group recently announced that it will pilot the second generation of its hydrogen fuel cell drive train in a small series of the BMW iX5 Hydrogen, boosted by Garrett's new generation, modular fuel cell compressor for hydrogen fuel cell electric vehicles.

"For the last four years, we have been working closely with BMW Group to develop an advanced hydrogen fuel cell compressor tailored to their exact needs. This effort will culminate in an in-depth, on-road trial later this year," said Craig Balis, Garrett vice president and chief technology officer. "We are proud to partner with BMW Group to support the innovative and zero emissions iX5 Hydrogen fuel cell vehicle," said Balis. He added, "This is the result of Garrett's continued investments in new technologies and is consistent with our commitment to being at the forefront of hydrogen-powered propulsion systems."

Garrett's electric air compressor for

fuel cell electric vehicles is a key technology in the BMW iX5 Hydrogen's fuel cell system. Fuel cells generate on-demand electricity for electric motors via an electro-chemical reaction between hydrogen and oxygen in the air supplied to the fuel cell stack. To perform this reaction efficiently, and to produce maximum power output, the fuel cell stack is fed with optimal air flow and pressure, as required. Garrett's high-performance electric air compressor delivers efficiently the airflow needed to optimize the fuel cell system's power density and output. It also maximizes the efficiency and durability of the fuel cell stack over the vehicle's lifetime, in a very compact package. Specifically for this application, a new turbine expander, designed to recuperate waste energy from the fuel cell stack's outlet, enables up to a 20 percent reduction in electricity consumption for air compression, when compared to conventional fuel cell compressors.

"Garrett is a pioneer in hydrogen electric fuel cell compressor technology with years of demonstrated expertise in production and on-road experience. The next generation builds upon a legacy of breakthrough design and engineering, including our own high-speed electric motor, power electronics and advanced

controls," said Balis.

During the development phase, the BMW iX5 Hydrogen and its key components, including the fuel cell electric compressor and its inverter, were tested against harsh temperatures, humidity, and vibration levels. These efforts reflect BMW Group's commitment to delivering clean mobility via a range of carbon-neutral drive systems that can reliably perform in all climates.

Garrett's modular, high-performance electric fuel cell compressors lean on the company's turbo aerodynamics expertise and operate above standard industry speeds, beyond 150,000 rpm.

Garrett's electric fuel cell compressor portfolio is configurable to fit the hydrogen powered electric powertrains of both passenger and commercial vehicles, as well as those of industrial applications. The company's 400-volt and 800-volt electric fuel cell compressors feature advanced, patented oil-less foil bearings which enable exceptional, efficiency and noise performance, through the avoidance of contamination. Garrett Motion is an industry pioneer in hydrogen electric fuel cell compressors, with the first generation developed in-house and launched in a passenger vehicle in 2016.

Lam Research Unveils Plans to Advance India's Semiconductor Workforce Development Goals at White House Today

Lam Research Corp made multiple announcements to usher in a new era of collaborative innovation, taking a leadership role in the creation of a virtual nano fabrication environment intended to significantly speed up and reduce the cost of industry breakthroughs:

In a significant stride forward in the creation of a physical-virtual semiconductor ecosystem, Lam unveiled its newly formed Semiverse Solutions business unit led by Corporate Vice President David Fried. Semiverse Solutions leverage Lam's significant expertise in the areas of software development, simulation and modeling, data systems and advanced analytics. The organization will focus on delivering breakthrough solutions and services to enable a virtual fabrication environment for the semiconductor industry.

The Semiverse Solutions portfolio is comprised of advanced software platforms to solve process modeling, design automation, and integration challenges. Also included are solutions to enable advanced plasma, fluid, electromagnetic and particle simulations. Together, they provide "building blocks" to create and foster an interconnected ecosystem of virtual tools and digital twins, allowing researchers to explore promising ideas and refine new processes more rapidly, at significantly lower cost, and with less physical materials usage.

Lam has also announced its proposal to put the virtual-physical ecosystem in action to tackle one of the biggest issues in the semiconductor industry today – developing the pipeline of future semiconductor talent. Announced as part of a JOINT STATEMENT and FACT SHEET issued by governments of the United States and India at the White House today, Lam Research's Semiverse Solutions with SEMulator3D® will deliver a virtual nano fabrication environment to help train the next generation of semiconductor engineers in India. Combined with program management and course curriculum



customization, this program is targeted to educate up to 60,000 Indian engineers in nanotechnologies, over a ten-year period, in support of India's semiconductor education and workforce development goals.

The role semiconductors play in enabling everything from artificial intelligence to electric vehicles is fueling a greater need for nanotechnology expertise around the world. We look forward to working with the government of India in support of their goal to fast track the education and training of the next generation of semiconductor engineers," said Lam Research President and CEO Tim Archer.

Closing the Semiconductor Talent Gap in India and Around the World

The semiconductor industry faces a major talent shortage to meet anticipated future demand. Educating future semiconductor engineers is even more daunting as it is cost-prohibitive for academic institutions to provide physical access to the most advanced nanotechnologies.

In addition, experimenting with volatile chemistries critical in the development and creation of semiconductors can be dangerous for students as they learn to work with semiconductor manufacturing equipment. Simulating real-world labs virtually provides greater democratization of engineering skills training, heightened safety, improved sustainability, and greater access to new talent pools around the world. Virtual skills training with the Semiverse Solutions portfolio is already in use by Lam, its customers, and partner academic institutions in the United States.

"Lam's Semiverse Solutions portfolio is a gamechanger that provides a foundation to create a virtual semiconductor innovation universe," says Fried. "As the semiconductor ecosystem races to scale to address the criticality of chips, the virtual-physical fabrication world made possible with Semiverse Solutions opens the door for exciting new opportunities for collaboration, workforce development and advanced technology breakthroughs."

Lucid's World-Leading Electric Powertrain Technology Propels Aston Martin to a Bold Electric Future

Lucid Group, Inc. setting new standards for luxury electric experience with the Lucid Air, winner of the 2023 World Luxury Car Award, today announced that it has entered into a definitive agreement to establish a long-term strategic technology partnership with Aston Martin to accelerate the iconic British brand's high-performance electrification strategy and long-term growth.

The relationship, the first of its kind for Lucid, will give Aston Martin access to world-leading electric powertrain technology, which is engineered and manufactured exclusively in-house by Lucid, to power future Aston Martin battery electric vehicles. The agreement will also provide Aston Martin with technical support from Lucid in integrating its proprietary technology into a bespoke all-new electric vehicle platform developed by Aston Martin, as well as the supply of Lucid components.

"This partnership will represent a landmark collaboration between Aston Martin, a storied marque with a rich history, including winning at Le Mans and its current successes in F1, and the very best of Silicon Valley innovation and technology from Lucid," said Peter Rawlinson, CEO and CTO, Lucid. "In line with its strategy, Aston Martin selected Lucid, recognizing the profound benefits of adopting its world-leading electric drivetrain technology, exemplified by the breakthrough 516-mile EPA-estimated range achieved by the Lucid Air Grand Touring."

"The supply agreement with Lucid is a game changer for the future EV-led growth of Aston Martin," said Lawrence Stroll, Executive Chairman, Aston Martin. "Based on our strategy and requirements, we selected Lucid, gaining access to the industry's highest performance and most innovative technologies for our future BEV products."

Lucid was selected by Aston Martin



through a competitive process and will provide advanced electric powertrain technologies, including its ultra-high performance twin motor drive unit, renowned battery technology, and revolutionary Wunderbox. The twin motor rear drive unit's prodigious power combines with torque vectoring to extend the capabilities of the car beyond that achievable with a passive all-wheel-drive system. These technically innovative electric motors incorporate Lucid's microjet stator cooling and wave winding, new heat exchanger technology and heightened coolant flow rate, as well as an accompanying battery system that is likewise upgraded for higher power and more precise thermal logic.

Taken as a whole, the agreement highlights Lucid's commitment to giving Aston Martin access to the very best

technology available to propel the company towards its target of launching the first pure electric Aston Martin model in 2025 and to support the brand's wider Racing. Green. sustainability strategy. The agreement also marks the first such car manufacturer relationship for Lucid's technology wing, expanding the reach of the company's products and paving the way for more mainstream applications of the company's revolutionary electric powertrain technology in the future. Earlier this year, Lucid unveiled a derivative of its power-dense electric drive unit specially designed for use in motorsports.

The commencement of the relationship is conditioned on the approval of Aston Martin's shareholders, as well as the receipt of applicable regulatory approvals and other customary conditions.

Soletrac launches electric tractor rental program



Soletrac, the first electric tractor manufacturer to offer their zero-emission products through direct sales and a certified national dealer network, is announcing the launch of its electric tractor rental program. The program will be administered through Soletrac's dealer network and will allow customers to experience the benefits of Soletrac electric tractors on a monthly basis.

"We want to offer our customers a way to familiarize themselves with our new technology without necessarily having to make a large financial decision of purchasing a tractor," said Mani Iyer, CEO of Soletrac. "We also know that smaller operations may only need a tractor occasionally."

Available for rent is Soletrac's 4WD e25G compact electric tractor, a quiet and powerful zero-emission tractor that eliminates the noise and pollution associated with traditional diesel tractors. The tractors are 100% battery powered and can be charged from the utility grid or renewable energy

systems.

"We want to facilitate getting our zero-emission equipment into as many operations as possible. Electric tractors not only eliminate on-site emissions, but they provide a healthier work environment for operators," adds Iyer. Soletrac's new rental program also benefits its dealer network in over 70 locations across the United States, allowing prospective electric tractor customers to experience the operational and health benefits of Soletrac's market-leading technology.

Electric tractors operate at a significantly lower decibel range of 65 dB which is considered safe exposure according to the Center of Disease Control and Prevention (CDC) and does not contribute to hearing damage that is seen in operators of diesel equipment. Soletrac tractors also eliminate exhaust and particulate matter that can impact the health of operators and their communities.

The 25 HP-category e25G compact electric tractor is ideal for hobby farms, golf courses, sports fields, equestrian

centers, educational institutions and municipalities. The tractor accepts all standard PTO implements, and offers available options such as a front loader, backhoe attachment, cab, and three types of tires to suit a wide variety of applications. Additional models are scheduled for release later this year.

Soletrac is a subsidiary of Ideanomics (Nasdaq: IDEX), a global company with the mission to accelerate the adoption of electric vehicles. Soletrac has been a Certified B Corp since 2019 and continues to maintain the highest standards of verified social and environmental performance, public transparency and legal accountability. Earlier this year, Soletrac joined "Farmers for Climate Action" a grassroots alliance of farmers and farmer allies supporting climate change policy in the 2023 Farm Bill. Soletrac is supporting the 2023 Farm Bill's empowerment of farmers, asking for resources, assistance and incentives that will allow them to lead the way in implementing proven climate change solutions.

TIER IV unveils “fanfare”: A white-label EV solution ready for driverless autonomous driving

TIER IV, a leader in open-source autonomous driving (AD) technology, proudly announces «fanfare», an innovative solution designed to ease and accelerate the production of AD-enabled electric vehicles (EVs). This solution offers white-label EV models, empowering customers to commercialize these vehicles under their own brand names and efficiently incorporate AD features.

Solution Overview

The Japanese Government is at the forefront of the Level 4[1] AD initiative, with a goal to deploy Level 4 AD services in at least 50 regions by 2025 and 100 regions by 2027 in Japan. However, the current market faces challenges in procuring affordable EVs certified for Level 4 AD services to meet the high demand.

In response, TIER IV has partnered with multiple car manufacturers to develop a scalable electrical/electronic (E/E) architecture[2] and a redundant drive-by-wire module, enabling customers to define AD features through add-on components. To ease the production of EVs using these technologies and accelerate the deployment of driverless AD services, TIER IV has also published the «L4 Custom Design Guidelines.»[3] These guidelines provide basic information intended to advise car manufacturers on integrating AD features into baseline EVs and testing them to comply with Level 4 standards. This initiative has created a new opportunity for manufacturing AD-enabled EVs in domestic production facilities.

Our EV solution “fanfare”, established through these achievements, empowers customers to develop and operate AD-enabled EVs under their own brand names. To ensure a seamless customer experience, comprehensive after-sales services are also under preparation. The initial plan is to introduce this new solution with a minibus model in 2023, gradually expanding the lineup to include multiple models by 2024. TIER IV aims to produce 300 units of AD-



enabled EVs with partners in 2025 and continues building up an environment for partners to accelerate mass production of AD-enabled EVs for diverse purposes.

Key Features

With a strong focus on safety, TIER IV has conducted numerous Proof-of-Concept projects demonstrating AD services in multiple counties, actively engaging with regulatory authorities and experts in the corresponding regions. Lessons learned from these projects serve as the best practice for AD-enabled EVs with Level 4 standards to adhere to traffic safety rules and vehicle equipment safety standards. Leveraging this expertise, fanfare’s EV models are designed to accommodate various operational design domains (ODDs)[4] with open specifications of AD software.

The E/E architecture adopted in this solution meets the necessary safety standards, featuring redundant designs for sensors, computers, and drive-by-wire modules dedicated to AD technology to prevent inability to brake or steer due to a single point of failure. These design specifications are also standardized through international industry organizations such as Mobility In Harmony (MIH)[5] and the

Autoware Foundation (AWF)[6].

For the initial phase, fanfare’s baseline EVs are procured from multiple car manufacturers, expanded to be compatible with Level 4 AD systems, and then sold to customers as white-label EVs. While there may be differences among the baseline EVs from different manufacturers, TIER IV ensures stable performance and quality to meet vehicle equipment safety standards. As a result, a common set of AD features can be installed in our white-label EVs.

Future Outlook

Following the release of the initial line of EV models TIER IV empowers third-party companies to begin mass production of the same EV models by disclosing the design specifications through the “L4 Custom Design Guidelines” initiative. TIER IV is also actively exploring new opportunities to engage with as many car manufacturers as possible that can provide baseline EVs compatible with the open specifications of fanfare’s EV models. Driven by its commitment to sustainable mobility, TIER IV is dedicated to refining AD-enabled EVs and expanding its vehicle selection to meet the growing demand for driverless AD services in the future.



EV Connect Editor Kartikeya in Conversation with

Mr. Atul Gupta

Co – Founder & Director, e-Sprinto



Q Tell us about your experience in the field of EVs and what were your fields of expertise before venturing into EVs?

A I have 38 years of experience in the automobile industry, with expertise in both internal combustion engine (ICE) vehicles and electric vehicles (EVs). Before venturing into EVs, I worked with renowned companies such as Yamaha, Suzuki, and TVS, where I gained valuable knowledge and insights in various roles within the industry. My journey in the automobile sector began after completing my engineering degree from REC, Kurukshetra. I then pursued an MBA from FMS, Delhi, which further enhanced my understanding of business and management principles. These educational qualifications provided

me with a solid foundation to excel in the automotive industry. Throughout my career, I held positions of responsibility and leadership, which allowed me to develop strong management skills and optimize the profitability and efficiency of the companies I worked for. I have always been passionate about delivering customer satisfaction and driving sales volumes. In addition to my experience in the ICE vehicle space, I also gained valuable insights into the electric two-wheeler industry through my consulting work. I provided consultation services to companies such as Kinetic Green and Being Human, where I had the opportunity to contribute to the growth and development of the EV sector. My expertise in the field of EVs encompasses a deep understanding of the technology, market dynamics, and customer needs. I believe in the

potential of electric vehicles to revolutionize transportation and create a more sustainable future. This belief, combined with my experience and knowledge in the automobile industry, motivated me to co-found e-Sprinto and contribute to the growth of the electric two-wheeler market in India.

Q What are the Products Currently Offering by e-Sprinto? What are the new developments we can expect in 2023?

A e-Sprinto has emerged as a trendsetter in the electric vehicle industry by offering a range of electric two-wheelers that are both efficient and environmentally friendly. Currently, our impressive portfolio comprises of e-Sprinto & e-Sprinto BB low-speed EVs, as well



as the high-speed Sprinto HS and Amery models. Our forthcoming range of scooters will cater to both the business-to-business (B2B) and business-to-consumer (B2C) segments, offering a diverse range of features and capabilities that will meet the needs of a wide variety of customers. Among the 4 new EV scooters, one will cater to the B2B sector while the remaining three shall be directed towards the B2C segment. We are excited about these new developments and are committed to providing innovative and high-quality electric two-wheelers to our customers. With each new model, we strive to push the boundaries of performance, technology, and sustainability in the electric vehicle industry.

Q What do you see as the biggest Opportunities & challenges in Indian EV Industry and how do you propose to overcome them?

A As e-Sprinto, we are keenly aware of the immense opportunities present in the Indian EV industry. The government's initiatives, such as subsidies, tax benefits, and charging infrastructure development, create a favourable environment for our expansion. We are well-positioned to capitalize on the increasing environmental awareness among consumers, who are seeking sustainable transportation options. However, we also recognize the challenges we face. One major challenge is the need for robust charging infrastructure throughout the country. To overcome this, we are actively working on expanding our charging network and collaborating with relevant stakeholders to ensure accessibility and convenience for our customers. Affordability remains another challenge. While the cost of EVs has been decreasing, it is still a

significant consideration for many potential buyers. To address this, we are committed to offering competitive pricing models and exploring partnerships with financial institutions to provide attractive financing options. By actively addressing these challenges and leveraging the opportunities in the EV industry, we aim to contribute to its growth and establish ourselves as a trusted and leading brand. Our focus on sustainability, reliability, and performance will continue to drive our efforts in providing innovative electric two-wheelers and shaping the future of mobility in India.

Q Is there sufficient infrastructure in Tier 2 & 3 Cities in India?

A The infrastructure for electric vehicles (EVs) in Tier 2 and Tier 3 cities in India is still developing and may not be as extensive as in metropolitan areas. While the charging infrastructure network is expanding across the country, the progress in Tier 2 and Tier 3 cities may be relatively slower due to various factors such as lower population density. However, there is an

increasing focus on improving EV infrastructure in these cities as the adoption of electric vehicles spreads beyond major urban centres. Both the government and private entities are recognizing the need to expand charging infrastructure to ensure the accessibility and convenience of EV charging facilities in Tier 2 and Tier 3 cities. Efforts are being made to set up charging stations at key locations such as shopping malls, highways, commercial areas, and residential complexes. Additionally, initiatives like public-private partnerships and collaborations between EV manufacturers, charging infrastructure providers, and local authorities are being undertaken to expedite the development of EV infrastructure in these cities. While there may be room for further improvement, it is important to note that the EV infrastructure is a dynamic and evolving landscape. As the demand for electric vehicles increases and technology advances, we can expect a gradual improvement in the infrastructure, including Tier 2 and Tier 3 cities, to support the widespread adoption of EVs across the country.

Q What can you say about Indian EV industry? What can be the reasons that left this industry so far behind when compared to international markets?

A In my view, the Indian EV industry is currently experiencing significant growth and holds immense potential for the future. However, when compared to international markets, it is evident that the industry has fallen behind in certain aspects. One of the key reasons for this gap is the limited charging infrastructure in the country. The availability of a robust and widespread charging network





is crucial for addressing range anxiety and promoting the adoption of electric vehicles. While efforts are being made to expand the charging infrastructure, it still has a long way to go, especially in Tier 2 and Tier 3 cities. Another factor contributing to the lag is the high initial cost of electric vehicles in India. Compared to international markets, EVs in India often come with a higher price tag, which can deter potential buyers. Limited government incentives and subsidies, as well as higher production costs, have contributed to the relatively higher prices. However, as the industry continues to grow and economies of scale kick in, it is expected that the cost of EVs will gradually decrease, making them more affordable and accessible to a wider range of consumers. Policy support and regulations are also crucial for the growth of the EV industry. While the Indian government has introduced various initiatives and incentives, there is still a need for more comprehensive policies and long-term planning to create a favourable ecosystem for electric vehicles. Collaborative efforts between industry stakeholders, government bodies, and policymakers are vital to address the regulatory challenges and create an environment conducive to EV adoption. Overall, the Indian EV industry has tremendous potential, and efforts are being made to bridge the gap with international markets. With the expansion of charging infrastructure, reduction in costs, and supportive policies, India has the opportunity to catch up and become a major player in the global EV market.

Q Which are the regions e-Sprinto is currently focusing on and what will be their contribution in your overall growth?

A At e-Sprinto, our current focus

is on expanding our presence in major urban agglomerations such as the National Capital Region (NCR), Mumbai, Bangalore, and Hyderabad. These regions have a high population density, strong market demand, and well-developed EV infrastructure, making them prime targets for our expansion efforts. By strategically targeting these areas, we aim to capture a significant market share, drive sales volume, and enhance brand recognition. In addition to major urban agglomerations, we also recognize the growth potential in Tier 2 and Tier 3 cities. These emerging markets offer untapped opportunities for us to expand our customer base and establish a strong presence. By extending our reach to these cities, we can tap into the increasing demand for electric two-wheelers and contribute to the overall growth of the Indian EV industry. The regions we are focusing on will contribute significantly to our overall growth. Major urban agglomerations provide a large customer base with higher purchasing power, allowing us to generate substantial revenue and establish a strong market position. The growth and

success in these regions will serve as a solid foundation for our expansion into Tier 2 and Tier 3 cities, further accelerating our growth trajectory. By targeting these regions, we aim to maximize our market potential, strengthen our brand presence, and establish e-Sprinto as a leading player in the Indian EV industry.

Q What is your mid-to long-term outlook for the Indian Market

A e-Sprinto's mid-to-long-term outlook for the Indian market is highly optimistic. We anticipate significant growth in the EV industry, as the government continues to support electric mobility and consumer awareness about environmental concerns, increases. Our focus is on establishing e-Sprinto as a trusted brand, offering high-quality electric two-wheelers that cater to diverse customer needs. We will expand our product portfolio, prioritize charging infrastructure development, and provide exceptional customer support. By leveraging innovation, sustainability, and customer satisfaction, we aim to make a significant impact on the Indian EV market and establish e-Sprinto as a leader in the industry.





The State of Medium- and Heavy-Duty Vehicle Electrification



The electrification of medium- and heavy-duty (MHD) vehicles is crucial in reducing greenhouse gas (GHG) emissions and combating climate change. What do we mean when we refer to MHDs? Tractor-trailers and other freight trucks, school and public transit buses, delivery trucks, utility vehicles (including trash disposal), construction vehicles, and shuttles are among the vehicles that exceed the 10,000-pound weight limit. Even though fleet sizes might range from 10 to 1,000 to 10,000 to 100,000 cars, MHDs are commonly controlled in fleets. Pickup trucks, commercial vans, and delivery vans are all categorized as light-duty vehicles.

The transition to electrification for HD trucks and MD vehicles is fast.

The trend towards electrifying fleets of heavy-duty vehicles is gaining traction due to business decarbonization objectives “pulling” and governmental laws “pushing” it. It is especially true for cargo vans and other comparable medium-duty vehicles, driven by purchase agreements from big fleet

operators, with pledges from heavy-duty fleet operators.

Most heavy-duty vehicle electrification time frames start around 2030 and only consider a portion of newly acquired trucks. On the other hand, that may alter. California officially mandates that by 2035, 50% of all heavy-duty vehicles sold must be electric. The US Environmental Protection Agency approved this requirement. Massachusetts, New Jersey, New York, Oregon, Washington, and Vermont have all adopted the same regulations. The sector will see many changes due to manufacturers spending billions to scale up technology and production to meet demand. It will create new employment in MHD EVs’ design, production, and maintenance.

Challenges in implementing MHD EV trucks, as well as new opportunities

The market potential for MHD EV trucks and adoption hurdles are shown below.

Cost

Due to cheaper maintenance and fuel

expenses, MHD EVs have a lower total cost of ownership (TCO) than diesel cars, although EVs now cost more than diesel vehicles. Depending on the manufacturer, electric tractor-trailers may be purchased for between \$300,000 and \$500,000, while a diesel version costs between \$130,000 and \$160,000. Prices will also decrease as manufacturing increases and battery technologies advance if MHD EVs follow the same trend as passenger EVs.

Batteries, range, and weight

Based on the battery type and arrangement, MHDs have a range of 75 to 300 miles per charge, with the majority in the centre. In-town deliveries, transporting cargo at yards or ports, or out-and-back day excursions are the main uses for medium-duty trucks and many heavy-duty trucks, all of which can be easily handled by the present range of vehicles. Long-range battery solutions and strong public charging infrastructure are necessary for long-distance transportation and other longer-distance applications, such as dump trucks. Another factor is battery



weight. MHD EV batteries can weigh up to 10,000 pounds depending on the range offered. But because the battery industry is receiving much funding and attention, we may anticipate advancements resulting in lighter, longer-lasting batteries.

Infrastructure for public charging

Investments in MHD EV-accessible public charging infrastructure will be necessary to meet emission reduction targets. That won't be funded under the present National Electric Vehicle Infrastructure (NEVI) program, which is focused on light-duty EVs. Private businesses are spending money on truck parking meters, though. Public charging networks will need standards to guarantee compatibility to be successful. Additionally, they will need smart EV charging management to provide the dependability and availability necessary for commercial operations and billing management for financial operations and e-roaming capabilities.

Private depot charging

Several MHD EV fleets will use private "behind the fence" charging at their fleet

depots to power in-town, onsite, and out-and-back day journeys. These fleet owners will face difficulties because of the high costs of constructing charging infrastructure and the lengthy — often multi-year — lead periods for grid connections. They have options, such as employing onsite generating and energy storage microgrids, smart energy management, and ensuring power availability for charging. Truck fleets may participate in utility V2G initiatives based on consumption patterns to assist the grid during periods of high demand.

Grid capability

Will there be sufficient access to clean energy where and when necessary to satisfy transportation and other electrification goals, such as charging for MHD EVs? The US Department of Energy asserts the national electric grid capacity must increase by 60% by 2030 and 300% by 2050 to fulfil these demands as the sector transitions to producing clean, renewable energy. Investment is required for local-level distribution and grid capacity enhancements in

addition to the modernization of the national transmission system to enable prompt service delivery to public and private charging facilities.

What steps must be taken to electrify fleets successfully?

The push for fleet electrification is no longer just a pipe dream. All key players are on board as the market for medium-duty EVs reaches a turning point and the market for heavy-duty EVs begins to take shape. Successful fleet electrification depends on an EV fleet management system. It allows charging to be integrated into a smooth vehicle ride, offers total control and a steady charging environment, improves energy management, and enhances fleet usage.

Drivers and fleet managers feel more confident and at ease when their EV fleets are consistently fully charged and prepared to go. Fleet managers may enhance their charging procedures and energy management and support a future of emissions-free transportation as EV fleets and charging networks for commercial MHD EVs continue to expand quickly.



The Electrifying Divide in Battery Chemistries for Construction EVs



Battery prices must be low enough such that the total cost of ownership is less expensive than diesel alternatives for electric vehicles to succeed in the construction sector. The new paper “Electric Vehicles in Construction 2023-2043” by IDTechEx demonstrates a battery price tipping point, after which running an EV throughout the vehicle’s lifespan will be less expensive. The proper chemistry must be chosen to have a cheap enough car price. So why a stark contrast may be detected between the batteries used in China and Europe?

Construction is a growing industry for electric cars. Only 49 database entries contain verifiable information regarding chemistry, while many cars have yet to be revealed. Conclusions concerning the developments in battery chemistry from OEMs in these locations may be drawn since Europe and China are the two more developed markets for electric construction

vehicles. At this early point, it is clear that Europe strongly prefers NMC, whereas China has selected LFP.

Construction vehicle battery specifications

In light of this, why would someone choose NMC, LFP, or even lead acid? It’s an intriguing and complex subject to electrify building machinery. High capacity and low cost are goals for batteries. Battery weight isn’t a concern because some of these machines are enormous and typically need concrete counterbalances to withstand the enormous weights they experience. Also not given much consideration is power density. Contrary to electric vehicles, which frequently see huge spikes in power consumption, construction trucks are more likely to run steadily for extended periods.

For instance, the Tesla Model S has a 210kW motor and a 60kWh battery.

Therefore its battery must generate a peak of 3.5C (power divided by capacity). Road vehicles often need to meet this criterion. Hence they tend to choose power-dense chemistries like NMC. In comparison, the Volvo L25 electric (an electric compact loader) has a battery capacity of 40kWh and a maximum motor power of 36kW. Therefore the battery is only required to drain at a maximum of 0.9C, far less than road vehicle standards.

Both NMC and LFP provide the performance needed for construction, successfully handling the peak discharge demands and having high enough volumetric and gravimetric densities to fit in the machines. In general, NMC tends to have superior energy and power densities than LFP, although it is more expensive. So it would make sense for the industry to choose LFP. The main goal of electric construction vehicles is to provide all the performance required while minimizing the cost of creating an electric vehicle.



Why, then, does the European market mostly utilize NMC?

Why does LFP prevail in China when NMC does not?

The most reasonable interpretation is that it was a matter of availability. Battery pack providers like Northvolt, Forsee, and Volta, who employ NMC in most of their products, have been used in most electric construction development up to this point. Manufacturers of packs in Europe and North America utilize NMC in more than 75% of their products. These businesses have supplied heavy-duty road vehicles, including buses and trucks, to various sectors. These cars will probably work better for NMC because they have relatively strong peak power to handle acceleration events, hills, etc. Due to battery price being a crucial component in the success of electric construction vehicles, Europe has primarily chosen NMC thus far. However, it is expected that LFP will rise going

forward shortly.

LFP is already the most popular chemical option in China, meanwhile. A sizable supply of LFP solutions is already available in China. It sought a low-cost solution that could offer a suitable energy density (vehicle range) and keep the car affordable. It has increased as its fleet of vehicles has been swiftly electrified. In contrast, the markets for electric vehicles in Europe and North America have prioritized increasing vehicle range. They often choose the more costly NMC, believing consumers will be more amenable to the increased expense. It is fantastic news for China's electric construction sector, which has swiftly deployed massive equipment, like the XCMG example, and created enormous batteries.

Is sodium ion a potential replacement?

Sodium-ion is a potential rival for the construction sector. There is currently no market for this developing chemical. The

most important thing to understand is that while sodium-based solutions may be generated more affordably than lithium-based ones, they will not work as well. They resemble LFP in this way. They are more costly than LFP and NMC since they are not scalable. Therefore, sodium does not now make sense in the building business. However, when scaled and achieved the promised price decrease, it may be the perfect fit for the demands of this complex market.

Few vehicles are currently being produced in series, keeping the electric construction sector in its infancy. However, if recent events and pronouncements are to be believed, there will be an enormous increase in the number of machines on the market in the next few years. All of this development will result in a substantial increase in the need for batteries, and whether those batteries are NMC, LFP, or even Na-ion, the development of this sector will be exciting.

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