

Learning Paper

# European Electric Vehicle Industry

How can the industry find its place on the global stage?



**PROTOLABS**  
Manufacturing. Accelerated.

# Amidst the turmoil of 2020, one sector to make a surprising surge in sales was the European electric vehicle (EV) industry.

The region saw an unprecedented 143% leap in passenger EV sales over the previous year, displacing China as the world's largest EV market<sup>1</sup>. There are more EVs on the road than ever, and greater support for both passenger and commercial vehicles.

However, even as uptake grows, many major OEMs are yet to make their presence felt on the EV stage and the region still faces many questions.

Can battery production keep up with increasing demand?  
What are the opportunities and challenges awaiting us?  
Can Europe's industry keep up and compete with the major manufacturers in the US and China?

These are difficult questions to answer conclusively, which is why we reached out to four of the European EV industry's top minds for their thoughts in a recent webinar and a separate podcast. This Learning Paper brings together their thoughts from these two events.



**Nicole Ahner**

Editor at Hüthig, specialising in automotive semiconductors and power electronics



**Ade Thomas**

Founder of Green.TV, the leading communications agency focusing on e-mobility



**Francisco Carranza**

Vice President of Sales & Marketing at ACC, a leader in electric vehicle battery technology



**Ian Digman**

Program Director (Vehicle Line) at Switch Mobility, with experience at Ford, Nissan, Infiniti, and McLaren

<sup>1</sup><https://theicct.org/publication/update-on-electric-vehicle-uptake-in-european-cities/>

# It Starts From The Top

According to Ade Thomas, one of the most important factors in helping European OEMs and manufacturers succeed on the EV stage isn't something that can be found in the R&D labs or the factory floor. Rather, the shift needs to be made at the boardroom level.

"The transition to e-mobility is happening," he says "and it is happening at pace. The industry needs to engage with that."

The numbers certainly seem to support his claims. Figures show that in December of 2021 almost 50% of the vehicle sales in the UK were either hybrid or pure electric vehicles. This is impressive year-on-year growth, and looks primed to climb even higher in 2022.

Yet according to the European Federation for Transport and Environment's EV readiness index, only VW and Volvo are on track to transition fully to electric by 2030. Clearly there is still a lot to do for many of the other manufacturers.

Ian Digman says that the key to adapting to this changing market "is about mindset."

"There are a number of companies who are either not accepting the need for change or are doing it half-heartedly," he continues. "If you decide to go down this route you can be very, very successful, but that decision needs to be made."

He notes that the OEMs are "big organisations with a long investment cycle," and that this sheer size can sometimes make it hard for them to adjust to rapid changes in the market.

"A corporate culture can take five years plus to change," he says. "Because of the size of them, they need to come out with big solutions. They can rarely test the waters with little projects. The start-ups are willing to grow, learn and re-invest. What the big OEMs are missing out on is the start-up culture."

“

**“There are a number of companies who are either not accepting the need for change or are doing it half-heartedly.”**

Ian Digman



## Betting on Innovation

All major European OEMs and countless university groups are pushing forward with their own research into EV technologies, but Nicole Ahner says that more needs to be done to translate this fundamental work into practical results.

“One of the major issues I see is that the basic research is here, but there is a gap between finishing a research project and bringing the technology towards industrialisation and making it manufacturable,” she says.

“This needs more confidence on the side of the researchers to push the technology, and we need more commitment from manufacturers. Maybe a bit more courage to say: you know what, let’s do this.

“You might be an early adapter of course and it might be risky, but we need someone at the forefront of new technologies.”

She explains that perhaps the best example of this comes in the form of Bosch pushing the industrialisation of the fuel cell, which is now being used to create EV drives<sup>2</sup>.

“This has led to a huge increase in new concepts,” says Ahner, “but it needed the hero to make the first step.”

<sup>2</sup> <https://www.bosch-mobility-solutions.com/en/solutions/powertrain/fuel-cell-electric/fuel-cell-stack/>

## Political Drivers

It isn’t just vital for corporate leaders to adjust to the changing nature of the sector. They must also be able to spot what forces and motivations are driving these changes.

Ade Thomas believes that the major force underpinning the current growth of the European EV sector is “a political driver around climate change.”

“This is a big external variable that is causing change throughout the sector,” he explains. “Previously, change came from technologists and from new ideas in design. Now it’s coming from external drivers, and the biggest of those is climate change. The people in our boardrooms really need to understand that.”

This can be seen in various mandates and subsidies that have been shaping both the customer base’s purchases and the OEMs’ own business plans. The European Green Deal, for example, is looking to slash the emissions of new cars in half by the end of the decade, and eliminate emissions entirely by 2035.

Of course, Europe is hardly the only region to be pushing forward with legislation around EVs. Digman notes that China offers “huge government support” for EVs.

“They’re making all elements of the infrastructure work together,” he says. “In Europe, we’re seeing mandates on the OEMs and vehicle production, but the infrastructure around it doesn’t have a similar mandate.”



## Embracing EV Collaborations

Establishing a place in the global EV market is a tricky task for any individual company to even attempt, but Francisco Carranza believes that Europe has one major advantage in this area.

“Collaboration is part of the European DNA, more so than we see in Asia or the US,” he explains. “There are a number of funding instruments making that easier, but the European mindset has always been about getting together a group of companies that share a vision of industry and project, who have then pooled resources to get it done faster.”

Thomas notes that it helps that the EV sector is currently experiencing plenty of rapid growth. “It’s not a mature sector where competition is more fierce,” he explains. “That leads to inclusivity and openness.”



# Push for Battery Innovation

Arguably the most important piece of technology in any EV is its battery. Where the first tentative designs could barely manage 50 miles of driving before needing a charge, modern vehicles can keep cruising for more than 300 miles without needing to stop.

This ability to more than cover the customer's range needs – and to rapidly charge when they do need a top-up – is vital for the continued success of the sector, and more research is being carried out all the time.

“Innovation is there to answer specific customer needs,” says Francisco Carranza. “Particularly about cost.”

“We all know that to have a very high penetration of EVs, the cost of batteries needs to come down,” he explains. “The speed at which the cost has been decreasing is not fast enough to reach a seventy or eighty percent market share.”



## The Latest Innovations

According to Nicole Ahner, though there is a huge amount of cutting-edge research being carried out into the cell chemistry of batteries, many of these are not currently ready to go into production.

“Manufacturers very much continue to use the battery technology that has been proven to work,” she explains. “What is being adopted right now are mainly innovations from a battery engineering point of view.”

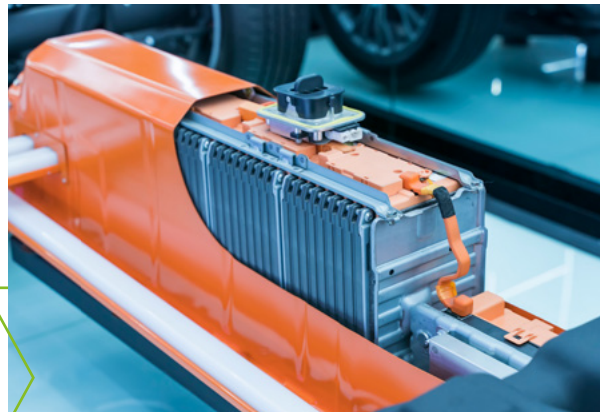
Chief among these, she says, are concepts around the idea of safety. Not only is battery safety one of the major concerns for people looking to purchase EVs – especially in the wake of dramatic videos and stories about supposed failures of lithium-ion batteries – there is also a growing legal need to integrate more safety measures.

“We have the new regulations like GTR20 coming up,” says Ahner. “This mainly concerns a possible thermal runaway of the battery cells and with that the risk of the battery packs and the whole car burning down.”

“There are materials being developed to insulate the battery cells and prohibit the thermal runaway in the case that one cell explodes. These can be polymers or foams that ensure that the battery doesn’t become too heavy.”

On top of this, work is being poured into helping battery management systems go wireless.

“ADI and Texas Instruments are very keen to get this adopted,” she explains. “It has already happened in the US, and will in Europe. One of the most important things for battery manufacturers and also car manufacturers is to get the type approval for newly developed concepts.”



“

“Manufacturers shouldn’t just look at what the usual automotive companies have to offer, but keep their eyes open for ideas from completely different fields like chemistry, plastics, material development. There are a lot of new and innovative concepts rushing in from there”

Nicole Ahner

## Tackling the Supply Chain

Ian Digman notes that two of the key drivers behind development are “the opportunity for innovation and the necessity for innovation.”

For many European nations, necessity could start playing a major role as more and more directives come in from governments to OEMs. He says that there’s going to be certain countries that will struggle to compete in the long term, because they simply don’t have access to the raw materials needed to manufacture batteries.

“The UK did particularly well during the industrial revolution because we could mine coal and iron ore,” he says. “We don’t have the raw materials to excel in EV.”

“That innovation needs to come in the repurposing of batteries, or the recycling of those materials so we’re less reliant on other parts of the supply chain.”

Ahner notes: “Just think about the amount of batteries coming back when electric cars are maybe 10 years old.”

“We need more activities regarding second-life applications and better recycling technologies. At the moment they are time and energy consuming, far from sustainable and very expensive.”

Carranza adds that the battery industry as a whole is highly CAPEX intensive. Behind every manufacturer is a full supply chain set-up that he says is “simply non-existent” in Europe at the moment.

“From the ground up, we have to build an entire supply chain that is going to take a long time and a huge amount of investment from all across the value chain,” he says. “Clearly, it is going to take longer than we want. Even if the consumers are responding positively – which we think they are from the numbers – I’m not sure how fast we can set up that supply chain in order to provide all the cars that are wanted.”

“Capital is fundamental, and time is fundamental.”





# Build the Second-Hand Market

When we're looking at car sales and growth figures, it can be easy to forget that not every consumer buys their vehicles brand new from the manufacturer. In fact, in 2021 UK consumers bought about 4.5 second-hand cars for every new car that was sold<sup>3</sup>.

While these sales may not directly support the original manufacturer, Ian Digman notes that "companies don't exist without looking at the customer base."

"I think EVs are going to take off officially once the second-hand market becomes useful," he adds. "At the moment, EVs are aimed at the professional level, partially because we get a lot of early adopters in that group, and partially because that's where the margins are for the OEMs. However, the small cars are the cars that the populous needs."

"We talk about congestion in the cities; if we all buy Model S Teslas and SUVs, that's only going to get worse. The issue with small cars, though, is that they're hard to make money on. The A-segment car (small, city cars) has virtually disappeared."

"We're legislatively driven to create a small car that hits the various requirements, and it's difficult to make money on those. Getting to a small EV requires a change of environment."

<sup>3</sup><https://heyicar.co.uk/blog/car-sales-statistics>



## Watching the Battery

One of the common concerns voiced by potential EV customers is the risk of degrading battery life. After all, lithium-ion batteries are known to lose some of their capacity over the course of their life, with early examples often falling off dramatically after just a few years. And, while it is occasionally possible to replace the batteries in a used EV, the expense involved almost always means that a brand-new vehicle is a more practical alternative.

However, this concern is no longer the barrier that it once was. Not only do most manufacturers offer generous warranties and guarantees, Francisco Carranza points out that modern batteries “now have a good life” that should keep them running well through the second-hand market.

“These days we’re offering 15 years of usable lifespan, maintaining a very high level of energy capacity,” he says. “Clearly, going forward, the remaining capacity of the battery is not a problem.”

Indeed, he says that one of his concerns is that the reliability of EVs means that people might keep the vehicle for longer.

“The used market is formed from having a fourth, and a fifth and a sixth owner,” he says. “But if the car is running well and is low maintenance...”

Perhaps the whole nature of vehicle ownership will change over time as the technology evolves – but that is the subject of a separate debate.



# An Agenda for Innovation

Clearly the automotive market is changing as the demand for EV vehicles accelerates, but it faces some stiff challenges in the next few years – and time is running out. While some European manufacturers are embracing this challenge there are still gaps that need addressing.

An FT article “Electric vehicles: the carmakers wary of going “all in” on batteries”<sup>4</sup> reinforces some of the views expressed in this learning paper – for instance the difficulty of producing a cost effective small electric vehicle that will appeal to the mass market and the ongoing issue of developing a charging infrastructure.

But on the bright side there is already some excellent work happening and the market is moving forwards. We can certainly expect the pace of change to accelerate in the next few years which will bring its own challenges to EV manufacturers and the supply chain. Those who haven’t fully embraced this need for change could be left behind sooner than they think.

Innovation and its practical application by those brave enough to adopt it will be the key to future success. It’s certainly time for the industry to jump on this electric bandwagon and propel it forwards, but remembering that we will need to revisit, rethink and recharge it occasionally to keep it going...



<sup>4</sup>FT article December 2021. <https://www.ft.com/content/92475838-97ce-4c2a-8469-5a8e59c870dd>



## Contact Us

Halesfield 8, Telford  
Shropshire  
TF7 4QN  
United Kingdom

P +44 (0) 1952 683047

E [customerservice@protolabs.co.uk](mailto:customerservice@protolabs.co.uk)

