



# Charging Forward with Electric Vehicles

## Factsheet

As the government steps up its policy on fossil fuels in cars, Fraser Technologies has invested in the future of the electric cars and the challenges involved in battery power.

**At the end of 2020, PM Boris Johnson announced a change in government policy on the use of fossil fuels in cars. As part of the Government's ten point £12bn green industrial strategy to tackle climate change, a ban on selling new petrol or diesel cars was brought forward from 2035 to 2030 (with the ban on hybrids staying as 2035).**

Environmental experts welcomed the improved target, but the legislation caused controversy amongst the automotive manufacturing industry, which described it as an immense challenge. The theory is that 60% of the market will be electric by 2030, compared with just 5% at the end of 2020, which certainly sets the bar high.

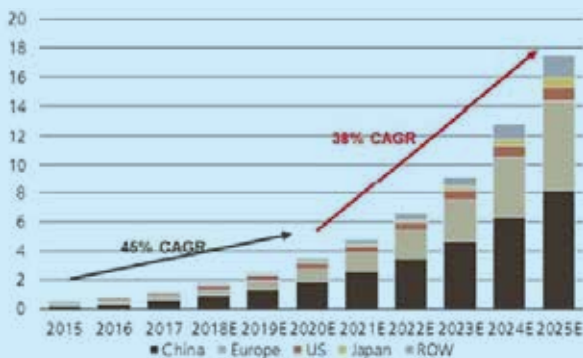
Nevertheless, environmental legislation is a primary driver in the industry, with the electric car industry investing significantly in R&D technology to allow them to travel further, charge faster and last longer.

For electric cars to become commercially attractive, the industry is considering a target of 10 minutes for 80% charge on the battery. The main objective is better reliability and safety so drivers can reach their destination without an issue. As innovative technology emerges in this field, new challenges become evident. One major hurdle for lithium ion battery technology is dealing with the high heat load generated during charge transfer in this brief time.

With this increased heat, it becomes paramount to improve long-term performance and reduce the fire risk in the battery packs. The key is developing an efficient thermal management solution which mitigates fire potential and improves heat transfer.

### Electrified cars - strong growth driven by China and Europe

Annual vehicle sales (in million units)



Source: UBS, as of October 2018; Note: chart includes battery electric, plug-in hybrids and fuel cell, but excludes full and mild hybrid vehicles

At Fraser Technologies, we work closely with Chemours, which has developed Opteon™ Speciality Fluids with performance and environmental sustainability in mind. The Opteon™ product portfolio includes heat transfer fluids for many different applications and temperatures ranging from -90°C to 250°C. These Opteon™ Speciality Fluids are non-flammable, offer excellent stability and provide superior heat removal in dielectric applications, with an environmentally friendly footprint.

The fastest and most effective way to cool a battery is direct fluid contact with a dielectric fluid, known as immersion. These fluids can be either be used as single phase, pumped much like current heat exchanger systems, or employed as a simple two-phase system with condensing and evaporation. Immersion cooling using Opteon™ Speciality Fluids answers the need for a safe battery; it provides the most efficient heat transfer using non-conductive and non-flammable fluids while also enhancing safety. Alternative liquids, such as PAO oils and silicone-based

fluids are potential candidates, but the Chemours Opteon™ Speciality Fluids products provide up to 30% higher heat removal performance in a single-phase system. This offers a much more efficient heat transfer process as the coolant gets closer to the heart of the heat. Additionally, by using two-phased immersion cooling systems, the latent heat during phase change is significantly larger than liquid thermal conductivity and thus provides a more uniform temperature across the entire battery pack.



We work with a number of well-known automotive manufacturers to ensure that their systems are efficient, utilising Chemours Opteon™ Speciality Fluids in a variety of applications, including component cleanliness, lubrication and carrier fluid, as well as the cleaning and cooling of EV batteries. We appreciate that not only is the health and safety of the battery itself crucial, but also, as electric vehicles must continue to become lighter and faster and with more range, anything that brings additional space or weight is not an option. The Chemours Opteon™ Speciality Fluids solutions benefit from a small footprint and are lightweight compared with oil-based solutions. And, as the energy density is increased with this form of thermal management solution, less liquid - and so less weight - is required.

As the automotive industry works hard to improve the electric vehicle offering, every element of the car will need to be considered, with battery challenges on top of the list. But, with innovation appearing throughout the supply chain and a steep target to meet, we will all have a major part to play in the future of electric vehicles.

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