

# BorgWarner LaserEMobility 2022



# OUR VISION

A clean, energy-efficient world

# OUR MISSION

We deliver innovative and sustainable mobility solutions for the vehicle market.

~50,000  
employees

2021 Sales  
**\$15.1  
Billion**  
combined

**99** **22**  
Locations Countries



# PROJECT CHARGING FORWARD



**PROFITABLY  
SCALE eLV**



**EXPAND  
INTO eCV**



**OPTIMIZE  
COMBUSTION  
PORTFOLIO**

**45% of revenue by  
2030 from EV products**

Our Sustainability Goals go  
Hand-in-Hand with Our Strategy

**Carbon neutrality  
by 2035**



**We Empower Our  
Diverse Teams**



# CEO Organizational Chart



**Fred Lissalde**  
President & Chief Executive Officer



**Julie Piazza**  
Sr. Executive Assistant



**Neil Fryer**  
Vice President of BorgWarner Inc.  
and President and GM  
Aftermarket



**Joseph (Joe) Fadool**  
Vice President of BorgWarner Inc.  
and President and GM Emissions,  
Thermal and Turbo Systems



**Kevin Nowlan**  
Executive Vice President  
and Chief Financial  
Officer



**Tonit Calaway**  
Executive Vice President, Chief  
Administrative Officer, General  
Counsel and Secretary



**Dr. Stefan Demmerle**  
Vice President of BorgWarner Inc.  
and President and GM  
PowerDrive Systems



**Brady Ericson**  
Vice President of BorgWarner Inc.  
and President and GM  
Fuel Injection Systems



**Paul Farrell**  
Vice President  
and Chief Strategy  
Officer



**Felecia Pryor**  
Executive Vice President  
and Chief Human Resources  
Officer



**Davide Girelli**  
Vice President of BorgWarner Inc.  
and President and GM  
Morse Systems



**Dr. Volker Weng**  
Vice President of BorgWarner Inc.  
and President and GM Drivetrain  
Systems
































**Tania Wingfield**  
Vice President and  
Integration Champion



**Tom Tan**  
Vice President and President  
BorgWarner China

# BorgWarner Product Portfolio

Emissions, Turbo and Thermal Systems	Morse Systems	Fuel Injection Systems	PowerDrive Systems	Transmission Systems	Aftermarket
 Boosting Technologies  Sensors  Intake & Exhaust Gas Management  Ignition Technologies  Thermal Management  Electric Boosting Technologies	 Engine Timing Systems  Valvetrain Systems  Battery Modules and Packs  Fuel Handling  Inverters  DC-DC converters  Battery Chargers	 Fuel Injection Systems <ul style="list-style-type: none"> <li>GDI Injection</li> <li>CV Diesel Injection</li> <li>LV Diesel Injection</li> </ul>  Exhaust Treatment (SCR Dosing)	 Power Electronics  Starters & Alternators  P0/P1/P2/P3/P4/PS Hybrid Architecture  EV Transmissions  Electric Drive Modules  Electric Drive Motors  Engine Controller Pressure Sensors	 All Wheel Drive & Cross Axle Systems  Transmission Technologies	 Diagnostics, Training, and Technical Support  Diesel Fuel Systems  Gasoline Fuel Systems  Maintenance Solutions  Vehicle Electronics and Engine Management



A white Volvo SUV is driving on a winding road that curves through a green landscape. In the background, a city skyline with various skyscrapers is visible under a clear sky. The car is positioned on the right side of the road, moving towards the viewer.

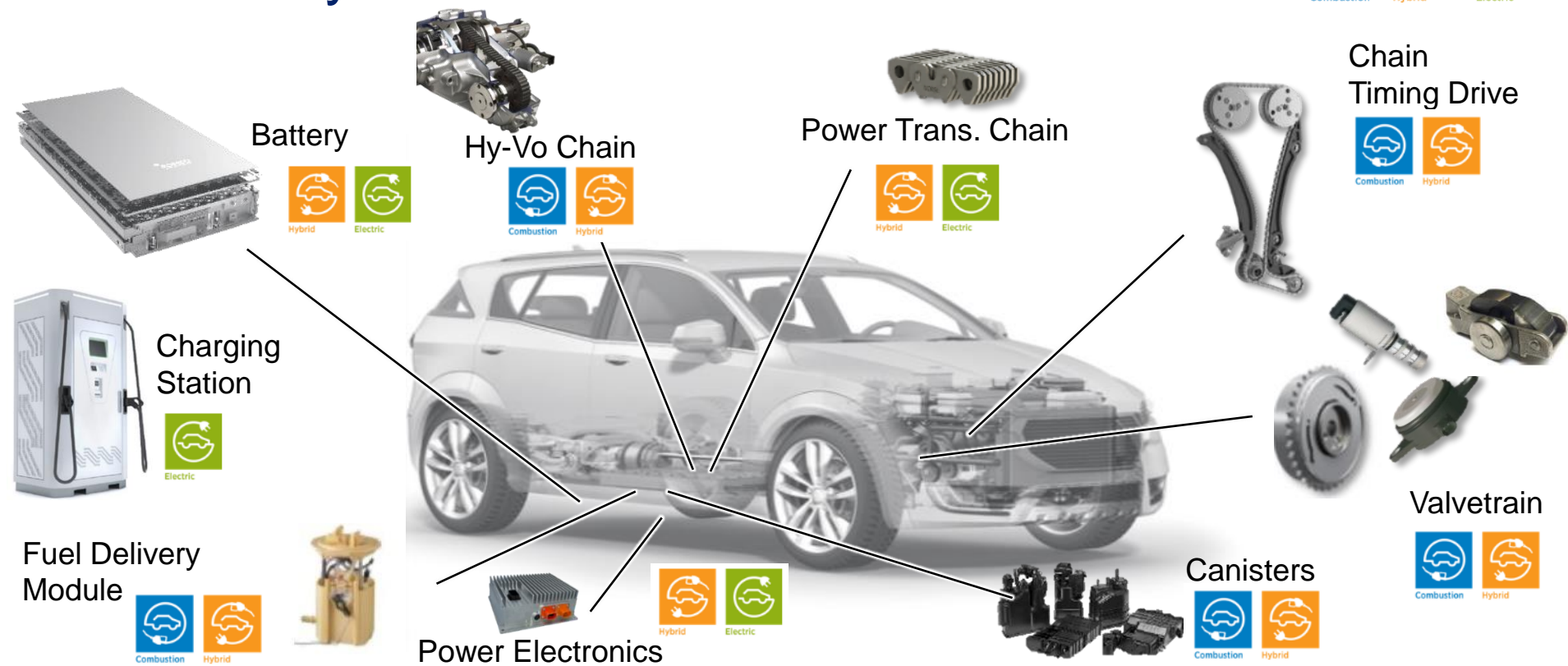
# Morse Systems eProduct Overview

# Strategic Global Operations

~ 7,000  
employees



# Morse Systems Product Portfolio





A white Volvo SUV is driving on a winding asphalt road that curves through a green, hilly landscape. In the background, a city skyline with various skyscrapers is visible under a clear blue sky. The car is positioned in the lower right of the frame, moving towards the viewer. The road has a blue guardrail on the left side. The overall scene conveys a sense of motion and modern transportation.

# Morse Systems Lugo Plant

# Product Portfolio Charging - Applications

E-BUSES



FORKLIFTS



AGRICULTURAL



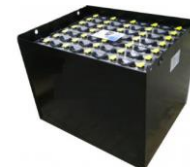
E-BIKES



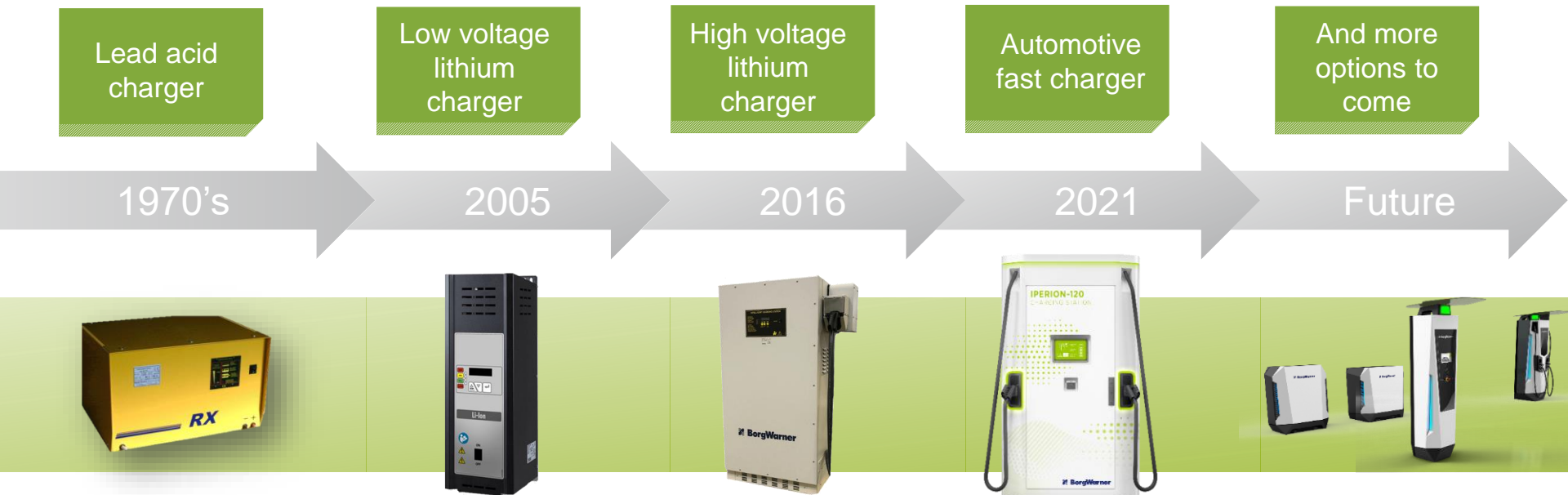
DC FAST CHARGER



BATTERY RECOVERY



# Charging technologies: a solid background





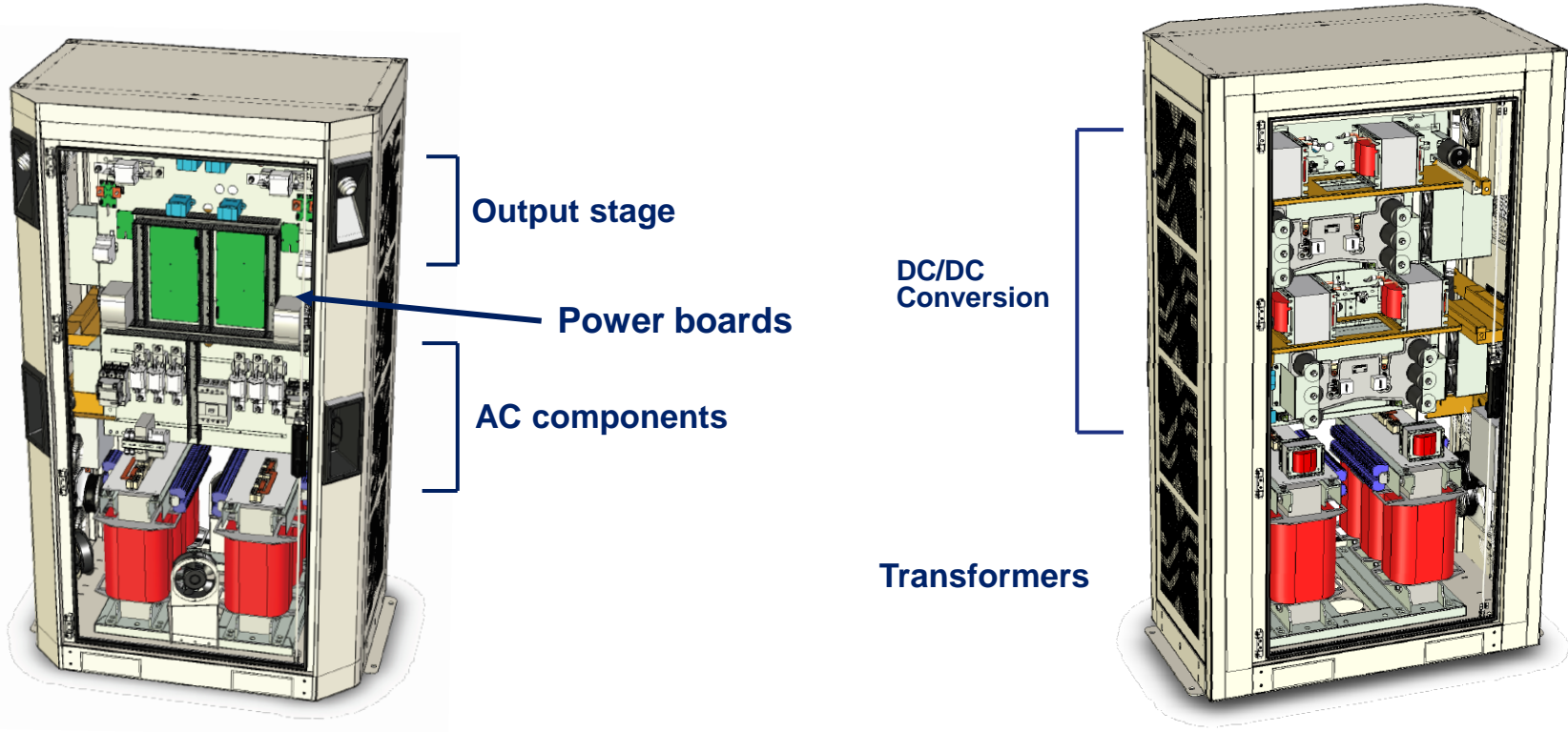
# Iperion-120 Technical Specs

## Technical details



- Designed according to the major standards:
  - IEC 61851-1, IEC 61851-23, IEC 61851-24;
  - IEC 15118:2019, DIN 70121:2014;
  - GB/T
  - IEC 60529, IEC 61439.
- Single 120 KW (150KW to be evaluated), and dual 60 KW plug
- Ready for harsh environment:
  - IP54, IK10, Pollution degree III;
  - Extended temperature range: -30°C +50°C, 4000m above sea level. UL certification limit: 1000m
  - Heavy duty: lifetime > 10 years with more than 10 charging cycle per day;
- Ready for high voltage battery: Vout up to 850V (extendable to 900V). UL certification limit: 1KV
- Expected efficiency >93% @full load

# Iperion-120 Mechanical Design



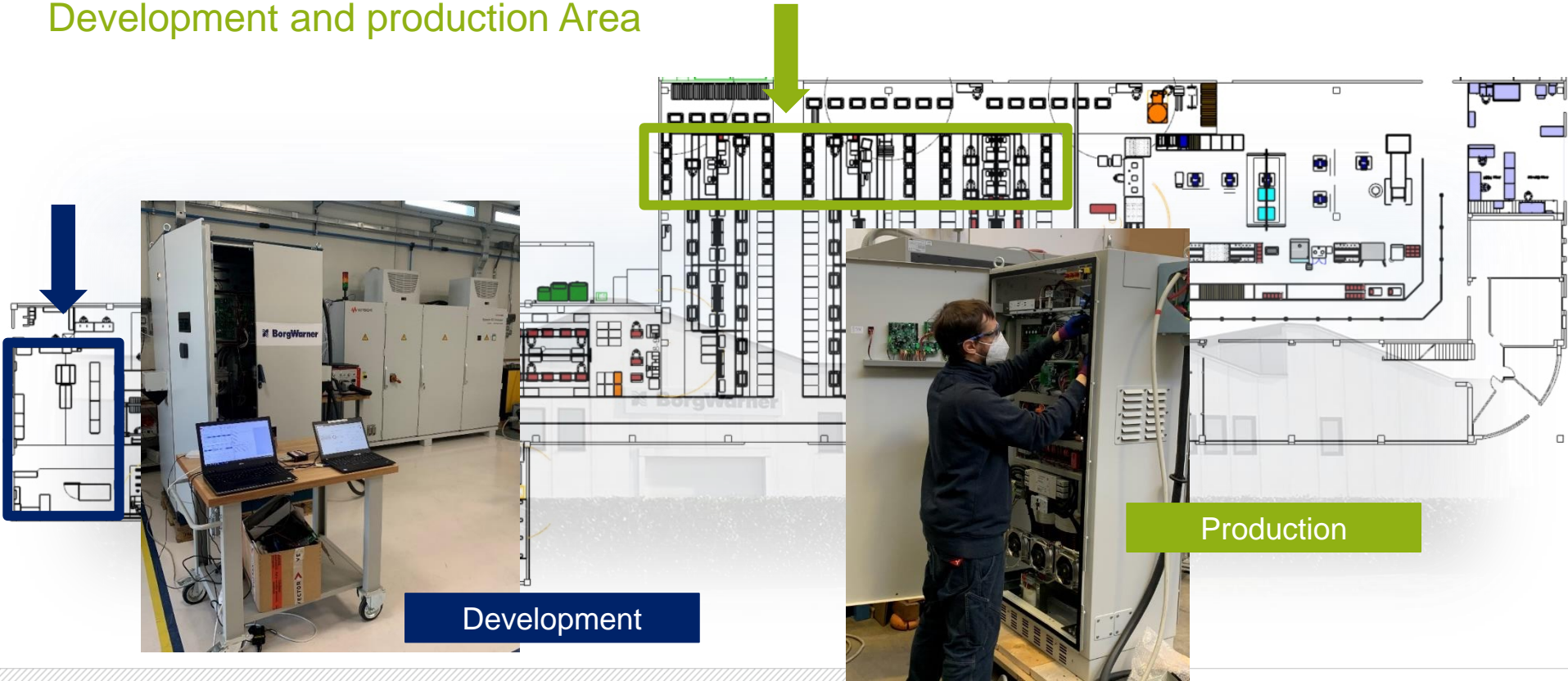
# Production Area





# Stationary Chargers

## Development and production Area



# Inverter Product Range ( AC motors)



**Gen4  
Size 2**



**Gen4  
Size 4**



**Gen4  
Size 6**



**Dragon8**

**24V-96V**



**Gen5  
Size 9**



**HVLP**

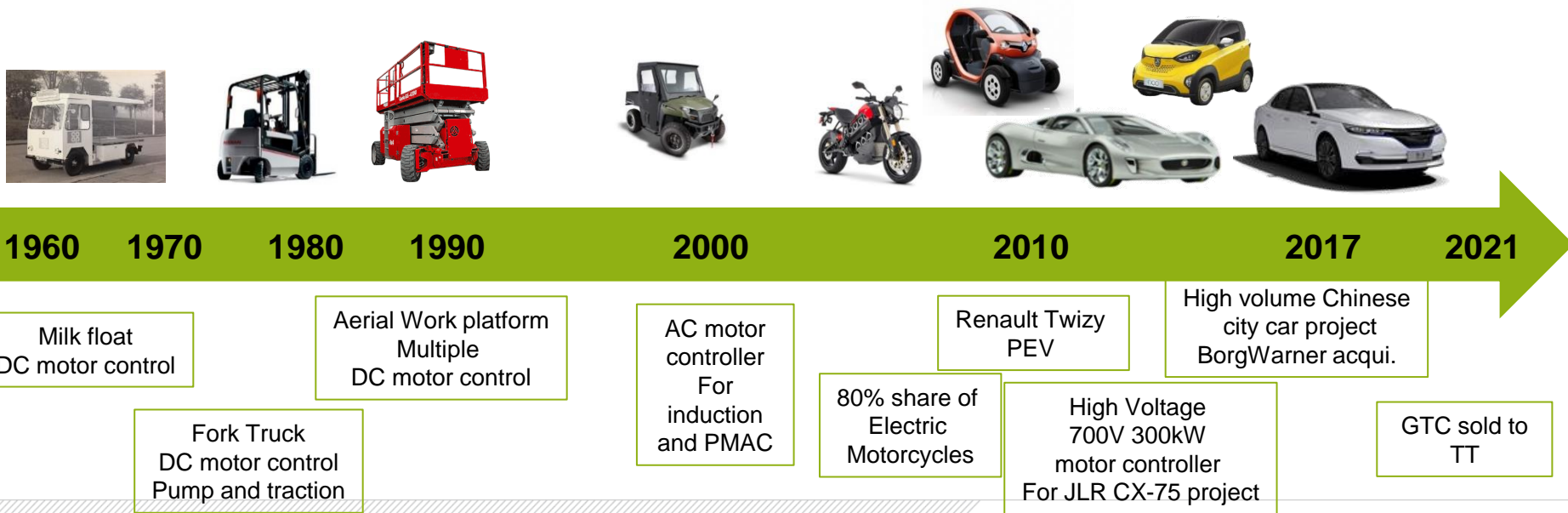


**120V-800V**

# Timeline of 50 Years Electrification Experience

50+ years of experience in electrification

150+ employees (over 50% degree qualified)





# Power electronics traditional Markets

## Industrial

(from 80%+ in 2007 to less than 60% 2017)

- Forklift Trucks
- Aerial Lift Equipment
- Airport Ground Support Vehicles
- Floor Care Equipment
- Construction Equipment
- Marine
- Mining Vehicles



## Auto and 'off-road'

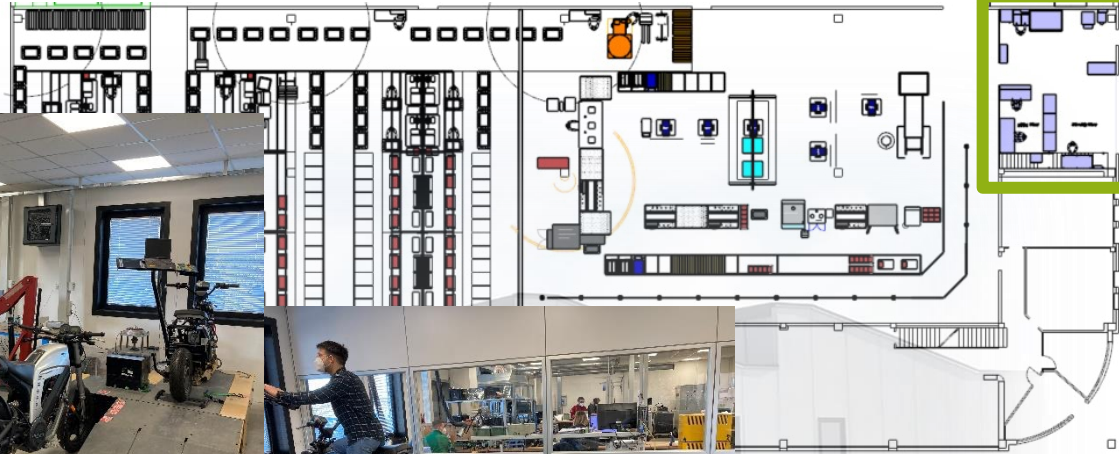
(more than 40% 2017 and biggest growth options)

- Scooters & Motorbikes
- Agriculture
- Recreational & Utility Vehicles
- Hybrid Vehicles
- Construction



# Power electronics

## Development Area



# Thank you!



Combustion



Hybrid



Electric