Johnson Matthey Plc – Capital Markets Day 2019

Thursday, 19th September 2019

Introduction

Martin Dunwoodie

Director, Investor Relations

Good morning everyone and a very warm welcome to Johnson Matthey's 2019 Capital Markets Day and thank you to everyone for coming along today. So as you can see, we have a full agenda today. We have presentations in the morning and then in the afternoon, you'll have the chance to meet with our sector CEOs as you rotate around each of the breakouts, so please do get them to answer any questions you might have.

Now if you are here for the afternoon, then you will find a coloured dot on the back of your name badge and that will indicate which group you should join. We're running four breakout sessions in total, so for example, if you have a red dot on the back of your badge, you're part of Circuit 1, which begins with Clean Air, followed by ENR then Battery Materials and finishing with Health. Circuit 2 is blue. It begins with ENR. Circuit 3 is green. It begins with Battery Materials. And then Circuit 4 is yellow and begins with Health. And all circuits follow the same pattern. It all sounds quite complex, but don't worry, there'll be people around to help you be where you should be and there are timetables outside and also posted on each of the breakout doors, so it should be very obvious once you get to it.

Today overall is about giving you an insight into how we're executing against the strategy we laid out in 2017, our long-term growth opportunities and why we're confident that the execution of this strategy is going to deliver on our objectives. But before we begin, I just want to introduce a short video and that quite nicely summarises who we are and what we do.

[VIDEO PRESENTATION]

Operational Strategy

Robert MacLeod

Chief Executive

So, good morning everybody and welcome. As you've heard, JM is about helping to create a world that's cleaner and healthier, not just today but for future generations. It drives our strategy and is the lens through which we do business. At a business level, this gives JM two advantages. Firstly, in a rapidly changing world, the application of our science is more relevant than ever before. And secondly, the need for a cleaner, healthier world is a long-term trend. This is not a fashion – it's a necessity.

These four global mega trends are shaping our business and our strategy. We're all aware that action around these mega trends has increased. There is a greater awareness and focus on the need to work together to mitigate and manage the impact of climate change and reduce our global carbon footprint. As you saw from the video, JM is already using our science to tackle climate change. For the future, our development of new low-carbon technologies will continue to make an impact – and more of that later.

For over a century, the world economies have relied on fossil fuels. The move we are seeing away from that will require a major upheaval in energy markets. What we're seeing is a once-in-a-lifetime energy transition. But the move towards more renewable sources cannot happen overnight. The impact on raw materials, prices and volumes, and consumer preferences is still unclear. Although there is uncertainty around where we'll end up and how quickly, we're already helping our customers to navigate this transition, in the first instance by using existing natural resources more efficiently, but beyond that by decarbonising much further.

We are well positioned, with a range of options across the power train, from Emission Control to Battery Materials and Fuel Cells, and there are a number of exciting opportunities, for example within Efficient Natural Resources, where we can use our expertise to shape this new era of clean energy.

And of course, population and longevity. Global headcount is still rising and richer populations are living longer and want healthier lives, something which our activities in Health support. However, this population increase, coupled with the major shifts in key industries such as energy and automotive, is having a knock-on impact upon our vital resources. The world will require new raw materials and there will be new challenges in accessing, transforming and recycling these efficiently. These mega trends are here to stay, but they also unlock significant opportunities for sustained growth as we use our science to tackle existing and emerging challenges.

But we can't tackle these challenges on our own. Society as a whole must come together to create a better future for people and our planet. The United Nations' Sustainable Development Goals, the SDGs, provide the blueprint to achieve a better and more sustainable future for all. And at JM we're reliant on this framework and contribute to nine of them. In fact, last year, almost 90% of our sales came from products and services that positively contributed to these SDGs, as you can see on this chart.

Everything we do at JM is designed to make a positive contribution to a cleaner, healthier world and we are already making a significant difference. Last year, 181,000 lives were positively impacted by our recently launched drug APIs. Our catalysts removed 3.5 million tonnes of pollutants. That's the same mass as around 10 Empire State Buildings. Our technology removed 10.1 million tonnes of greenhouse gases and our new UK renewable energy contract saves 34,500 tonnes of CO2 each year. And thanks to our new waste-to-aviation fuel technology, 11 million gallons of renewable jet fuel is being produced each year. That's enough to fuel a plane for 180 return flights between London and New York.

To address these key global mega trends, we put our science into action. Our science is at the heart of our business and we use it to solve our customers' complex problems. As I've said many times before, we don't do easy: we focus on the complex and difficult. We build strong relationships with our customers and work in collaboration to provide them with customised solutions that make a real difference in their businesses. And to do this successfully, we allocate our resources effectively too.

The mega trends are unlocking new growth opportunities. There are new areas of growth where we can win based on our existing science and areas of growth which require innovative

science. We evaluate and assess opportunities rigorously, to make sure we compete in areas of the market where our technology can drive the highest returns. And in the last few years, we've created an agile and efficient business that is the platform for our sustained performance.

We categorise our science expertise into nine core science capabilities. These capabilities are at the heart of what we do and link across our sectors. They support the development of our new products and processes but they also enhance existing ones too. But it's not just these nine individual capabilities – it's the combination of these and how we apply them to deliver customised, innovative and scalable solutions that is more powerful.

In all areas of our work, whether batteries, catalysis, emission control or active pharmaceutical ingredients, we apply our core capabilities to create innovative solutions for our customers. To give you an example, today in Battery Materials, we are using our science to enable the greater adoption of long-range, pure battery electric vehicles that meet consumers' performance expectations on range, charge time and safety.

On the slide, we've shown how five core competencies have been used in developing our cathode materials, eLNO. We use these capabilities all the time, especially as we optimise the performance of the materials following feedback from our customers and the input of our R&D teams. And the development of eLNO was of course supported by our expertise in nickel chemistry, gained from over 80 years of working in nickel-based catalysis.

Looking to the future, where we play will be directed by our science. We want to be in areas where we can have a competitive advantage and create value for our customers. And given our science and the mega trends we are operating with, these opportunities are significant in both scale and number.

Across our sectors, we compete in niche areas of the market where we can apply our science and add the most value. The strength of our science means that we have leading-market positions and strong barriers to entry. Take Clean Air, for example. We are one of three global players. We have a clear number-one position in diesel and have a strong position in gasoline. In Efficient Natural Resources, we have strong segment shares in our key markets. For example, in methanol synthesis, we have a segment share of more than a third of the catalyst market and we're the world's largest secondary refiner of platinum group metals, with more than 5 billion pounds of metals flowing through our refineries each year. And in Health, we have a leading position within the controlled substances space in Europe.

Across our sectors, our competitive advantage is the combination of our understanding of science with an ability to design and develop scalable solutions for our customers. Each year, we invest around 5% of sales in research and development to ensure we stay at the cutting edge and maintain our advantage. It is this cutting-edge science which allows us to deliver high returns and we are, and this should be, in markets that have that capacity. However, things move on and so we keep reviewing our businesses to ensure that their end markets still deliver the higher returns we seek, which appropriately value our science. And if a market no longer requires our cutting-edge science to solve their problems, then we will exit. Ultimately, our science underpins everything that we do and is vital to our future success.

So bringing this all together, let me summarise our strategy that we set out at our Capital Markets Day two years ago. It is to deliver sustained growth and value creation by applying our world-class science to solve our customers' complex problems.

We deliver our strategy through our four sectors and over the medium term, each sector will contribute to the delivery of shareholder value, which we define as mid- to high-single-digit earnings-per-share growth per annum, return on invested capital at 20%, and a progressive dividend.

Our ability to keep delivering as planned is underpinned by the fundamental changes that we have been making across all aspects of our business. JM is a business that is being transformed. It is a very, very different business today compared with five years ago. We've instigated a substantial change across many aspects of the Group to create a high-performance culture.

So what does this mean? We've brought new people into JM who know what good looks like and can share that with our existing teams and we're also investing more than ever before in the development of our employees. Across each of our sectors, we've created global organisations that are better able to operate and interact with our customers, who are in many instances already organised in a similarly global way. And of course, we need to operate more efficiently than our competitors. A drive for efficiency in everything that we do is paramount and Anna will talk more about the progress that we've made and the further opportunities that we have in the next presentation.

So, we've come a long way since 2017 and as I talk through the sectors I'll give examples of this agility and how we've course corrected to consistently deliver on our expectations.

We are successfully executing. Overall, Clean Air is delivering as expected. We've had fantastic performance in this business, with 11% annualised profit growth since 2017. Efficient Natural Resources has turned around. We're outperforming in our key markets and we've seen good profit growth over the last two years, supported by efficiencies. In Health, we've made huge strides in fixing the operational aspects of the business. And in Battery Materials, we've made significant progress, as I'll come onto later.

So for the group, since 2017 we've delivered mid-single-digit annualised earnings-per-share growth at 5%, return on invested capital of around 16% and a progressive dividend, with growth of 7% per annum. This is against a tough economic background, with the automotive market in particular going through a period of substantial volatility. I'm very pleased with what we've delivered as it clearly demonstrates JM's resilience and agility.

Of course, everything hasn't gone exactly as we planned, but we continue to deliver performance in line with our guidance while still investing in improving our business.

The CEOs will take you through the sector detail later this morning and in the breakout sessions, but I'll start by giving you the high-level summary of our future growth drivers in each of the sectors. We're also delighted to have Joan Braca and Christian Günther in the audience, who will soon be joining us as Sector Chief Executives of Clean Air and Battery Materials, respectively. They'll be joining us in some of the breakout sessions too, so you'll have the chance to meet them there if you wish.

In Clean Air, we have visibility of sustained growth for at least the next decade. Although there have been some changes to our expectations that we laid out in 2017, the end point is broadly the same, which demonstrates the agility we have in our business. In John's sessions later this morning, he will talk through these changes and go through each of the segments in detail to give you a sense of the phasing of growth. But to summarise our 2025 outcomes, we now expect Asia to more than double, Europe will be maintained in size and Americas will continue to be driven by GDP growth.

In Asia, we're seeing tightening legislation with the advent of China VI in both light and heavy duty, which will drive additional content and a significant value uplift. And the doubling in the size of our business will come even though this is the region with the highest assumed battery electric vehicle penetration.

In Europe, our light duty business will slightly decline, given the dynamics in the diesel market and increasing battery electric vehicle penetration, but this will be offset by growth in heavy duty.

Performance in the Americas will largely be driven by GDP growth, but we successfully managed the recent Class 8 upcycle effectively, without additional investment, and we will continue to do so in the future through the peaks and troughs. And of course, we'll remain focused on maintaining our margin and return on capital.

And bringing this all together, we expect mid-single-digit growth in operating performance to '25 and John will go into why we then expect steady growth for the rest of the decade.

In Efficient Natural Resources, Jane and the team have made significant progress in refreshing the strategy for the sector and as such, we now expect mid- to high-single-digit growth in operating performance to 2025, an upgrade compared to last time.

We are already well positioned in high-growth segments and over the last couple of years, through a rigorous programme to improve efficiency, we have stabilised the business, driving value from our existing core business and at the same time investing in technology. Using our technology as markets evolve, we're already leveraging our position to provide new solutions. These utilise our existing strengths to enable our customers to adapt to changing feedstocks, trends and environmental matters. This will provide a steady stream of opportunities.

We have a pipeline of new opportunities that will accelerate in the near term. You've heard about a couple of these already, with our newly licensed technologies to transform household waste to aviation fuel and one to more efficiently produce monoethylene glycol. And there are more new technologies that we're working on now that will give us growth on a longer time scale.

In addition to leveraging our growth opportunities, we've also identified a number of initiatives to improve our efficiency. This includes the investments we're making in our refineries to improve their safety, resilience and output. I have to say I'm really pleased with the progress that the team has made over the last couple of years.

Jason and the team in the last couple of years also have done a huge amount to set up the Health business for growth. As you know, this was a business where performance was under pressure, high-margin products were maturing and moving through their natural lifecycle, and

the business was suffering from under-investment from a decade ago. However, over the last five years, we've invested in our product pipeline and more recently taken important steps to optimise our manufacturing footprint and increase our efficiency through the closure of Riverside and opening of Annan.

With these changes now behind us, the business is better structured, we have passed an inflection point and are now focusing on leveraging the opportunity we have. Overall, our goal remains to deliver an additional £100 million of operating profit by 2025 from our pipeline of generic and innovative products. We've already launched one new product from our original generic pipeline. Ten molecules have been submitted for regulatory approval and the pipeline of new products remains as strong as ever. When we talked about the pipeline in 2017, we saw the £100 million coming entirely from our generics pipeline. Since then, Jason has reviewed our portfolio and adjusted resources accordingly to put more effort on our innovator business, where we see higher potential returns and value, and still deliver the £100 million of operating profit by 2025. And the long-term growth potential of the entire generic portfolio is though as broadly as it was before.

In terms of our strategy, the main drivers of growth are we will enhance the performance of our base business and continue to drive operational efficiencies, we will aggressively drive growth from our new product pipeline, and finally, we will broaden and build on our existing capabilities to better support our customers as their product portfolios evolve. Overall, this will on average deliver double-digit growth in annual operating performance through 2025.

In Batteries, we've made huge progress over the last few years. We are committed to building a successful business and are working hard to put the building blocks in place for break-out growth. This is a market that is enabled by technology. We have developed a high-performing range of cathode materials, eLNO, which will enable the development of long-range, pure battery electric vehicles. But our leadership comes from our ability to further customise them for our particular customers' needs. And we're investing in research and development to make sure we maintain this leadership.

Today, we've announced that we've progressed to full cell testing with two of our customers, which demonstrates the value of customisation and confirms our confidence in our material. The move to full cell testing means that they've down-selected to only a few potential suppliers and they are now starting to put more investment in on their side to further develop and test these materials. Of course, it does not mean that we've won the business yet, but it increases our confidence in eLNO and puts us in a good place as we position ourselves for platforms coming to the market in 2024.

To support our growth ambitions, we're investing today in commercial capacity in Poland and our scale-up plans are well underway.

Before I conclude, I wanted to wrap up, giving you a snapshot of how our future growth will evolve over time. Globally, the mega trends affecting us all are bringing opportunities for science-led solutions and this is where JM can really add value.

In the short term, we'll see growth in Clean Air through legislation tightening in Europe and Asia, outperformance in Catalyst Technologies and you'll start to see value from our Health portfolio coming through.

Looking to the medium term, growth will accelerate in Clean Air Asia as the China and India light and heavy-duty regulation kicks in, and also in Catalyst Technologies as new licensed technologies come to market, and Health as the pipeline develops further. In Battery Materials, we will have commercialised eLNO and be scaling up further. I also believe that we will start to see the development of our Fuel Cell business, which we've held for a number of years, but the market is now finally beginning to come towards us and we have just approved further investment in this business.

In the longer term, as I've already described – and I will describe in more detail after the break – our ambition is to have a Battery Materials business of scale and there may be an opportunity in battery materials recycling as well, where a closed-loop offering has the potential to be a key part of our customer proposition. We know we have the chemistry expertise to succeed in this space and we're currently exploring where and how we might play in the value chain. In everything we do, we look for the bottleneck and use our science to solve it.

In addition, with the energy transition underway and rapidly growing, society will inevitably move towards a low-carbon, more sustainable future. There is a growing need for a secure supply of clean, affordable and accessible energy and hydrogen could be part of the answer here. We're already the world's number-one supplier of catalysts for the efficient production of hydrogen and we have leading technology that could further enable the efficient scale-up of hydrogen generation and we're already working with a number of potential long-term customers.

So I hope this gives you a sense of where we are headed and why we're excited about our future growth.

In summary, I'm really confident in our future. Over the last few years, we've successfully executed on our strategy and we've delivered as planned, notwithstanding the ever-changing market backdrop. We're well positioned to address the world's most complex and challenging mega trends and in doing so, we will help to make the world cleaner and healthier.

Our science remains absolutely the heart of our business and we will continue to invest in it. It is fundamental as it enables us to develop the innovative solutions required for the future, but it is also the fundamental driver that enables JM to deliver such attractive returns.

Alongside a strong strategy, we have transformed our business to create an agile and efficient platform for growth. These changes are critical, and they have given us greater capability to adapt to the fast-changing world around us and deliver sustained performance.

What also makes me really excited is that the choices that we have made over the last couple of years are starting to come to fruition. We've continued to improve our Clean Air business, managing through the increasingly challenging automotive market environment. The upside in Efficient Natural Resources is starting to come through. Health is past an inflection point. We've made excellent progress with the development of our Battery Materials business and there are several new opportunities in which we've been investing for a number of years which will drive growth in the longer term. And taken together, this will allow us to deliver sustained growth and value for many years to come.

I'll now hand over to Anna to talk you through the financial strategy and then there will be a time for Q&A with both of us. Anna.

Financial Strategy

Anna Manz

Chief Financial Officer

Thanks, Robert. Good morning. I'm going to take you through our financial strategy, but before I did so, I just wanted to stop for a minute and look at the short term and our guidance for this year.

You probably saw from our announcement this morning that our guidance for the first half and for the full year is unchanged with what we said at the Q1 AGM statement.

The group's growth in recent years has been driven by Clean Air. This year however, we expect Clean Air financial performance to be slightly weaker. This is because we're incurring some one-off expense in Macedonia, ahead of our Polish plant coming online due to some capacity constraints. It will particularly affect the first half of the year.

Full year, we will deliver mid- to high-single-digit growth and that demonstrates the strength we have in our portfolio as we execute our strategy.

Now, let me tell you what I'm doing and how that underpins our strategy overall for the Group. As you know, I have three focus areas: increasing business-wide efficiency; disciplined management of working capital; and rigorous resource allocation. I'll describe how I think about our portfolio and how I apply these focus areas to how we manage our business.

We have a portfolio of businesses that use science to solve our customers' complex problems. All of our businesses should deliver at least a 20% return on invested capital when they're operating efficiently and at scale. Focusing on efficiency and disciplined management of working capital enhances returns and gives us the capacity to invest. Together, these areas underpin our strategy and drive shareholder value – starting with efficiency.

At the last Capital Markets Day, we announced our global procurement strategy that would unlock £50 million of savings to invest and to enhance our margin and a £25 million of cost-cutting benefits, to give a group total of £75 million. Since then, we've progressively identified further benefits, including the closure of the Riverside plant and additional procurement savings, which we're on track to deliver. Today, we've announced a further £40 million of procurement savings, which takes the total benefits for the group to £145 million. Of the incremental £40 million, around two-thirds will benefit the income statement and one-third will benefit capital expenditure. At least half of these savings will be reinvested.

You see the benefits in the income statement and in capex, but much, much more importantly, in a more able, agile and resilient JM.

Let me give you some examples of what I mean by this. We're a business built on science and that's our competitive advantage and I'm hugely proud of that. However, growing through science, JM's not historically operated in a standardised manner and this shows up across our business processes – in how we manufacture, how we procure and how we

manage our cash cycle. We're standardising the way we work, we're globalising pockets of best practice, we're making our business more agile and we're reducing costs. There's a huge amount for us to go for here while staying true to our science core.

For instance, we're investing in a more simplified and robust IT function. Four years ago, IT at JM was fragmented. Each site had its own autonomous IT function. That was not only hugely inefficient, but it carried risk and it meant that not all of our people had the tools that they needed to do their jobs. We've spent the last four years centralising and professionalising the function and improving the user experience. For example, we've migrated around 20% of users now onto our single global ERP system and by mid-2020 that will be 40%. This supports and accelerates our work on operational efficiency, allowing us to unlock further savings.

We're also making good progress in manufacturing. The improvements we've made, amongst other things, have resulted in a 20% increase in our capacity in our Clean Air plant in North America. That's allowed us to weather the peak of the heavy-duty truck cycle without any need to invest in additional capacity. We've also increased the capacity in our Clean Air Macedonia plant by 30% in the last year.

The creation of a procurement function two years ago is delivering significant value, as you've seen on the previous slide, but it's also driven consistency in how we manage our suppliers, giving us a much more resilient approach to sourcing our raw materials.

And working capital. Reducing average working capital days requires an understanding of the entire working-capital cycle. So how we pay our customers and why, how much inventory we hold and why, and how we pay our suppliers and why. Shining a light on this creates discipline through which we run our business better every day in many different ways: measuring our speed to invoice, removing duplicative safety stock, improving our planning. In Clean Air, we're working with the OEMs on optimising working capital management and we're able to share those benefits.

We've applied this discipline to Non-Precious Metal working capital. We measure success as maintaining Non-Precious Metal working capital days between 50 and 60 throughout the year, not just at points in the cycle.

Since the last Capital Markets Day, we've improved our Non-Precious Metal working capital by 11 days. That's a significant reduction. It takes about £120 million out of our working capital every month. We continue to target 50 days in the medium term and remain confident of achieving this. That would be the equivalent of taking out a further £100 million each month.

You will remember that last year we saw an increase in Precious Metal working capital, due to an outage in one of our UK refineries, which led to an abnormally high level of backlogs. This and an increase in metal prices drove a significant increase in Precious Metal working capital during the 2018/19 financial year.

Metal prices have continued to increase and that continues to negatively impact our working capital. However, we're working hard to reduce the volume of metal that we hold and there's two levers that we have to do this.

Firstly, reducing refining backlogs. It's a highly complex process that takes time and our refineries are sized primarily to support Clean Air and therefore there's little spare capacity to

process excess metal. That said, we're making good progress and we still expect to be at normalised levels by the end of Financial Year 2020/21. Once we return to these levels, we expect an overall reduction in Precious Metal working capital of around £250 million against the full year 18/19.

Secondly, we're investing to improve our refineries. Our refineries have been under-invested for several years. We've started investing and it will total about £100 million over three years. The benefit will be a further reduction in Precious Metal working capital of £100 million, meaning that this investment at a minimum will be returns neutral. Of course, Precious Metal working capital is not entirely under our control and it will continue to fluctuate, sometimes significantly, as metal prices change, and of course, as our customers change their requirements.

Moving to resource allocation. At our full-year results, we said CAPEX in 19/20 would be up to £500 million. This slide describes the make-up of that CAPEX and how we're seeing it evolve over the next couple of years.

We think about CAPEX in two parts. Firstly, maintenance CAPEX, which also includes smaller growth projects. On an ongoing basis, we foresee this to be at around 0.8 to 0.9 times depreciation annually. Secondly, we currently have a number of strategic projects, which I'll take you through individually. In all cases, I'm going to describe our CAPEX spend from fiscal 19/20 onwards, although some of these projects started last year.

In Clean Air, a mature business, we're investing in three new plants to scale up to support the growth. All three will have come onstream in 2020 and inclusive of this year we're investing a further £200 million. As we've won the volumes, the platforms that align to this capacity, returns will be similar to the rest of Clean Air, which is at a 30% return on invested capital. That will come through once these plants have ramped up.

In Efficient Natural Resources, as I've mentioned, we're investing a total of £100 million to improve our Precious Metal working capital as we upgrade our refineries, improving our safety, efficiency and resilience. That will be returns neutral and there's a further £70 million of investment to completion.

In Battery Materials, we're investing against our strong technology in a nascent market. As we commercialise eLNO, we'll invest a further £300 million, of which £280 million is CAPEX , across R&D, application centres and our commercial plant. This will get us to the point of commercialisation. This investment won't meet our returns criteria. However, at scale, this business should have a 20% return on invested capital.

As I've already described, we're upgrading our IT systems and investing in our global ERP system. Our ERP rollout is in line with plan. We're also investing in other global processes: infrastructure and cybersecurity. These projects are included within the £100 million remaining investment and will deliver further efficiencies.

Looking further out, we will continue to have a normalised level of maintenance CAPEX . We do not foresee further strategic projects in Clean Air and in the short to medium term in Efficient Natural Resources or Health. However, we do foresee the scale-up of Battery Materials. We only invest in strategic projects if they meet our disciplined investment criteria.

Even though we're investing in our business, we have a clear path to achieve a return on invested capital of 20%. Clean Air is a mature business that already generates returns of around 30% – well above the group target. Here, growth is driven by legislation and the investment will deliver the capacity to support that growth. We've won the business and we expect to maintain these returns.

In Efficient Natural Resources, there's several moving parts that expand our returns. I've outlined how we'll take £350 million out of Precious Metal working capital. And in returns, there's several new technologies that are driving an acceleration of our growth. Jane'll take you through these in the breakout session this afternoon.

And in Health, over the last five years, we've invested in the manufacturing assets and in building our pipeline, but we're not yet benefiting from the full value of this investment. Jason will share how we've passed the inflection point and will deliver significant returns.

So we're confident in our path of 20%, including the commercialisation of Battery Materials, which to the point of commercialisation, is a cumulative £350 million investment. Robert will take you through this later.

I mentioned earlier that we're well placed to manage our portfolio businesses, all of which are at different stages in their lifecycles. The return on investment target of 20% is an extremely useful strategic frame that provides discipline and rigour when making capital allocation decisions. All of our businesses should have the potential to have 20% returns when at scale. We allocate resource dependent on the stage of the lifecycle a business is at and we have different expectations from each. Whilst a business is in its infancy and as we scale up, returns will be below our target for that period, as has been the case in Health. For a mature business like Clean Air, we're maximising returns.

The 20% is not a hard, annual target: it's a strategic target. And therefore, you won't see us constrain investment in an opportunity which delivers on our strategy and our medium-term return criteria, even if it causes us to drift off from our target for a short period.

So, that should explain how we're using return on invested capital to bring greater rigour and discipline to the group, to deeply understand our businesses, where they stand in their lifecycle, how we allocate capital and how we increase efficiency.

So with that, Robert and I are very happy to take your questions.

Q&A

Robert MacLeod: Okay, so happy to take any questions that anybody might have. We've got some people with roving mikes and in the front row here, the sector chief executives are here to answer any more detailed questions. So, any questions?

Andrew Stott (UBS): Thanks. Andrew Stott from UBS. A question for Anna. You mentioned an issue with Macedonia. I just didn't quite understand what's going on there, so if you could explain the cost over-run I think was the phraseology and then how that might change in the second half and then further out. Also, staying with Clean Air, on the guidance you're giving for the year, when you say a slight down, what's the assumption you're making for the second half on both light duty production and on trucks versus where we are today? And then a second question is – sorry – is CAPEX. I was trying – this one's more

straightforward. I was trying to get to the CAPEX number for 2021 from the various numbers in there, but it's not possible. I wonder if you could help me.

Anna Manz: Do you want me to go for it?

Robert MacLeon: Go for it, Anna.

Anna Manz: So the first one, that Macedonia, what's happened in the first half? We've had some capacity constraints in Macedonia because a number of the platforms that we had in that plant have done very well and actually has pushed the plant – you know, created more capacity than we were able to easily deliver at that plant. And so to ensure that we were meeting our customers' needs, we've incurred all kinds of emergency freight and additional costs to ensure that we still delivered on the customer requirement.

Now, with the OEM summer shutdowns having just occurred, we've got our safety stock built back up. We've moved some of those platforms into other plants. That takes a little while because you have to have OEM agreement. So as I look at H2, I don't expect to see those costs. And because I know that you're going to ask me the question, it's about £20 million, the impact in the first half. So how do I feel about H2? I think the other thing to say about Clean Air is growth is solid. We're seeing good sales.

So our issue around H1 is actually about not having enough capacity because we are seeing good sales. So you know, as you know, our growth is driven by legislation. The weakness in the auto market is very much a secondary factor for us and is not something we see influencing performance and we don't particularly see that influencing performance versus our expectations as we look at H2. And in terms of CAPEX, I purposefully wasn't guiding, as you can guess, year by year, because it's very hard to know exactly when spend will be incurred as you're building a plant and which side of the fiscal year it will fall. But we've got elevated CAPEX this year. As you see from those strategic projects, there is ongoing elevated CAPEX. I would expect next year to remain high and the year after to be a little lower.

Robert MacLeod: Okay. Shall we move over to Neil, in front?

Neil Tyler (Redburn): Thank you, morning. Neil Tyler at Redburn. Two from me as well, please. Firstly, in the medium-term growth trajectory, you call out new licensing income. Is that assuming just a sort of normal upturn in the CAPEX cycle in the projects for which you offer licensed technologies, or is there something more specific on the horizon there – the distant horizon you can see?

And then secondly, on Clean Air, you talk about stable margins over the medium term. Is there a sort of upward contribution from a lower unit cost production of these new plants – Poland, China, India – offsetting downward pressure elsewhere, or is – are you assuming that unit cost production numbers don't alter a great deal?

Robert MacLeod: Okay. Shall I take the first? Do you mind if I do it the other way round? I'll take the second question first. So it's really about – look, we said two years ago we would expect fairly stable margins in Clean Air and we expect that to continue over time. As you probably know, every year automotive OEMs expect price-downs. And so, the efficiency we're driving through, the efficiencies of the new plants, will in some ways offset some of that price-down that we have coming through. That's the normal cycle. We would expect that to continue, but we're very confident that we can maintain those stable margins because of the

balance we've got coming through. Of course, we still see – and John will talk through later on after the break about some of the legislation coming through which gives you a bit of an uptick. But absolutely, we would expect margins to stay – because of all these factors moving up and down.

When I look at Efficient Natural Resources, we've got licenses are fairly steady at the moment, at a relatively low-ish level. We'd expect them to stay on existing technologies there or thereabouts, but some of the new technologies are coming through in the medium term and, you know, Jane in the breakout sessions will talk about things like waste-to-aviation fuel, MEG. But Jane, is there anything else you'd like to add? I think there's a –

Jane Toogood: you've said it.

Robert MacLeod: You've said it. Okay. So there's nothing more to add there. But she'll go into more of the details later on. And then obviously in the longer term, there are other opportunities as well for further licensing, but you know, as I said, Jane'll explain a little bit about that in the breakout group. All right. Lots of hands going up now. Shall we – I think Andrew was, had his hand up the last time.

Andrew Benson (Ambient): Too kind. Andrew Benson here from Ambient. Robert, you mentioned in your Battery Materials 2024 as a year of – I was a little bit confused – you mentioned perhaps it was commercialisation. Can you just flesh out what you meant that was going to happen, whether you were going to be achieving substantial sales? That was the earliest. Perhaps you could just clarify the reference to 2024. On hydrogen technology, did you mean sort of traditional gas steam reforming or do you mean other technologies? And can you just say when you think the earliest year it is you're going to get to 20%?

Robert MacLeod: Good try, Andrew, on that one. So, let me – God, my mind's going very quickly. What was the first?

Anna Manz: 2024 and the platforms.

Robert MacLeod: 2024 and Batteries.

Anna Manz: Yeah.

Robert MacLeod: So, look, what we're expecting is 2024 we'll be on commercial production, so we'll have our commercial asset producing on platforms in 2024. A little bit later than we said when we were together two years ago, but that's, you know, not a big deal for us as we understand much greater the – much better the way that the OEMs are going through all their validation processes, etc. But nothing we're particularly untoward or particularly worried about. The second one –

Anna Manz: Gas steam reforming.

Robert MacLeod: – was about hydrogen and gas steam reforming. Look, I think we are – as I already mentioned, a lot of the hydrogen – well, I didn't mention – a lot of the hydrogen generation in the short run I think is going to come from steam methane reforming. We already are the leading player in the catalysts market for hydrogen generation, but we have got new technology which we think can further enhance the performance of hydrogen generation, not just from a cost point of view but also potentially from a CO_2 point of view, as

it greater enables carbon capture and storage, for example, to happen going forward. That – those projects will start to come through we would expect in the medium term – medium to long term – but I wouldn't expect any big impact on that in the next few years. On the return on capital target, I know the answer is going to be we're not going to tell you, but do you want to say anything different?

Anna Manz: Well, I'm not going to tell you, but at the Capital Markets Day a couple of years ago, I said that we should be at a 20% return within the medium term. You know, medium term is around five years and, you know, we feel good about that, but I'm not telling you.

Robert MacLeod: I think it'll be a steady improvement. And it's not going to be a sort of one giant leap. Sorry, it sounds like someone else said that. We're not going to do one giant leap to get there. It'll be a steady improvement over time. Shall we keep the mic at the front? No, no, I tell you what – we'll move to the – sorry guys, we'll move to – I think you had your hand up there before. Yeah.

Sebastian Bray (Berenberg Bank): Thank you. Good morning. Sebastian Bray of Berenberg Bank. I would have a question about the returns target at 20%. This has been around for quite some time, from memory, since prior to 2015. But my guess is that the expectations of future business mix have changed quite substantially. Can I ask what the basis is for this target? Where does it come from?

And the second question is more on the long-term returns profile and batteries relative to the current returns in autocatalysis, which are higher than 20%. Is the idea for batteries – cathodes, I should say, that you hit 20% target and that's fine or do you view your potential returns as broadly similar to what is currently achieved in autocatalysis in the long term? Thank you.

Robert MacLeod: Okay. I've been around JM now a wee while and I can assure you the 20% return on capital target has been there for a lot longer than 2015. In fact, when I joined in 2009, the target of 20% return on capital was there. And I think it absolutely goes to what Anna talked about in her presentation. Around our science is what enables our growth, our competitor advantage and the markets in which we operate and the value that we get from our technology enables that 20% return on capital. It's a discipline we use to assess the markets in which we play and the markets in which we operate and the potential that we have. We absolutely think it's a strategic target, rather than a tactical target, and it very much frames the sort of markets in which we want to operate. Is there anything else you'd add?

On battery materials, look, I think the capital intensity of battery materials will be slightly different from the capital intensity of clean air, as you know. And I think the first instance for us is scaling up the business and getting to that 20% return on capital target. And I think, you know, it's far, far too early today to suggest what the long-term return on capital target or return on capital potential might be for that business but we absolutely believe that where we're playing, the value that we're going to deliver for our customers can deliver a 20% return on capital. And that's the area that we're going to play to enable that. But look, whether it will go beyond that or not or fall shy of that, we don't know at this stage. But we think that the potential of the market is there.

Sebastian Bray: Just as a…

Robert MacLeod: Go on, you can have a quick follow-up since you've still got the mic.

Sebastian Bray: Just as a quick follow-up, if you are able to set a return on invested capital target for the battery business, the cathode business, does that mean that you have enough preliminary indication on pricing of this material at this stage to start to feel comfortable on that front or do you just have a baseline assumption at this stage on what pricing would be?

Robert MacLeod: We've got a – over the last couple of years, we've been working a lot with customers, we've been learning a lot more about our business. So absolutely. This is not a shot in the dark. This is absolutely our belief about where we can play and what we can deliver from this business.

So we bring – I think we've now got two – we'll come to the front. I think Adam was first. Sorry martin. And then we'll come to you afterwards. The mic's behind you.

Adam Collins (Liberum): Adam Collins from Liberum. Couple of questions please. Maybe one for Anna to start with. We haven't talked about this year's cash flow today. Obviously there's been a big move in Pgm prices in the last few months, which normally has an upward pressure on the Pgm component working capital. Can you just comment a little bit about how you're seeing that in the business right now?

And then going back to the battery side, just a clarification on some of the points you've made. I think you talked about the 350 million investment. Could you split that between CAPEX and working capital? Previously you talked about 10,000 metric tonnes per annum of installed capacity to start with. Is that still the plan? And you talked about two OEMs being at the cell testing stage and you've had more until now. Can you talk a little bit about what the overall customer interest is? How many OEMs are working with you? What's the status with the others?

Robert MacLeod: Okay. Shall we – I'll read the –

Robert MacLeod: You go first and I – you've read – you've asked a lot of questions.

Anna Manz: Yes. They're scribbled. So cash flow. You're absolutely right, Adam. We've seen a significant move in precious metal prices and that is not helpful for our working capital. So this year we've got heavy CAPEX and, you know, quite a significant move in metal prices and that will not be great from a cash flow perspective. But I'm not going to guide on what it will be because it sort of depends on where those prices go.

Robert MacLeod: And on batteries, the 350 million of investment we talked about is really from inception to commercialisation. So that includes all the costs we've incurred to date in R&D, in development, the application centres, the pilot plant and getting to first commercial production. So essentially in a way it's the sort of risk capital to some extent because, you know, we're – we're absolutely confident in this business sand the opportunity they're going to have but that's the investment we have – we will be making in this business before we get to first commercial production. It doesn't include working capital because it's a capital number we were talking about rather than anything else.

Full cell testing, absolutely. We've gone to – gone forward with two customers at this stage. We are working with a number of other customers who aren't quite as well advanced with us as those other two are and I mentioned that full cell testing is very much where – we talked before about coin cells, which is essentially us providing samples to them. Them being our

customers. When you go to full cell testing, they start investing more in the development of the material rather than it just being down to us. So it's a validation of that next stage in the development of the business and gives us confidence in how we're progressing. Clearly we're talking to other OEMs and other cell manufacturers, and I'm not going to go through exactly how many they are, but we are talking to some others. So it's not just these two and that's it. I think it's very much a range of customers we're talking to. And look, if I told you who they were, you would recognise the names. They are, you know, serious world scale OEMs that we're talking to. I think that's…

Adam Collins: The 10kt.

Robert MacLeod: Oh sorry, the 10kt. Absolutely our intention is to put 10kt. The first investment is 10,000 tonnes in Poland. I mentioned I will talk later on about our scale-up stagey and how we'll do that, talk about that after the break. And the first – first commercial production, we won't have all the 10,000 tonnes available because it will be done a little bit over time. But absolutely, the intention is for the first investment to get to 10,000 tonnes.

I think Martin was next and then we'll come over to – let's see if we can be ready for over there after Martin. Sorry. Took your bit of paper.

Martin Evans (HSBC): Thanks. Martin Evans, HSBC. Anna, just going back to your sort of – your focus and the things you're looking at, procurement manufacturing, systems, ERP and so on. I think you joined in October 2016 and fairly quickly identified a lot of efficiencies that you could work on. I guess the question is to protect profits, in the short term, do you think the low hanging fruit has largely been taken and how much more is there to go on? I appreciate it's an evolving strategy. And also, I guess, from Robert's perspective, when Anna came in and identified these things that could be improved, what was your feeling when you were doing that job as to how and why they could be changed and I guess why they weren't changed before Anna arrived?

Anna Manz: Robert started it with SAP

Robert MacLeod: Thanks. Look, I think – yeah. Look, I mentioned earlier on about how we're transforming JM and it's that transformation that's happening and hasn't started to happen over the last five years and it's accelerating as we bring in the people that know what good looks like. Anna very clearly being one. But it's not just Anna, it's a range of people across the organisation. And that's accelerating that growth and that opportunity. I think it was there but it's all very well being there, but you've got to have the people with the capability and the skills to actually go after it and deliver it. And that's what Anna's brought in and I think you'll talk a little bit more about what the further opportunities are. But I think it was just about making sure we have the capability and the capacity in the organisation to deliver it.

Anna Manz: I think, Martin, the really important thing is that we deliver this change, this standardisation in a way where we don't lose our core competitive advantage of science at the heart of everything. Because in some ways, our lack of standardisation has come from that. We've grown scientist out, plant up and that's why, you know, sitting here today, there remains a big opportunity in terms of moving everybody to a standard way of doing things. But I think Robert and I are very cognisant of implementing that change, which will deliver savings but at a pace that doesn't get in the way of our growth or hurt anything that's at the

heart of what we do. I think sitting here today, the opportunity is big. Not just in procurement but more generally as we continue to look at standardising how we do things.

Robert MacLeod: Okay. I think we had a question over there.

Tom Wrigglesworth (Citibank): Good morning. Tom Wrigglesworth from Citi. So first question, you – could I ask you to kind of give a bit more colour about the passing of the inflection point in health? How are you defining that inflection point and maybe, you know, what should we see going forwards as that infection point has passed? Is there more clarity now about the mid-term earnings potential for health? And secondly, on the procurement savings, are these net of fixed asset cost inflation or are they gross? And if not, what is the fixed cost inflation that the business should experience? Thank you.

Robert MacLeod: So I'll go first and talk about the health inflection point. I mean, we talked before about and you will have seen how the business has been suffering from the underinvestment for many, many years before and the decline as product life-cycles evolve and the declines as product life-cycles evolve and the old high margin products come off cycle. But now we're starting to see the new pipeline coming through, the new products coming through, the improvements and efficiency that Jason and the team are driving through.

So what we mean by inflection point is essentially about operating performance. Inflection point. We've past it, so we're now going in the upward trajectory. And as I said, we'd expect to see – what, A, we've got the £100 million by 2025 we're still confident in delivering that but it's not one lump at the end in 2025, it's on average double digit growth year after year for – through that period of time. Now that doesn't mean every year it's going to be double digit, it means on average it's double digit. But it's not sort of up, flat and then wait for four years before it goes up again, it's a much more gradual steady trajectory.

And on procurement, that was quite a detailed question. Do you want to answer that?

Anna Manz: Yeah, sure. So you know, when we count procurement savings we are very rigorous about it because it is very easy to count all kinds of cost avoidance as the saving. We need to be seeing a tangible saving versus our plan. Now there is an element of raw material inflation in some of our raw materials and some of that, actually, the nature of our raw materials we won't be able to mitigate but these are absolutely clear realisable, see it in the bottom line and can therefore reinvest it savings that are achieved versus where we thought we would have been.

Robert MacLeod: Okay. I think we had Chetan at the front here. Sorry, Nancy.

Chetan (JP Morgan): Hi. Chetan from JP Morgan. Just on health, Robert you referred to moving resources from generics into more innovation-based products. Is that a reflection of some risk playing with some existing pipeline that is making – forcing that change to some extent? And second question was on, you know, the next stage of testing on battery materials. Has that given you guys more clarity on the competitive landscape out there in the market, especially given that there is clearly some concern that Chinese have been able to catch up in this business faster than many might have thought, say, 12 to 18 months back?

And so last question, we are coming to an end of first half, so to the extent you can provide some sort of colour on how to think of the split of first half, second half. Thank you.

Robert MacLeod: Yeah. So on the pipeline of new products, look, I think it was a resource allocation decision by us. It was absolutely not a reflection of the pipeline. It was a reflection of the fact that we saw innovator products which have a lower risk, better return profile and we – and Jason and the team – took affirmative positive action to say we would rather invest in the innovator, they came quicker than we were expecting maybe a couple of years ago and so we positively decided to reallocate resources, because we've only got scarce resources, development resource and manufacturing resources. We couldn't just add them all up because then we couldn't deliver it all, so it's a positive reallocation of resource into the innovator business. And it's a better business, better returning type business.

On the second question which was on the fuel cell testing, has it given us greater clarity? Well not really, because what OEMs in some ways – because we don't know exactly who the competitors are. What OEMs are very good at is they give you the data which says how are you performing relatively to others, so that has given us real confidence about our materials, but they don't tell us who the others are. They would sort of – you know, company A or 1, 2, 3, 4. They don't say who they are or what's – which one's which. But you do see your performance, you do get data which says how you are relatively doing – relatively speaking. Not only is it a good step forward for us and validation of what we're doing but also the data that we're getting is very positive as well, which give us – you know, adding to our confidence.

And on the first – I know the answer, but –

Anna Manz: You know what I'm going to say, Chetan, which is I can't tell you the answer but usually our first-half-second-half phasing historically would've been kind of 48:52. I wouldn't be guiding to a weaker first half if I wasn't wanting you to understand that it would be significant – well, different from that and different enough for me to be standing up here saying the first half will be weaker for the reasons we understand, incremental costs in clean air associated with those Macedonia challenges which go away in H2 and the fact that both our ENR and Health businesses for different reasons are naturally second-half weighted. Health because some of our APIs take six months to make, therefore we only sell them in certain windows of the year. And in Efficient Natural Resources, what you see is people, particularly in catalyst technologies, purchasing catalyst ahead of plants, some are shut down so there's a natural skew. We see our order pattern, it's going to be second-half weighted.

Robert MacLeod: Okay, there seems to be sort of a lack of questions now, which is fine, so why don't we break now and when do we get back, Martin?

Martin Dunwoodie: We have a break until 11.10, so if you can be back in the room for 11.10 for the next set of presentations. There's coffee outside. I think it's outside to the left. Yes, outside to the left. But yeah, if you can be back for 11.10. Thank you.

Introduction

Martin Dunwoodie

Director, Investor Relations

Right. Thank you very much everyone. Back pretty much on time. Thank you to Robert and Anna for the presentation earlier and next up we have two presentations coming and then

Q&A on both. First off, we're going to have John Walker, our Sector Chief Executive on Clean Air and then we will have Robert Macleod, our Group Chief Executive talking about battery materials. Now I'll hand over to John.

Clean Air: Sustained Growth for the Next Decade

John Walker

Sector Chief Executive, Clean Air

Thank you, Martin. Still morning, I guess, so good morning everyone. I'm John Walker, Chief Executive for our Clean Air sector. I'll be updating you on progress on strategies since our last capital markets day in 2017 and how we're confident in growth for the next decade. As we announced over the summer, I will be retiring at the end March after a 35-year career with Johnson Matthey. It's been a privilege to work with so many talented and dedicated people over the years to transform clean air into a world-renowned substantial sector for Johnson Matthey.

Clean Air remains well-positioned for sustained growth and I'm pleased to be handing over to Joan, who with her strong background and supported by her competent and able Clean Air team will ensure the business continues to drive value for Johnson Matthey and improve air quality for millions of people around the world. Joan will join us on 1st October and will have full responsibilities for the sector from that date and I'll offer my support as needed because I'll be around through March. We look forward to welcoming Joan to Johnson Matthey.

So let's start by looking at Clean Air today. A sector that represents around 65% of group sales and underlying operating profit and delivers a high return on invested capital of around 30%. Our growth has been driven by legislation but with the energy transition towards low carbon, sustainable and cleaner transportation, we're seeing a greater consumer behaviour demanding clean air. Whilst the internal combustion engine is a major part of the power train, we will continue to develop our mission control science to make the air cleaner and healthier. Our catalyst up around 3.4 million tonnes of pollutants every year, improving air quality, helping to make the world a cleaner, healthier place. In fact, in some polluted cities, often the air coming out of one of our catalysts can be cleaner than the air going in. So with nine technical centres, 14 global manufacturing facilities and three further plants in construction, we have strong and leading positions in many of the markets we operate. As well as strong relationships with almost every major car and truck manufacturer around the world. One in every three new cars and six out of every ten new trucks carries one of our emission controls catalysts.

So since the last capital markets day in 2017, we've made good progress on our strategy. We've grown our operating profit by compound annual growth rate of 11% and we're on track to deliver our medium-term guidance. So some of the highlights since we met in 2017, we saw a huge uptick in market-shares in Europe light-duty diesel, an impressive 20 percentage points, leaving us with around 65% of the market at the year-end. New legislation in Asia is confirmed and will be enacted from early 2020 and we are all set to win our share of both the China and the India VI legislation. In North America, we've successfully managed an extend upcycle in the heavy-duty business and crucially we've done this without having to add any additional capacity or assets. So we've made progress adding new capacity in Europe and

Asia to support growth. Two world class plants will be coming on stream in 2020, Poland in the Q1 calendar year of 2020 followed by China in Q2 and then third plant India in Q3 of 2020 calendar year. And has Anna said, each of these factors will take about six months to ramp up to full capacity. Our new plants will be highly flexible and efficient and will deliver both the capacity and capabilities to support OEM platforms that we've already won.

However, we've seen some unexpected challenges and we've had to demonstrate our resilience and agility to navigate these. The two main issues have been rebalancing our supply lines for the new business won in 2018/2019 and this has put existing pressure on our existing footprint from a capacity and capability perspective, particularly in Macedonia. And that's resulted in short-term one-off cost inefficiencies. We've now rebalanced the new business across our existing plants to relieve the pressure. The second issue is gasoline market share in Europe, where we've seen some share losses mainly driven by the business we have with OEMs slightly underperforming in the market. So we talked about winning with the winners. Well know some of our customers are losing in the market. We're refocusing our investment in gasoline to ensure that we're in a position to gain market share in the future. So as a result, we expect a slightly softer 2020, as already mentioned by Anna, before returning to normal margins in 2021. Overall, we're on track to deliver mid-single digit growth and operating performance to 2025 and sustained growth over the next decade. So let me explain those growth drivers over the next decade.

So this summary shows our growth profile over the next decade and the key drivers. I'm not going to go into detail on this now as we'll cover this region by region in the following slides. But to give you a summary, I already talked about the softness in the first half of the current year and the fact that we've now rebalanced our plant loadings in half two to ensure that the onetime costs do not repeat. In the following years to 2025 we expect mid-single digit growth in operating performance, driven by new legislation in Asia, which more than doubles the size of the business there. Beyond that to 2029, we see low-single digit growth and operating performance. The Euro 7 discussions in Europe are much more advanced now and there's also the possibility of new legislation in other parts of the world. The legislation in other parts of the world is not confirmed yet but discussions are progressing and we're confident that new legislation will be introduced in all regions in the period. We have longer term growth opportunities but we can't really define the benefits case until there's more clarity on some of this new legislation. We're also targeting the market share growth opportunity for Johnson Matthey in light-duty gasoline by refocussing our R&D spend in these areas.

So starting with Europe, we expect by 2025 our overall European clean air business will generate the same profit as it does today. Within this, light-duty is expected to show a small decline and there are quite a lot of moving parts here but the key ones driving light-duty are market shares in light-duty, gasoline and diesel will remain stable. We previously assumed some normalisation of our 65% share of the light-duty diesel market but we're now confident of retaining this for longer and the confidence, I guess, is we have platforms we are bidding on and winning that are now entering 2024 model year. So that's what gives us that confidence. Diesel share or the Powertrain mix will decline and we continue to expect 25% of light-duty vehicle sales including commercial vehicles to be diesel by 2025. And legislation will continue to drive greater fitment of gasoline particular filters.

In heavy duty we expect growth to be broadly in line with GDP, given that there's no material new legislation. And our new plant in Poland comes onstream in 2020 and this is a key driver of value for the segment. Not only because it's a world-class facility but also because it relieves the supply pressures in our existing plants that were mentioned earlier.

So as governments and consumers look to reduce emissions, we see consumer behaviour move through a range of choices from diesel to gasoline, from diesel and gasoline hybrids to pure battery electrical vehicles and hydrogen fuel cell vehicles. Diesel, as you all know, has been in the news for the past few years and that has led to a change in consumer behaviour and a decline in the proportion of diesel and the Powertrain mix as you can see from this chart. There's a wide range of assumptions about how this will develop in the coming years.

So now looking out to 2030, we've been prudent and assumed the ration of diesel or gasoline falls to 10%. So you can see this at the lower end – this is at the lower end of the estimates. But even with this pessimistic assumption, we still forecast growth and clean air over the next decade. The assumption still holds that for every 1% decline in diesel to gasoline below our assumptions, it impacts gross profit by £4 million. And a move to hybrid is neutral to us as they require broadly similar after treatment solutions.

So here you can see the key assumptions for Europe. Vehicle production remains low. Diesel share of the Powertrain mix I have already mentioned. We're getting value uplifts in both gasoline and diesel from legislation. Up to 2x in gasoline and up to 1.5x in diesel. And hybrids are neutral to us, as I said. Better electric vehicle penetration, we continue to assume 9% by 2025 and will maintain our share in light-duty diesel and gasoline vehicles.

Moving now to the Americas. Put simply, without material new legislation in the next few years, we don't see significant growth drivers in this region and expect growth to be in line with GDP. Heavy duty, which represents 17% of the sector, moves in line with the US truck cycle in the absence of legislation. The challenge here is to satisfy the demand at the peak of the cycle without adding any capacity and history has shown that we're very able to do this.

Looking at our assumptions for the Americas, you can see that there's not many moving parts, with low vehicle production, modest legislation and little by way of battery electric vehicle penetration or market share moves.

Now to Asia. Our light duty Asia business currently makes up 13% of sector sales and more than doubling in size by 2025 that I mentioned is being driven by legislation, particularly in China. Near-term growth will be driven by China VI legislation in heavy duty, which will see up to a tripling of the value to us, phasing in from 2020 with the full value by the end of 2021. I think I said earlier, there are two phases to both the China and India legislation, so I'm talking about this in two stages. Further on, expect growth to be driven by China VI in light duty, this is the second phase of the legislation, where we will see up to double the value on cars for us from July of 2023. That additional value comes through the fitment of gasoline particular filters and compliance with real world driving standards. We're seeing some GPF fitment to light-duty vehicles already and this will accelerate as the legislation comes into force.

In India, BS VI legislation will see up to tripling the value in heavy duty, starting in April 2020 with the full effects being seen by 2023 when trucks will require the full emission control

system to meet real world driving standards. So the Indian legislation comes in two parts as well. And we'll support our growth in Asia from our new world-class plants in China and India.

Key assumptions in Asia. Here you see the key assumptions that we've used in our planning. The biggest value drivers are the value uplifts in heavy and light duty. These more than outweigh moves in the others given their size. Although, for completeness, you can see that we've assumed for auto-production, BEV penetration and our market shares.

I've talked to you about a number of legislative drivers on our business but there's also changes in consumer behaviour that means the landscape is changing all the time in ways that are hard to predict. It's particularly evident when you look at the Powertrain and you can see the range of outcomes that people model. We've already shared with you the penetration levels of the battery electric vehicles that we assume, and this hasn't changed since 2017. The sensitivity to one percentage point change is £7 million on gross profit before mitigation. But what this means for us is that with the uncertainties we need to be able to manage our business in a flexible and agile way so that we can deliver results irrespective of the level of battery electric vehicle penetration or the pace of change.

So our drive for efficiency and building an agile business is critical moving forward to help us support our customers. We don't do these things for the sake of efficiency alone but in being able to help our customers, we enhance our competitive position. In the next few minutes, I'll take you through how we use our science, manufacturing and procurement to help us solve the challenges our customers face that arise from the fast-changing world around us all.

So we use our science to solve our customers' complex problems and we're increasing our investment to around £95 million in R&D from this year. Which is about 3% of sales. This investment in Clean Air is predominately going into gasoline technology to ensure that we're well-positioned to win business from 2025 as the new Euro 7 legislation is enacted. And we're making good progressing in identifying new technological solutions for the future needs of our customers as they face tightening legislation on gasoline and diesel platforms. We've directed some R&D spend to gasoline where we see an opportunity to improve our technology. We already have a pipeline of technologies that address Euro 7 legislation and we are focussed on increasing these solutions and officially scaling them up well before the legalisation requires compliance. This is what we did with diesel back in 2015/16, which enabled us to be ready when our customers needed enhanced solutions to win market share. We're doing that again now in both diesel and gasoline to build in that flexibility.

So I'll just give you a quick example of what we're working on to reduce emissions. One of the things we're working on is called 'start'. There's a larger prevalence of start-stop vehicles out in the marketplace today. And with real-world driving conditions, you know, the cold start portion of how we do the testing makes a bigger impact on emissions. So coming up with new cold start technologies is critically important for the Euro 7 legislation going forward.

So we have three new flexible and efficient plants in Poland, China and India which come on stream next calendar year. So we've already focussed on maximising the outputs of our existing plants to minimise the need to add further capacity and approve our returns. Last year, we increased our heavy-duty outputs in North America by 20% and our overall output in Macedonia by over 30%. On top of this asset leverage, our aim has been to add sufficient

capacity to support our growth so that we optimise our footprint and maximise our overall returns. In addition to capacity, one of the benefits of our new plants is that they provide standardised manufacturing assets, allowing us to move products all over the world. A truly flexible manufacturing base. This will allow us to drive further efficiencies for our footprint moving forward.

My new baby here. So Robert's allowed me to go a little bit – what did you want to call it, off-piste? Yeah. So you've been hearing about – you know, me talking about these factories for a long time now. So today, I wanted to do a little bit more than talk about these factories. I want to at least show you why I'm so proud of these facilities. So this is a recent picture of our Poland plant. So one of the things I pioneered in my 35-year career at Johnson Matthey was colour coded floors. Alright. So living in Japan and having the honour of spending a month working with Masaaki Imai, who's the author of the Gemba Kaizen books, and understanding the importance of cleanliness and orderliness in a factory was invaluable to me. So when I reviewed this with one of our analysts before this presentation, they said they couldn't understand why clean floors were important.

So I went okay, let me try and start over and explain this to you. So clean floors do matter because they're the early warning systems for leaks in a chemical plant and maintenance issues show up because you can see anything that's leaking on these clean floors. So Mr Imai would be very proud of these floors. So we've already had several European customers visit the plant and they all have been very impressed with what they saw. These three new factories are the best of the best that we've built in all my years in Johnson Matthey. And you've heard me say how efficient the Macedonia plan is: well this Poland factory will be more efficient than Macedonia, in particular our larger sized parts. So we can run larger sized parts through the Macedonian plant at either the same efficacy or improved efficiency in Macedonia. So the throughput in this plant will be truly impressive.

The noise levels inside the factory and on the perimeter boundaries are the lowest we've ever had. We used gravity – you can't really see that in the details of this picture but we use gravity to move our slurries around the plant. So we've eliminated 50 pumps on this level of the plant. These new factories, you know, I've talked about this before, can make our whole product mix. Light duty, heavy duty, flow through and filters. So everything – every product that we make, we can make in these new factories.

So Robert only gave me 20 minutes for the whole sector, so I'm sorry I'm going to have to cut this short because I could've used all my time to talk about this. So in the interest of time, I'll leave it there but I encourage you to get out and see these factories. So I'm proud of them and I'm sure that you'll be impressed.

Procurement. Seems like a little let down coming to procurement after that but anyway. Procurement. Procurement is integral to our strategy and the savings are driving value to clean air, which accounts for 60% of all the group procurement savings that Anna put up on the board there. But it's more about just lowering cost. Procurement's increasingly becoming part of our strategic decision making. For example, in our new product introduction area and clarity on how and where we source materials will increasingly improve our ability to design optimal solutions for our customers. This is becoming even more important with tariffs starting to show up everywhere, so sourcing of raw materials is critically important to our strategy.

In addition to direct efficiency benefits, procurement is also helping to build agility into the business. Improved logistic flows offer the opportunity to improve service and security of supply to our customers. In the event of Brexit, our procurement of logistics will be a critical enabler of our supply strategies. And finally, we're working hard to improve our key supplier relationships to ensure we deliver excellent service and quality to our customers. As an example, we're committed to working with substrate manufacturers to deliver great products to our customers.

So to close, in summary, I've gone through the drivers of growth over the next decade with the main driver being Asia where our business will more than double in size. What you're also seeing are the change that we're making to Clean Air where we're building a flexible and agile business which is fit for the future and can navigate the challenges that the changing world presents to us. So I'm confident in the future and proud to hand over a world-leading business to Joan.

Battery Materials: Breakout Growth

Robert MacLeod

Chief Executive

Thank you, John, and I'm sorry to have cut you short from your opportunity to talk about how wonderful these people are. So I haven't been out to Poland yet, but I'm looking forward to seeing the shiny floors in full production which will be coming out soon.

But good morning again. I'm going to talk about Battery Materials Strategy and the progress that we've made on the development of this business over the last couple of years.

If you recall in 2017, we introduced our ultra-high energy density cathode materials, eLNO, and we also explained how excited we were about the potential that eLNO offers to enable the developments in the market for long-range pure battery electric vehicles.

As I'll explain over the next several minutes, we have made good progress over the last two years and are now well and truly in the commercialisation phase for this business.

We are therefore delighted to announce a couple of weeks ago that Christian Günther will be joining us as Sector Chief Executive of Battery Materials on the 4th November. Christian joins us from Tasnee, a Saudi Arabian industrial company, where he held a number of senior roles. He has a strong background in science and a successful track record in the development and leadership of large global technology businesses, an ideal skill set to lead the further developments in commercialisation of this business.

Christian is with us today and will be joining me in some of the Battery Materials Breakout sessions this afternoon so you'll have a chance to meet him there.

Over the last two years – few years, the external environment continues to drive at pace towards electrification. The energy transition is well underway and consumers are changing their buying behaviours as they have become more aware of air quality and climate change concerns and hence are demanding options from OEMs to enable them to make a difference.

In addition, legislation, not only emissions legislation, but also carbon dioxide regulation, remains a further key driver for change. And battery electric vehicle adoption is also being further enabled and influenced by government subsidies and incentives as we've seen in China.

So irrespective of how battery electric vehicle adoption will develop, it's clear that there will be significant demand for cathode materials in the future. And as the pace of electric vehicle adoption grows, our ambition is to successfully commercialise a business and build a business of scale.

To enable higher penetration of electric vehicles, consumers are demanding that OEMs solve a number of issues. And while solving each on their own is relatively simple, doing them all together is complex. Range anxiety and total cost of ownership, particularly for larger electric vehicles, remains a key barrier to mainstream ownership. This will require innovations in cathode materials, as well as across the entire lithium-ion battery supply chain.

At JM, we are focusing our efforts on leveraging our science to develop solutions to address these concerns and reduce the total cost of ownership. eLNO is a portfolio of ultra-high nickel cathode materials which offer a step change in energy density, as well as overall performance. I'll talk more about the specific benefits of eLNO shortly, but high nickel is where the market is heading.

Furthermore, as the industry continues to evolve. OEMs are demanding, the best cathode materials to enable them to satisfy ever increasing consumer demands. But just as importantly, they are all pursuing different strategies to solve these problems and this as a result requires greater customisation of the battery materials for each customer.

Our initial focus within our battery materials business is in cathode materials. This is the part that has the greatest impact on performance and cost of the cell, but it's also the most complex part of the value chain. Like we do across all of JM, we've targeted the most difficult area as this is where our science can really translate into value, but that's not the only complexity.

I've already talked about the need for customised solutions, where technology remains a key differentiator. But in addition, OEMs require strong and secure supply chains, something that, through our long involvement within the automotive industry, we truly understand. And there are long lead times with many testing procedures to go through before platform qualification. All of this means high barriers to entry which plays exactly to our strengths.

eLNO is a next generation cathode material. We've said before that compared to the current automotive commercial benchmark, NMC 622, eLNO is around 20% to 25% higher energy density and it's also better compared to the next generation NMC material, NMC 811, that is not currently widely used. As all materials develop, ours and those of our competitors, we will continue to maintain our competitive advantage and evolve the family of materials that we call eLNO.

But to enable long-range, the industry is, like we've already done, moving to ultra high energy nickel materials where eLNO already outperforms. Today's current materials are not able to deliver the necessary performance at an acceptable cost.

To give consumers what they demand, OEMs are over-specifying the size of the battery and hence the quantity of battery materials which significantly adds to the cost of the vehicle. With better performing materials, with higher energy density customised to meet the other requirements of customers, OEMs can either increase the range of the vehicle by using the same size battery or substantially reduce the size of the battery and hence, cost, to deliver the same range. It is this market that eLNO is there to address, long-range pure battery electric vehicles, particularly with those OEMs that are performance-focused and it is that market that we are targeting.

And our goal is to capture value by being a provider of leading cathode materials that delivers value to our customers. But to be clear, small or potentially shorter-range battery electric vehicles may well use other materials where that higher performance is not particularly valued by the customer and our customers.

As I have just talked about, eLNO is a high-performing next generation cathode material. It has higher energy density compared to other current and next generation materials, but it has other characteristics, too.

Good power performance, which means faster charge times, and good stability or cycle life which is another key differentiator. Good cycle life is important because OEMs must ensure the batteries in their cars will last for many years and many miles. They don't want nor can afford to replace the battery if its performance degrades too quickly.

So maintaining the high energy density for a long time is an essential way to enhance the life and hence performance of the battery. Once again, if the cycle life wasn't good enough, then the OEMs would have to over-specify the battery, again adding to the overall cost.

Another way that we help to address costs is through managing the quantity of cobalt. Our ability to thrift cobalt, similar to what we do with auto catalysts in pgms is, attractive to our customers. Our materials contain considerably less than 10% cobalt.

I'm sorry, but I'm not really going to – I'm not going to disclose at all exactly how much but again, this lowers the cost. And we continue to lower the cobalt content for those customers who choose to optimise on this requirement, but they don't all do that.

Whether we look at energy density, range, power, stability, it's the overall performance of eLNO and our ability to optimise for the specific characteristics that matter most to our customers which is attractive to them.

As the electric vehicle market evolves and we progress through customer testing, it's becoming increasingly apparent that our ability to customise is, and will remain, a key to capturing value from our technology. Different OEMs are pursuing differing strategies, and the ability to provide a customised solution that meets their specific requirements will enable us to capture value.

The chart on the left-hand side shows how we tailored eLNO to meet a specific customer requirement. And this is one of the customers that's taking us through to full cell testing. The first formulation is the base but our customer asked us to lower the cobalt content. We did so while slightly increasing energy density but at the expense of cycle life.

However, after further tailoring, we were able, in the third formulation, to recover some of that cycle life at even lower cobalt content. This is an example of how our technology

expertise enables rapid development and customisation to meet the needs of our customers. It demonstrates how we're able to meet a multitude of demands through the application of our clever chemistry and our customers are very supportive of this, as you can see from the quote on the slide.

To support our ability to customise, we are building best in class application and testing facilities. And this photograph shows our first application centre which is now in place in the north-east of England. Our centres will include a range of facilities from laboratories to demonstration cell, manufacturing capability and they are critical to delivering the tailored solutions that our customers are asking for.

These centres are crucial to support new process and material development, ensure that we have the right quality assurance and quality control of our new materials and perhaps most importantly, provide capability to fabricate and test large format cells. This will be crucial to support new product development and provide customer specific performance data.

Understanding exactly how our materials perform within our customer applications is essential to enable us to more accurately customise our materials to meet their requirements. And this is entirely analogous to the testing centres that we have within our Clean Air business. These application and testing facilities are at the heart of our strategy.

Our technology will continue to evolve and our R&D effort will be sized to ensure that we remain at the leading edge and we will scale our business accordingly. We will not be playing at the commodity part of the battery materials market.

Overall, I'm really pleased with the progress we've made in battery materials over the last few years. There's a huge amount of work going on behind the scenes as we develop the best technology, build customer relationships and progress with commercialisation. We have a strong team of around a 150 people, of whom around 80 are in research and development. And the recent appointment of Christian as sector CEO, is another important step in our battery materials journey.

Customer feedback from both OEMs and cell manufacturers remains positive and we recently moved as I've said already into full cell testing with two of these customers. This essentially is where we move from testing coin cells to larger format cells which is equivalent to A samples that we've talked about previously. And as I mentioned, the move to full cell testing means that they've down-selected to only a few potential suppliers and they are now starting to put more investment in their side to further develop, formulate and test eLNO. This will be an iterative process over the next year or so, as we will jointly further customise the material in their – to their specific requirements and applications.

This is another significant point of validation which gives us significant endorsement of our technology. We're therefore confident to continue to invest in assets to support our commercialisation efforts, and I'll talk through the timeline for this on the next slide.

And we're also making progress on sourcing key raw materials. You recall we secured our first supply agreement with Nemaska Lithium for lithium hydroxide. And whilst we haven't announced any other long-term sourcing agreements yet, we are actively working on this area in preparation for our first commercial plant. And alongside all of this, we are evaluating the best options for scale up which I'll come to shortly.

To support our commercialisation, we're building several key assets. These investments are essential to succeed in battery materials and they enable us to prove that eLNO is a leading cathode material and we won't be able to win customer platforms without them.

We must have the ability to manufacture at scale to win substantial contracts. But in addition, before finalising a contract with us, we expect that the OEMs will require us to produce validation scale quantities of materials from the plant that will produce at commercial scale. This is our short-term limiting factor.

Today, our pilot plant in Chilton is fully operational. It's a research development and small scale production facility with a capacity of 10 tonnes per annum. Our pilot plant is the first step in demonstrating scalability of the eLNO process to customers which is vital to access the EV market. And it also allows us to manufacture the quantities of materials required for our customers full cell testing that I talked about a minute ago.

We're also making good progress with our first commercial plant in Poland. This plant will have a capacity of 10,000 tonnes per annum but the land that we have purchased has the capacity to expand to up to around 100,000 tonnes per annum. We aim to break ground in Poland this fiscal year and it should be operational in 2022.

And it is from this plant that we will be qualified and awarded customer contracts and it allow us to be supplying platforms in production by 2024.

Our investment in battery materials across JM is significant and we anticipate by the time we have commercial production from our plant in Poland, we will have invested around £350 million in the business since inception. That includes our investment in the pilot plant, application and testing facilities, the first commercial plant itself, as well as the R&D and management that it will have taken us to get there.

Additional investments in scaling up our business beyond that will be made with a knowledge that our eLNO materials are successful in the market. So as you can see, we've been incredibly busy over the last two years in developing our battery materials business. This is a significant growth opportunity for us, and we are confident that we can build a successful, scalable business.

I spent the last few minutes talking about what we have been doing to enter this market, developing our products and building our manufacturing capabilities. And at the same time, we've been working through our plans for scale up beyond our first commercial plant. Further expansion is likely to be phased. Adding capacity, probably in units of 20,000 tons per annum at a time. And alongside our R&D efforts to further enhance eLNO, we are already working on process improvements that will enable us to reduce the capital intensity and operating costs for future plants.

In addition, the learnings that we will take from the pilot and first commercial plant, from both a science and engineering perspective, will help us to enhance performance still further. We are thoughtful on how we will choose to invest and we're aligning ourselves with the pace of growth of the cathode market. Through a modular scale up – type scale up we'll be able to effectively manage risk in what is still a very nascent market. We will be able to be move quicker or slower depending on how the market develops, but also how we see pricing and value.

From all what we know today and what we've learned over the last couple of years, we absolutely believe that the strategy that we are adopting for this market has the capacity to deliver returns in line with our requirements. But of course, our first investment will not achieve it. We will continue to assess the market as it evolves and of course allocate our resources in a disciplined manner in line with our capital allocation framework.

So to conclude, we've made some really good progress here, developing our technology leadership, the core of JM. We have developed and continued to enhance the best in class high energy cathode material, and we are pleased that we have progressed to full cell testing with two of our customers, which demonstrates the value of customisation.

We are investing today to build a commercial and scalable business and we remain confident about our future in this market. Where our goal is to deliver breakout growth by capturing value from being a provider of leading cathode materials that enable long range, pure battery electric vehicles.

So that concludes this section for today. We've now got some time for question and answers with myself and John. But of course as you know there will be more time for questions and answers during the breakout sessions.

Q&A

So John's going to join me up on the – on the stage Good. I will take any questions that you have.

So if we get one right by there, Carl. Hi there –

Alex Stewart (Barclays): Yeah, it's Alex Stewart here from Barclays. Two hopefully simple questions. You talked about China VI light duty from 2021, but I thought that roughly half the provinces were introducing it from the 1st July this year, is that pre fitment? Can you just explain the difference there, please?

And then secondly, on the – I don't know, eLNO CAPEX level which is obviously higher now than it was two years ago, could you just walk us through some of the investments that you've had to make, that perhaps you weren't anticipating at the time? Would be very useful. Thank you.

Robert MacLeod: Okay. So John, do you want to go first on the China VI?

John Walker: So China VI A starts in July 2020, then there's the second phase legislation which comes in two years later. So what I – the legislation affects both light duty and heavy duty. But the bigger impact for the first phase of the legislation for us, is in heavy duty and then the second phase is when gasoline particular filters come in. I don't think I said 2021, I might – so I've got – yeah.

Robert MacLeod: Is that okay? And on eLNO, I don't think we changed our number because what we talked about before – what I'm talking about this time is £350 million. So it's the – it includes everything, it includes the operating costs, includes the pilot plant, the application centres, the R&D effort that we'll capitalise, etc., as well as the first commercial plant.

I think last time we talked about around about £200 million for the first commercial plant, we now think it will be a bit higher, maybe £200 million to £300 million, in that sort of range. I'm not going to give you the specific answer but in that sort of range. But we – the

demonstration scale plants that we previously talked about, we decided, with further work we've done, we've concluded that we don't need that to do those demonstrations scale plants. So we've put more into the, you know, we're focusing absolutely on the first commercial plant. So the number of investments are broadly the same as we talked about two years ago.

Alex: Thank you. So – yeah, so can I get back to the Clean Air question, because on slide 44, it does say China VI A nationwide from 2021. I just wanted to understand that.

John Walker: Slide 44?

Robert MacLeod: Oh, you can have it, you're going to – right, we may – I'll tell you what, may – are you able to answer that quickly, John, do you think? Or we'll have to maybe take it offline afterwards?

John Walker: I can take it in the breakout sessions

Robert MacLeod: Okay, that's fine.

John Walker: Yeah.

Robert MacLeod: We'll take it in the breakout sessions. Sorry. I don't want to go back to the slide. So I think we had a question in the front here. Coral, do you mind if we come in to the front?

John Walker: So, I can answer that.

Robert MacLeod: Oh, you can answer now, yeah?

John Walker: Yeah. That's nationwide but, you know, the legislation is starting in some of the bigger metropolitan areas from July 2020 but nationwide from 2021. So that's just a difference in the roll out of the legislation.

Robert MacLeod: Because unlike Europe and America where it tends to be sort of automatically go across the whole region, in China it tends to be sort of scaled up over time. Adam?

Adam Collins (Liberum): Yeah. So the question on the comments you made about – the lost momentum in light duty gasoline. Am I right in thinking that's a Europe only problem or does it relate to other regions? I mean you talked about it being to some extent due to the ebb and flow of customer share, you know, customers are currently in a phase where they're losing share. Are there any other sort of technology issues around that that you need to address, or is it really just the customer mix that you've got?

John Walker: I think that technology on gasoline is pretty competitive. I would say that, you know, right now we're probably not a clear number one. So I think where there's work there – the reason that we're allocating more R&D money to gasoline is because we do feel that we have the capability to improve our gasoline technology.

You know, you could argue that with, you know, in Europe, an 80-20 split of diesel to gasoline, maybe we had overegged our activities in diesel. But one of the things that's going to be happening over time is, as the diesel and gasoline ratio continues to decline, the opportunities for Johnson Matthey to participate in more of gasoline bids will increase as customers start to rebalance their portfolios as us as the leader in diesel declines over time.

Robert MacLeod: Okay. All right, there's three all of you together and I think we'll go right first. Oh –

Peter Cartwright (Fiske): Just a straight follow up to that.

Robert MacLeod: Yeah.

Peter Cartwright (Fiske): Mazda has launched what they call a spark-controlled compression ignition gasoline engine. Now is this a gimmick? Or if it's for real, will other companies follow and what implications would it have for your gasoline business?

John Walker: So, you know, more efficient combustion is what you're saying?

Peter Cartwright (Fiske): Yeah, but more diesel like as well. So –

John Walker: More and more diesel like. You know, I think it would play into our hands, you know, a little bit. You know, our specialty in leaner technologies would be something that would give us probably a little bit of an advantage for some of that.

Peter Cartwright (Fiske): What I would have guessed, yeah.

Robert MacLeod: Okay. Martin

Martin Evans (HSBC): Just on the eLNO plant, again, the £200-£300 million, I think, you referred to, Robert.

Robert MacLeod: Yeah.

Martin Evans (HSBC): And obviously it's a nascent technology and evolving overtime. How versatile is that plant such that if you got to that 2022 period, if it became apparent for whatever reason that the technology wasn't being accepted or it needed to be modified, can you – can you react to that or is it a sort of one product plant basically?

Robert MacLeod: Well, that's a sort of half empty question. I am much more half full, of course, and I'm very optimistic and confident in our business, in our technology.

But to answer your question directly, we are putting in, in this first plant, much more sort of flexibility on our manufacturing, than we do, do, perhaps, in the normal, sort of, more mature market where you, you know, take John's shiny floored plant, we know exactly what to produce and know exactly how we're going to produce it. So we are putting a bit more flexibility in that, not just in case in your half empty approach that eLNO wasn't successful, but actually eLNO will continue to evolve and develop. And so we need to make sure we have flexibility in it for that.

And at the same time, as our process technology improves as well, we're making sure that we have the flexibility to adapt and evolve that going forward. So it has definitely got more flexibility in it

That row is dominating the questions.

Robert MacLeod: Market shares are not allowed to dominate market shares, but maybe questions you are –

Andrew Stott (UBS): This question, Robert, on the – on the battery business. I know you're not there yet, but if you're going wind forward to invoicing your battery customers in 2024, are you confident that this will be like the catalyst industry and you can invoice with a

pass-through arrangement on metal prices because we asked this question to all of the cathode guys and we don't get any straight answers. So it would be great if you could give us that straight answer.

Robert MacLeod: Look, it is a very nascent market, so I'm not sure you can give a definitive, yes or no at this stage. But we, as a business, are not going to be able to – as a business, take the swings on metal prices and take them and absorb them within our business. It just will not work because the swings on metal prices could massively swing the profitability both one way and the other, and it won't work. So it will have to be shared through the supply chain, how much will be ours – whether it's a pure pass through, how much of it will be the cell manufacturers or the OEMs themselves, we will have to wait and see how the market develops.

But what we've been doing in Clean Air, we've got that experience, we understand how to do it. We certainly believe that that's the way we will be pushing it – or we will be pushing it that way. Let's see how the market evolves.

So that the – we got somebody right at the back as well. No, you don't – you're first, yeah.

Tom Wrigglesworth (Citi) Sorry, just a quick one. In thinking about, obviously the Poland plant, the 10,000 tonnes that has come on stream and the customers that you're currently running with, and the two full cell tests, if – is that enough to fill those plants? I.e., what you're currently guiding us to in terms of customer testing, would those – let's say, they come to fruition, is that more than enough to fill the 10,000 tonnes, you know, or do you require further wins down the line to fill the first phase of capacity?

Robert MacLeod: I'm not worried about filling capacity. I think the issue is around – because – so to answer your question, absolutely we will be able to fill the capacity very quickly. It's more around getting platforms, getting proof of technology, proof of the commercialisation of that technology in the market, and then rapidly scaling up as we further demonstrate the adoption in the business – sorry, in the market. So I wouldn't worry about filling up the capacity.

And actually, we don't want to fill it up because you can fill up with low margin poor performing, you know, poor returns business. We want to fill it up with high return business as much as we possibly can. But absolutely, we don't have a problem with that.

Let's go – oh, Coral, you made it out there, well done.

Sanjay Jha (Panmure Gordon): Hi, sorry. This is Sanjay Jha from Panmure Gordon. Just have two questions. First for – on – one of the – page 43, I think you mentioned that the BEV penetration, you know, assuming is 3% by 2025 in United States, is this US or are you talking sort of the whole of Americas – I'm just – because the numbers I have suggest that the US is already 2% in the – for seven months of this year. So I'm just trying to understand why you're so low on BEV penetration in America.

And secondly, on the eLNO, you mentioned that is focused on long range. I know that from the – the European manufactures have struggled to catch up with Tesla. I think there's about 80 miles difference within the range. Is this the sort of market you're talking about, 300-plus mile range, or are we talking about sort of slightly lower?

Robert MacLeod: For – so battery electric vehicle penetration in – it's a North American comment, isn't it?

Sanjay Jha (Panmure Gordon): North American comment, yeah.

Robert MacLeod: So it's the entire

Sanjay Jha (Panmure Gordon): So why it's only 3%? Because they're already nearly 2% in 2019, so I'm just wondering you are expecting things to slow down dramatically?

Robert MacLeod: It's an assumption, and if you look at the range of assumptions we've looked at, you know, that range that we had on that chart – sorry, I don't have the chart in front of us here, but you know, battery electric vehicle penetration, there's a range there. And we've looked at what people are forecasting and taking as sort of a conservative element of the range by region. I have to be honest, so the data, I don't recognise the data – not that I'm saying you're wrong. It's just I haven't seen the data at that level of detail by region or by country. But certainly from what we are hearing, it feels like that's a sort of reasonable place to assume for North America as a whole by 2025.

Sanjay Jha (Panmure Gordon): You know, I just think it's odd because US and Europe today is virtually nearly 2%, and yet you have a much higher assumption for Europe than for US? And that just seems slightly bizarre. Anyway, that's just – on my second question, sorry –

Robert MacLeod: So your second question was around eLNO, and sorry, I forgot it already.

Sanjay Jha (Panmure Gordon): So my question is, is the problem for most manufacturers, their technology is not really good enough to catch up with Tesla, and is this what – is this the gap you're trying to capture?

Robert MacLeod: It's really around – it's really around range at acceptable costs because you can get range by just putting a very, very large battery on the – in the car. So it's around how you get the range at the same time as you get the appropriate and effective total cost of the cell and the performance in all the criteria that we were talking about.

How each OEM is going to compete with each other, and obviously, with Tesla as an example, that's up to them, what we are working on is how we enable them to really drive the cost down, because you're upping the performance of the cell and how they decide to configure their – their battery, and therefore the performance of their vehicle is kind of up to them.

But we expect that the eLNO really enables that lower cost total range dynamic together, to be successful – allows that – wider scale adaption of longer range – larger, longer range vehicles.

Sanjay Jha (Panmure Gordon): Thank you.

Robert MacLeod: Alright, we're coming back to the front here, but who's going first? Should we go –

Jean-Baptiste Rolland (BofA Merrill Lynch): Hi, good morning, Jean-Baptiste Rolland from Bank of America Merrill Lynch. I have two questions. The first one, just coming back on the diesel share, in Western Europe, I just wanted to know, if you could briefly comment maybe on the trajectory that you're forecasting on slide 40. It seems to be an – to see an

acceleration in the decline past 2025, and sort of a slowdown in the decline just before 2029. I just wanted to understand the rationale beyond this – behind this, sorry.

And then one question on the ultra-high energy density market that you expect by 2030. On my calculation, it sounds that you're, at a minimum, you're expecting an 18% market share for ultra high density market. I'm wondering if you could maybe tell us where you think this market share is today, and how you think this market share can improve in the market? What gives you confidence that consumer adoption will follow ultra-high energy density market in terms of adoption? Thank you.

Robert MacLeod: Okay, so we start off with the diesel share, John, do you –

John Walker: This isn't our view, this is – this is market information from people like IHS, LMC, so this is a consolidated view of the range that we've had similar to what we produced in 2025. So you know, that's not, you know – us saying our view is that we went to the low end of this range in 2030. So the 2030 data – by LMC and IHS I guess, was just published a month or two ago, so it's relatively new information.

I think a lot of the automotive teams of the people in this room, will be extending their forecast out to that – to 2030 and the not too distant future. So you know, that will be evolving over time, so – I don't know exactly what the number is going to be, but you know, that is what the range, similar to how we described in 2025.

Jean-Baptiste Rolland (BofA Merrill Lynch): Okay, thank you.

Robert MacLeod: And certainly, what we're seeing is, you know, the trajectory is kind of in line with where we expected it to be two years ago. And what we've done now is extended it out through to 2030, and we expect that to continue to decline to happen, to 10% of vehicles in 2030 which is equivalent to 5% of cars and another 5% for sort of commercial vehicles.

And on the eLNO, look, ultra-high energy density today is very limited. There's very limited 811 type material, that's a sort of – where we're sort of characterising ultra-high energy density, 811 and beyond, there's very little of it, today, exactly how quickly it penetrates the market, exactly what the adoption is, is kind of a little bit hard to tell, because, as we talked about it, it's a nascent market, but we certainly believe that it will – it can enable some of the requirements as we talked about already, that the consumers' demand, but adoption of the whole supply chain will require significant investment, significant further validation, testing, etc., before it can move forward. And so exactly what the pace of take up is, is hard to judge.

Should we move over to Chetan again?

Martin Dunwoodie: Yeah, can I just say – if we can take this as the last question, and then we'll have lunch and there's plenty of time afterwards still to catch up with John and Robert on Battery Materials and Clean Air afterwards, but this can be the last question, then we'll break for lunch. Thanks.

Chetan Udeshi (JP Morgan): Last two, sorry.

Robert MacLeod: That's allowed, I think.

Chetan Udeshi (JP Morgan): So first question is, you know, we've been hearing more about auto OEMs trying to come together for the development of certain platforms to cut

costs for them, does that have an implication for JM in terms of more competitive, probably bidding process in general given that there are more limited platforms now to bid for?

And the second question is on, just to understand this phasing of China and India sort of, you know, legislation changes, so is next year going to be significant here for JM from that ramp up, or changes in legislation, or is it more 2022 and 2023? Thank you.

John Walker: So I'll take the second question first. The next year, we'll see the beginnings of the impact in our P&L, but a bigger year will be the second year, as you say. What was the first question again?

Robert MacLeod: First was about automotives combining to be –

John Walker: So as we're in this big automotive transformation, what we're seeing is, you know, both with automotive tie-ups, and within a particular OEM just by themselves, as they're starting to allocate their resources to multiple platforms, be it internal combustion engines and battery electric vehicles, what we're finding is that, they're starting to depend more on us to deliver some of the solutions for them.

So you know, I think the trick there is for us to find value in that, because the flexibility that we're going to have to have – which is why we talked about agility so often, as this transformation is happening, depending on how electric car sales are going, we're going to have to be pretty flexible in that transition period, to be able to adopt to that. So you know, we'll be looking for value out of that transition.

Robert MacLeod: Another thing I would expect – the dynamic among – I mean the OEMs have been tough on John for – he used to be seven feet when he started JM, it's tough on John year after year after year, they're always batting you down. And so we don't think that's going to change materially, because ultimately, it's about the technology and the technology advantage that you have. If you can enable value for them, they're happy to share some of that with us.

So I think we're stopping for lunch? Martin do you want to –

Martin Dunwoodie: Yeah, I would just – a couple of quick things. Firstly, can you remove all your belongings from the room after the session? Because the room is going to get broken down for the breakout session, so all the tables, everything is going to be removed. So if you can take all your belongings with you.

And secondly, the breakout sessions begin at 1PM, so please be prompt for those, because we have to be on quite a tight timetable running around all of those. If you can check the back of your badge for the colour, which will tell you which group you are in, and the groups, and the timetables will be posted on the doors outside, and you can also pick up timetables from reception.

It's a fairly strict military operation, so if you look at all that, and hopefully it will work quite well. But lunch now, which is downstairs, outside, and downstairs. I think to the left downstairs if I'm right. But people will show you where to go. And be back in the breakout sessions for 13.00.

Thanks.