

## **STRONGER UK-JAPANESE COLLABORATION IS ESSENTIAL FOR OUR ZERO-CARBON FUTURE**

**As we get closer to the UN's international conference on climate change (COP26), Julian Hetherington, Automotive Transformation Director at the Advanced Propulsion Centre, gives a global perspective on the opportunities for the automotive industry and highlights the importance of greater Japanese-British collaboration to achieve net-zero goals.**

If there is one lesson to take from the last 12-months, it is that international collaboration can achieve extraordinary things – not least sustaining the incredible pace with which vaccines have been developed and deployed against COVID-19.

The question now is whether it is possible to harness this same spirit of collaborative action in our response to other global challenges, particularly the need for rapid, industrial-scale decarbonisation to tackle climate change.

It is this ambition that drives the UK's Advanced Propulsion Centre (APC) as it seeks not only to nurture the game-changing ideas and enterprises that support greener transport but also to help those enterprises become part of a successful, mainstream global supply chain.

The approach is embodied in a series of industry "technology and product roadmaps" published last year – a unique collaboration of 150 international experts from across the automotive sector brought together to help predict and shape the future technological landscape.

Rather than focusing on a single technology, these roadmaps seek to "join the dots" to create a connected suite of technologies. They explore everything from vehicle systems to batteries, to drive systems, exposing the interfaces and mutual dependencies along the way.

So, what can be learnt from them? In this article, we will look at three specific trends the roadmaps have pinpointed and explore how they might pave the way for even greater future Japanese-UK collaboration.

### **Shaping future mobility**

The first of these is the impact of changing market preferences, particularly in respect of mobility needs.

Japan is synonymous with the Keijidōsha, vehicles suited to urban mobility. Small, light and perfect for daily, low-mileage commuting trips, this trend is now resonating in other parts of the world.

This is also stimulating new financing approaches: for example the Citroen AMI, a two-seater vehicle launched last year, can be bought for US\$8,400 or rented per minute, a trend we expect to continue as consumers seek more flexible ways of paying for their private transport.

For larger vehicles covering long distances or with high torque needs, manufacturers like Toyota and Hyundai are already leading the way in the development of fuel cell technology – our forecasts predict that almost 10 per cent of passenger vehicles will be fuel-cell powered by 2040.

Meanwhile, luxury car makers will see demand for SUVs continue to grow. The roadmap forecasts that high-performance vehicles will be first to fully electrify – Jaguar’s recent commitment to being a luxury pure-EV brand by 2025 being a case in point.

Yet with accelerated product timelines comes an appetite for advanced EV technologies, reflected in the APC’s own work supporting the development of high-powered powertrains through Jaguar Land Rover’s “project Zeus” programme.

Maintaining this pipeline of strong and viable concepts will clearly continue to be a major priority for industry, and we are looking forward to showcasing the APCs innovation programmes at the virtual JSAE conference later this month.

### **Diversifying energy portfolios**

Bound up in this is a second important issue: how best to manage a diverse energy portfolio to meet different mobility requirements, particularly with those harder to decarbonise heavy goods and off-highway vehicles.

Fuel cells are increasingly part of that narrative: Hyundai, for example, plans to roll out a total of 1,600 XCIENT Fuel Cell trucks by 2025, while last year, Daimler Truck, Iveco, OMV, Shell and the Volvo Group created the H2Accelerate (H2A) industry alliance to launch heavy-duty fuel cell trucks across key European freight corridors.

Many industry players see an important role for new internal combustion engines (ICE) running on hydrogen and e-fuels, and this may be important in countries where power infrastructure is challenging. Others meanwhile have shown that full battery electrification is technically feasible for heavy-duty transport, despite the challenges of cost, energy density and package space. It is encouraging disruptors like Tesla and more recently ARRIVAL and Volta Trucks, which are already designing bespoke EV platforms to address a demand in the market.

Implicit in this is a wider challenge of managing a new generation of suppliers, which may not necessarily have years of established relationships with tier 1 and OEM customers. Within this new and diversified technology portfolio, industry will need to deal with companies that have a very different risk profile – some of them self-declared ‘disruptors’ – and will need to learn how to manage that risk appropriately.

### **Infrastructure and supply chain development**

But underpinning everything is the third and final challenge of ensuring stable access to resource, both human and material, to support the transition to electrification. This is the key area where the APC believes Japan and the UK stand to gain from collaboration.

Access to rare earth materials is a particular concern, with global shortages already being felt – and both Japan and the UK have identified the strategic risk of having a limited mining and production supply chain.

The UK’s response involves diversifying its supply and investing in UK-based processing capacity – building on the model provided by Less Common Metals in Ellesmere Port in north west England, which has global capabilities both to source and produce rare earth metals and alloy products, and the expertise to process materials through to finished magnet production.

Similarly, semi-conductor businesses CSC and Newport Water Fab, based in South Wales, supported by the APC, are developing new production processes to deliver high-voltage semi-conductor chip technology.

Add to this the industrial-scale development of battery production and other key aspects of the electrification supply chain where again Japan and the UK are following similar paths in supporting their industrial development.

Through a government-backed funding programme called the Automotive Transformation Fund (ATF), delivered by the APC, the UK is in the process of building a comprehensive electrified end-to-end supply chain for the global market.

This includes attracting and supporting the inward investment necessary to support large-scale gigafactories, as well as helping emerging UK-based technology manufacturers to commercialise and scale up their operations to compete globally. Through the ATF, the APC together with partners in the UK Government's Department for International Trade (DIT) provide investors looking to invest in the UK with support for site selection, permit processing and engaging with government departments. APC work to understand the needs of individual companies, speed up the process and help projects succeed in the UK.

With three of the top 10 universities in the world, the UK has always been a fertile ground for conducting fundamental research, and the APC has traditionally played a significant role in bringing these nascent technologies to full concept readiness.

There are also UK interventions that support the scale up and commercialisation of net-zero technologies such as the UK Battery Industrialisation Centre (UKBIC), High Value Manufacturing Catapults and Power Electric, Machines and Drives centres of excellence.

Now, with the ATF, we are able to build the last part of the bridge to large-scale industrialisation, helping the UK to consolidate its established strengths as a leading destination for innovators, entrepreneurs and investors. This generates considerable opportunity for Japanese organisations.

## **Conclusion**

In short, the history of Japanese-UK collaboration is an enduring one, best exemplified by the moment the first Nissan Bluebird rolled off the production line in Sunderland to begin an unbroken, 35-year automotive association between the UK and Japan.

Today, three major Japanese OEMs are active in the UK, with many more Japanese companies and subsidiaries operating across the supply chain, benefitting from our skill base, supply chain and an accepted language of international business.

Leaving the European Union (EU) is no impediment to this. In fact, the comprehensive trading agreement struck between Japan and the UK – the first since leaving the EU – promises to open up many more opportunities for collaboration in the years ahead.

This will not only offer the chance to bolster industry and strengthen the nations' respective economies but to forge an essential partnership for creating the net-zero carbon transport solutions necessary for a greener future.

And in a period when we have seen the power of international partnership, there is surely no better time to start than now.

**Julian Hetherington is Director of the Automotive Transformation Fund at the Advanced Propulsion Centre. You can download Japanese language versions of the APC's new roadmaps by visiting <insert link>**