There is no longer a question of when will be the tipping point for electric vehicle adoption - it has already happened, as WMG’s Prof David Greenwood explains:

Within the UK Government’s recent 10 point plan there is one critical item for the vehicle manufacturing supply chain: **from 2030 onwards it will not be possible to sell internal combustion only powertrains in cars and vans.** From 2030, car and van sales will only be in plug-in hybrid and electric vehicles and from 2035 only electric (or possibly fuel cell) vehicles. Given that typical vehicle platforms live in the market for over 10 years, this means that automotive manufacturers are changing product development plans right now.

This is no longer just a Government-led initiative and observations of the car market during Covid-19 have been very interesting. Despite the overall crash in vehicle sales due to an economic downturn, there has been a significant increase in electric, plug-in-hybrid and hybrid vehicle sales. With regards to new technology acceptance, EV buyers in many countries have moved beyond the ‘innovators’ and are now in what is classed as the ‘early majority’ stage of market adoption. This is great news for the electric machines and power electronic drivelines supply chain, according to SMMT data, in November last year, 37% of cars sold had a traction motor and power electronics in them.

Following Brexit, the EU-UK trade deal is also providing a driver, not just for the uptake of vehicles but also for the sourcing of components to be from within UK and Europe. In order not to be subject to trade tariffs crossing borders, electric vehicles sold in the UK and Europe must currently have at least 40% local content classed as originating materials (this is in line with today’s supply chains). However, by 2027, things change considerably, only 45% of the content of the vehicle is allowed to be sourced from outside the UK and EU, and manufacture of the battery in the UK/EU is mandated. There will therefore be a strong desire for UK manufacturers to bring EV components to the UK or Europe, and in cases where exports outside of the EU are significant, the UK will be preferred over Europe. - The need for a UK supply chain has never been more critical.

The expansion in the electrification market is not just in cars. WMG is also working with motorsport, off-highway vehicles, aerospace, marine, motorcycle, rail, truck, industrial automation and renewable energy generation sectors. The market opportunity is very great indeed.”
Dr David Simkin, Principal Engineer at WMG explains in more detail the specific opportunities in the electric machine and power electronic driveline supply chain:

**ELECTRIC MACHINES:**

Predominately, this is a mechanical engineering challenge. There are opportunities in materials supply, materials processing, supplying sub-assemblies, final assembly and assembling electric machines into the drive units.

Some examples of parts and processes needed in the electric machines supply chain include:

- Lamination stamping
- Copper parts
- Insulators
- Bearings
- Magnets
- Robotics
- Windings
- Welding
- Laser suppliers
- Testing and validation and certification

**POWER ELECTRONICS:**

Predominantly this is an electronics challenge. These are systems that handle very large amounts of current with not just hardware to consider, but also embedded software to make the device efficient.

Some examples of parts and processes needed in the power electronics supply chain include:

- Housings
- Castings
- Bus Bars
- Electronics assembly (value is in IP and software, not just hardware)
- Harnesses
- Injection moulding
- Thermal management

**THOUGHTS FROM UK BUSINESSES WHO ARE ALREADY PART OF THE SUPPLY CHAIN**

**Dr Melanie Michon, Head of Engineering at Motor Design Limited:**

“What we see overall is that the electric motor will become the standard driver in the vehicle. Off the back of that, we expect a significant growth in the need for software to design these motors… as a company we had to be flexible and adapt to the changes we see in the landscape. Motor design needs to take into account electromagnetic, thermal and mechanical aspects. Design needs to take into account full system optimisation.”

**Dr Pete James, Director and Technical Specialist at Lyra Electronics:**

“Grant support projects, such as Innovate UK and APC competitions, have been very important to Lyra’s growth and have allowed us to generate IP. We worked closely with universities to look at new technologies and applied those to real-world situations. Being part of a consortium allowed us to fill in missing knowledge, and partnering OEMs and tier 1 companies allowed us to get real-world requirements to add realism to applications.”
Adam Huckstep, Managing Director at Hypermotive Ltd.:

“Electrification has lowered the perceived barriers of entry to the automotive sector and has been extremely disruptive. The electrification market has changed the perception of volume, vehicles are now being marketed in tens, low hundreds, thousands which has really opened up the market to SMEs. For the OEMs, lower vehicle production volumes, shorter development times, niche vehicle programmes all require engagement with suppliers with lower costs, who are able to take on product design and product validation – this is perfect for SMEs! Businesses like ours are now able to compete with tier 1s, our manufacturing costs are competitive, but our setup costs are lower and we are nimble.”

GET IN TOUCH WITH US:

If you would like to find out more about the opportunities please contact wmgbusiness@warwick.ac.uk

For information on innovation trajectories for motors and power electronics the UK’s Advanced Propulsion Centre roadmaps can be found here: https://www.apcuk.co.uk/technology-roadmaps/