TECHNOLOGY BREAKTHROUGH IN ELECTRIC VEHICLES

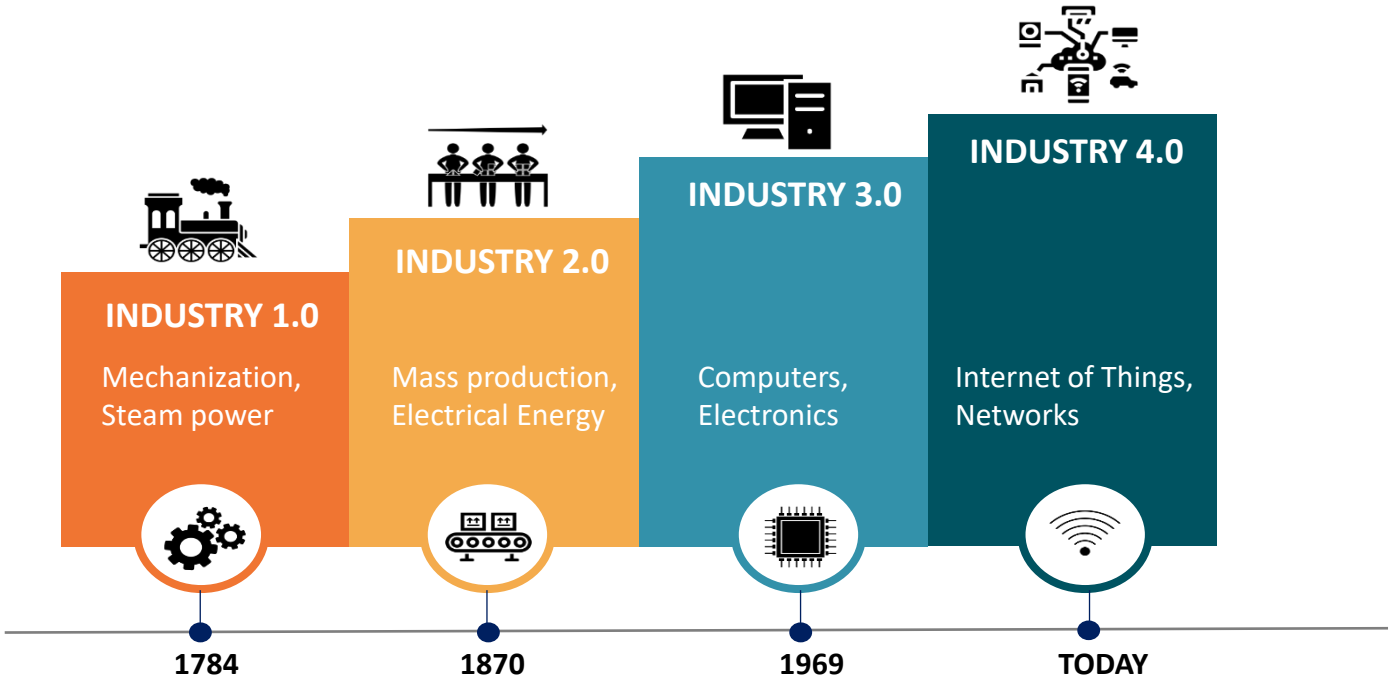
Malaysian Pacific Industries Berhad

A Member of the Hong Leong Group

22nd March 2022

ELECTRIC CARS HAVE BEEN AROUND SINCE A LONG TIME

Electric Vehicles go back as long as the beginning of 1900 but the adoption to EV failed in the Second Industrial Revolution

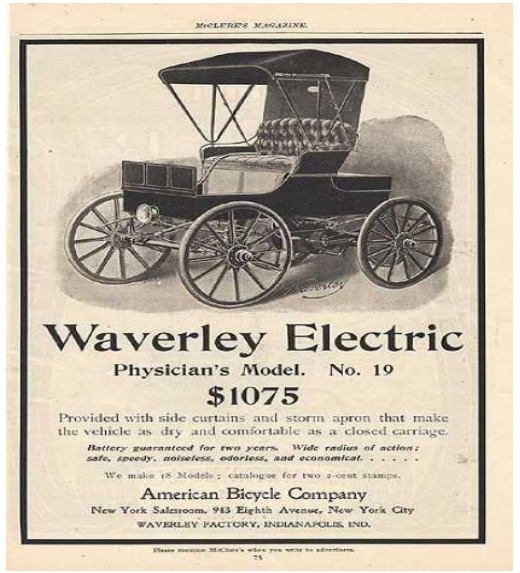


Too few customers
EV – US$ 1,000+
Gas Vehicle – US$ 500

Expensive Electricity & Batteries held little charge & had short life

- ❑ Discouraging Gas vehicles
- ❑ Battery Revolution/Faster Charging
- ❑ High Speed
- ❑ Reduced prices

BACK THEN



NOW

ALL OF A SUDDEN WHAT MADE EVERY AUTOMOBILE COMPANY INVEST IN EV

Bloomberg

BMW AG pledged to invest 500 million euros ($563 million) at its largest European factory as the German carmaker bolsters its electric-car manufacturing capabilities to better compete with rivals including Tesla Inc.

Daimler brings its EV plans to the table with €20 billion battery cell order

Another German car manufacturer has announced ambitious electric vehicle plans. Daimler AG says it has invested €20 billion in the purchase of battery cells to further advance its electric fleet.

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Audi Announces €12 Billion For EV Development, BMW €400 Million For 2021 iNEXT Production

ch Bloomberg Sign

Fiat Chrysler to Invest Up to $1.1 Billion On Canada EVs

By Ilya Banares and Gabrielle Coppola
October 15, 2020, 12:22 PM GMT+8 *Updated on October 16, 2020, 1:01 AM GMT+8*

AUTOCAR

Ford to launch seven new electric vehicles in Europe by 2024

AUTOS

GM will begin production next week on the Cadillac Lyriq, the brand's first EV model

APAC NOVEMBER 13, 2020 / 11:34 PM / UPDATED A MONTH AGO

VW boosts investment in electric and autonomous car technology to $86 billon

Ford

Ford Doubles Down On Electric Vehicle Push In Europe

Mercedes to continue EV investments despite Ukraine war disruptions

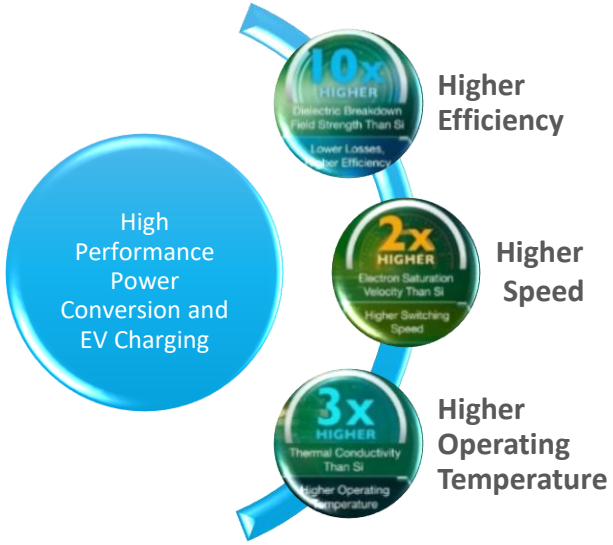
TECHNOLOGY BREAKTHROUGH - SILICON CARBIDE (SiC)

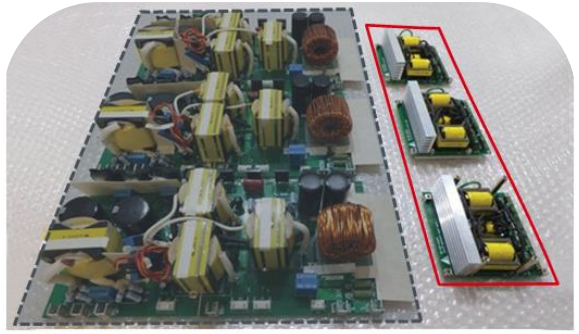
Silicon Carbide (SiC) is significantly more energy – efficient and better able to handle the demands of rapid charging

SiC is a semiconductor material containing silicon & carbon. This technology focusses on High power & High frequency devices.

It has various advantages which have proven to be path breaking in Automotive & Telecommunications segments compared to the traditional silicon used previously.

Traditional Silicon Vs Silicon Carbide

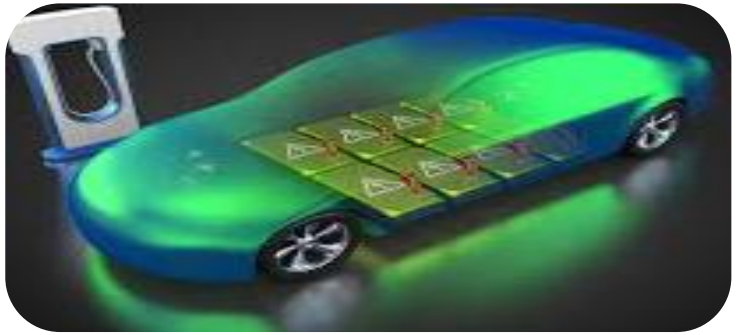




	System with Si IGBT	System with SiC
Weight	7 kg	0.9 kg
Volume	8.775 cc	1.350 cc

PRACTICAL BENEFITS

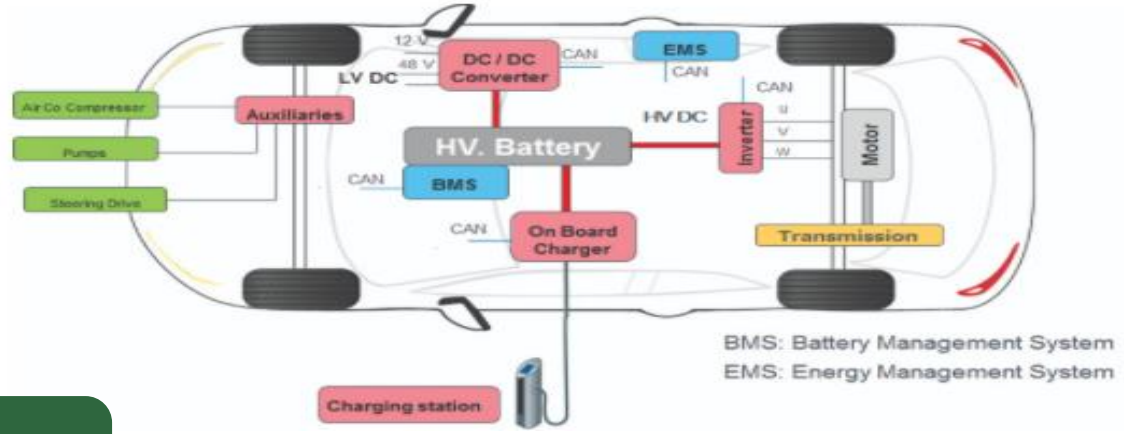
- **Rapid Charging:** Charging in less than 30 Mins. Before EV 12 Hrs
- **Long battery life:** Last longer with same usage in one charge
- **Energy Efficiency:** Only 5% energy loss in power conversion compared to 20% loss with standard power semiconductors
- **Thermal conductivity:** Keeps the device cool at high temp.
- **Lower cost:** Cheaper solution with additional advantages.
- **Package Miniaturization:** Smaller/lighter devices for daily use



TECHNOLOGY OF THE FUTURE – SILICON CARBIDE (SiC)

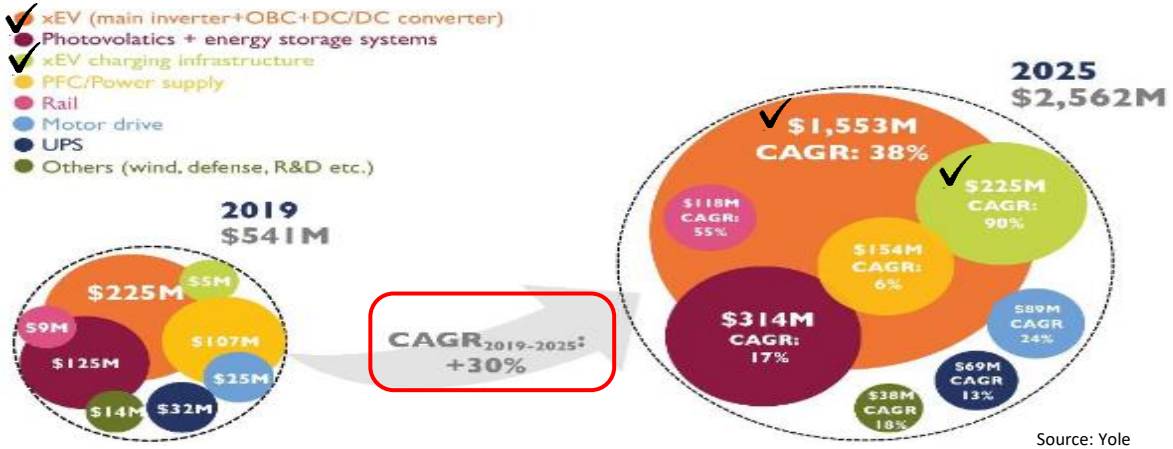
SILICON CARBIDE

ELECTRIC VEHICLES



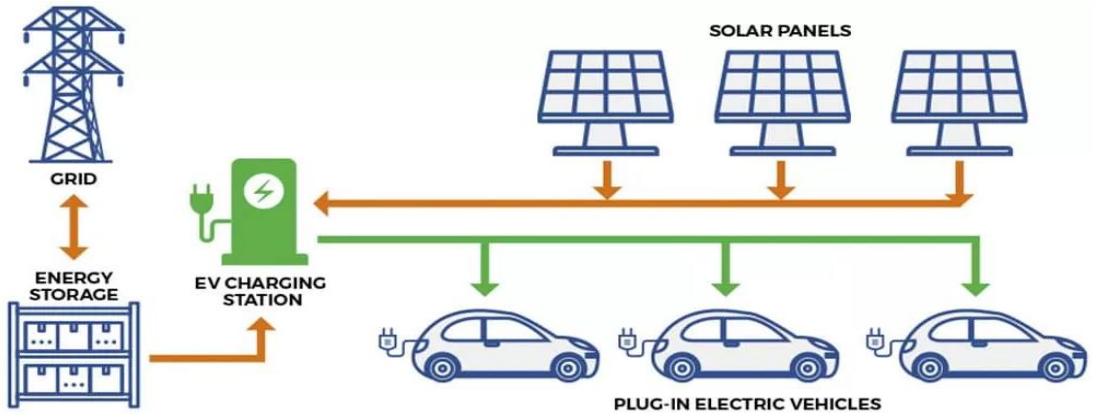
DC - DC converter

SiC PROJECTION



Source: Yole

SOLAR PANEL



THE GLOBAL ELECTRIC FLEET & CHARGING STATION OVER THE LAST DECADE

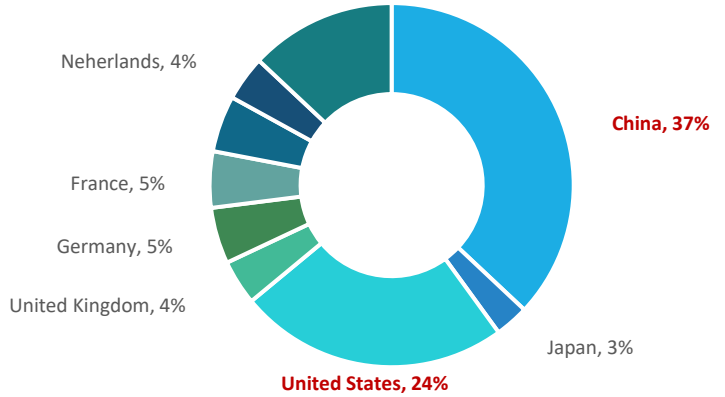
Worldwide number of Electric Vehicles in use

Majority of world's EV are in just 25 markets in China, Europe, Japan & US

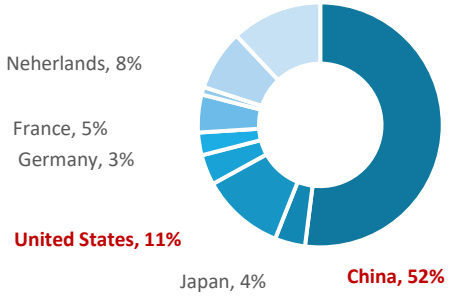
Source: Statista & automotive world

10.3 million charging stations worldwide in 2021 (40% more compared to 2019).

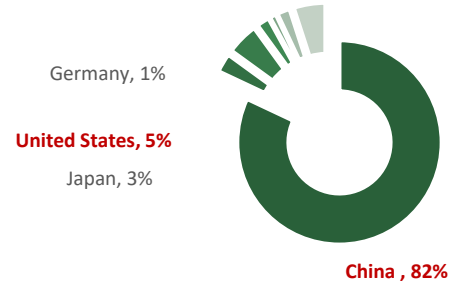
9.0M Private Chargers at home & work place



0.8M Publicly Accessible Slow Chargers



0.5M Publicly Accessible Fast Chargers



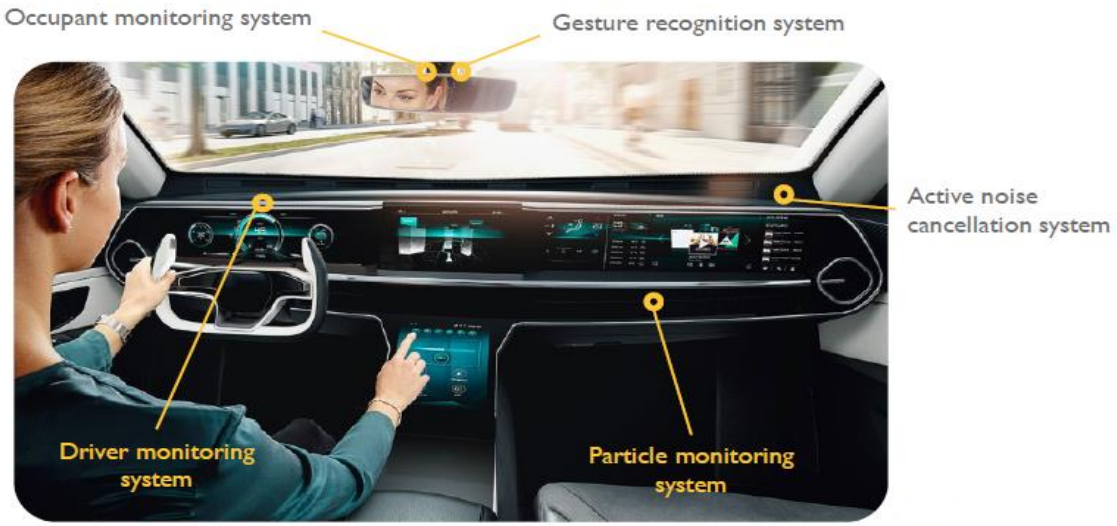
Source: International Energy Agency

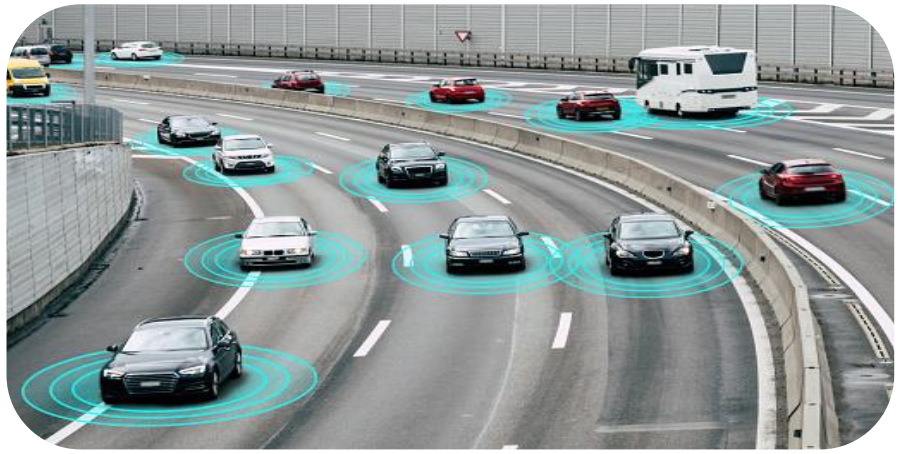
WHAT ARE THE NEXT STEPS IN ELECTRIC VEHICLES?

Autonomous Vehicles | **In Cabin Sensing Connectivity** | **Real Time Connections - AI**

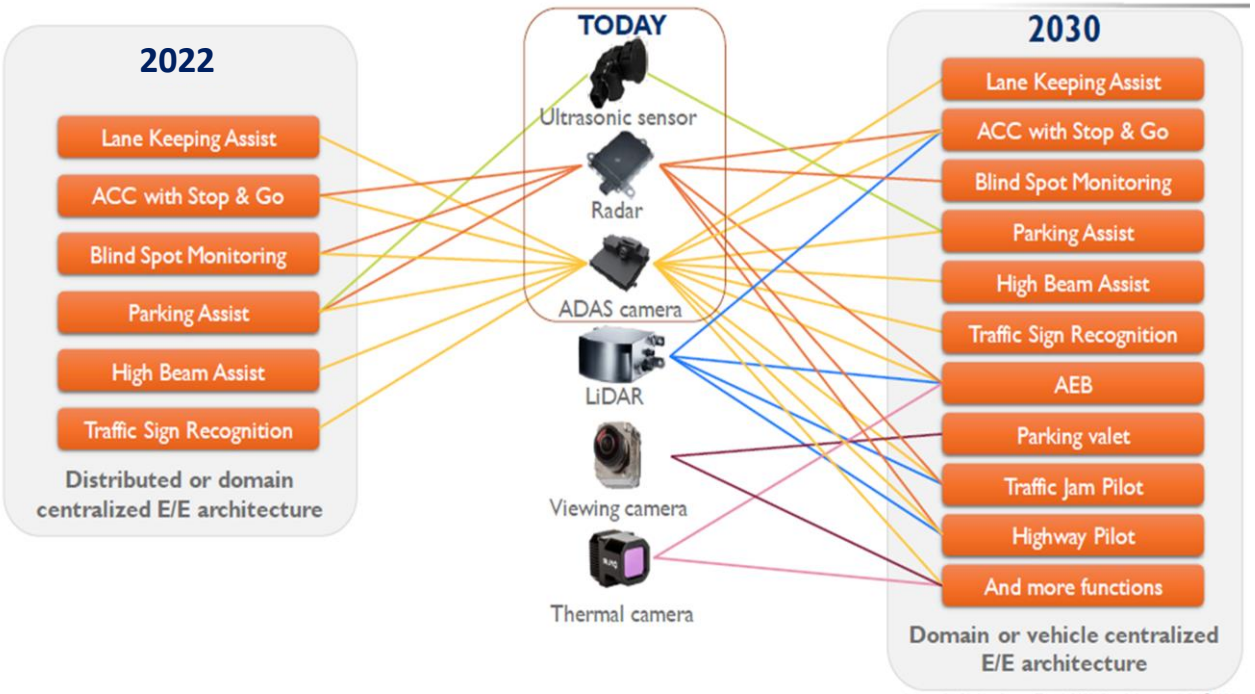
Source: Daimler

ADVANCEMENT IN SENSORS, 5G BANDWIDTH FOR ELECTRIC VEHICLES





The future of driverless electric vehicles with intuitive traffic information and real time monitoring is not possible without lot more highly sensitive sensors & faster internet connection.



Source: Yole

MALAYSIAN PACIFIC INDUSTRIES EXCELS IN PACKAGING & TESTING OF SiC, SENSORS, 5G SEMICONDUCTORS

Malaysian Pacific Industries Berhad

97% Carsem

3% Dynacraft Industries

YEARS	REVENUE	EDR	NET CASH
50	~US 500M/Yr	100:0	RM 890M

MPI'S SUBSIDIARY CARSEM IS A GLOBAL LEADER IN PACKAGING & TESTING SEMICONDUCTORS

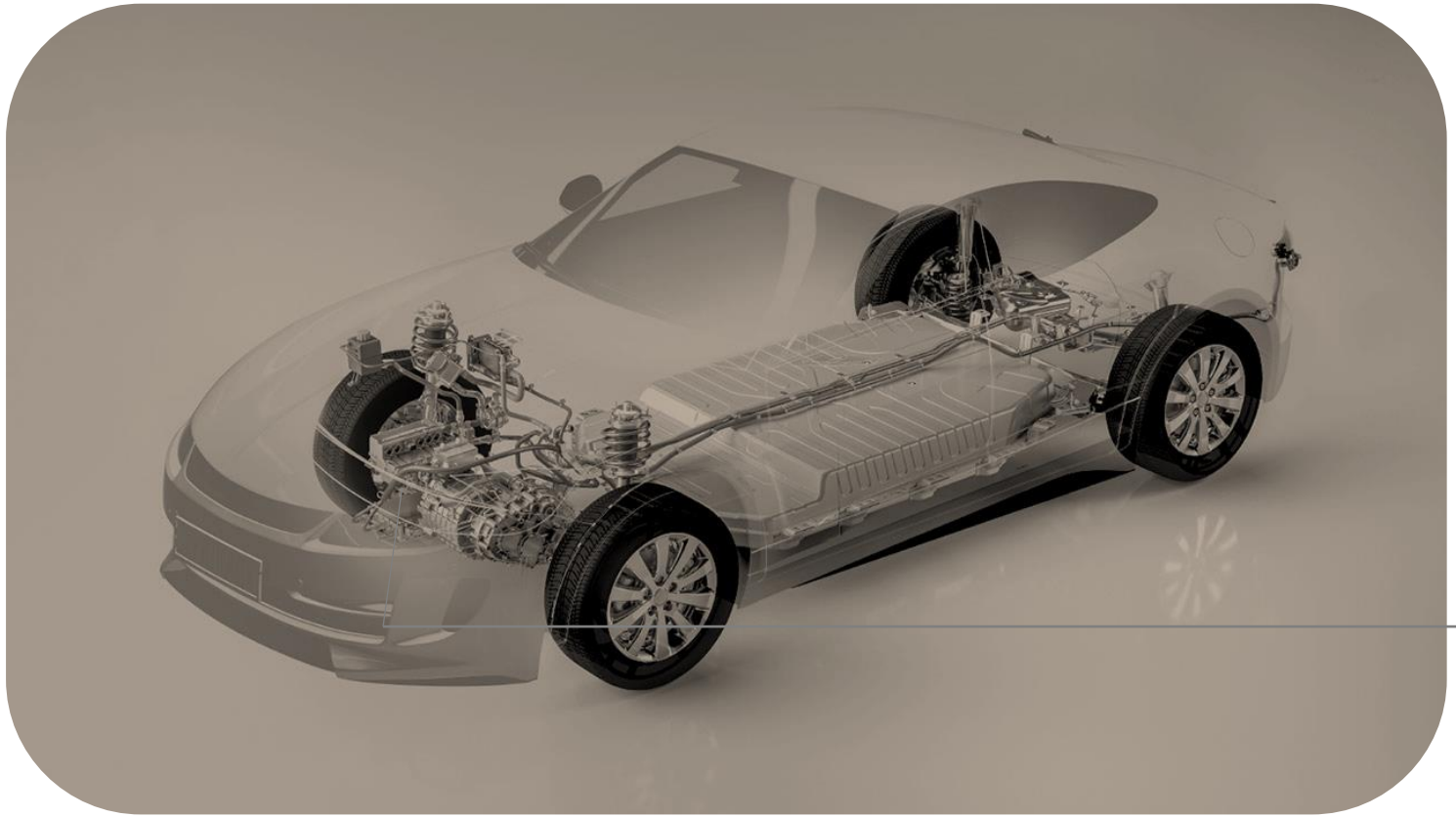
Carsem has **factories in Ipoh, Malaysia & Suzhou, China**
Customers: Asia, Europe & America

- Carsem has an **exclusive partnership with the world leader of SiC Technology**
- **Entire backend of the SiC world leader** is packaged & tested by Carsem
- **100% Automated "Lights Off factory"** for Sensors
- **Zero defects quality**, the best in the industry for Automotive
- Carsem Invested **over US 20Million in the last 2 years** for SiC, Sensors & 5G Testing:

Technical talent | Embedded Technology | Superior Machines | Research & Development

SILICON CARBIDE TECHNOLOGY & SENSORS FOR AUTOMOTIVE, POWER & TELECOMMUNICATION SEGMENTS

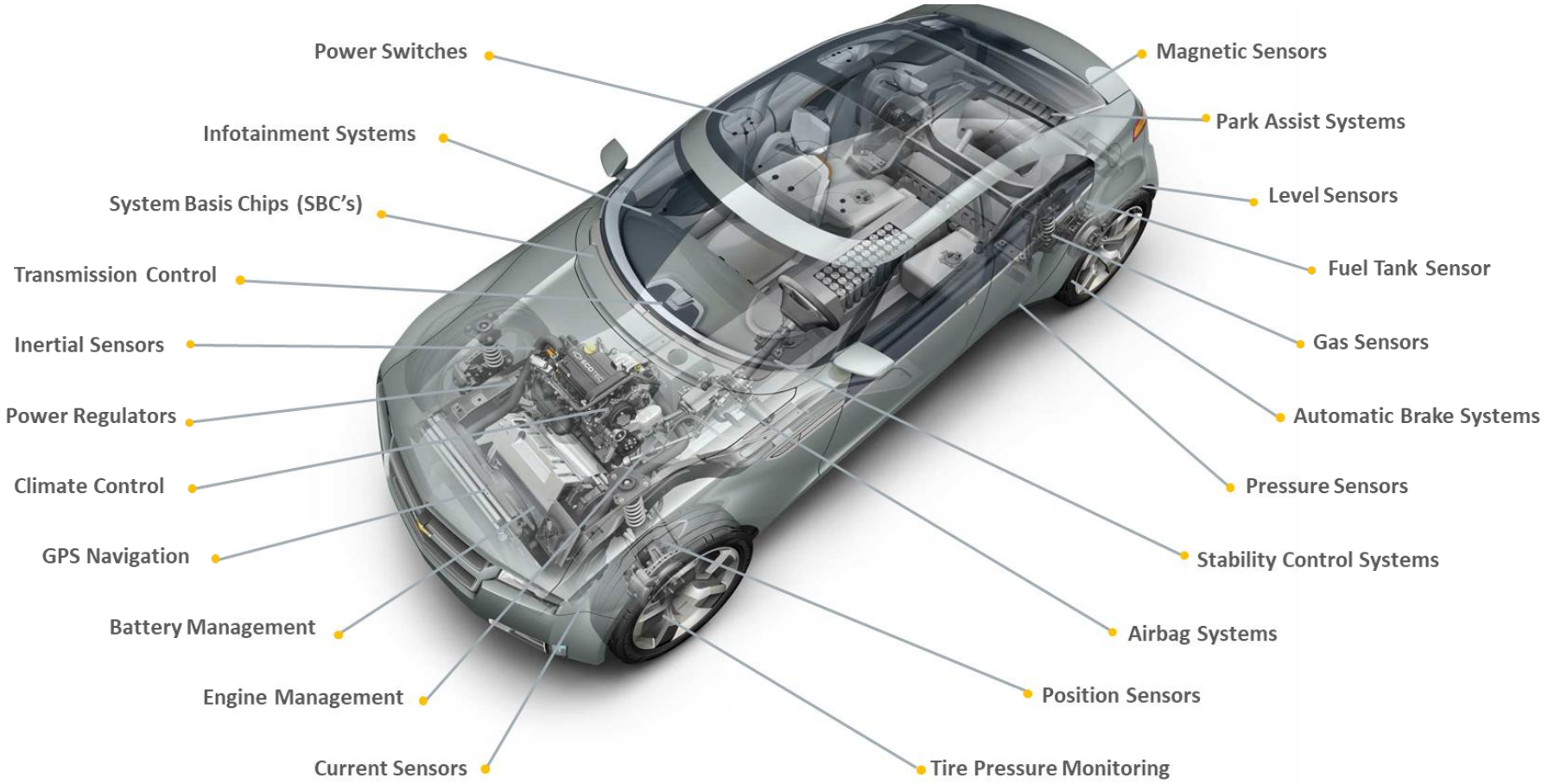
SiC PACKAGED & TESTED BY CARSEM FOR AUTOMOTIVE SEGMENTS



Discrete Power Devices

STRATEGICALLY WELL POSITIONED TO LEAD FROM THE FRONT IN LATEST AUTOMOTIVE SOLUTIONS

SENSORS PACKAGED & TESTED BY CARSEM FOR AUTOMOTIVE SEGMENTS



LATEST TECHNICAL CAPABILITIES FOR PACKAGING & TESTING SENSORS USED IN FUEL VEHICLES, ELECTRIC VEHICLES AND AUTONOMOUS VEHICLES

SiC, SENSORS PACKAGED & TESTED BY CARSEM FOR OTHER SEGMENTS

SKILLED MANPOWER, LATEST EQUIPMENTS & EXTENSIVE TECHNICAL CAPABILITIES WITH IN DEPTH R&D

Servers

Internet of Things

POWER SEGMENTS

5G Base Stations

TELECOMMUNICATION SEGMENTS

BEST IN CLASS QUALITY STANDARDS LED BY AUTOMATION

CARSEM INVESTMENT PLANS

CARSEM CONTINUES TO INVEST FOCUSSING MAINLY ON SENSORS, 5G TESTING & SILICON CARBIDE/GALLIUM NITRIDE

SZ

5G TESTING

S

SiC/GaN

M

MEMS SENSORS

- Installing **New Machines** for Capacity Expansion

- **Hire more people** across the globe to support business operations & sales

- Invest in **Research & Development** to deliver latest technology solutions to our customers

- **Floor space expansion** to meet increasing business demands from existing & new customers

- Continue **Industry 4.0 via Automation** in each factory to have zero defects quality

- **Upskill** existing operational & technical manpower to be able to perform better with latest technology

- Look for **more anchor customers** to secure more guaranteed business in future `

CARSEM FACTORY EXPANSION TO SERVE AUTOMOTIVE SEGMENT

Ipoh, Malaysia

- New Factory starting production by January 2023.
- Entire floor space to be dedicated to packaging for automotive segment.
- In future, all the highly sensitive sensors in the car would be from this factory.

Ipoh, Malaysia

- Floor Space expansion in an existing factory to be ready by October 2022.
- Complete floor space for testing of Silicon Carbide (SiC) packages.
- Already secured business for the additional floor space in test area.

Suzhou, China

- New Factory in China to start production by January 2024.
- Additional floor space for testing 5G packages.
- Construction of two buildings spread across 2 phases.

CARSEM'S IMPECCABLE QUALITY STANDARDS THROUGH AUTOMATION

- Proper Packaging & Testing is extremely important in Automotive segment as slight glitch can prove to be a disaster.
- In order to have world class quality and packaging/testing techniques, Carsem makes huge investments each year in technology, machines & R&D to automate the entire process.
- Fully Automated lines with minimal dependence on people.
- Quality Certifications – IATF 16949, ISO-9001, ISO-14001, ISO8001, ANSI/ESD S20.20.

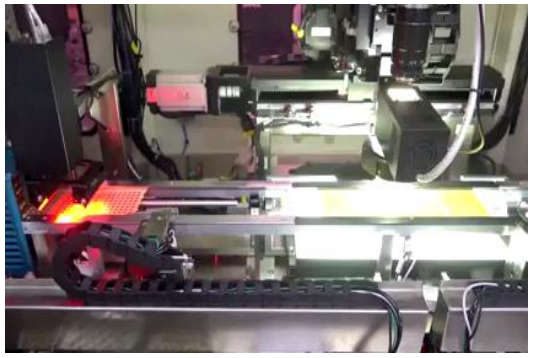
Flip Chip Inline System

Intelligent Factory Program – Production Lines

Auto Visual Inspection (AVI)

Before :

Now :



Customized AVI system for Assembly Level operations

Smart Production Line – Sensors Unit

Zero Defects Quality - No Human Interference

Automated Guided Vehicles

THANK YOU!