Johnson Matthey
Inspiring science, enhancing life

New Markets Sector Conference Call

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Alan Nelson

Sector Chief Executive, New Markets and Group Chief Technology Officer, Johnson Matthey

Opening remarks

Welcome

Good morning and good afternoon, everyone. Thank you all for joining this call today. I'm Alan Nelson, Chief Technology Officer and Sector Chief Executive for New Markets for Johnson Matthey. I'm delighted to kick off our newly introduced programme of Johnson Matthey's sector conference calls today.

Sector conference calls

Just to briefly remind everyone, there'll be four calls in the year covering each of our sectors in turn. The aim is to ensure that we help you understand the businesses and our strategy and the aims we have and, of course, to give you a chance to ask us any questions you may have. It's my pleasure to begin today with Johnson Matthey's New Markets sector.

Background

Past work experience

As I may be new to several of you, I wanted to take just a very brief moment to introduce myself and my background. I joined Johnson Matthey in 2015 from the Dow Chemical Company, where I led research and development for a number of market-facing businesses, business development and ventures and corporate research.

Of particular note is while at Dow, I led research and development for lithium-ion battery materials as well. I also directed product and process innovation in a number of key market segments including electronic materials, oil and gas, water solutions, automotive, chemicals and petrochemicals and agriculture chemicals. And prior to Dow, I was a Professor of Chemical Engineering at the University of Alberta, where I led research in catalysis, functional materials and fuel cells.

Chief Technology Officer

As the Chief Technology Officer, I lead Johnson Matthey's research and development team and I am responsible for establishing the company's innovation vision and strategy to develop customer-focussed solutions. I work across all of our businesses and our sectors to enhance our technical rigour and accelerate revenue growth from our R&D investments.

As we outlined at our Capital Markets Day this September, it is our technology and our core chemistry competencies that bind this company together. We have very strong technology skills across surface chemistry, metallurgy, catalysis and complex chemistry and its synthesis. Our strength is in the interrelationship of all of these skills. We find the ways to make them work together in a very effective way to deliver better solutions which means better products for our customers.

That is to say, we do complex, we do difficult and we do both very well. This is what enables JM's high margins and high barriers to entry. The way we work in complex fundamental chemistry and in technology as well as the scale-up of complex manufacturing processes is why we have a constant stream of new products and new technologies.

Most of our R&D is done at the sector level, about 80% of our R&D investment, with the balance done centrally. And we invest approximately 5% to 6% of sales in R&D each and every year. To invest this significant amount in research effectively, we have a high level of rigour to manage and prioritise that R&D investment. And it's my role, as Chief Technology Officer, to ensure that we have the right expertise and the right oversight to investigate the opportunities in our businesses and deliver customer-focussed technology.

Over the past two and a half years, I've implemented active R&D portfolio management with stage-gating processes and a cross-cutting approach for discovering new innovations and customer solutions to ensure we're creating new sources of growth through innovation. This requires a strong relationship between R&D and new business development to drive opportunity assessment in new technologies and new markets.

This is why the responsibilities of the CTO and New Markets' leadership [sector] are now aligned to ensure that we drive greater value from our R&D investments into these New Market opportunities.

New Markets Sector

I'll now provide you with an update on New Markets. New Markets is all about identifying new growth areas for Johnson Matthey in both new technologies and new markets to build significant businesses for JM over time. Investment in our New Markets sector is the first stage of resource allocation that was outlined recently at Capital Markets Day.

Here, we selectively invest in areas which have not yet been commercially developed, but where the future commercial opportunities aligned to our three global mega trends around Clean Air, Efficient Natural Resources and Health.

Today, we have three key businesses at scale: Alternative Powertrain, Life Science Technologies and Medical Components, although we continually identify and invest in future opportunities to find other businesses which meet our investment criteria. These businesses sit in New Markets to ensure we explore the future opportunity in a tightly focussed way.

We progress all of our investments through a rigorous phase-gate process with the timing and the level of investment linked to the delivery of critical milestones with the goal that once at scale, these businesses must have the potential to deliver a 20% return on invested capital in line with our growth targets.

But until that time, the focus these opportunities have within the New Markets sector means we can manage the short-term ups and downs over the next several years, investing near term to support our long-term growth strategy and being very disciplined and strict about exiting those which we do not feel would get us there, long term.

Alternative Powertrain

Let me now move to the three businesses at scale that we have within New Markets. I'll begin this afternoon with Alternative Powertrain. Our ambition in the Alternative Powertrain business is to become a leader using our chemistry advantage and JM capabilities and to have flexibility across the evolving powertrain.

The business currently combines Battery Materials, Battery Systems and Fuel Cells. Through this portfolio approach, we can [unlock the technical] and customer synergies across the

evolving powertrain market. The majority of our sales in this business today come from our Battery Systems business, primarily related to non-automotive applications.

The sales in our Battery Materials and Fuel Cells businesses are expanding with the automotive market and represents significant growth potential for JM. I covered the opportunity in Battery Materials in depth at our recent Capital Markets Day and we remain right on track, regarding the timeline and milestones I discussed then.

So today, I provide a brief update on our progress across Battery Materials and Systems and Fuel Cells.

Battery Materials

Firstly, I'll start with Battery Materials, which we expect to be the main long-term growth driver within the Alternative Powertrain business.

As I mentioned at Capital Markets Day in September, we've made tremendous progress over the past year to accelerate the execution of our strategy. Having best-in-class technology is in core to this strategy. But additionally, having security of raw material and precursor supply, applications development and validation, freedom to operate, a global and flexible manufacturing footprint and robust customer relationships will be what sustains our growth in this market.

So, to briefly recap the journey thus far. We entered the lithium-ion battery market in 2012. And in 2014, we entered the battery materials market with a leading position in lithium-ion phosphate. In May 2016, we licensed key high-nickel intellectual property. And since then, we've made significant progress developing our own unique cathode materials.

To date, we've developed an exciting, new higher-energy density cathode material, our Enhanced LNO. We've executed our high-energy material development, leveraging JM resources. We've scaled up our high-energy cathode material to pilot scale and we're currently expanding our pilot plant as well as building larger assets.

We have validated the benefits of this product with cell manufacturers and OEMs alike. And we have our material in qualification cycles now with seven customers, increasing from six since September, progressing in line with our timetable. We are investing to expand our pilot plant production and investing in larger demonstration-scale plants to provide customers with volumes required for their qualification cycles.

We're also progressing the front-end engineering and design work for our commercial-scale plant which will have the capacity to produce 10,000 metric tonnes per year. This will be submitted for Board approval in the summer of 2018 and we expect it to cost around £200 million and subsequently, we expect commercial production to be starting in 2021-2022.

This process that I just described is the process by which we manage our investment and development of our businesses. We leverage our core science, our ability to scale up new products and our customer focus to build new businesses for JM. And because of our strong reputation with automotive OEMs, our customers see us as a credible high energy battery materials manufacturer, which is clearly evident by the growing list of potential customers for our high-energy materials.

Additionally, as you may expect, today we're working with many more customers requesting eLNO and we expect to begin supplying them early next year. While I will not list them all, I will say clearly that we and our customers remain confident in eLNO and its ability to outperform the other materials against key metrics.

As we discussed during Capital Markets Day, a broad range of potential outcomes for EV adoption will clearly drive considerable demand for cathode material with an approximate cathode material market size in 2025 of between $15 billion and $100 billion.

Our strategy is to create levers to manage our business within this range of adoption rates. And this, importantly, includes having a broad portfolio of cathode materials, including lithium-ion phosphate, NMC and our high-energy low-cobalt eLNO to meet the specific demand of the automotive market and vehicle segments.

This portfolio gives us the freedom to optimise cathode material composition and performance across the platforms, driving towards the most favourable cost on a dollars-per-kilowatt-hour basis for our customers. We will invest in product development to ensure that our technology stays ahead. So here, an R&D ratio of investing 5% to 6% of sales does not apply.

Security of raw material supply is also key. And we will leverage our group expertise in handling and sourcing metals as well as looking at internal development of precursor materials. As mentioned, scaling up manufacturing is a high priority to prove we have a commercially viable product.

These are the competitive advantages of Johnson Matthey across our businesses, where we have a long history of taking new products through from samples to full-scale manufacturing. And these things are all being done through our commercial and market plans to ensure a deep understanding of the possible evolution and growth of such a nascent market today.

So, in summary, we continue to make exciting progress in our Battery Materials business. We have developed the best-in-class, high-energy cathode material which represent a step-change material for the market and we're excited about its future.

Battery Systems

Next, just a brief update on Battery Systems. Our position in Battery Systems, which covers both automotive and non-automotive applications, has informed our investments in battery materials and given us valuable insight into the automotive market. And we will look to identify ways in which selectively investing could create a business where we have a leadership position and can reach our investment criteria. Looking forwards, we're obviously excited by the prospects for Battery Materials, which we have discussed with you at length, and this will be our primary focus.

Fuel Cells

And lastly, on to Fuel Cells. The Fuel Cells market today is primarily around stationary applications for backup power and for energy storage. In the long-term, fuel cells are an alternative to the conventional internal combustion engine and potentially provide an alternative long-term clean mobility solution.

However today, we're seeing real growth in stationary applications such as backup power as well as industrial applications. This has underpinned the growth in our Fuel Cell business. The business had sales of £12 million in fiscal year 2016-2017 and we saw the sales of Fuel

Cell products double in our first-half this year, compared to the same period last year. Importantly, the underlying business has improved significantly over the past 12 months, from being loss-making to being broadly breakeven this financial year 2017-2018.

Johnson Matthey has leading technology in Fuel Cells for automotive applications. However, as we all know, the automotive market has been slow to evolve and grow, not so much due to fuel cell technology, but rather hydrogen production, distribution and onboard storage. We are seeing several leading OEMs developing fuel cell passenger vehicles. But to be fair, we don't believe we will see mass adoption in passenger vehicles for at least another ten years.

In the short term, we will continue to focus on improving the financial performance of our Fuel Cell business by taking advantage of the growth opportunities in energy storage and backup power generation and, at the same time, provide us with a long-term option to meet the demands of the evolving powertrain.

Life Science Technologies

Now, turning our attention to the other businesses at scale in New Markets, Life Science Technologies and Medical Components. Life science technologies, which was previously known as Catalysis and Chiral Technologies or simply CCT, is focussed on providing catalyst and processes to both the pharmaceutical and agriculture chemicals markets.

This business was moved into New Markets from Health earlier this year so that it will benefit from the focus which our way of working provides as we look across the exciting growth opportunities in both the pharmaceutical markets and adjacent markets alike.

Life Science Technologies has a breadth of core technologies that touch many areas and they're key enablers across a range of markets. One example, just to bring this business to life for you all today, is our market-leading technology used in disinfecting systems for contact lenses, which many of you may be benefitting from today.

At present, the majority of this business leverages our technical and commercial strengths to provide pharmaceutical companies with catalyst and biotechnology to solve complex customer transformations to meet tightening regulatory requirements. While we have customer links with the Innovator Health business, the products are very different – catalysts and biotechnology compared to active pharmaceutical ingredients.

Our current customer profiles are medium to large pharma innovators, where, for example, we have strong product offerings in oncology and cardiovascular drugs. We also work with leading biotechnology companies to develop custom products to accelerate new molecule and drug development.

An expanding market opportunity for us today is agrochemicals and we're actively expanding our products and services into that market. For example, we're now partnering with the leading agricultural chemical companies to commercialise our products for the manufacture of pesticides and herbicides. This represents a new and exciting market for the business.

We aim to grow our market share across these markets through a determined sales force, aggressive global marketing plan as well as outstanding technical and customer services. Both pharma and agchem are large markets today and they're both growing globally at a rate of 5% to 7% per year.

We maintain a high margin, about 30% in 2016-2017, through our complex market differentiating technologies. We had sales of about £48 million in 2016-2017. And our five-year sales, excluding precious metals, and operating profit, compound average annual growth rate has been 14% and 22% respectively.

So, we have a solid foundational business positioned for growth in attractive markets today. And as implicit in all new markets, this opportunity is at an early stage and we're looking to selectively invest ahead of the future growth potential for the business. We do expect to be able to deliver double-digit organic growth sales over the next five years as we identify and capitalise on new technology opportunities in both pharma and agchem.

Medical components

Now, turning our discussion to Medical Components. Medical Components leverages our science and technology to develop products that are used each and every day in medical procedures, to save lives around the world. We are a leading, integrated, quality-driven, premium supplier of medical-grade products to the medical devices industry.

Our Component products are being used today with industry leaders in cardiac, vascular, electrophysiology, cochlear, dental and orthopaedic applications worldwide. We maintain a competitive advantage as a leading medical device industry partner choice for the sourcing and technical expertise in PGMs and alloys, expertise in precision manufacturing and coating and surface chemistry. Today, we are positioned in the value chain as a supplier of Medical Components into the medical devices market for applications in the fields of both invasive and non-invasive medical procedures.

Sales in 2016-2017 were £69 million and we have experienced strong double-digit, year-over-year organic sales and operating profit growth across all commercial operating segments. And this level of performance we expect to continue into 2018-2019 and beyond.

Today, the market which we operate is growing rapidly, driven by the demand for more advanced and innovative products, greater personalised treatment options, increasing availability of healthcare and aging global population. These market drivers will require the accelerated design and production of new components and devices to get products to market quickly, efficiently and cost-effectively.

This plays to our core strengths and presents a potential growth opportunity for Johnson Matthey. And just like Life Science Technologies, this business is moved into New Markets to unlock the growth potential and provide it with a dedicated focus it needs to grow.

And similarly, much of our work in Medical Components is at the early stages. To further accelerate business growth, we recently recruited a new managing director of the business who brings over 20 years of experience in the medical components and device markets. Under his leadership, we will further refine our strategy to accelerate our growth as we build our customer product offering principally through our core technologies and our innovation.

As with all New Markets business, we will manage the investment needed to grow this business through a rigorous stage-gate approach, benchmarked against potential return on investment and sales growth which Anna discussed during Capital Markets Day. This will allow us greater market penetration in existing and entry into adjacent market segments.

Summary

So, to briefly summarise our discussion today, we moved Life Science Technologies and Medical Components into New Markets to unlock new and adjacent market opportunities and we're optimistic about the growth potential that each of these businesses presents.

On Alternative Powertrain, we are confidently on track with our plans for the commercial launch of our eLNO high-energy material. We are expanding our production capacity and we expect to start our £200 million investment from mid-2018.

We are expanding our customer base and are now in qualification cycles with seven customers with more customer opportunities ahead. And we remain confident in and excited about eLNO based on continued customer feedback.

I hope this has provided you with a strategic vision of R&D and New Markets, our business profiles, market drivers and how we will leverage our core capabilities to unlock long-term growth for Johnson Matthey. Thank you for your time and I'd be happy to take any questions that you might have.

Q&A

Jeremy Redenius (Bernstein): Hi. Thanks for taking the question. So, the first one I wanted to see if you would talk a little bit about the competitive level landscape out there. Because it seems like it's moving very swiftly. A lot of competitors seeming to be making announcements about materials or bringing the market in significant capacity over the next few years. You've made some very promising statements about eLNO. But you know, we're kind of four years away from commercialisation really. And I wanted to hear about what you see as the kind of competition as you bring that material to market, you know, in four years time

And then second, if you could talk a little bit about the IP around it as well? Because I understand you've licensed patents from CAMX power and the 3M family of patents now owned by Umicore. Do you think you'll also need to licence other patents such as the ones from Argonne National Lab? Thank you very much.

Alan Nelson: Yeah. Great. Thanks, Jeremy. So, you know, firstly, on the competitive landscape and how we see things moving forward. I guess – look, I would start by saying the lithium-ion battery market will be an enormous market. And there's plenty of space for not only different materials, but for different suppliers. And as we discussed during Capital Markets Day, we're at the very early stages of that growth. And whether that growth results in 10% EV penetration or 25% EV penetration, one company cannot do it all. One material will not solve all of the EV challenges.

So, we see this more as an opportunity to accelerate growth in the market as long as everyone is investing at the same time, at the same level and at the same pace. But suffice to say we remain confident in our enhanced LNO or our eLNO, based not only on our testing of the material, but more importantly, our customer feedback. And we feel that we have a very strong and differentiated position in the high-energy materials market for EV.

And on to your second question, just on the intellectual property side of things. We did licence – so in 2016, we acquired licences from both 3M as well as CAMX Power to give us

background intellectual property and ultimately provide us with the freedom to operate for enhanced LNO. And today, you know, we're filing new intellectual property to protect our investments in innovations around eLNO, and as we continue to develop and innovate the next-generation cathode materials, the next-generation eLNO, of course, we have a watchful eye on the patent landscape. And if at such time if we decide that we need to either license additional patents or file additional patents, we'll make those decisions at that time. I think suffice to say today, we're comfortable with the background IP that we've licensed.

We're very comfortable and confident in our current intellectual property strategy around protecting our eLNO. So today, we don't see a need to access that additional IP. But again, as we continue to develop and innovate, that may change, and we'll make those decisions at that point in the future.

Jeremy Redenius: And sorry, just a follow-up. Kind of strategically versus competition, are you thinking about really positioning yourself at the high-end of the materials out there or are you really, with your range of materials, looking to kind of span the spectrum of the market?

Alan Nelson: Well, I think if you look to where our material has a unique advantage, it would be for long-range full-battery electric applications. That's where it's clearly differentiated on the basis of both performance and cost on the dollars-per-kilowatt hour basis. But look, that being said, accessing that market doesn't mean that we wouldn't also be a good fit across the full options around EV. So, I think it's just more around timing and phasing.

So initially, we're probably going to target more of the higher value, more of the premium markets because we think we have a very strong position there. And again, that's what we're hearing from our customers. As the market continues to evolve and as more and more capacity comes online, we will certainly bring it into the other markets, provided that we can maintain the same level of returns and margins while we're accessing those other markets as well.

Jeremy Redenius: Okay. Great. Thank you very much.

Alan Nelson: Yes. Thank you.

Charlie Webb (Morgan Stanley): Hi, Alan. Maybe you can hear me now. I think I was talking to myself. Just a couple of questions. First off, a lot more comments around solid state batteries being used in EVs in the coming future. Many more companies are making announcements around that. How do Johnson Matthey's cathode materials play into that? Can they be used in solid state batteries? Is there a preference between eLNO, LFP as to, you know, what would work best in a solid state battery and how do you think about that?

And then, maybe another question just around where the capacity you intend that to be? Are you looking at a location in Europe or in Asia? Maybe if you could provide a bit more insight into where you're thinking that that will be based?

Alan Nelson: Okay. Good. Thanks, Charlie. Thank you for your question. So, firstly on solid state batteries. I think it's helpful to start by saying solid state batteries are – is really a reference to the electrolyte in a lithium-ion battery. So, in a solid-state battery, the key thing that's different is the current liquid electrolyte, which is an organic solvent, and the separator, which is a polymer film.

Both of those are replaced by a thin film of a – typically of a metal oxide. And when you replace that liquid electrolyte and that polymer thin film with that metal oxide, then your lithium-ion battery becomes a solid-state battery. The other components in the battery, however, are exactly the same.

So, the anode material or the cathode material are identical, whether it's a solid-state battery or whether it's a conventional lithium-ion battery. So, you still have the same requirements. You still have the same needs. And so, for that reason, we see our eLNO as certainly a long-term attractive option for solid state batteries. It provides market-leading energy density. It provides market-leading cycle life. It provides market-leading – a number of metrics that we discussed, I guess, at Capital Markets Day.

And again, it's equally suited for both current lithium-ion batteries as well as future solid-state batteries. I think it's also worth saying – I just need to comment a bit. My personal belief is solid state batteries are still a bit in the future. We don't see solid state batteries being commercially viable in the short-term – probably not within the next five or maybe even ten years. There's still a number of challenges around that manufacturing technology for solid state batteries.

And there are still some challenges around cost for solid state batteries. So, if we're really driving towards a long-term total cost of ownership level that's broadly in line or broadly parity with internal combustion engine, there's a number of things that will have to get ironed out with solid sate batteries before I think they can provide a commercially viable long-term option.

Your second question, just in terms of the location of the pilot – or on the commercial plant, excuse me. Look, today, we have a process to decide what plant to build, how much to invest, where we'll locate the plant and we're running that process today. And our process is very efficient to ensure we meet all of our key investment criteria.

And in parallel, of course, we're also investing in scale-up and we're learning a lot from the pilot plant. And we'll learn a lot from the demonstration scale plant as well, as we continue to evaluate potential sites. And the outcome of that process will be the final selection of a manufacturing plant. And once we complete that process, we'll make an announcement.

So, we're not going to make that announcement today. But you can expect to hear from us again once we complete this overall process and we receive Board approval to move ahead with the manufacturing facility.

Charlie Webb: That's great. Thank you.

Adam Collins (Liberum): Hello, Alan. Thanks for doing this. I wanted to explore a couple of areas, please. The first one was on the legacy business, so to speak, in Batteries – the Battery System business, which relates to the former Axeon concerns. As I understand, as of 2015-2016, it accounted for roughly three-quarters of the revenue base. But we don't hear a lot nowadays about what you're up to in the battery pack business in Poland and in the consultancy activities in Milton Keynes.

And then, the other area I'd like you to discuss, if that's okay, is the customer testing. How long do the customers need to test the eLNO? How much material do they need? And then, in terms of the sort of key performance drivers, how would you rank range, safety and cost,

in terms of the priorities for customers? And what do you think, in particular, is the eLNO strength, in terms of those three attributes? Thank you.

Alan Nelson: Okay. Great. Thanks, Adam. Thanks for your questions here this afternoon. So just firstly on to the systems business and just to briefly recap for everybody on the call, our batteries systems business today is comprised of essentially two different segments. One is what we refer to simply as a non-automotive segment. And that, as Adam has referred to, is our business that's located in Poland.

And then, we have an automotive segment that is located in Milton Keynes. Both of those businesses today remain very strong. Our business in Poland is doing quite well as we continue to work with new customers and across different applications, primarily around power tool applications as well as e-mobility. So, these are things like e-bikes, e-scooters as well as larger e-mobility types of platforms as well.

So, the business, again, is doing quite well. We're winning additional volumes with our customers. And today, it's just a very stable, very solid business. I guess that I would say that, you know, the one aspect with that business is it's largely a manufacturing business where we manufacture – we assemble, we manufacture the packs then that go into those different applications. And again, it's a very solid business that we have today, and we continue to invest to bring new manufacturing capacity online in Poland.

In the Milton Keynes business, very similar story. We're working across a varied – a broad slate of customers today in the automotive segment from, say, the very high-end speciality hypercar types of applications all the way through to passenger vehicles as well as larger vehicles such as heavy-duty trucks. We continue to work with them to engineer and design packs for a variety of different applications. Unfortunately, I can't, you know, go into a lot of customer detail or segmentation there. But again, great progress with both of those businesses today.

In terms of, you know, the customer testing side of things – so, on your second question around eLNO. You know, during Capital Markets Day, we laid out in general terms the customer qualification process and cycle. And we're following that process with those seven customers today.

So, you know, initially, customers required very small amounts of materials, say in the kilogramme quantities. And that is for the Phase A qualification process or step. And then as we move into B, C, D, up until PPAP then, they require larger and larger volumes. So, you know, the timing – the volumes are fairly consistent across the customers. The timings can be a bit different, depending on the customer's sampling capability, their platform launch cycles.

And, of course, we see some regional differences as well. Some of the OEMs in Asia, for example, tend to move a bit faster than the Western OEMs is at least what we're seeing today. So again, that process from start to finish can take anywhere from a number of months up to a couple of years and even as long as say, three to five years for some of the Western OEMs. So, we've got the full customer mix today across the cell manufacturers and OEMs and all of them are broadly in line with the – with that customer qualification process that we discussed in September.

When it comes to the specific performance attributes on eLNO, you know, again, in Capital Markets Day, we'd laid out the relative performance of eLNO in comparison to the key competitors here or competitive materials in the marketplace. So, we benchmarked it against NMC 811, 622 and, of course, NCA.

I think, you know, for us, the key differentiator for eLNO is that we're able to have higher energy density at lower cost. So, if you think of that important ratio of dollars per kilowatt hour, we have the – essentially the greatest position there – so, the lowest total cost, dollars-per-kilowatt basis – than of any of the materials. But more importantly, we're able to do that without sacrificing any of the other attributes.

So, we're equal to or better than the performance across, again, 622 or 811. That's the key differentiator here, is that we're able to offer better performance at a lower cost while not sacrificing recharge, while we're not sacrificing power, we're not sacrificing safety. And that's the key element that's there. So, we're able to maintain performance across all of the key performance factors. And the last comment that I'd say is, you well know, we've listed six performance vectors here but, of course, there are many more when you start working with customers. There are different characteristics. There's different metrics. And of course, there's different processing capabilities, etc.

There's probably another 15 other metrics that we could put on a spider diagram. And that's what we see when we're working with individual customers. We're not only working with them across these key six parameters, but that working with the other ten or 15 or 20 parameters to make sure the material absolutely meets their needs for their specific application.

Adam Collins: Very good. Thank you, Alan. That's clear.

Alan Nelson: Thanks, Adam.

Andrew Stott (UBS): Hi. Good afternoon, Alan. Thanks for taking the question. So, there's a couple of things. Firstly, I just wondered if you could enlighten us on the licensing arrangement with CAMX? Just if you've got any rule of thumb on the costs of the license and how we think about that? That's number one.

Two, you also said in your opening remarks that the technology was unique. I understand that – I think there was an earlier question touched on that that clearly, there's a patent here that's shared with others, including BASF. So, I think you're referencing, obviously, your own cathode material. Could you just update us as to where you are with the patent application, please?

The final question is away from batteries. It's on the life science tech business. You've been growing at what, three times the market probably in pharma and ag, if I listened to the numbers you just gave us. I'm just wondering if you could go back to basics as to why you're seeing that scale of growth relative to your underlying markets.

And then also, forgive me, a short-term question. Whilst you've grown really impressively in that area, the first half was down, and I just wondered when you're going to cycle through those two contracts that had an impact on that first-half number. Sorry, that's a long list. Thank you.

Alan Nelson: No worries. Okay. Thank you, Andrew. I'll try to go back and answer all the questions that you have. So, look, first on the licensing side of things, we haven't publicly stated the licensing arrangements that we have in place CAMX or the costs associated with that nor have we done that for any of the other licenses that we've taken with 3M, for example.

So, look, we're not going to provide that level of detail and provide that level of information. Suffice to say we've licensed those patents from both 3M and CAMX to give us background intellectual property to give us freedom to operate for our enhanced LNO material.

On the technology side of things and it's the uniqueness around our eLNO, I think I'd start by just reminding everyone that all high energy density cathode materials – that includes NCA, NMC and eLNO and CAMX materials, for that matter – are all compositionally similar. Okay?

The differences, however, are in the exact metal compositions – so, the ratios of those metals – but more importantly, where those materials are actually located in those materials. And what we've done is we've used our material science and expertise and decades of experience in manipulating metals at the smallest link scale and thrifting metals out of catalysts to design new and exciting high energy density materials. That's what creates differentiation for us, founded on that 200-year history of science and technology.

In terms of, you know, where we're at, again on the patent side of things, you know, I mentioned that we've licensed the patents. We are filing new intellectual property to protect our investments and innovations around eLNO. Again, I'm not going to get into a discussion about when and what we've patented as this would clearly provide business-sensitive information to our competitors today. But you know, suffice to say we're actively identifying, harvesting and protecting our information for the composition and the production, the processing of our enhanced LNO material.

And on to your last question on LST. We have seen very strong growth in that business in New Markets. But I think it's important to remember it's still today a very small business, relative to the overall size of the pharma and the ag markets. So, the growth potential for a business at that size, when it's very small today, is absolutely enormous and we're trying to drive that as hard as we possibly can.

But that's why the growth in that business looks to be much greater than the growth in the base – businesses of the base markets themselves. Again, it's a small business going after two very, very large markets. And we're doing very well.

We were down in the first half as we did lose some volume across a number of customers. But as in the case of all small businesses and new businesses, there will be short-term ups and downs. And again, we're not going to manage the long-term performance or success of that business by – we're not going to compromise, excuse me, the long-term performance or success of that business by making short-term decisions.

So, we're going to continue to run that business, continue to invest, continue to grow with a view towards long-term growth. And again, there will be some short-term ups and downs. We expect that that will start to rebound here probably in the next year, where we'll start to see some of those volumes either come back through those customers or we'll replace that volume with some new customers, moving forward.

Andrew Stott: Perfect. Thanks, Alan.

Andrew Benson (Citigroup): Yeah, thanks very much. I do – if I could put my optimistic hat on, which I know some of you might think is a bit rare, but if your stage-gate process does come up with the confirmation of a very high probability of commercial success for eLNO, and given that about 10,000 tonnes is roughly 100,000 cars and you split that with seven companies and you – in the scheme of the auto space, it's not a lot to go around, what is the mechanism for potentially accelerating growth?

Second question. Are there any acquisitions that could give you a – some sort of manufacturing capacity that could be easily converted to your technology?

And on that, just to follow on from Andrew's question on the Life Science Technology, what is it, specifically, that you think is going to enable you to drive that growth forward with new – potential new customers?

Alan Nelson: Yeah. Great. Thanks, Andrew. So, look, on the growth side of things and the investment in the manufacturing plant, as you correctly said, right, we have a rigorous stage-gate process that we'll follow to make our investment decisions. And investment in future manufacturing plants will follow that same capital allocation process to ensure that they meet our return criteria – our investment criteria, moving forward.

But we'll continue to work with our customers. We'll continue to understand how and how quickly the market could grow for cathode materials. And we'll make investment decisions timed based on market growth. The important point here is that we need to make the first investment in our manufacturing asset to bring our eLNO to market. That's the first step in this overall process. We need to be able to demonstrate commercialisation of the material and we need to bring it in significant volumes to our customers.

So today, we're very focused on executing the plans for that first commercial scale plant and we'll continue to look for opportunities to build plants in the future. But at this point, we haven't made a decision on the next manufacturing plant or plants. But you know, we'll take that decision at the appropriate time and, again, work it through the same stage-gate and capital allocation process, moving forward.

On the M&A side, you know, as I mentioned during Capital Markets Day, we're looking at all options to broadly accelerate the commercialisation of eLNO and, not surprisingly, that includes M&A. So again, not getting into specifics with you all today, but, you know, we will look at those options and where they make sense both from a manufacturing standpoint, from a customer standpoint and from an investment standpoint, we'll make those decisions on a case-by-case basis. But that is certainly something that we're looking at and considering today, moving forward.

And lastly, your question on the growth side around some of the other businesses in new markets. Look, a lot of the growth is going to come from leveraging our core science and technologies that we have today in existing markets and moving those technologies and products into adjacent markets.

So, for example, a number of the transformations that we do in the pharmaceutical market today, the very-small-scale chemistry, chemical transformations that we do are exactly the

same transformations that are required for the production of agriculture chemicals, for example.

So, in those instances, the catalysts, the processes, they don't know if they're making an active pharmaceutical ingredient, a drug or a new agriculture chemical molecule. So for us, expanding a business like Life Science Technologies into adjacent markets provides great potential to unlock additional growth for that business.

We're able to leverage our core science, our core capabilities to take that from existing processes and markets and customers today and very easily and straightforwardly transfer that into adjacent markets; again, leveraging much of that chemistry and science and expertise that we have in the existing markets today.

Andrew Benson: Okay. Well, thanks very much.

Alan Nelson: Thanks, Andrew.

Mathew Hampshire-Waugh (Credit Suisse): Hi. Thanks for taking my question. I've got two, please. Well, the first is on eLNO. And just in relation to this, can you tell us whether this is something that you had developed in-house, and then you bought in the licenses to cover you from a legal standpoint or is this something where you bought in the licensing and then sort of this helped you develop the recipe for eLNO, if you like?

And then secondly, how sure can you be on the actual dollar per kilowatt hour cost when you're yet to scale up the production facility? Because obviously, a lot of that's going to come from the overheads and the production costs.

And then on LFP, I'm just wondering whether you think this can have a place in the mass electric car market in the sort of mid-term? I'm just thinking from a sort of cobalt or metal sourcing risk. If this becomes an issue for the high-nickel NMC eLNO whatever products, do you think the car or the battery makers could start looking at sort of reengineering a bigger space in their cars for an LFP battery and whether that could work?

Alan Nelson: Yeah. Great. Thank you, Mathew. Appreciate your questions. So, back up to be – to start with your first question. So, on eLNO, I'll be absolutely clear. eLNO, is a JM material. It's a material that we developed that we produce and that we've done so over the past say nine to 12 months maybe now.

But of course, in, you know, doing that research and development and innovating that material, yeah, we have a broad perspective, in terms of the science and the chemistry. And you know, naturally, when we developed that material and decided on the composition and the process by which to manufacture it, we decided at that time to give us freedom to operate for that material. And we then needed to license background intellectual property to give us freedom to operate for eLNO and that's what we did in 2016.

On the dollars per kilowatt hour basis question and why we're so confident, look, today, the majority of the costs that go into the production for battery material are actually the raw materials – mainly, the metal materials that go into that battery material. But you're right in saying that, you know, there is a significant or there is a portion, of course, of the cost that is the manufacturing cost associated with that.

But we have deep expertise in manufacturing not only battery materials today – we do that with LFP, but we have deep expertise in designing and building manufacturing plants. So, we've leveraged all of that expertise and experience manufacturing our cathode materials to get a very good estimate, in terms of what the overall cost of manufacture would be for our eLNO material.

We've benchmarked that against industry numbers around NMC and NCA materials to make sure that we're within range of what we would expect for total cost of manufacture for that. So, that's why we feel comfortable, in terms of our assessment on the dollars per kilowatt hour basis and advantage for eLNO material.

On the LFP side of things and looking ahead whether or not LFP, whether there's a future here, I think – look, I think LFP is an important material in our overall battery materials business today. And we continue to develop LFP products at pace with the market and with our customers.

And as we mentioned during our Capital Markets Day and I touched on again here, having that broad portfolio gives us the opportunity to optimise the material for specific customer applications. And I think you're right from the standpoint that if we do start to see metals – not start to see, if we see metals continue to escalate, particularly nickel and cobalt, there will be a point where you will cross over on the dollars per kilowatt hour basis where LFP will actually be advantaged compared to some of the higher energy density materials.

That doesn't mean that it will necessarily replace all of the higher energy density materials, but importantly, it will give our customers an option, which is why we maintain it as an option in our portfolio today and it's why we continue to work with customers on developing new and next-generation LFP materials.

Mathew Hampshire-Waugh: Thank you very much. Just a quick follow-up to that. Would energy storage as well, would LFP be applicable there?

Alan Nelson: LFP would certainly be applicable to energy storage, Mathew, no question about it. And in fact, we do sell some small amounts of LFP into energy storage markets today. I think, you know, energy storage markets are generally a lower margin market. So, they're not necessarily all that attractive to us from that standpoint. But you know, where there's an opportunity to sell LFP maybe in, you know, certain segments in energy storage, we would certainly look at that as an opportunity.

Mathew Hampshire-Waugh: That's great. Thank you very much.

Alan Nelson: Thanks, Mathew.

Fabian Smeets (NN Investment Partners): Yes, thank you very much. I have two questions. Could you elaborate a little bit on the metal content of eLNO? I'm especially curious after nickel and cobalt.

And my second question would be as I understand that there are multiple different eLNO mixtures currently in tests with customers. At the Capital Markets Day, where you referred to the spider web, based on the company feedback of eLNO compared to NMC 811 and 622 and NCA. But when looking at your most vast eLNO mixture in terms of energy density cycle life and safety, would you elaborate a little bit on what kind of more detailed specifics you could disclose for this?

Alan Nelson: Great. Thank you. Appreciate the questions. So first of all, on the composition of eLNO, I have to say that in the last two months, that is probably the most common question that I get. So, thank you for that. But unfortunately, I'm not going to provide you with an answer, as I haven't over the last couple of months.

Look, eLNO, what we said, and I'll reiterate today, eLNO is a high energy cathode material that has – that is principally high nickel in content. Beyond that, we haven't given the composition of that material other than to simply say we've used our ability to thrift out metals to bring the cost of that material down to as low as possible while still maintaining a differentiated energy density performance as well as the other five characteristics that are there as well.

When it comes to the spider diagram and performance attributes on eLNO, the important thing to remember for any battery material, the key performance criteria are not in terms of how that material behaves in the laboratory in a test system or cell or even how that material behaves as a standalone material, the critical piece is how that material behaves in our customer's cells and their applications.

What we can do through our chemistry and our science is we can modify that material. We can make compositional changes. I can change the structure of the material to move slightly the eLNO position on that spider diagram. And I can do that because some of our customers may have cells that have a better design from a safety standpoint or they may have a cell that is better designed from a power standpoint or they may have a cell that's better designed from a cycle life standpoint, for example.

So, I can use my chemistry and my material science expertise and optimise my material in their specific applications to make it maybe a little bit better on safety or a little bit better on energy density, recognising that when you move one of these, you tend to move another one of the variables together.

So, it's a bit of a complicated answer. I can't give you a very straightforward answer in terms of how all of these are interrelated. But what it requires and what we have today is that deep customer and that OEM focus to be able to understand their specific application and to take that back and translate that into chemistry and material science to develop to their specific – or develop materials for their specific applications.

Fabian Smeets: Okay, thank you.

Daniele Seruya (Bell Rock Capital Management): Actually, my question has been answered. Thank you.

Alan Nelson: Okay.

Tom Firmin (Hermes Investment): Hi there, Alan. Thanks for the call. Just one sort of high-level question from me, on looking at your R&D from a strategic standpoint. It strikes me that you're competing quite effectively in the industries where the incumbents or your competitors are spending an awful lot of money on R&D as well. So, I'm just wondering where do you see your sort of key competency or edge within that respect? Is it, say, like access to human capital pools or something else.

And then, what's the sort of commonality between all the divisions that you see? That's it.

Alan Nelson: Great. Thanks, Tom. Yeah. No, a very good question. Thank you for that. Look, I think one of our advantages today is that we manage our R&D portfolio with a similar stage-gating process that I mentioned for New Markets investment.

But we also have a corresponding system for discovering new innovation and customer solutions to ensure that we're creating sources of growth through that innovation. And what's important about that is that portfolio is fully transparent to our business and our technical leadership so that the – our scientists and the business leadership alike can identify areas of collaboration and synergy across the Group.

So, in that way, it's not how much we're spending, but it's how efficiently and how effectively we're spending. And that process also allows us to make sure that we're identifying the right investment areas. And we're leveraging our cost-cutting capabilities – technical capabilities, more correctly, while ensuring we are investing efficiently and effectively.

So, we get a broad line of sight as to the R&D projects and programmes and capabilities all – across all of our businesses across all of our sectors. So, we can leverage that deep expertise that we may have in catalysts, from one business into the next. We can leverage that deep expertise that we have in scale-up, from one business to the next. And therefore, again, when we're able to leverage that, we're not duplicating or trying to recreate those processes or those skills across the businesses.

And then maybe lastly, what I'd say is, you know, as you'd expect from a science and technology company, we also have a number of other internal ideation processes across the Group. And it's this combination of running a – an R&D portfolio through a stage-gate process, the rigorous portfolio management and those initial ideation processes that give us the concept of this innovation ecosystem that really allows us to drive value creation and growth from our R&D investment.

Tom Firmin: Okay, thank you.

Eugenie Stoyanov (?): Thanks very much. My question has been answered as well. Thank you.

Diego [Debilloez]: Yes. Thanks. I come from Belgium. I would like to understand the Johnson Matthey strategy going further in eLNO. Does that mean that you believe in the cylindrical cells technology more than the prismatic cell you use in LFP?

Alan Nelson: Right. Thanks, Diego. Thank you for your question. When it comes to eLNO, the material itself can be used across any cell size and any cell geometry. So, that includes cylindrical, pouch cells, prismatic cells. And whether those are small cells – say, for example, 18650 cells that are about 3.3 amp hour – up to large EV cells – so, it could be, you know, several hundred amp hour – again, the material is equally suited across those different platforms. So, we don't have a strong preference in terms of the cell format or the cell size. We can equally address all of those different cell sizes and form factors.

Diego: So, you believe that the safety standard of your eLNO technology can fit in any battery design?

Alan Nelson: Yes, that's correct. It can fit any battery design.

Diego: Okay. All right. Second question. Do you believe that NCA technology is cheaper than NMC 811? I mean, for cost of prismatic or cylindrical cells?

Alan Nelson: So, on the cost side, when we look at – so, I think you're referring to the spider diagram that we have on – or that we showed during Capital Markets Day. Target cost for us, when we start looking at this, is on a dollars-per-kilowatt hour basis.

So, it's going to be a combination of both the energy density and the manufacturing cost for that material. And of course, I think the other thing, you know, to remember is that the processes by which you manufacture NCA and NMC are slightly different and that can change a bit of the manufacturing cost. But again, as I mentioned earlier, the primary costs associated with those two materials are in the raw materials themselves.

Diego: Okay. So, is NMC a second priority for you and you focus first on eLNO in term [of standard]?

Alan Nelson: Yeah. Our first priority today is commercialising our eLNO material as we believe, and our customers have confirmed it has leading performance across all of the six key attributes. So, we think and, again, our customers have confirmed that this material is truly step-change material. And that's where our focus is today, is bringing this material to the market through scale-up and close collaboration with our customers.

Diego: Okay. Thank you.

Nicola Tang (Evercore): Hi, Alan. I hope you can hear me. Thanks a lot for the call. I had two questions, actually. The first was on – actually, coming back to the spider chart again. And if I look back to your not the most recent Capital Markets Day but the one before in January 2016, you highlighted LFP as being, you know, on a relative basis, a better performer on most metrics except for range. And obviously, you know how things have developed it's becoming clear that LFP is not necessarily kind of the – you know, the necessarily the cathode of choice on specific – specifically on auto application. Is this because the range was the biggest issue or was it actually that your assessment on LFP and sort of the relative performance was actually a bit overoptimistic?

In other words, you know, when I look at the chart you show this time with eLNO, is there any risk that you're being overoptimistic on this sort of, you know, metrics relative – of eLNO, relative to other existing technologies?

And then, the second question would be would you mind talking a little bit on what your thoughts are on other technologies like lithium sulphur and lithium air and whether you see those as a threat or potentially an opportunity for JMAT? Thank you.

Alan Nelson: Great. Thanks, Nicola. Yeah. Back on the spider diagram, I think it's important to point out that the spider diagram that we showed during Capital Markets Day, as we said on the slide, is a relative performance across the cathode materials that we showed on that spider diagram.

If we would add LFP to that diagram, it would look different, right, to be absolutely clear. Because when it comes to such parameters like safety, LFP is heads and shoulders above any high energy density material. So again, if we would go back and we would add different materials to it, it would look slightly different.

So, just remember that the two spider diagrams present the relative performance of those materials based on the materials that are shown on each of those two separate spider diagrams. When it comes to the confidence in our materials, the confidence that we have, as I mentioned earlier, is not based our internal testing and assessment of the material.

And in fact, the data that sits in that spider diagram is not our data, it's our customers' data. And that's what gives us confidence. When we go out and we see the performance of our material validated by our customers in their specific cells and their applications and they can provide us and validate that relative assessment that we showed in that spider diagram, that's what gives us confidence in the performance of our eLNO material, moving forward.

When it comes to some of the other technologies or some of the future technologies, again, as I mentioned during Capital Markets Day, we are investing in a number of, say, future technologies to future-proof the business. We're investing in lithium sulphur. We're investing in solid state. We're investing in lithium air.

I think for me; all of these technologies are still a long way off. As I mentioned, there are a number of challenges yet with solid state around manufacturing and overall cost of production that need to be resolved before I see that as a broadly commercial technology. When it comes to lithium sulphur, the inherent limitation with lithium sulphur is its volumetric energy density.

So, it requires a very large footprint or large volume in order to have the same energy density as, say, a lithium-ion battery. So, that doesn't necessarily mean it's not an appropriate technology, but it's probably not an appropriate technology for electric vehicles where volume is going to be at a premium.

Could lithium sulphur work for, say, stationary applications? Absolutely. But that would be a potential. I just don't see it as a natural fit for electric vehicles. And when it comes to lithium air, I think lithium air has been a – I guess a promise to the industry for quite some time. But it has a number of key technical challenges that are really holding it back.

I personally don't believe that lithium air will be commercialised – probably not in my lifetime, to be quite honest with you. I think it will require many, many decades of science and technology and innovation to overcome a whole host of technical challenges. And, you know, I think it's also worth pointing out that a number of high-profile research institutions that, even as recent as two or three years ago were investing significantly in lithium air, have since pulled back on that investment citing the difficulty and challenges around some of the technology for lithium air.

So, it still remains an option. We continue to invest in some of these forward-looking technologies to also give us greater insights into how battery materials behave, how we can then take that information and create better cathode materials. And we're doing that today while, at the same time, future-proofing the business against some of the additional technologies.

Nicola Tang: Okay. And just one follow-up on that. If I think about, you know, the Alternative Powertrain in terms of questions or requests that you get from, you know, OEMs and battery manufacturers, is it fair to say that lithium or nickel-based or lithium-ion is the top, then, you know, being – still thinking that sort of the fuel cells and then, you know,

sulphur and lithium air, as per your comments. Is that the right way to think of that and how people think about the industry?

Alan Nelson: Yeah. I think right now, you know, our customers are very focussed on high-energy materials. So, that's, generally saying, high-nickel-content materials. So, that was – that will be first and foremost on their mind. But I would say though, for different applications – so, for example, for 12-volt, for 48-volt applications, there is a broader discussion that we are having with customers about the right cathode material for those particular applications.

So again, when our customers are talking about high-energy materials, it's principally for long-range, full-battery electric vehicles as well as for hybrid vehicles. We're hearing a lot of interest in high-energy materials for hybrid vehicles today as well. But again, there are a number of applications across the different vehicle segments where other materials are applicable.

We don't hear our customers talk a lot about lithium sulphur or lithium air and that could be for several reasons. And one of the reasons is we don't have a technology option in lithium sulphur or lithium air today. So, that could be the reason. It could be that they don't see an option there as well. And it's hard to say at present, but that's not something that comes up in a lot of discussions that we have with our customers.

Nicola Tang: Okay. Thank you.

Jeremy Redenius: Hi. I just had two quick follow-up questions. One, I know as analysts, we worry a little bit about nickel and cobalt constraints at a higher EV penetration forecast. And so – and I've heard of some work out there with a high manganese NMC. I was curious if you had any point of view on the potential for high manganese NMC?

And the second thing was coming back to your testing with seven customers so far, I suppose if – I mean, I want to get a sense of how much of the market you're covering with that? Because I guess if I'm looking at battery makers, that's probably good outreach and penetration. But if I'm including OEMs, it seems like that's pretty early days still. So, a sense of the market covered. And also, if it's still small, what's some of the rate-limiting steps for covering more customers sooner rather than later? Thanks.

Alan Nelson: Good. Thanks, Jeremy. So, let's see. Starting off on your first questions – so, high manganese content NMC materials. I think it's, you know, important to remember that there is a manganese-based cathode material that exists in the marketplace – so, lithium manganese oxide or LMO. And that, in fact, is one of the – I won't say necessarily one of the first commercialised cathode materials, but it has been commercialised, actually, for quite some time. And in fact, one of the major OEMs uses that chemistry in one of their plug-in hybrid vehicles.

So, the manganese chemistry has been developed. It has been commercialised, but it doesn't have the range of – that is, the energy density required for long-range full-battery electric vehicles. So, I don't see that as a long-term option for, again, whether it's higher-end plug-in hybrid vehicles or long-range full-battery electric vehicles.

But you know, suffice to say people are looking at ways to be able to manage the nickel and cobalt constraints as we are as well. And we're taking a different approach certainly in the

cobalt side and that we're looking at this as an opportunity to use our thrifting expertise to remove as much cobalt as we possibly can.

On the customer segmentation question, we have a broad mix of customers today. Again, I'm not going to list the customers off to you. If I did, you would recognise all of the names of those customers. And we have broad coverage today across leading global cell manufacturers as well as large OEMs.

So, we feel we have broad coverage of the overall cell and OEM markets today. And we're prioritising our customer segmentation and our material sampling and qualification process based on the size of the market and the opportunities for JM, moving forward. So, we're looking at that sampling rate, etc., through very much a market coverage lens to make sure that we are broadly covering the markets, again, very much with an EV focus, but that we've got good market coverage and broad market penetration.

Jeremy Redenius: Can I ask, are you happy with that seven or you – are you really pushing and rushing to try to get that number up?

Alan Nelson: Look we're certainly – we're happy with the seven customers we're working with today. We have a list – a fairly long list of additional customers that we're currently working with to understand their specific cell needs and their requirements and I expect that we will broaden our customer base here in early 2018. So again, it provides greater market opportunity and greater penetration for us, moving forward, and we'll look to do so.

Jeremy Redenius: Great. Thank you very much.

Andrew Benson: Yeah, sorry, I was on mute. I do apologise. I just want to push you again, if I may, on the issue of trying to accelerate the development of the – of this project. You know, what would be the technological, financial timeline horizons that would enable you to pull this forward?

Also, if it is the breakthrough to technology you claim, then my – surely your customers might be pushing for this. And if it is the breakthrough, would it – obviously, the commercial arrangements are going to be confidential. But the arrangements which would perhaps help manage the capital costs of capacity expansion, is that something you might consider?

Alan Nelson: Yeah. Great. Thanks, Andrew. Okay. Look, if you consider the rate of market adoption for any new material, including eLNO, there are a number of potentially rate-limiting steps to be able to go from that initial conception, that initial ideation all the way through into large-scale commercial production and on vehicle platforms.

One of those limiting steps is the ability to scale it up. And we are scaling up the material today, making sure that we understand all the different process variants and key process parameters so that we make sure that when we make that investment, that we know that that plant starts up on time, on budget and can produce that material from day one. And that's a critical part of this overall process that we can't short-circuit.

If we try to go too quickly and get out ahead of the front-end engineering design of this or even the learnings from our pilot and demonstration scale plant, we run the risk that we have a manufacturing asset that doesn't produce material in spec or at cost. And that is a very – that's a risk that we're not going to take.

So, we're going to be very deliberate, in terms of how we scale this material up, to make sure that when we bring it to market, when we make that investment and when we start up that manufacturing asset, that it starts up on time, on budget and produces the eLNO that we expect it to do from day one.

The second piece around all of this, of course, is customer qualification cycles. And as we discussed during Capital Markets Day and as I mentioned a bit earlier, customers have – and different customers have different qualification timelines and different cycles. Some of our customers can move fairly quickly. Some of them move a bit more slowly. But nonetheless, it will take a number of years from the time that you go into initial customer sampling all the way through to large-scale commercial production.

So even if we did have the manufacturing capacity on the ground today, hypothetically, to produce 10,000 metric tonnes, we're not at that qualification process yet where we could actually sell 10,000 tonnes. So, the level of investment that we need to make needs to be timed with our customers, with the growth of the market and those qualification processes. And that's what we're pulling together right now.

So, we've got that strategy. We are investing to scale up the material. We are doing the front-end engineering work on the manufacturing asset. And where we see opportunities to accelerate the commercialisation of that material through, you know, partnership, through joint ventures, through tolling, through M&A, we will look to do that. But again, it will be opportunity-by-opportunity basis.

Andrew Benson: That's very clear. Thanks very much.

Andrew Stott: Hi, Alan. Just a quick follow-up. I just wondered if you're limiting your customer conversations to just the passenger market or whether you would be open to talking to truck companies as well?

Alan Nelson: We – no. Great question. No, we're not only focused on, say, passenger vehicles. We're focusing on actually a broad market segment because we do believe that the high-energy material, our eLNO, does have a particular advantage for the truck segment. So, we're including, again, a broad customer base and a broad market cut as we bring eLNO to market.

Andrew Stott: But there isn't a truck company in the seven OEMs validations you're talking about, I assume?

Alan Nelson: I'm not going to get into the specifics, in terms of the customers that we have.

Andrew Stott: Okay.

Alan Nelson: But suffice to say the customers that we're working with today cover all ends of the EV powertrain spectrum from small, mild, micro-hybrids all the way through to large-scale and truck applications.

Andrew Stott: Okay. Thank you.

Dominic Frauendienst: Yes, hi. Thank you very much. Sorry, if the question has been asked already. I was a bit late on the call. I have three simple questions. The first one is why not wait with the investment for the commercial-scale plant – the 10,000-tonne plant till you are – till you have actual orders?

The second is once you're qualified for a platform, does it also mean you have orders or are these two separate things?

The next question would be: is the demo plant good enough to get those – to get qualified or do customers expect you to produce commercial-scale first to get qualified? Thank you very much.

Alan Nelson: Great. Great. Thank you for your questions. So, on the first question, in terms of why not waiting until you have orders, the customers require that we have the volume on the ground at the time that their production launches, their vehicles go live. So, they will make sure for all cathode materials manufacturers – they require all of us to make sure that we have that manufacturing capability.

What we're doing with our investment is, as I mentioned earlier, we're following a very rigorous process to make sure that we time our investment with the market and with our customer qualification processes and their cycles. And so, in the first stage of this, we'll be seeking approval mid next year. And we expect to start that level of investment, start the first phase of our £200 million investment next year. But it is something, again, that the market and the customer requires that we have that volume that's on the ground.

When it comes to that overall qualification process – that is, you know, once you qualify, do you have orders? – the short answer is yes, although there's a lot of specifics that go around that. But once you go through the various stages of the automotive qualification process – so, through the Phase A, B, C, D – into the PPAP process, that brings you through the overall qualification process. And then, at that final stage, you essentially have an order to be placed on that vehicle platform. And today, we're at the very early stages of those qualification processes, but importantly, we're on a number of those qualification processes and platforms, moving forward.

And then, your last question, in terms of the demonstration-scale facility, our customers today are very happy to qualify materials off a demonstration-scale asset and we will work with them in that regard. They will require, of course, that once we get the manufacturing asset up and running, they will do a final essentially quality check to make sure that the material that comes off the manufacturing asset meets or exceeds the specifications that we achieved on a demonstration-scale process.

That's very typical for the industry and that's normally the way that the process operates. So, short answer is yes, they will qualify the materials off the demonstration-scale facility with that final check of the manufacturing plant.

Dominic Frauendienst: And just the – one follow-up, please. On the qualification process, how long, on average, would you say does that – is that typically in the industry? At this point in time, how long is the qualification process?

Alan Nelson: Yeah. As we discussed during Capital Markets Day, it can be variable from customer to customer and from region to region. You know, if we go all the way from the first initial sample all the way through to commercial launch, that's typically measured in years.

So, it can be – take two to three years on the short end of the time scale and it could be as long as four to five years on the longer end of that timescale. It really depends on the

customer qualification process and the uniqueness around that as well as their commercial launch cycles. So again, on the short side of things, it can be a couple of years, but it can also take up to five years for some of the customers as well.

Dominic Frauendienst: Does the qualification process start then, once the material comes out of the demo plant?

Alan Nelson: No. The qualification process –

Dominic Frauendienst: If I ask that now –

Alan Nelson: No. Sorry. Just to be absolutely clear, the qualification process is a stage process that essentially goes through either four or five stages, depending on customers. The initial qualification step, customers are happy to test and to validate the material on essentially a pilot-scale asset. And that's what we're doing today.

Dominic Frauendienst: Okay.

Alan Nelson: As you continue to work with them and as they test on larger and larger cells and larger and larger formats and do more detailed testing, particularly around safety and lifetime, they require larger and larger volumes. And it's at that point that those volumes then get shifted to the demonstration-scale facility and that's essentially where you complete the balance of the qualification process.

And then, the final sign-off, as part of the PPAP process, is the last qualification step for the manufacturing asset again to confirm that the material meets the quality specifications and standards that came off the pilot plant and meets the customer's qualifications and standards.

Dominic Frauendienst: Okay. Thanks, Alan. Thank you.

Alan Nelson: Great. Well, look, thank you all for taking the time to listen to my remarks today. Hopefully, you found it useful. I certainly enjoyed the dialogue and the questions. Just to wrap-up, if anyone has any further questions that we haven't had time to cover or haven't had time to address today, please do get in contact with out Investor Relations team and they will pass those questions on to me and we'll be happy to provide any additional answers that you may have. So, thank you again for your time and I appreciate the opportunity to talk to you all today.

[END OF TRANSCRIPT]