

Business and Trade Committee

Oral evidence: Batteries for electric vehicle manufacturing, HC 1070

Tuesday 23 May 2023

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Members present: Darren Jones (Chair); Ian Lavery; Andy McDonald; Mark Pawsey.

Questions 77 – 119

Witnesses

I: David Wong, Senior Technology and Innovation Manager, Society of Motor Manufacturers and Traders (SMMT); Konstanze Scharring, Director of Policy, SMMT; Jeff Pratt, Managing Director, UK Battery Industrialisation Centre; Dr Andy Palmer, former Chief Executive, Aston Martin, former Chief Operating Officer, Nissan, and Chairman, InoBat.



Examination of Witnesses

Witnesses: David Wong, Konstanze Scharring, Jeff Pratt and Dr Andy Palmer.

Q77 Chair: Welcome to the Business and Trade Committee for our second evidence session on electric vehicle battery manufacturing here in the UK. I am delighted to welcome four witnesses this morning. David Wong is the senior technology and innovation manager at the Society of Motor Manufacturers and Traders, or SMMT, and Konstanze Scharring is director of policy for SMMT. We then have Jeff Pratt, who is managing director at the UK Battery Industrialisation Centre, and Dr Andy Palmer, who is the former CEO at Aston Martin, former chief operating officer at Nissan and now chairman of InoBat. Welcome, all four of you.

Just to get us going, I want you to try to help me to understand the current risk that we face here in the UK. From our previous session—and there has been a lot of press coverage since then about various written submissions to our Committee—we can tell that the clock is ticking. We can see what is happening in the US, we can see what is happening in the EU and we can see that there is a bit happening in the UK, but not very much.

What I do not have a sense of is whether we are now too late or whether we have the capacity to catch up and be competitive. I just wonder if you could each give me your views on that particular strategic question on timing, just to get us started.

Konstanze Scharring: We absolutely have not missed the boat. It is definitely leaving, and the engines are running, but we have a really good window of opportunity and we need to take it now. The reason why I can say this is that, if you look at the diversity of our industry and its investment over the last 10 years, £11 billion has already been invested in electrification here in the UK. There is an opportunity now, with the right conditions and the right package, strategy and action, to try to make us competitive and put us on a level playing field when there is an international race for investment.

Jeff Pratt: The risk is that we definitely end up losing our engine industry, because legislation is driving it that way. There will be no engine industry in the UK by about 2030. There are currently about 200,000 jobs in engine manufacturing in the UK, if you look at direct engine manufacture and supply chain. If you then look at the effect on the balance of payments, it is about £13 billion, so it is significant. Then you look at the risk to car manufacture in the UK if we do not localise battery supply, and you add those jobs.

Is it too late? It is not, but time is pressing. The requirement by about 2030 is about 100 GW of capacity; we have currently announced 12 GW. If you look at the time to install manufacturing in the UK, it would be done in phases. It is about a year's worth of planning and about two



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years to build a plant, so three years. We are in 2023 now, so it would be 2026 by the time we had the first ones up and running. Then you would phase them in if it were a large factory, so you would fetch on about 10 GW every six months. It is very tight in terms of time to meet that demand.

Dr Palmer: The risk has been well understood for a long time. As we came through the Brexit process, it became evident even in 2018 what the taper requirements were, the taper being the local content ramp-up. I wrote to the Secretary of State in January 2021 outlining those conditions and saying that it is already starting to be too late.

To answer your question specifically, we are too late against the current timing, because the current timing requires us to have local content in 2024 through to 2026. In order to make 2027, I completely agree with Jeff's point that you have a year of planning and two years of execution, so you could just about get there, but you have missed the 2024 dates.

That means that you have to go back to renegotiate the conditions or the taper that were set. Fortunately the EU is also late, and so you are probably going to find a like-minded analysis that we should move the dates so that we have a chance to meet the local content. That means—again, to answer your question—that it is not too late.

My point would be that we do have an opportunity outside Europe. You have to impose the dates coming from Europe for export into Europe, but the UK has the possibility of pushing those dates out even further. Our industry is not totally reliant on Europe. It has exports to China and the US, and its own domestic manufacturing. In the UK, therefore, we have the opportunity to reduce that pressure a little bit, given the freedom that we have as a result of not being part of the EU.

Part of my message is that in order to alleviate a little the crisis that we are now facing because of our lack of action, we have the opportunity both to welcome what the EU will allow for the EU and to make it a little easier in the UK to give our industry the opportunity to catch up and—to answer your question—therefore not be too late.

Q78 **Chair:** The assumption is that we push back the 2024 dates for EU export, because we hope that is in everyone's interests.

Dr Palmer: Yes.

Q79 **Chair:** The Europeans are probably not going to budge on the 2027 date, so we know what the timescale is for that. We know how long it takes to get these things built and functioning. I have some concerns about the supply chain and what that means in terms of local content as well. It is all well and good building a factory and trying to make some batteries in it, but if the components are not from local or regional content, it does not solve the problem, does it? Is the supply chain a problem, or does it exist in a way that means that we can deliver a factory within three



years, as you have suggested, Jeff?

Jeff Pratt: In terms of supply chain, it is a problem. It is a significant cost to the battery. The total manufacturing cost of the battery, which is the gigafactories, is about 20% of the cost. Parts are about 80% of the cost. Within that parts breakdown, 50% of that cost is in the cell itself. That is the cathode, the anode, the electrolyte, the separator and the can—whether it is a laminate bag or an aluminium or tin can. There is a significant part of the cost just in the cell parts.

If you go to localise those cell parts, you stand a good chance of meeting the local content for the battery and complying as local. In terms of requirements for that, it means that the material has to be processed in the UK. We do not have all the raw materials—the minerals—so we have to process the material either in the UK or the EU.

Q80 **Chair:** Konstanze, forgive me for asking a very specific question; feel free to write to us. Of the 100% of cars that we make in the UK, we export lots to the European Union. We export quite a lot to the United States. We have a small domestic market within that production total. Do you have the figures there? To Dr Palmer's point, the EU might have the 2027 date. Maybe in the UK we could say 2030 or perhaps later. I do not know whether the Americans have set a date on any of these issues. Would that work in the context of the numbers around export?

Konstanze Scharring: Yes, absolutely. As Andy was saying, the vast majority—around 56%—of the 80% of our products that we produce here goes to the EU. We have been very successful in terms of exporting EVs—in total 24 billion, and 10 billion for EVs—so that is really growing over time.

The rest of the world is obviously the rest as we go forward, but the EU is the highest-value part of that, and we need to try to grow it. One of the positives of the rules when they were set out under the TCA is that, as you can imagine, it was a great relief that we had a TCA that provided for a framework that allowed for growth in electric vehicles to go across borders because of the more relaxed rules. Moving forward, our ask would be to continue those rules until January 2027, because the industry on both sides needs that time that we were talking about to grow and to go forward.

However, here in the UK, we absolutely need to increase that material content to get the origin requirements up for both the EU but also that rest of the world bit that I talked about.

Q81 **Chair:** It is very easy in my job for me to criticise the Government, because I do that quite a lot, but there is also an equal question, which is that industry knew this date as well. Why does industry need the Government to intervene? Why could you not have prepared yourselves to hit these dates when they were coming?



Konstanze Scharring: At the time when the negotiations happened, the rules of origin were one of the last pieces that were put together. As an industry, we have advised for a long time that we need quite accommodating rules of origin, because, as you have just heard, building up these value chains does take time, because of the current structure of where battery cells and their materials are coming from. We advocated for a much longer timescale, but the rules came out as they came out.

Everybody has been trying to upscale their own supply chains. You see maps where you see battery manufacturing investment, or promises of investments going forward, but as we explained, it is the value that needs to go into the cell as well, on top of the battery manufacturing that needs to be done.

Nobody could predict, when the rules were set, that we would have the covid crisis lasting so much longer and disrupting, that we would have a war in Ukraine and that input prices would rise so significantly. This level of uncertainty, disruption and cost has just changed the equation. We need to be at scale and at pace now, but extending the rules would provide us with that critical opportunity and not hit the very vehicles that we want to trade in the future.

Q82 **Chair:** Can I just be clear that I have understood that answer properly? When the British Government and the European Commission signed the TCA with the 2024 date in it, is it the case that industry thought at that point that that was achievable and that it has just been sidetracked because of covid and the energy crisis, or were you telling the Government at that point that you did not think that the 2024 date was achievable?

Konstanze Scharring: At the time, the Governments on both sides would definitely have worked with a set of different industries that are needed to create this new environment—the chemical industry, the battery industry and others. From our perspective, it was very important that we had enough time to not risk this really highly valuable trade, hence our recommendation for longer.

David Wong: Part of the challenge in meeting 2024 is also because of the delay in onshoring the battery and material supply chain in the UK and the EU. Fast-forward three years, coming now to 2024, we see that quite a lot of the early stages of cell production and, even before cell production, the midstream refining of the materials are almost non-existent in the EU. They are ramping up, but just not quickly enough.

Q83 **Chair:** Is the fact that they are non-existent legitimately due to covid and the energy crisis, or is it because something has not happened that should have happened?

David Wong: Things have not happened as quickly as we had hoped. Not everything is in the gift of the automotive industry to dictate, because this is very much in the mining and refining as well as the



battery supply chain sector. The prolonged effects of covid definitely played a part, not to mention the war in Ukraine, which nobody expected, as well as the hike in energy costs and raw material prices.

Q84 Ian Lavery: Britishvolt, the British-based start-up company in my constituency in Northumberland, achieved unicorn status in September 2021, and then went into administration in January this year. What on earth went wrong?

Jeff Pratt: I have to be a little bit careful, because they were a customer of UKBIC's and we were under a non-disclosure agreement, but what I can say is that they hired a lot of good people—a lot of the right people. They had a very good cell development programme that was using UKBIC and others in the UK.

They got to a stage, by about the November, where their cell was just about benchmark. We independently took a load of cells in from a load of different suppliers, and it was in the top tier of cells in terms of performance. It needed a little further work, but it was getting there, so you could see a route to them having a good, viable cell.

I think what happened was that there was a bit of a perfect storm, to be honest. They did not have a customer at that time. They were envisaging getting a customer by about June, July or maybe August this year. We had a problem with investment in the UK. A lot of investors started drying up, and they could not fund that last stage of development and then secure the customers. That is what happened: it is really unfortunate, because it would have been good for the UK, but that was the position that they found themselves in.

Dr Palmer: Again, I will speak about it from an outsider's point of view looking in, but having vision of a similar situation. The problem with Britishvolt was simple: it didn't have any orders. It had lots of opportunities, but it didn't have any hard orders. Financing a multibillion-dollar investment is impossible unless you have hard orders. Those are the fundamentals, if you will.

The interesting part is that all of the European start-ups have a similar issue. They are competing for business versus the Koreans, the Chinese and the Japanese. From an OEM point of view, it is much less risky to take a cell that has already been developed in the far east and is being localised than it is to take a cell from Northvolt, as an example, where you are developing a new cell and developing a manufacturing facility.

You have to get a certain amount of the way down the investment cycle to be able to prove that you have a product that is good enough. That is exactly what Britishvolt was doing, and it is exactly what InoBat is doing, but you have to get past the OEMs and be prepared to take a risk in terms of sourcing locally as opposed to sourcing with an Asian manufacturer coming into Europe.



Why you should do that as an industry is that your locally grown battery manufacturers have the intellectual property. We so often forget the importance of that intellectual property. What makes manufacturing sticky to the UK is having that intellectual property inside the UK. It is very unfortunate that Britishvolt went, because it was creating that intellectual property, but I suspect that we will see others go as well for exactly the same reason.

The counter to that is either carrot or stick incentives on the OEMs, where you somehow force them to use European or UK-made batteries as part of their local content, in a way that conforms with world trade requirements. An example of that would be that you do not give Government incentives to OEMs that are not using a certain proportion of British-built batteries. That would certainly encourage the slightly riskier sourcing of taking something from the United Kingdom and allowing these unicorns to properly establish themselves.

Q85 Ian Lavery: With regard to what you said earlier, should the UK be looking to develop home-grown battery manufacturers, or would it be better for the nation if we were to ask the Chinese, the Koreans or some other country to come into the UK and manufacture batteries because of their experience in the markets and everything that comes with that?

Dr Palmer: First of all, let us remember the origin of a lot of the lithium ion battery technology, which was born in the UK but has subsequently moved to Asia, which was much quicker at industrialising it. If you asked me the least evil, of course I would rather see Korean, Chinese and Japanese manufacturers manufacturing in Europe or the UK than not, because it is such an important part of the cost of the car and at least you would preserve it, but if you asked me for the ideal, it would be that you capture the intellectual property.

We are not going to develop intellectual property particularly around the current generation of cells, but if you think about the future, where we should be applying our brains in our universities and in our start-ups, it is at the high end, particularly semi-solid state and solid state batteries of the next generation, but also at the energy storage level, and developing things like sodium ion to succeed lithium ion.

What is key is that you are preserving geopolitical risk. If you are not bringing that intellectual property back, you are always going to be exposed to that geopolitical risk, particularly from China, which owns about 65% of the battery manufacturing worldwide right now.

Konstanze Scharring: Just building on the risk issue that Andy was talking about, vehicle manufacturers have set themselves very stringent targets, with the end of the sale of petrol and diesel cars, and EU regulation around CO₂ as well. From their perspective, they need to be able to deliver on the UK's ZEV mandate and others at pace. Hence, we need any source of delivery of the value that can come, and hence you can see that you need both—home-grown as well as whichever



manufacturer needs to secure the investment here in the UK of their battery partners.

David Wong: On the Britishvolt question, we, as the industry body, are not in a position to point the finger of blame. However, we can say three things. First, it is definitely a blow to the potential jobs in the north-east, but it shows how highly competitive this space is and how highly competitive the competition for international capital is, which is economically rational.

The second thing is that the Britishvolt issue may have been a disruption to the industry's transformation journey, but it certainly does not derail the industry's transformation ambition. The ambition is still there. It is just a minor hiccup in the journey.

The third thing is perhaps more important. We need to learn the lessons about what we could potentially do better as a result of this. This underscores the importance of having a fully thought-through, fully fledged and properly articulated industrial strategy that covers all these angles, and particularly in creating investable propositions in the UK. We need a UK offer that really makes us the location of choice for international investors, so that they will not think twice; they will see the UK as being so attractive that they will locate their capital here. That will also have spill-over effects and attract the wider ecosystem within battery manufacturing and the battery materials supply chain.

On your second question, regarding whether we should nurture our home-grown battery players or just encourage existing major players abroad to invest in the UK, if the aim here is to create growth opportunities and as great an economic impact as possible for the UK, it is about stickiness, which Andy mentioned.

That means that, as long as high-value activities are located in the UK, with benefits to jobs in the wider ecosystem, that is to be welcomed, regardless of whether these are national champions or major players from abroad. After all, Britain is open for business and, in the spirit of global Britain, we should welcome any important players that may be able to make an economic impact on the UK.

Regardless of whether it is home-grown or foreign players, the importance of stickiness cannot be over-emphasised. We need to bear in mind that it is critical for the UK's ability to deliver tariff-free or reduced tariff exports of our EVs to countries with which we have an FTA, because of the accumulation of local content. This is in the context not just of the EU-UK FTA, but of those with other parts of the world.

Q86 Ian Lavery: I am not sure if you saw Orral Nadjari's comments in an interview with Sky television early last week. As I am sure you are aware, he was the co-founder and chief executive officer of Britishvolt. He said that the failure of Britishvolt was not because of a number of things that have been suggested by the panel.



I seriously do not want anybody to be finger-pointing—I understand the position that everybody is in—but Mr Nadjari was quite straightforward when he said that he blamed Government bureaucracy and delays for Britishvolt’s failure. Do you agree with that? He mentioned that one of the lessons that could be learned would be a much better, much deeper and much more thought-through industrial strategy. You mentioned that, Mr Wong, so perhaps you would like to begin.

David Wong: We are not in a position to comment on Mr Nadjari’s comments, simply because nobody quite knows which version of the truth is the truth. What we can definitely say is that a well thought-through industrial strategy is particularly important, but perhaps more important is what the content of the strategy looks like.

What we proposed in a publication that we put out back in March called *Race to Zero* is a green automotive transformation—GreAT—strategy, which sets out a few of the key pillars that are absolutely necessary to create a vibrant UK electrified manufacturing sector, with a vibrant supply chain to boot. That includes key aspects like encouraging and de-risking private investment and making the UK attractive. Of course, we may not be going toe to toe with the US IRA and the money that has been allocated to that. None the less, more substantial support needs to be a part of the strategy.

Secondly, it is about making sure that we have competitively priced clean energy. Of course, this is positive, because in the first three months of this year, renewables made up 43% of the electricity generated in the UK, and fossil fuels only 33%. We are seen as a place where we can manufacture the cleanest vehicles with the greenest energy. That is good, but we must make sure that the renewable content goes up within our energy generation mix.

Thirdly, it is about better regulation, more streamlined, simplified permitting processes, and access to funds. We must never allow ourselves to reach the point where it takes longer to permit a wind farm than to build it. As was reported recently, some green energy projects worth more than £200 billion are sitting there in the pipeline, in the queue, waiting to be connected to the grid. Some are taking 10 to 15 years to connect. That cannot be right. In fact, we have learned that some of our members that are looking at building new facilities, new plants, are being quoted something like up to 10 years just to connect to the grid for power requirements. That cannot be right.

It is about quicker processes, but also investing in skills and upskilling the workforce. That is critical, but if we have to have a supply chain, we should not forget that that strategy must also look at global resource and trade diplomacy, using our influence to secure the supply of critical minerals that we may not be able to mine ourselves here in the UK.

Q87 **Ian Lavery:** Was Orral Nadjari right when he said that it was the Government’s fault?



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Dr Palmer: I will try to answer. I do not know the case of Britishvolt. I reiterate that you need orders before you can build a battery plant. In the context of my experience of dealing with Government with a similar type of request, I can answer.

First of all, I am going to agree with the SMMT about a lack of industrial strategy, and I am sure that that is going to come out a lot. You would not invest in a company that did not have a corporate plan, and so, if you are an external investor, why would you invest in a country that does not have a clear plan about what it wants to do with its automotive sector? That is the first key point.

The second key point, dealing with Government, is that at the moment we are pointed, for batteries, to go and talk to the Advanced Propulsion Centre. Batteries do not necessarily fit into that sector. Batteries go into cars, but they also go into what are now called vertical take-off and landing aeroplanes, for want of a better explanation, and into energy storage.

My experience, from the point of view of InoBat, which is a potential inward investor, is that those different sectors were not recognised. We were constantly pointed at APC and told, "Because you have orders with a vertical take-off and landing company, that does not count."

You have to recognise that you can make batteries in a battery factory that are very high energy density, medium energy density or low energy density. They come off the same cap-ex equipment, so looking at this through the lens of automotive is, frankly, ridiculous. You have to look at the bigger picture, which is looking particularly at energy storage, which is mission-critical.

First of all, funding batteries through the APC is, in my humble opinion, a mistake. That is one of the issues that gets in the way. The successor to Britishvolt is looking first of all at energy storage rather than automotive, so that carves that out.

The second is that InoBat could not get past stage 1. In other words, we wanted to invest in the United Kingdom. We wanted to come here; we wanted trade and industry competition to come here. When we got into the system, we were told that there was not enough money left within the APC. We were, essentially, placed fourth, and the top three—whoever they might be, but you can guess—would take priority for that funding.

We were asked to go and do a check against other countries. We went out to Europe, we did the check, we looked at their incentives, and what we found was that Spain was better. We were virtually pushed out of the United Kingdom. What you had there was a defeat claimed from the jaws of victory, which is crazy.

I cannot answer your question about Britishvolt, but I can give you the context as another manufacturer wishing to come into the United Kingdom, and the problems that you face because of the diktat that you have to go through the APC. Again, I would humbly request that when



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you start to think about an industrial strategy, if that is the route that you go, you also think about the mechanism for funding it and bear in mind that it is across sectors, not simply automotive.

Q88 Ian Lavery: Can I move on quickly to the automotive sector deal in 2018? There were three major points in that: there was the development, there was the manufacture and there was the design of electric batteries. Has enough progress been made? Does this deal need refreshing? Is it up to date? Is it up to standard?

Jeff Pratt: I will try to answer that. The Faraday battery challenge came out of the automotive sector deal. It is an ecosystem that has been set up in the UK. It has the Faraday Institution and funding for mid-TRL programmes. The UK Battery Industrialisation Centre is part of that. Up to now, we have had about 500 researchers working in some of the best universities in the UK, which is the envy of the world; I have certainly had teams from Asia, Europe and the US visiting and saying that it is world-class.

The ecosystem that we have set up now is very good, and others are copying it. As an example, the US is looking to put an industrialisation centre in. In Germany, they are about three years behind us, but they are already doing it. They are spending a lot more money on it, by the way: they are spending about €700 million. We have spent £130 million and are going to put another £50 million in in the next two years, so £180 million.

Back in 2017-18, when we set this up, it was world-leading, but you have to stick your head above the wall every now and again, and other areas have moved on. You have IRA in the US, with massive incentives. You have the green pact in Europe, again with massive incentives. We need to do something to turn investors' heads back towards the UK because, speaking frankly, they are not looking at the UK at the moment.

Andy is right that it needs to be cross-sector, not just automotive. Faraday 1 was all about automotive because of the urgency of the legislation coming in, but it absolutely needs to widen out across sectors and needs a significant amount of money put towards it—maybe not as much as America or Europe are putting in, but it needs to be targeted around the industry that we have in the UK.

Q89 Mark Pawsey: I want to follow up on some of the points that Andy Palmer has just made about UK manufacturing, particularly in relation to automotive. I speak as somebody who grew up just outside Coventry and who represents a seat adjacent to Coventry, where the automotive manufacturing sector is important to us.

The SMMT reminds us that the UK, in recent years, has been a great place to assemble vehicles: we have great skills, we have great heritage, we have great brands and we have done phenomenally well. We are now faced with this new challenge of moving to electric. Andy, as somebody who has been in the industry and is now in battery manufacturing, how



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do you feel the UK sits right now against other locations as a place to manufacture cars?

Dr Palmer: I will start by saying that I have spent 44 years of my career predominantly in love with making cars, and making cars in the United Kingdom, whether that was for British Leyland, where I worked for a while, with Land Rover, with Nissan or with Aston Martin. In a way, my heart has always been in trying to make sure that we brought manufacturing to the United Kingdom. Nearly 15 years ago, I was fortunate enough to bring the Nissan LEAF from a seat in Japan and to bring the battery manufacturing facility that we see in the UK.

I believe in the UK as a place to design, develop and manufacture vehicles. We have some extraordinary skills. My six years at Aston Martin certainly reinforced the unique skills that we have around boutique manufacturing. What is key is the transformation to electric. In developing the Nissan LEAF, I was at the centre of that pivot towards electrification. It changes the context of the industry completely. The transition from ICE to electric is as significant as that from horse to car. It is key, because it changes the complete value chain of the vehicle.

For us, staying relevant means staying in the top 20 vehicle manufacturing countries around the world.

Mark Pawsey: 20!

Dr Palmer: We have dropped since the 1950s. The United Kingdom was No. 2 in the world for manufacturing of cars, and No. 1 for exports of cars. Over that period, for many different reasons, we ended up at 19 last year, so you can see that there has been a decay. We make about the same number of vehicles, but the car park has significantly increased.

We need to get moving in the other direction. The key here is that you move with the transition: 10 years ago it was not clear whether electrification would win, but today it is absolutely as clear as death and tax that the automotive industry is going EV and that you therefore have to invest in that supply chain that allows you to build those vehicles. In the same way that 50 years ago we invested in engines, we now have to invest in electric motors, inverters, software and, most importantly, battery. That, I guess, is the crux: the UK needs to pivot.

Q90 **Mark Pawsey:** What strengths do we have? Is it the workforce, the location or heritage brands?

Dr Palmer: It is not about heritage brands. The heritage brand is MG, which is currently made in China, so that is not the key. Our strength lies in our universities, particularly with advanced development. Our strength lies in our engineering skills; you can see that on the track every two weeks with Formula 1. We have good understanding around manufacturing capability. If you add to that the rule of law, the English language and the ease with which you can do business here, you have all of those advantages. What is weighed against us right now is basically the supply chain.



Q91 **Mark Pawsey:** Jeff, a big part of that, of course, is battery manufacture. Perhaps you could tell us why the Battery Industrialisation Centre is located where it is.

Jeff Pratt: The absolute truth of the reason why the Battery Industrialisation Centre is in the midlands is that it was put out as a competition. All regions were asked to bid for it, and the midlands won the bid. There is a lot of history around car manufacturing in the midlands, and that is probably one reason that it was pushed harder in the midlands to get it there. That was the reason that it was located in the midlands.

Q92 **Mark Pawsey:** With a view to establishing some form of factory to manufacture batteries to service our domestic industry?

Jeff Pratt: Yes.

Q93 **Mark Pawsey:** If we do not get that battery manufacture, what happens to our industry? Could we have the sector that Andy has spoken about relying on an overseas supply for our batteries? For many of the cars that have been made here, the batteries have been imported anyway, so is there a future for our industry if we do not have battery manufacture?

Jeff Pratt: There are a couple of risks there. First, in terms of the practical risks of battery supply and the supply chain, if it was supplied from overseas, the further away it is supplied, the higher the risks. There is the potential for delays. Most of our car plants now manufacture just in time, so they will have minimal stock at line side, and they sequence the batteries in, so any disruption to that supply chain causes a stop in the plant, which is very expensive.

The other issue is that if you are a UK manufacturer and you export mainly to the EU, you have to have supply either in the EU or in the UK. If you are exporting to different regions, as some manufacturers are doing—they might have a third to the US, a third to Europe and a third to Asia—you have to make sure that the trade deals are acceptable for those regions, which would cause a problem if the battery manufacture was not in the UK.

Q94 **Mark Pawsey:** Are you really saying that there is no future for automotive assembly in the absence of getting a gigafactory established? We have already heard that we have this three-year lead time to get one in place.

Jeff Pratt: It is very difficult. It is possible, but it is very difficult without battery manufacture in the UK. The worry is that the embedded manufacturing that we have now would drift away model by model if we did not have sufficient battery manufacture in the UK.

Q95 **Mark Pawsey:** Last week, *The Times* reported that the Chancellor has offered a £500 million package of support for a plant in Somerset. I do not know about a great automotive heritage in Somerset. What would be the consequences of that?



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Jeff Pratt: It is down to the manufacturer to locate in where they think is the right place to locate. There are about 50 sites in the UK that are capable of supporting a gigafactory. If you then look at sites that can be accessed in a reasonable amount of time, there are about 12 with outlined planning permission. Of those 12, I would probably knock four out for suitability—I wouldn't build a plant on them—so you are down to about eight.

If you look at those eight and see which are more suitable, planning permission is pretty common in the UK, but you are looking at energy supply and the amount of time required to get energy to the site. Does it have local energy? You are looking at the cost of the energy. Could it have solar or wind attached to it? All those factors play into that in selecting the location. It is unique to every supplier.

Q96 **Mark Pawsey:** Is there a particular advantage in having battery manufacture close to where the vehicles are assembled?

Jeff Pratt: Yes, absolutely, for the reasons I have mentioned in terms of just-in-time supply.

Q97 **Mark Pawsey:** So there would be some real benefit, then, in having that located in the west midlands rather than elsewhere around the country.

Jeff Pratt: You can supply batteries fairly locally. You can ship by truck or by train. The further away you get, the higher the risk.

Q98 **Mark Pawsey:** I wonder if I could turn to SMMT and ask about the export opportunities for electric vehicles. Jeff or Andy referred to the US IRA. The US is the third biggest market after the EU. What are the implications there for our ability to get a product that is manufactured here in the UK sold in the US?

Konstanze Scharring: The game has really changed with the interaction of the US IRA and also the EU coming forward. For UK automotive manufacturing, while the deal should be welcomed in the sense that the US has started to enter the race, we need our own industrial strategy to get us into the right place to manufacture vehicles and batteries, and for the wider supply chain to come forward, hence the focus on the question that we had before in terms of us needing these investments that you were talking about, so that we have more local content that can comply with the various elements.

In relation to other markets, we talked about the EU vis-à-vis the US. The package that they have over there is advanced manufacturing tax credits combined with clean incentives. It is very important that our Government work with the US Government to ensure that UK product can also supply into the EU market.

For the UK, the main message has to be that we need to be very competitive here and to make the UK offer the most competitive for the investment, so that what we produce here is competitive on the global



market, either on a rules-of-origin basis or through the energy costs that you were talking about earlier. We really need to have that access and these offers of support to localise here in order to deliver on these requirements for content going forward, building on the strengths that Ian and you pointed out that we have in our diverse industry.

Q99 **Mark Pawsey:** What do overseas buyers like about British brands and British-manufactured vehicles?

Konstanze Scharring: They like our fantastic brands and our fantastic technology. There is massive uptake in the US, which is, as you know, our third largest market. We need to drive the technology as we move into the next stage. From our perspective, it is very important that we also support our small-volume manufacturers and find just as much for the debate that we had on volume and how to create batteries for volume. We need to work together with Government and industry to also drive the decarbonisation of those vehicles, so that they are attractive now as well as in the future.

Q100 **Mark Pawsey:** Andy introduced the term “boutique manufacturing”, which I had not heard before, in the context of Aston Martin. Is that where our industry is going to end up if we cannot grasp the nettle here?

Konstanze Scharring: It is one of our key strengths. We always talk about car manufacturing, and one of the things about the UK and the £67 billion that we represent here is that we are so diverse. The luxury, low-volume, specialised and power manufacturers are absolutely part of that attractiveness, but we are already producing a third of our electrified vans, trucks, buses and coaches.

There is a huge opportunity, but the point that we are trying to make is that there is no longer-term industrial strategy that not only tackles short-term issues but is longer-term in its support. It needs to tackle the issue of energy, which goes beyond just energy-intensives. For our members, this is now the biggest competitive disadvantage that we have in relation to Europe in particular, as well as the US. We need to get the equivalent to EII status. We need to get our ability to reduce our energy consumption and then decarbonise it over time recognised through the effort. That is why our diversity is our strength.

Q101 **Andy McDonald:** Could I turn our attention to the trade and co-operation agreement? We talked about it initially, but I am just trying to get a clear understanding. Perhaps I could start with David and Konstanze in the first instance. It ratchets up in 2024 and 2027. What is the likely impact on UK manufacturers if no changes are made?

Konstanze Scharring: We are advocating very strongly, and are jointly in that call with the European automotive industry, that there should be an agreement between the EU and the UK to retain the existing rules. They have driven an enormous increase, despite the very difficult circumstances at the moment under covid, in trade in electrified vehicles. The UK alone has been able to export £5.6 billion-worth of EVs to the EU.



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That has risen substantially: it has doubled over the last two years. Equally, given that our market is 90% imports, the EU has been able to export €9 billion-worth of electrified vehicles to the UK market. The current rules, which are very accommodating, are working at this point in time.

As I tried to say earlier on, when the rules were set originally nobody could predict that the anticipated rise in all this localisation that we talked about in terms of battery gigafactories, cell manufacturing, processing and, potentially, mining would be much quicker in its development, which is outside the automotive industry. That has not quite happened, despite enormous investments already taking place.

What we are arguing is that by extending these rules, you can give more time to developing all of this. There should be no complacency whatsoever, because it needs to happen at pace, given the timescales that we have just heard about, but we do need that time. If it does not happen, we are potentially looking at tariffs of 10% to 22% on cars and heavy goods vehicles that would have an impact on demand, on cost to consumers and on cost to the industry. These are the very vehicles that we want to grow and become 100% in a very short timeframe.

From that perspective, we would argue very strongly that there is a common interest in not putting that cost burden on either the industry or the consumer going forward. Battery rules need to be retained until 2027.

Q102 Andy McDonald: Essentially, it seems to me that what you are saying is that it was unrealistic to expect the industry to respond in this sort of timescale. I am trying to unpack how that happened. What sort of assessment was made by Government and what conversations were being had? It seems stark-staringly obvious that this was going to be unachievable and detrimental if it was implemented to the full. Can you tell me a little bit about that process and what discussions were taking place? We need to learn the lessons, do we not?

Konstanze Scharring: We definitely need to learn the lessons. From our perspective, it just shows how difficult the rapid ramp-up is that is really needed to try to create the £24 billion that we hope the UK can benefit from in a short timeframe. As we said, from an industry perspective, these were last-minute discussions. A lot of industries gave their input. Maybe there was enormous optimism from the battery and chemical industry perspective that this could be done in a shorter timeframe. It is an industrial policy decision, clearly.

Onshoring is what you see all over the world, and the rules are, in a way, an encouragement to try to get more and more local content into both the EU and the UK. The external circumstances that we described, which have come in between and which we did not know would pervade for so long, have really not led to a situation in which we are now able to comply with these rather strict rules.



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Andy McDonald: Does anybody else want to come in on this?

Dr Palmer: I just want to comment that two weeks after the TCA was signed, I sent a letter to Kwasi, the Secretary of State for BEIS at the time, exactly outlining the risk, so the risks were absolutely clear even back then—this was sent in January 2021. The risks were absolutely clear.

Q103 **Andy McDonald:** Could we have sight of that letter?

Dr Palmer: Of course.

Q104 **Andy McDonald:** Could we have that in full, through the Clerks, in the usual way? Moving on, according to Sky News, the Business and Trade Secretary has raised the rules-of-origin issues with the EU and is determined to find a joint UK-EU solution. Are we saying that that solution should be sustaining the 2024 demands and keeping them there? How do we see that progressing? The 2027 target and requirement are now perceived to be detrimental, so what changes to the rules should we be seeking specifically?

David Wong: The industry position is very specific—perhaps more specific than what was reported in the press. It is specifically about one technical aspect of the trade and co-operation agreement in relation to the rules of origin of batteries. That is the 60% originating requirement for the battery pack.

Andy McDonald: I thought it was 70%.

David Wong: It is 60% by 2024. Maybe I should start from the beginning. Currently, the finished article—the vehicle itself—has to be 40% originating. With the battery pack, only the assembly needs to be done either in the UK or the EU; the cells, the materials and the modules could come from elsewhere. In 2024, while the finished article needs to be 45% originating, the battery pack needs to be 60% derived from the EU or the UK in terms of its value. That is the bit that is challenging.

The request from the industry, where there is full alignment with the European automotive industry, is for the current arrangement to be extended until 2027 on the battery pack specifically.

Q105 **Andy McDonald:** How confident are you that the industry will be able to comply with that requirement by 2027, if it is kept at that level? Will we be able to work within that?

David Wong: Given all the commitments to battery production capacity, as well as the battery supply chain, in the EU, we are optimistic that the industry will be in a slightly better position in the next few years to be able to comply with the requirements of 2027. However, as is standard in any free trade agreement, there is a review clause. In 2025, there should be a review whereby a serious assessment of whether it is realistic to comply by 2027 will be conducted.



Q106 **Andy McDonald:** Presumably you are engaged in discussions with UK and EU officials on this. Can you give us a little flavour of where you have got to?

Konstanze Scharring: Yes, absolutely. The issue is that it is imminent. 2024 starts on 1 January 2024 and, as you have just highlighted, the consequences are significant. This is our top priority as an industry because the battery for a vehicle can be as much as between 30% and 50% of the total vehicle. Unless that battery qualifies, the vehicle cannot qualify, so from our perspective it is really paramount that we are working with officials and Ministers. As you have just quoted, they are aware of it on the UK side. Our counterparts are equally talking on the European side.

We heard about the willingness of the UK Government. They are very receptive to thinking about the temporary solution for the immediate future in 2024. Going forward, we need to work together with our colleagues in Brussels to ensure that the European Commission equally sees the benefit of not putting penalising tariffs on the very vehicles that both the EU and the UK want to encourage.

Q107 **Andy McDonald:** This is mutually challenging. Do you know what the response is? You have said that there is a receptivity in the UK. Is that reciprocated from Brussels?

Konstanze Scharring: At the moment we cannot see this yet, but the truth is that this whole measure is obviously there. As I tried to describe, initially we had accommodating rules that were there not to disrupt our trade but to encourage it. It has been very successful, as the figures have shown. What happened during the crisis is a success story but, as these rules got tougher in stages, the intention was to onshore the whole value chain that we talked about. Giving that up too early might be a risk but, for our industry, the earlier we can find that agreement, the better, because then we can plan ahead rather than assuming a cliff edge coming towards the end of the year.

Our position is that we want to see an early solution. The solution can be found early on. Counter to some coverage of the issue, this is not about renegotiating the TCA. The TCA made provision for issues like this where, through a technical agreement between both sides, this can be resolved very quickly. The Partnership Council is the main body to do this. That is why we are working with both the UK Government and the European Commission to resolve it through the council.

Dr Palmer: I am going to reiterate what Jeff said earlier. It takes about three years from the get-go to the delivery of a gigafactory. The EU is ahead of us. They are late, but it is relatively easy to say that with the 30-odd gigafactories that are under construction in Europe right now, they will be able to meet their tariff requirements by the cliff edge at the end of 2026.



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In the context of gigafactories in the UK, however, we only have the Nissan factory that is under way. We have three years from now to get those factories in place, otherwise we will not get the benefit: what will happen is that the factories that will be used will be the European factories. Over time, the car factories will move closer to the battery factories, so you will see the erosion of vehicles built in the UK, starting with the erosion of the batteries built in the UK.

That is why I say that while we will have no choice, we can coalesce around an agreement with the EU because it will be driven by what the EU needs. What we should not necessarily do is then impose that on UK-produced or UK-sold vehicles or those selling to other nations. We have the freedoms to have a different date for discharging that registration into the UK, and that is what I would suggest.

Q108 **Andy McDonald:** I get that, but essentially what you are saying is that if it is focusing solely on EU trade and if it stays as it is, then the EU is the winner and the UK is the loser.

Konstanze Scharring: It is a lose-lose situation for both sides.

Jeff Pratt: I was just going to reiterate what Andy said there. It is essential to get the supply chain in the UK and to create the draw for the supply chain, which means gigafactories in the UK. One gigafactory is not enough; we need at least another one. That would then create the draw for the supply chain and allow us to negotiate with them and incentivise them to get them into the UK.

Q109 **Andy McDonald:** On that point, can I move us on to a discussion about the supply chain? The Government set up the task and finish group to investigate the vulnerabilities and the critical minerals that the UK needs. What do we see as the key vulnerabilities in the supply chain of batteries if we are going to build the vehicles here? Where are the weaknesses?

Konstanze Scharring: We are part of the task and finish group that has just started its work. It is cross-sectoral, which is very welcome. It also involved people you have had in previous sessions coming forward. We welcome that this is going forward. However, from our perspective, as we have just described, our exposure to critical mineral shortage comes through these rules of origin that are here at the moment, driving us to increase not only the number of batteries made in the UK, but the content. It is about being able to get into the refinery, so the mid-stream, as well as potentially having the trade deals that are needed, and the partnership agreements with other countries that are more mineral-rich, securing us that supply of critical minerals into the UK that is needed for the engines of the future for electric vehicles.

Q110 **Andy McDonald:** We have looked at the extent to which we can supply some of the critical minerals from within these shores, and that is obviously interesting. You have mentioned a lot of these things before, so I am not going to go over old ground, but I did note that the *Financial*



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Times has reported that Tesla has been partnering with mining companies and other parts of the battery supply chain. When we were in Stockholm talking to Northvolt, perhaps the reason it was able to succeed where Britishvolt was not was that it had a product. It eventually had Volvo, Volkswagen and others engaged, so it had that vertically integrated approach.

I will ask the question more broadly to you all: should other car manufacturers adopt a similar strategy to create that resilient supply chain? Should those partnership and engagements be happening?

Konstanze Scharring: We see a variety of responses depending on the commercial background, but yes, absolutely. For resilience, you will want to try to secure the best conditions under which you can then make sure that you get the resources, that they are produced in a responsible manner, and that you influence all these measures. That is why we are very much in favour, at an industry level, of the Government trying to provide the ground so that the companies can find their own way, whether they are horizontally or vertically integrating or finding different routes.

David Wong: One of the reasons why some of these companies decided to vertically integrate, for want of a better word, is the scarcity of some of the minerals within the supply chain. I should be very clear that it is not about the scarcity of these minerals in the earth; for example, we have more than enough lithium in the earth. It is not a problem of geology; it is a problem of extraction of these minerals from the earth. This is because of timescales, precipitated by the climate emergency.

With regulation in various markets, the end of the sale of internal combustion engine vehicles will be quite soon. As a result, there is an insatiable appetite among vehicle manufacturers to secure battery supplies. Of course, if you go upstream, that means mineral supplies, but the clock speeds are different. It takes between 36 and 42 months to commission, build and operate a so-called gigafactory cell production facility, but it takes between five and 10 years from the point at which you identify a mine to commission and operate it. It takes a long time to extract these minerals out of the earth. Of course, the choice of vertical integration is the prerogative of manufacturers. Some manufacturers have been driven to take the initiative to secure their supplies many years into the future.

Dr Palmer: I mentioned to Mr Lavery earlier that the development of intellectual property is key. When you are securing your supply chain, you can supply it by vertical integration, by the mine, but you can also secure it by changing the chemistry. For example, today most energy storage would consider LFP, lithium phosphate, as the correct chemistry to be used in that application, but if you think to the future and you use your intellectual capacity, you can re-engineer a battery to use sodium. Sodium is simply salt and is available everywhere.



Engineering out the geopolitical risk is something that you can do if you are in charge of the intellectual property itself. That is why I would encourage us in the UK, from an intellectual property point of view, to prioritise the leapfrog technology, be it leapfrogging into semi-solid state or solid state, or leapfrogging across LFP and into sodium ion or similar types of technology. We have lost the battle for today; we need to win it for tomorrow.

Q111 **Chair:** I want to wrap up with a couple of final questions. Andy Palmer, you have told us that you wrote to the Government in 2018.

Dr Palmer: I wrote to the Government in January 2021. I first started the dialogue around 2018, but formalised it in January 2021.

Q112 **Chair:** You started talking to the Government in 2018. You wrote to them formally in 2021, highlighting the risk to UK car manufacturing coming down the track in 2024. Why did the Government not act on your warnings?

Dr Palmer: Let us assume we all agree that the UK needs 100 GW by 2030 and 200 GW by 2040. To be competitive with either IRA or future EU incentives, that is a £4 billion ticket of incentives. It is a big deal to get your arms around. People were saying, "We have not put that in the budget. We do not know how to deal with it. It is not usual to take incentives of that level. Is anybody going to move?"

It is not until particularly the US moved with the IRA that people started to recognise that, for the first time in my memory of the auto industry, the UK is not only now in competition with the EU, but in competition with the US. That is what has changed. The auto makers could see the car crash in the future but could not work the economics. The IRA initiative unlocks the economics and allows things to go quickly. We do not have a competitive offer to either the IRA or the EU incentives as we stand here today.

Q113 **Chair:** In 2018 and in 2021, the Inflation Reduction Act in the US did not exist. The European response did not exist. Are you telling us that, in that 2018-to-2021 period, the UK Government just did not have the money or the capacity to grapple with this issue?

Dr Palmer: The UK Government probably sat in the same position as the US and the EU, which basically means saying, "It is for the car makers to solve." The car makers themselves were unable to find an economic model that worked for affordable cars. Today, the only affordable cars are the Chinese-produced cars below £30,000. The car makers were struggling with the economics, and the Chinese were stealing a march on us in that respect. It was not until the US recognised the geopolitical danger to their car industry and acted that the economic argument was unlocked—hence the reason everybody flooded to invest in the US.

Q114 **Chair:** Konstanze, I just want to see whether you agree with that. What I am hearing is that the UK, having left the European Union at that stage,



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was too small, in and of itself, to deal with the economics of the EV transition. It needed the Americans and the Europeans to move to help bring the cost of production down. Is that accurate?

Konstanze Scharring: Obviously we had a period of real political and economic uncertainty over the last few years. Post Brexit, with covid and Ukraine, that has massively impacted on what investors really want when they want to invest here, which is certainty. The window of opportunity that we have now is really there. From our perspective, what we need to do now is to build on what we have built up over time. As Jeff has highlighted already, we have a really good strength in R&D and engineering talent, but we need to transfer it now.

As Andy was saying, if we get the investment offer right and we make a proposition that is really tangible, the demand will be there. Our members are looking for a much bigger strategy that can deal with the here and now as well as the longer term, which is that we absolutely make the UK and anchoring manufacturing here competitive. That means dealing with the energy costs. We talked about the regulatory piece a little bit earlier. It is not just about permitting. Making that quicker so that they can transfer much quicker would encourage them to invest here and provide the demand for this whole ecosystem that we are looking at.

We have not talked much about the people side, but it is really important that we finally get our hands around how to encourage this transition and the fantastic skills that we have already, upskilling and reskilling our workforce. These are things we can do here and now. We can make the apprentice levy work for us. Unspent apprenticeship levy could go into the digitalisation and electrification skillset we now need en masse going forward. We could find new ways of making an offer that is not generic, but a much more specific offer that works for manufacturing, or more modular offers that mean people do not go off the lines for too long to try to get upskilled.

We need to look at labour mobility. This scale-up is so fast that we absolutely need to grow our domestic talent, but we equally need to look at where we have talent gaps, because the talent pool has not grown as fast as possible. It is a timing issue. We need to be able to access those skills from our plants across Europe.

Finally, we have not talked about it very much, but it is really important to also secure the future of automotive here in the UK. It is important to grow it and drive it into electrification so that our future market is strong, stable and goes forward. As this market, through regulation and demand in the market, transforms towards electrification, it is really important that, in addition to getting an enabling piece of regulation in the zero-emission vehicle that works for us through flexibilities and does not penalise companies in the UK, we equally have a regulatory requirement on having an infrastructure there that enables our customers to make the transition and enables us to do it. To take Andy's point, that is why we



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think we need it even broader. That will help us to drive and take advantage of the window of opportunity.

Q115 **Chair:** We heard earlier that one of the main reasons that Britishvolt did not work was that it did not have any customers. On our visit to Sweden, we saw that Northvolt has been able to succeed at the speed it has because car companies partnered with it, pre-ordered batteries and worked with them. Why did car companies in the UK not partner with Britishvolt or place any orders? Is it not up to the car companies to place the orders for the likes of Britishvolt to succeed? Why did that not happen?

Konstanze Scharring: We cannot comment on the specifics of Britishvolt, in a sense, but from our perspective it is very important that our industry and individual companies can be helped to try to find these offset agreements with suppliers going forward. I pointed to one opportunity that we should really look at and learn from others, where the Government can play a hand in trying to put demand together, and that is exactly around the small-volume manufacturers. They need to find a battery technology and a solution that is distinct to them. By pulling demand together and then working with the relevant gigafactories and suppliers who can provide that kind of performance battery, we can create something that brings these offset agreements together more easily.

Q116 **Chair:** Andy, can you comment more on that issue of the lack of customers? I am very conscious that we will probably end up saying that Government need to work with industry to deliver gigafactories in the UK—that seems like an inevitable direction from this Committee. What we cannot have, especially if public money is involved, is another situation where we end up creating a successor to Britishvolt but the car industry does not buy anything from it and then it goes bust. In your view, why did that happen?

Dr Palmer: You have to have a carrot and stick. Obviously, you need to do it within world trade rules. For instance, this is not necessarily defining a solution, but why would you give a vehicle manufacturer incentives not to use British-built batteries? In my mind, you do not incentivise manufacturers unless a certain proportion of their volume is using British-built batteries. It does not break world trade rules because it is about future incentives, but you have to have a carrot and stick. You have to have a reason why you would use a British battery.

It is more subtle in other countries, from what I see. Other countries will nod and wink and say, "You must use batteries made in our country," so it is more subtle. For me, you have to put something together. Otherwise, the vehicle manufacturers will simply buy from the cheapest source, and the cheapest source is not necessarily always the best source. It is not necessarily the lowest-carbon source, which is key.



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By the way, I would like to put it out there that we need to do something about making the carbon involved in the battery clearer to the consumer somewhere, because that disadvantages the UK versus Chinese manufacturing, for example. My point would be about having some mechanism that says, "If you want incentives in the future, 40% of your batteries need to be UK-made." At that moment, the vehicle manufacturers will find a solution. Today, other than cost, they have no incentive to necessarily buy British-built batteries.

Q117 Chair: That is the issue. You are trying to keep the cost of production low here in the UK so that you are competitive compared with other countries, but if you either sign a deal or are forced to buy UK batteries, the cost of production goes up. How do you deal with that conundrum?

Konstanze Scharring: We should not underestimate the benefits and the incentives that are already there for UK manufacturers to try to find partners and localise battery manufacturing. We have talked about the trade deals, the logistics costs were mentioned earlier on, and then there is the ability to have a battery for those who need a bespoke battery that is to their degree. There are a lot of incentives and drivers already.

Q118 Chair: It is not working, is it?

Konstanze Scharring: As we have just described, if you look at our figures as an industry overall, we have not recovered from covid. We are now recovering from covid. We have nine months of market growth. We have not had what other industries have had; we are counter-cyclical. We now also have three months of production growth, so we are now in a position to really look forward and work with Government and others to try to find these investments going forward.

I would not argue for a localisation requirement on others, because we need to be realistic. These manufacturers have partners with which they work. What we are arguing is that the UK needs to be an attractive place for these partners, whether they are start-ups or established battery manufacturers, to have a reason to come to the United Kingdom. From our perspective, it needs to be a competitive business environment. Energy plays a huge role. Labour availability plays a huge role. These are not minor issues; these are really important items that need to be addressed. From our perspective, now is the time to do them and to signal them really clearly and in the longer term to those investors to make these investments.

David Wong: Can I just say two very brief things to second what Konstanze has just mentioned? First, offtake agreements are important. We think that is one of those things that the Government can do as part of a fully-fledged industrial strategy. In this game, it takes three to tango. The Government play the facilitating role. They are not just lending to a cell producer, but to a potential customer in the form of a vehicle manufacturer at the same time. That is what we call offtake



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agreements, because they need each other anyway and the Government play that facilitating role. Hence, it takes three to tango.

Secondly—at the risk of sounding like a broken record going on and on about industrial strategy—you asked the question about what happened in 2018. Konstanze alluded to the fact that the game was very different then. The game has changed now, not least because the US IRA moved the needle. Therefore, we need to react, but without an industrial strategy, we will always be reactive.

We need to be on the front foot. That is why we need a holistic industrial strategy coupled with economic and political stability. Investors will see that. They will see that the UK has a really good offer, on top of all the strengths that we have, such as a stable of illustrious brands, R&D, engineering excellence, a flexible workforce and so on. We need to capitalise on our strengths, have a holistic industrial strategy and go from there on the front foot, not forever be reacting to what others are doing.

Q119 Ian Lavery: This is probably a very naive question—it is a very basic one, anyway. Virtually everyone today, to a person, has said that, from day one, it will take three years to develop a gigafactory. Depending on which experts you listen to, we are going to need up to nine gigafactories. What sort of challenges are there? A company might agree to invest in a gigafactory and put the first brick down, but then three years later the technology changes. Technology changes day by day. What challenges are there in that three-year period in ensuring that you are not building something that, when it is complete, is basically out of date?

Jeff Pratt: If you look at where the technology is at the moment, it is evolutionary, not revolutionary. Everybody talks about solid state. The best estimate for solid state is that it will be into the next decade—probably mid-next decade—so the gigafactories going in now are not going to be irrelevant.

The other thing is that the sunk cost in the gigafactory is absolutely massive, so the manufacturers do not want to scrap the asset. The asset has a massive value, so they want to change the asset gradually over time. A rule of thumb we used to use is that there is about a 20% change for the next-generation battery in terms of investment. I do not think it is a massive risk now—and you have to put a stake in the ground and go at some time.

Dr Palmer: The capital asset generally can produce 622 or 811 or silicon. You are changing the slurry and the chemical part, but that does not mean that you have to throw away the ovens and all the other associated bits. It is an evolutionary change depending upon the chemistry. You have already seen it in Sunderland: the original 2011 LEAF used a very different chemistry from the one that they are producing today.

Chair: We have timed out. Thank you all for your contributions. We are



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very grateful.