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PRESENTATION

Robert MacLeod - ***Johnson Matthey - CEO***

Good morning to every one of you. Thank you very much indeed for coming here, coming to Reading, and for many of you for coming on to see us hopefully in Sonning, and then for dinner tonight.

This, for me, is my first venture as a Chief Executive doing this sort of presentation. And I'm delighted to be able to stand up in front of you and give this opportunity to explain the strength of the company and some of the -- and our strategy as we build -- as it says in the slide -- into our third century. As you know, Johnson Matthey in -- was founded in 1817, so we're just nearly are 200th years old, so we're starting to think about how we go into our third century.

And it's great for me, as I say, to be here to share with you the future but also with the team around me, the great quality team. And I'm sure you'll see today some of that but also how the technology makes a difference. And that's why we're here and particularly to go to Sonning to show you and help you understand about the technology.

So what is the program for today? This is it. We're going to go through every one of the businesses. I'm going to do an overview upfront of the strategy of the company but then we'll go through each one of the divisions. Hopefully, plenty of time to ask questions. I know that's one of the reasons why you like being here.

We've got plenty of JMers here. Some -- the presenters, a few others who are specialists and have particular knowledge on some topics. So please make use of their time and ask any questions that you have.

Why are we here in Sonning? Or here in Reading to go to Sonning? We really wanted to share with you some of the technology and demonstrate some of the real value that we get through our technology and help you understand them.

So the purpose of the day really is to provide you an update on the group's strategy and the long-term strategy. I'm not really going to spend too much time today talking about the short-term that we kind of covered yesterday. Really, today is all about 5, 10 years away and the long-term future of the group.

I'll line up some of the fundamentals and some of the developments since January 2011, which is the last time we talked to you about the group's strategy and how some of that has evolved. None of it is a revolution, it's just a little bit of evolution in some areas.

I want to explain a little bit about how technology is a fundamental underpin of the group. And hopefully by the end of today, you'll hear about it not just from me but from all the division directors about how technology is an underpin and a strength of the company. And really, fundamentally, in the end, hopefully give you an idea of how well we are positioned for the long-term, and also on the investment case fundamentally of JM.

This is a strategy slide that we put up in 2011, and vast majority of this holds true today. There's a little bit, as I said, of evolution and I'll cover that in the next few slides. But really the vast majority of what we said back in 2011 still holds true.

And what we've done over those four years, since we spoke to you about the group strategy, is we have delivered, I think, a strong consistent performance in line with what we thought we would. And so I think that gives us some degree of confidence that we understand our businesses, we understand our markets, and hopefully that gives us confidence that we understand how the group can continue to progress in the next few years.

Three things here I'd like to sort of draw out is some of the progress we've made on expanding our margins despite the loss of the Anglo contract. Of course, four years ago, we couldn't -- we didn't predict the loss of the Anglo contract who still managed to enhance the group's margins. And also we continue to invest around about 5% of the group sales in R&D. But I think we're going to continue doing that going forward.

So I just want to talk a little about or strategy then today. And this -- I want to share with you first of all a video that we've made for our staff, because of course it's very important that our staff understand where we're going. And this is a little short video that we used -- that we launched about six months ago to explain the strategy to our employees.

(Video Playing)

Unidentified Speaker

At Johnson Matthey, we have a vision of building our third century through value-adding sustainable technologies. How are we going to get there? That's a very good question. Let's start by looking at what we do.

As a business, we always aim to deliver what we promise. We work together, applying our expertise in advanced materials and technology to innovate and improve solutions that are valued by our customers, optimize the use of natural resources and enhance the quality of life for the people of the world both for today and for the future.

But how did we get here? In our first century, we built a reputation not just for expertise in precious metals but for real integrity and for being a company our customers could trust. In our second century, we developed our expertise in the engineering and refining of metals. We also began our environmental journey, a journey that continues to this day. For our third century, we have developed a business strategy that will drive our next century of growth.

There are nine building blocks within our strategy pyramid that will help us to achieve our vision. Invest in our people to develop the best talents across our business. Invest in our products and technology too. In doing this, we can differentiate ourselves from our competitors.

Collaborate more than ever before for smarter and closer working with even greater flexibility so we can better leverage our expertise across the company. Build on our core strengths in advanced materials and technology to develop the next generation of sustainable technologies.

Focus on our customers. Target those who value technology, and ensure we select attractive markets with strong external drivers.

Develop new businesses that fit our technology competencies and can provide the next material growth engines for the group. Be the best we can be, pursuing operational excellence and sustainable business practices to enhance our operations. Keep our people safe. Protect our reputation and make a positive contribution to the world around us.

Create value from strategic investments that accelerate and enhance our growth. Evolve our culture through living our values by applying what has made successful and unique in the past to the challenges of today's complex and global marketplace. Marry our small company flexibility with our large company global strengths to ensure we can be both nimble and competitive as we continue to grow.

And here's the best bit, we can all live this strategy everyday by concentrating on our three Cs -- collaborate, customer focus, and create value. And if we do that, we will turn our third century vision into a third century reality.

Robert MacLeod - ***Johnson Matthey - CEO***

Well, that's the internal video that we used to share our strategy. And I want to just touch on a few of those points in the next few slides as I go through, explain a bit more detail to some of those.

So what is our vision? I mean, today Johnson Matthey is a global leader in sustainable technologies. I think we'd say that without a doubt and we believe. And our vision is to build our third century through value-adding sustainable technologies.

Now, why those words? I guess plenty of companies could talk about building value-adding sustainable technology but not many can talk about third century. That's one of the things that is unique about JM and one of the things that particularly gives pride to all our employees within the company. Very proud of the company and very proud of the strength, the long-term vision, the long-term strategy of the group. And that's something that really makes us, to some extent, unique.

Value adding -- critically important. Not only value adding for ourselves but in particular for our customers and ultimately for you, the shareholders, too.

And then sustainable technologies -- we're already a global leader but we're going to continue to focus upon that. It's an area that we -- when we talk through it today, you'll hear from the division directors about how their strategy is and how they're moving forward. But most -- the vast majority is in sustainable technologies. And we will start to lead the customers, lead them into where they -- where we believe we can take the organization and make this place a better world.

Our purpose -- what do we do? Well, there are 58 words on this slide and we spent quite a lot of time thinking about these words, about what we do. One of our core values as a company is integrity, delivering what we promise. So that's really quite important within the company. And aiming to deliver what we promise, not just internally to ourselves but also to our customers.

And that's one of the things that enables us to keep the positions we have. We're very strong customer relationship driven, and very much delivering to them what they want. And if something goes wrong, then we work really hard to fix it and to make sure we deliver what we promise.

Working together -- you saw on the slides, we talked about collaboration. It's very important in JM and I'll talk a little bit in a minute about technology. But it's not just around having a single skill, it's very much how do you bind those skills together that makes us a stronger organization. And as technology happens and technology works much more effectively, you can collaborate in an effective way to share the ideas and get -- spark ideas off each other.

Applying our expertise in advanced materials and technology -- and I talked a little bit about some of the evolution of the company and this is one that's perhaps a little bit of evolution. Last time, we did talk to you about PGMs and catalysis.

Now, we're not saying that PGMs and catalysis are no longer important. Of course they're still important, very important in the main. But actually we think, as we move forward, keeping to our core strengths, keeping to where the technology we can differentiate, but broaden it a little bit to encompass a whole -- a wider range of advanced materials and technologies.

To innovate and improve. Of course it's not all about just guys in white coats coming out with great new innovations and new ideas, it's also about how do we continue to improve products, make yesterday's product better tomorrow and make it better the day after. And that's that constant drive to continual improvement is something that we're very familiar with doing. And that's what we do all the time around the world and around -- for our customers.

But importantly, our value by our customers. It's really important that the customers that we deal with value technology. And they value -- but at the same time, we understand how we can use our technology to make a difference for them. And that's the key thing we need to make sure. We're the best for them by understanding what they want and how the technology can add value to them.

In some instances it's using the best technology to make a cheaper product. Some customers want cheap, that's fine as long as this needs technology to make it a cheaper, better product. Other companies are prepared to pay a very high value for the best. And in many cases, the best, it just means something slightly different to different people and that's fine.

Optimize the use of natural resources, sustainable technologies. That's absolutely what we do and it's a core part of what Johnson Matthey is. And some of you will hear a little bit more later on about the PGM world, PGM refining for example, which is all about optimizing resources. And arguably, catalysis is all about using the world's resources in a more efficient way.

And last but not least, enhance the quality of life for the planet. And that's something that is really important for us and for Johnson Matthey. And we're proud about that. And we need to continue to make sure we develop that as we go forward.

Last time we talked about the four macro drivers affecting JM. And they haven't really changed. They're still there, they still provide us the opportunity to deliver superior growth. And I just wanted to go through what those are and where we are today.

If we look at the first one, population growth, well, that's really about, in many ways, increasing wealth. It's about the emerging markets. And we're very well-placed in China. We've got about 11% of the group sales in China, and we continue to grow and develop in that market. And we're pretty well-positioned across our divisions.

Longer term -- potentially, South America and other emerging markets provide other opportunities. And I think we'll start investing in South America in the relatively near future. I don't exactly know when yet, but I think relatively soon we'll start investing perhaps in Brazil some time, as I say, fairly soon.

Natural resource constraints -- energy security remains a key concern for a number of countries, particularly China and the US. That provides us opportunities for using coal in China, and natural gas. As we all know, the shale gas revolution provides opportunities with Johnson Matthey in those two areas. I'll talk a little bit about some of the short-term challenges of that in a minute.

Recycling of PGMs -- it is a strategic service not just for Johnson Matthey but also for our customers. It's really important that we can continue to provide that service to our customers. But also PGMs are a key raw material for our largest business, our ECT and having that refining cycle and being able to have security supply of that key raw material is really important.

But going forward, I think buying renewables, alternative energy sources, does provide opportunities for Process Technologies and perhaps other areas too.

Environmental concerns are clearly one of the biggest drivers today. And it's not just about vehicles, but of course vehicle legislation continues to enhance and develop. John Walker will tell you more about that later on today.

But industrial emissions continue to get more challenging and tighter. And fuel quality requirements continue as well. And those provide opportunities in the medium term. And in the long-term, I think we'll go further as we talk about the electrification of the power train and further tighter regulations.

These regulations, they're all continuing to happen. And in many ways, they're our friends. That tighter legislation helps Johnson Matthey. But often we're able to be at the forefront of that legislation because we provide products to those markets and to enable the regulators to put those legislations -- the necessary legislations in place.

And finally, health and nutrition. The ongoing pressure on healthcare costs hasn't stopped and continues to get tighter and tighter. And that does provide us opportunities. Our biggest customer in the healthcare market is the generic space. It continues to be, and I think that pressure on cost for the healthcare industry will continue to provide us opportunity.

And then longer-term, the drive for enzymatic catalysis. Does provide, plays to our core strengths and provides us significant opportunities.

So the drivers fundamentally haven't change and provide us good opportunities for the future. And hopefully, as I said, through today you'll get an understanding of how those -- if we go into more detail by the divisions, you'll understand how we can give ourselves confidence in those.

So what is our strategy for superior growth? This is it. This is basically what went through on the video. The three things that are different and changed from last time are the customer focus, collaboration and the best of big and small. Now arguably, that's a little bit more internal focus rather than external, but clearly for Johnson Matthey, understanding our customers and collaborating across the group does enable us to deliver more value.

For the four -- what areas I like particularly to talk about today are these four, the best of big and small, investments in our people, building on our core strengths and operational excellence. And I'll go through those in a few minutes as I go through it now.

So starting off with technology, how we differentiate ourselves. I mean, this is really what binds the group together and that's -- I want to just talk a little bit about today. We have a very strong set of technology skills. We showed some of them here in these cogs here.

And why do we show them as cogs? Going back to my point about collaboration, is they all interrelate. It's no good having one set of skills. So they all interrelate together. You've got to find a way to make them work together in an effective way to come up with better solutions, better products for our customers.

We do complex, we do difficult. That is what makes Johnson Matthey able to have high margins, high barriers to entry and gives us opportunity to have a constant stream of new products and new technologies.

But what's most important is not so much just having the cogs and having them together. But it's around how we actually understand and bring them both together. And that's about how we create chemistry, how that chemistry skill is married to the application knowledge.

It's all very well having a chemical knowledge and understanding the science. If you don't understand how its application is in it with the customer, with the customer's products, then you can't be successful. So having those two together is absolutely fundamental. And you'll hear as we go through the presentations today how having that chemistry knowledge and the application knowledge is so absolutely fundamental to everything we do.

The chemistry has to be cutting-edge. If it's not cutting-edge, it doesn't enable us to create those barriers to entry and create the opportunity for Johnson Matthey. But really that's fundamentally what it's all about, the ability to understand those two things together that makes a difference.

As I said, complexity matters. And if you work here in complexity you can be the forefront of science, you can have a lower risk business but higher margins and higher barriers to entry. In the main, we are a business-to-business company and we're going to stay a business-to-business company. We're like -- that is what we do, that's where we make our money and that's where our products are used.

In the vast majority of cases, we hold the IP and that's absolutely crucial. We don't want to be building a product or making a product using somebody else's design. We want to have the design ourselves, we want to have the IP intellectual knowledge within Johnson Matthey.

Having that, having those chemistry skills, having that application knowledge, having that IP allows you to have barriers to entry. All right, some of them are technical, some of them legislative, but there are -- some of them just because of the knowledge and applications expertise that we have create those barriers.

That allows us to have complex products that are difficult to emulate. And more importantly, we can continually improve them. And one of the challenges we have and when look at things internally we often ask ourselves, "Can we do this better?"

And if we go to a stage where we're looking at products and we can't do them any better and there's no opportunity to move them forward, then we look at ourselves and say, "Actually is this something for us? Does that work for Johnson Matthey?" And if we can do all those we can then maximize value with the strong customer focus and relationship with the customers that allows us to add real value to them and their needs.

So that's why with this chemistry skills, the application skills it's really important that we continue to invest in R&D. And that 5% of group sales is -- we don't know if it's right but it feels right, it feels about the right level. 5% of sales we'll continue to have as we grow the business to maintain and extend our technology advantage.

We are going to continue to build on our core strengths. So we will actively manage our portfolio as we go forward. We need to stay focused on markets that give us the opportunity to have high margins. And as I said before, they give us the opportunity to continue to advance the technology so we continue to progress.

So we'll exit areas that we don't believe are cutting-edge for us, and hence the reason why we sold our gold and silver refining business. We haven't sold it yet, we're hoping complete it by the end of this year. But that's no longer the cutting-edge of our technology. Or sometimes areas that don't fit with our business model we will exit.

And one of the things many of you have asked us in the past is, "What about fine chemicals? Is that core to Johnson Matthey?" And I'm going to say to you today, absolutely, yes, it is.

It's fundamentally underpinned by that chemistry skill, that application knowledge. And you'll hear some of that today, about how that delivers the synergy across the group as much, but in particular, within fine chemicals, the API manufacturing and catalyst businesses are really important as part of the group.

How do we position ourselves for growth? Well, we've got to continually improve the way we do business. But every company has to do this. We're pretty good at what -- across Johnson Matthey but we need to continue to work to be better. And we can always be better, it's a never ending challenge for any company to continue to become better and better as a group.

So health and safety is really important. Our performance is good but it could be better. And we've launched a program now to continue to improve our health and safety because it really does matter to ourselves and the values of the company. As one of our core values, health and safety is our priority.

But within, it's not just about how we do business. And internally, health and safety is also -- the whole area of how we deal with our customers, and the whole of area of compliance becoming a much bigger issue across the world, and it's an area of continued focus for us. And we need to make sure we do business in the right way, and that's an area that we'd keep looking at.

Manufacturing excellence is something we started a few years ago and it's getting real traction now. You saw it in the half-year results, they increase margins in ECT, partly driven by manufacturing excellence, not solely. But that played a key part in our continued advancement of our margins in that business.

And we're going to keep focusing on manufacturing excellence to become world class. We have to become a world class operator. We have high margins. That sometimes means that you don't focus enough attention on the manufacturing processes. But that's an area that is getting more and more focus as we continue to drive to at least maintain if not grow our margins into the future.

Sustainability, you heard me talk about. It is a sweet spot for JM. It's an area that we've -- you've heard of our 2017 sustainability initiative. That's very much internal as how we use our internal resources as we go forward, as we move outside of the 2017, it will be much more focused on the customers and new products, and how we make sure we are leveraging our product portfolio but as sustainable products for our customers.

The best of big and small -- I mean, I think when I joined Johnson Matthey five years ago we were about 8,000 people. We're now getting towards 13,000 people. And if we roll forward and look to the future it will be maybe 15,000 to 20,000 people in 5, 10 years time.

That's quite a difficult challenge as we migrate from being -- the way I would describe it is a big-small company and how we changed to being a small-big company. It sounds very easy and -- no disrespect to people in the room -- it's actually quite hard when you're operating a business. How do you run a small-big company rather than a big-small one? A lot of difference to how you run the business.

We need to think about how we capture the benefits of being a big company at the same time as maintaining the agility and flexibility of a small company. But some of the things we need to do is we need to upgrade our management information systems and our business systems and that's the process that we've gotten on -- embarking on today. And also how we manage HR and how you manage talents across the organization, easily said but actually quite difficult to do when you are a globally spread, larger and larger organization.

So what does this all mean as our medium-term targets and priorities to the future? The medium term, I'm still talking three to five years. But if I look at -- this is a summary of what you're going to hear today through all the individual businesses and the business directors as they go through the presentations.

So ECT in the next three to five years we see a high single-digit growth in sales. They've got very well-positioned in many of their markets. We believe the market is going to continue to develop and they can maintain their market position over the next few years.

They're going to continue to develop the products. But in particular there are opportunities to drive operational improvements, and that's the thing that they're going to keep focusing on as they keep delivering for our customers and continue to advance their market position as they continue to grow and the whole market, as a whole, continues to grow.

We're going to talk today, as I said already, about the long-term. Now we talked yesterday about some of the short-term hiatus within PT, which will make it a little bit difficult for PT to grow next year. But in the longer-term, on average , this is mid to high single-digit growth business into the future.

We are very -- we are still confident in PT albeit, as I said already, a little bit of a short-term hiatus. But we're going to continue to broaden our offering and broaden our portfolio. And try and leverage and make sure we got the right share from the US shale gas opportunity, which remains there, and the China coal opportunity. Those things are still there, they are still real and Jeff will explain in a little more detail later how we can leverage that opportunity.

Precious Metal Products division is an area which in many ways has been focused on -- for many years has been focused on the Anglo contract and you always asked us about it. And this was also very profitable and it's now gone away.

This business -- for many years we've invested very much in making sure we run this business in an effective way, managing metal, managing return on assets. We haven't been managing it for growth. And so there's less investment put in that business over the last few years to create opportunity to grow into the future. So we are now starting to invest more to create opportunities to grow that business particularly on the manufacturing side.

On the refining side, it remains absolutely core. I've already said on the pgm side, it's very important that we have access to pgms for our product businesses, particularly ECT. But having said that, we need to continue to invest in making a better refinery process. But that's an area we're going to spend a little time over the next years. In fact we already started that process already. And so at the moment I think we'll see this division being mid single-digit growth rate.

Fine chemicals -- I've already said it creates good opportunities for the group. I think it's a mid to high single-digit growth business. We're going to invest in new products, you'll hear more about that from John. But really it's about investment for the medium term growth. And I think the opportunity is real, the pharma market is enormous and we play well in that and it creates good opportunities for us.

We're going to enhance our offering in Europe too. Most of the business today is in North America, particularly on the non-opiate side and then we do have more opportunities here in Europe.

Our New Businesses you'll hear a bit more about it later from Nick. It's early days in this area but it's well and truly on track. We're very pleased with the progress we're making to date. This year [if we lose] -- as you know, we're investing maybe up to nearly GBP20 million. But when we get to year five we think this has absolutely got all the necessary building blocks to be at least GBP30 million of operating profit with further growth beyond that.

Now all of these numbers and all of these targets here are both -- with a little bit of M&A, not very much -- most of this is organic growth. So obviously there's an opportunity for us if we see the opportunities or the attractive opportunities out there to use M&A to grow further and faster.

But a vast majority of M&A that Johnson Matthey will want to do will be relatively small. But it doesn't mean we won't if there's opportunity -- exists to do a larger scale M&A. But the vast majority of the opportunities today are relatively small bolt on type acquisitions to broaden the portfolio or create market offerings and routes to market for different businesses.

What does it mean for our balance sheets or the investment requirements? We've been running about 1.5, 1.6 times depreciation in CapEx. Things are going to increase a little bit. And part of that has to do with the investment I've already mentioned in business systems. And that maybe over the next five years and so, maybe require around about GBP100 million of investment to improve the internal process of the management information and business systems across the group.

Migrate a bit away from growth in ECT CapEx. We've invested a lot, as you know, over the last 5, 10 years. So it's more investment in the other areas, the other divisions into the future. But ECT -- it still does need some growth. I've already mentioned South America and continued requirement of growth and expansion in China as that market continues to grow.

Capital efficiency is absolutely embedded in what we do. We have and we remain to have that very strong target and making sure every investment we make has a route to get to 20% return of capital. We're already at 20% return on capital across the group. We want to maintain it there or thereabout.

I've said many times before, I don't think this is a 25% return on capital business. I don't think we can get there. We could by cutting spending and cutting investment, but I don't think that would be right for the long run. I think around about 20% is the right level for us to be.

And on the balance sheet side 1.5 to 2 times net debt to EBITDA seems right too. Again, we could be outside of that range for a period of time, relatively short period of time, but if we see ourselves being outside that range for a longer period of time, particularly on the low end, then we'll deal with that as we've done before at the appropriate time.

So, really what I was trying to give you is an overview of the business. You're going to get much more detail as we go through the day, but really I wanted to leave you with some takeaways of what I believe in about the company in the future. I think we have a robust strategy. I think, as I said, the market drivers are pretty good, and we're well-placed for the future.

Our focus is and will continue to be on sustainable technologies. We're well-placed, it plays to our strengths. Our customers need our products. Our customers demand our products and they add value. They like our technology and how it helps them be more sustainable too.

What underpins Johnson Matthey is chemistry and its applications. That is the core element that underpins the group. And that requires us to continue to invest in R&D, to continue to invest to move the business forward, and we will keep doing that.

We'll also keep investing in for new business areas for growth in the long run. I mentioned we're going into our third century. We look back 10 years ago, we were a different business 10 years ago than we are today. And we go forward another 10 years, we'll probably be different again through investments in these new businesses and new opportunities.

And that's something that we're very well used to. We're very happy to keep doing that. But creating those opportunities for growth in the future is absolutely essential, we believe, to make sure we're a strong robust growing business into the long run.

Operational excellence is something that is absolutely intrinsic in what we do. We have to be the best at what we do. Operating performance is really critical, and that's not just about cutting cost. Yes, cutting cost is good, being more efficient is good, but it's also about making sure the way we run the business is as the most effective way we can.

So it's about health and safety. It's about how we run the business from compliance. It's about how we run the business from HR. All sorts of things that really are in the nitty-gritty behind the scenes but absolutely fundamental to make ourselves as -- make us a sustainable business not just having business that creates sustainable products for our customers.

And if we do all that together and we're successful, we believe that we can deliver double-digit growth in earnings per share over the foreseeable future. Now, if you go back to the previous slide, maybe you'll say -- well, these don't add up to a double-digit. Well that, as I said already, that is probably the high single-digits, which is primarily organic growth. We get ourselves to the double-digit through an element of M&A, through element of driving further performance, and that's what we're going to keep doing and I'm confident that we can deliver that.

Now, that's all I was going to say, I'm going to give you an opportunity, if you wish to ask me questions before we then hand over to -- I think the first is John Fowler on Fine Chemicals and then Alan Myers on Precious Metal Products, but I'm very happy to take any questions that any of you may have.

QUESTION AND ANSWER

Robert MacLeod - ***Johnson Matthey - CEO***

If you could, there are some microphones, I think we got mics. And if -- when you ask a question, as normal, we want to hear from -- Andrew, if you can just name your -- say your name and where you're from just for the purposes of the recording.

Andrew Benson - ***Citi - Analyst***

Yes, thanks very much. Andrew Benson from Citi. The one area that looks a little bit anomalous is the new business development GBP5 million to GBP7 million of investment per annum to generate GBP30 million of operating profit in five years' time, that seems like a fantastic return on capital invested. So, it looks high. Can you rationalize and just explain that a little bit more?

Robert MacLeod - ***Johnson Matthey - CEO***

I can absolutely for you. Thank you for your question, Andrew. Just to be clear the GBP5 million to GBP7 million is the ongoing investment for new ideas. And you'll get more of that from Nick later on today and hopefully some of your questions will be answered as we go through the day.

But remember we've already invested some money in our battery technologies business. We've got an established business as we talk a little bit about it in fuel cells. Water purification provides opportunities. Atmospheric control technologies provides, which is what we are renaming packaging. Again, you'll hear more about this later, but the GBP5 million to GBP7 million is the ongoing running cost of currently looking at new opportunities and new ideas for the longer term.

We haven't given up on the pipeline of new ideas, it's a continued investment. So, we've -- and part of that GBP30 million is from what we've already got already in the battery technologies area part of it.

Thomas? No, no, it's just here.

Thomas Gilbert - ***UBS - Analyst***

Thomas Gilbert, UBS. I got two questions. You said R&D sales 5%. There are many areas in the chemical industry where compliance cost for the chemistry go up, on crop protection, pharma -- I mean the regulator on -- for your chemistry gets more stringent. Do you see any change or do you think that is growth -- that the split between growth and maintenance R&D is the same going forward? Is there any regulatory pressure on your kind of chemistry? That's the first one.

Robert MacLeod - ***Johnson Matthey - CEO***

I think the answer to that is no. I think we see it continue to evolve in a relatively consistent way. That's not going to dramatically change anytime soon.

Thomas Gilbert - ***UBS - Analyst***

And the second question, you said you're adapting today the strategy to give an update. Has there been any changes to the incentive -- management incentives around the strategy?

Robert MacLeod - ***Johnson Matthey - CEO***

No. The long term incentive plan remains in place that was to do with earnings per share growth. It's the same as it was three to five years ago, it continues to be about driving earning -- growth and underlying earnings per share, which fits entirely with what we think that drives shareholder requirements.

Do you want to put it forward to Andrew?

Andrew Stott - ***Bank of America - Analyst***

Andrew Stott from Bank of America. It was just -- Robert, the slide on midterm guidance, so very clear on the sale side but it says stable margins. Now, I guess that's a comment for the group average.

When you think about how the divisions look now and especially given comments yesterday on process tech, am I right in thinking you still think it's a bit of upside in the ECT margin? There's obviously some risk now to the process tech and fine chems and PM products are steady. Is that the right way of thinking of the contributors to that stable margin comment?

Robert MacLeod - ***Johnson Matthey - CEO***

We're now getting quite granular, Andrew. And we were trying to not to be too granular today, but that's not a reason not to answer your question. The short answer is because what I'm talking about is the big group, the entirety of the group. But I think -- ask John the question when John Walker -- when he talks about ECT. I think we've done very well in ECT margins over the last few years, I think -- is there a little bit more to go? Maybe, but it's a little bit.

The other businesses in the long run will be relatively stable. And obviously, if we are successful in driving New Business from a loss-making business to a profit-making business we'll be able to maintain that. What I didn't want you to get the impression was to say that -- because we're already a relatively high margin business, I didn't want you to go away and put into your models and your thoughts about the future, there's a lot of margin accretion ahead of Johnson Matthey.

I think there's some, but relatively stable margins for the group as a whole. But it is granular by division.

Andrew Stott - ***Bank of America - Analyst***

Okay. And can I just follow-up on the balance sheet comment? You said inefficiency equals we're prepared to do what we've done before. Obviously that includes both the special dividend a couple years ago and bolt-on. So, is that how to think about it or combination of both?

Robert MacLeod - ***Johnson Matthey - CEO***

Well, it'll depend upon the number of bolt-ons that are available and the opportunities available to us. Most shareholders -- and we've all rang shareholders and talked to them -- have said, if we can find and there are attractive opportunities that give us an opportunity to get to 20% return on capital on those acquisition opportunities, they'd rather us do those than return in capital. However, if we still -- if we believe that for a period of time that the balance sheet is getting too strong, then we'll do it.

Do you want it back a couple of rows to [Adam] there?

Adam Collins - ***Liberum - Analyst***

It's Adam Collins from Liberum. I'm just sticking on that slide about the midterm targets and from the top line side. For both the fuel cells and the PT side, you're now talking about mid to high single digits. I just wanted to understand is that a change from what you were indicating previously? You were talking for about high single-digits growth that didn't stipulate in the past whether that was a profit growth number or revenue number?

Robert MacLeod - ***Johnson Matthey - CEO***

Now, you said fuel cells, did you mean fuel cells?

Adam Collins - ***Liberum - Analyst***

I meant fine chemical.

Robert MacLeod - ***Johnson Matthey - CEO***

I thought you did. I think PT is a point that is -- taking account of reality, we talked yesterday about the hiatus in China in particular and the oil price, that is going to impact the ability to deliver in the medium term, and here I'm saying three to five years. Long run we still believe we can get to the high single-digit growth, but it's just a reflection of if we have a hiatus for a period of time that will impact our ability to deliver for that -- in that timeframe.

On the fine chemical side, I thought we'd always, always said mid to high single digit growth. And I think when you hear John later on in the next presentation, he'll talk about mid to high -- I think he's going to talk about mid to high in the next five years, but then going to higher levels beyond that.

Martin Evans - ***JP Morgan - Analyst***

Thanks. Martin Evans, JP Morgan. Just on the ECT comment about going forward, slightly less investment in that division as a proportion, Robert. Is that anything to do with the response to the negative diesel discussions versus gasoline and you were anticipating increased pressure in market share shift on that or is that an independent issue?

Robert MacLeod - ***Johnson Matthey - CEO***

I'm surprised it has taken this long to get to the question on diesel, but no, it's nothing to do with that at all. I mean, you've got now -- we've invested quite a lot over the last few years in Macedonia, in [Royston] -- John will talk a little bit about that later -- and we've got plenty of capacity in Europe today and in North America today.

So, the future investments are likely to be more in Asia and potentially in South America. So, it's more a fact of just the nature of the investment cycle. We've got to a stage now where we've got enough capacity, principally enough capacity in -- let's call it, I don't like using this word, but the developed markets, we've got the capacity

we need. Nothing to do with any issue about diesel or gasoline. And we, by the way, don't believe in the death of the diesel engine, and John will talk a little bit about that later on today.

Can you wait for the mic? Just to make sure we can --

Unidentified Audience Member

I'm sorry. If I had asked you five years ago about ECT and can you get to 20% ROIC, it probably would have been -- it's going to be hard. There's more capital employed in the working capital with the substrates, the car makers put pressure on us. Now, you're clearly at 20% even though you did lots of CapEx. So I guess the question is, what changed in your favor that allowed you to get to that 20% and sustain it that you wouldn't have expected three, five years ago?"

Robert MacLeod - ***Johnson Matthey - CEO***

I think what's fundamentally changed in our business in the last few years is the performance that we've made on the manufacturing excellence program, we've been able to take out more cost than we might have expected. And at the same time we have driven -- manufacturing excellence program doesn't just take out cost, it also takes out working capital because what you're doing is you're getting much more just in -- not quite just in time, but much more focus on how you manage your supply chain, how you manage your work in progress to make it as efficient as you possibly can.

So, all part of operational excellence in manufacturing excellence that clearly back in the day a few years ago the factories were relatively underutilized, as you grow, as you expand your utilization and get them up to more appropriate levels that allows you to grow your business into your assets, which has help grow that working capital, that whole return target too.

Unidentified Audience Member

The follow-up is, if we're looking at in five years and you're not 25 but you're higher than you thought again, what would be the most likely cause?

Robert MacLeod - ***Johnson Matthey - CEO***

Well, I'm glad to have a glass-half-full person asking me questions. I mean what could cause us going more -- I'll tell you what, why don't you ask John that question rather than me? He's not - I can't see John, but he is here today. I think there is always constant pressures with the OEMs they are -- we are -- we're big customers, really powerful, but we're also delivering great products, great technology -- great partnerships with them. It's about getting that balance right and I think the challenge is balance.

We're very visible now with you about our returns. That's both a good thing for you, you can get to understand what drives our business, but it does create a little bit of a challenge with our customers. So, I think we're pretty much where we can get to, I don't think we can get a whole lot higher. Mind you, you'll say that I said that before, but I just want to hand it over to Thomas again.

Thomas Gilbert - ***UBS - Analyst***

Can I follow-up on this question and ask you, isn't one of the reasons that you thought the competition would get tougher? Didn't you expect more market share loss in the HDD isn't that the reason?

Robert MacLeod - ***Johnson Matthey - CEO***

We've always thought that the competition would be tough. The competition remains tough and I think what's changed -- and to some extent that's all about capacity utilization because you build a capacity for what you plan -- what you are going to sell and what you believe you're going to sell. And so is the utilization point.

We have done well in particular HDD this is where we've extended our market position, perhaps higher than we thought we would have done five years ago. But in a way, we built a capacity as a result to enable that. So some of it, that's not a factor to do with margins.

What's wrong with this side? You guys not got any questions?

QUESTION AND ANSWER

Joe Dewhurst - ***UBS - Analyst***

It's Joe Dewhurst from UBS. On just the business systems investment that you're highlighting. So there are a couple of questions. First of all, why did you kind of identify that as an issue? And also, how extensive is it? Are you planning right across the organization, a whole kind of sort of the ERP type implementation? And potentially, maybe, might that'd be disruptive while you're doing it, but do you see a lot of opportunities, say, on SG&A and other things afterwards?

Robert MacLeod - ***Johnson Matthey - CEO***

Yes, yes. Look, any organization needs to have, as it grows, needs to have the right business systems to run it. We've invested in a whole series of systems across Johnson Matthey today which don't really talk to each other effectively. So we're not then able to leverage the opportunity and strength of being a bigger company to leverage scale that we might be able to get through procurement, through working with our customers.

Our customers are becoming more global, particularly in the OEM side, with the car companies. And they want a demand to understand what's going on across the entirety of the group. So part of this is an investment requirement to meet our customer demand. Part of it is an investment requirement to meet the opportunities that we believe are available to take cost out of the business.

A part of it is an investment you just have to have. We've, to some extent, our systems, we evolve them, but some of them , we haven't evolved for some time. So it's now a sort of catch up in getting back into the right systems for today.

We're not going to do a big bang. No way we're going to do that. It's one of these things that will rollout by site. We've got, I think I heard yesterday, 53 manufacturing sites across Johnson Matthey. So we're not going to do all 53 together. It'll be very much a phased process which is why we'll take five plus years to rollout across the organization.

So one of these things, you'll start doing. It'll be relatively inefficient for the first one or two because you're setting up the templates, you're setting up the infrastructure. But as you get used to it and you start rolling it out as -- it's not going to be a cookie-cutter, but because it's easier as you start rolling it forward, you build out the skill set, and that enables you to be a better organization.

So what we're going to do is we -- this is a requirement. It's necessary to do for the group. I think there are opportunities to take cost out of SG&A. There are opportunities to take cost out through -- linked to the manufacturing excellence element because then, you can work much closer with your supply chain because you got more access to information. So you won't see savings in one particular place. You should see it sort of spread across the group.

I got one more question and then we'll probably have to -- sorry, this side has woken up. So now I've got some questions, but go on. Sorry, I don't want to imply you were asleep.

Peter Cartwright - ***Fiske***

Peter Cartwright, Fiske plc. You spent a good few minutes explaining why turnover is only in mid to high single digits and why margins won't go up, yet your last bullet point is earnings in double digits. So there's a slight disconnect there. There's either a big load on new business, which I guess we'll hear about, or a bit of financial engineering?

Robert MacLeod - ***Johnson Matthey - CEO***

Well, now I thought I said what -- if you look closely at the first slide, whatever number it is. I can't see. I need my glasses.

If you go to slide 18, those are the medium term targets of mainly organic growth. And that gets to sort of high-ish single digit growth. To get to double digits, It's not financial engineering. It's just about maybe a little bit of accelerated further M&A which allow us -- and that's our ambition. Our ambition is to grow the business quicker than just the underlying organic growth of the group.

We believe there are plenty of opportunities for us to broaden our portfolio, broaden our offering and our technology across a range of different markets, and that will get us into the double digit growth territory.

And there's plenty of opportunities to ask, not just me questions, but everybody else questions. What I was trying to do was just give an overview for the group. And we'll go in now into much more detail into the individual businesses. And to start with, I'll hand over the John Fowler to go through Fine Chemicals. John.

PRESENTATION

John Fowler - ***Johnson Matthey - Division Director - Fine Chemicals***

Thank you, Robert. My name is John Fowler and I'm responsible for the Fine Chemicals Division. It's been four years since I last presented at Investor Day. So my goal here is to give you a much better idea of what the division is all about and hopefully, you'll understand and appreciate how we contribute growth to the broader group.

Increasingly, the division is focusing on pharmaceutical markets, so I'll be using a lot of language that is pharma-specific. Apologies for that. It's tough to avoid, but I'll try to keep it simple. And you've got glossaries with definitions at the back of your packets, I think there's like four pages worth. So if you aren't sure of something I say, you can always reference it in the back or we could talk later.

So first, let me describe what we are today and then I'll get into where we are going. The vast majority of the division's revenues are pharma facing derive from our activities in active pharmaceutical ingredients, what we call APIs and Catalysis and Chiral Technology or what we call CCT where we develop and manufacture catalyst for chemical reactions that go into making those APIs.

And if you look at the chart, on your right you'll see that CCT and our API businesses represent 75% of the division's revenues, 25% is research chemicals. We split our pharma clients into two buckets -- innovator clients which are those researching and developing new chemical entities, new therapies, and those engaged in generic versions of those brand drugs.

And our leading API positions are attention deficit hyperactivity disorder you've heard that before, ADHD, and those are basically amphetamines. Also palliative care therapeutic area and those would be narcotic APIs or APIs that are derived from opium poppies.

The business has high returns, very good return on sales, approximately 25%. And this is because we focus on the high-value market segments, the niches -- especially where we can leverage our catalyst technology and our complex chemistry capabilities.

So, yes, moving down, looking ahead, we're keen to expand our activities in North America or in Europe as we have in North America over the past couple of years. And if you look at the chart on the right, you'll see that the sales are not too different, 46% North America, 40% in Europe. But the portfolio is much broader in Europe than it is -- or in the US than it is in Europe.

The US has a portfolio that goes well beyond controlled substance. In Europe, it tends to be very focused on opiates and narcotic APIs. So we're looking to expand that.

And capacity has also been a constraint for us in Europe. Up in Edinburgh, they've been maxed out for several years now. And manufacturing excellence will only take you so far. At some point, you have to take the plunge and make capacity investments which is what we did in December when we bought an old former GSK factory in Southwest Scotland, Annan.

So you've heard us talk about the sales of other niche APIs before it results, and we're looking to grow more in this area to include a higher level of participation in developing the formulated generic drug products that use our APIs. And I'll talk more about this later in the talk.

And finally, our plan is to continue to invest in technology that will give us an edge in tackling difficult chemistry. That's a key element that you heard from Robert, and it's certainly a key driver for us to maintain a competitive advantage in the Fine Chemicals Division.

And here's some detail on our markets. We supply small molecule APIs which are those that are derived from chemical processes as opposed to biological processes or fermentation processes. We don't do that. The controlled substance niche is a fraction of the overall API market, but it's a space we like due to the barriers that exist, very high regulatory barriers when you deal with controlled substance.

For example, you can't import low-cost morphine if it were made in China into most of the countries in Europe, and certainly not in the United States as these are closed markets. I've listed some of our key competitors. On the right, the usual suspects all with very high share and -- I'm sorry, customers. And then the competitors there I've listed are key competitors in the US and Europe.

And then moving to the middle of the chart, custom services. The custom services side of our API business is focused on the pharmaceutical innovator clients. And we have a strong position in chemistry development, number 3 in the US, and we're seeing this transition into a growing position in manufacturing more niche or complex APIs.

It's a smaller portion, but an attractive one, a small portion with very large market. And here, we're focused on specific customer segments. We're not looking to go after vertically integrated huge big pharmaceutical companies, but rather the small to medium, mid-size pharma companies that value and need our expertise in chemistry.

And the other thing that we'll talk about custom synthesis in making these APIs, we're not going after the commodity stuff. We don't want to compete with the big Asian contract manufacturers. Rather, focused on complex chemistry and going after the stuff that has limited competition.

And if you look at the pie chart on the right, you'll see that the split of revenues for our business, and it's mostly generic clients, 70% of our revenues. At the bottom, in terms of catalyst supply, our position is very strong. It's number 2 in the overall market. But having said that, when customers look to Johnson Matthey, they view us as number 1 when it comes to coming up with technical complex solutions.

So, yes, we'll supply more of the commodity catalyst, but we tend to focus more on coming up with clever solutions to use, better catalysts to give our customers, better performance when they do the chemical reactions.

And at the bottom right, what I've done, busy slide, but I've tried to make it -- give you an idea of how we make money. To make it simple, generics, we supply APIs. It can be an arms-length transaction or it can be a profit sharing arrangement where we participate in developing that generic, we take a little bit more risk.

We also sell catalyst to generic drug companies. And then brand innovators, we first usually sell chemistry services and then that leads to what we call custom synthesis for making the APIs. And again, the focus there is complex. And as we execute developing these APIs and catalysts, often times, we generate patents. So there is a royalty stream element to the revenues of the division.

So here's some of the macro trends impacting our business -- aging population, you've heard that before. They require more medicines. In emerging market development that Robert talked about is driving a lot of the growth. How we can react and capitalize on these drivers underpins our strategy. Generics will continue to be important to us. As we look to grow our custom services business, with innovator clients.

10 to 15 years ago, there was a shift to low-cost regions on the contract manufacturing, particularly in India. And a lot of this was driven by the big pharmaceutical companies. It was a balance sheet play. More and more of these companies, though, we're finding that they're struggling with quality, regulatory issues.

And the cost advantages that existed 10 years ago, that gap is closing. They're not as significant as they were a decade ago. So we see this as an opportunity, particularly, with our capacity investments in the US, and more recently in Scotland.

We're also seeing a drive to reduce the environmental impact. We're using more sustainable chemistry. You've heard a lot about green chemistry. And the key area there that we're participating in is creating and selling enzymes. These enzyme catalysts use less organic solvents, they have less energy inputs, and they tend to be much more selective relative to a traditional precious-metal-based catalyst, and if it's more selective, then your clients get better yields and their cost goes down.

So there's a lot of advantages in this, and we got into this about four years ago. We bought a small company in Dusseldorf, Germany called X-Zyme. And over the past four years, we've expanded their library of enzyme catalysts. And pleased to say we've got two innovator clients that are at the cusp of launch using our enzymes.

So excited about this area. And it's a key driver in terms of sustainable chemistry. Emerging markets are still on our radar. I talked about that quite a bit back in 2011, especially the potential of extending our leading position in narcotic APIs.

But to be sure, this is a long-term opportunity. It's not built-in to our near-term plans over the next five years. But 5 to 10 years from now, we're certainly covering our bets, and we expect emerging markets to be a key area well into the future.

So our strategy, growth ahead of market. There was a question in terms of our performance, and if you look at our profit growth over the past five years on a constant exchange rate basis, we've grown the division at 8%. And this is compared to market growth over that same time period of about 5%, and again, constant exchange rate basis.

And you have to understand, that's the CAGRs, it's the average. It can be lumpy. Some years might be 12%, 13%, other years might be low single digits. But on average, we've grown this business by 8%.

And here are the key elements of our strategy. We've had a lot of success in expanding our generic API portfolio in the US, both controlled substance and complex APIs. With our strong API development capability capacity investments back in 2010 and December of last year, I'm confident that we can do more especially here in Europe. This will enable us to increase our presence on the innovator side of the business supporting clients like Biogen.

Who're having tremendous success with new drugs to treat difficult disease states like multiple sclerosis. So we're a key partner with them and they've been doing very well and growing. I anticipate that our riverside plant that we bought back in the fall of 2010 from Lonza will enable us to get our top line growing nicely. We've planted a lot of seeds with these innovator clients, and some of them are starting to come to fruition as we speak.

Also, extending our generic position by moving further up the value chain by co-investing and co-developing the formulated drug products that use our APIs. This will enable us to access more value from this high-growth market segment. And also, we're going to continue to advance our development -- enhance our development capabilities and invest in new areas that will create value for our clients.

For example, enzymes, talked about that, but also things like continuous flow reactors that offers significant savings over a typical, traditional batch reaction chemistry. And all this plays into our manufacturing excellence strategy. And as Robert mentioned, we're also going to look to accelerate our growth through targeted M&A if there's opportunities to do that, and we believe there are.

So let me now talk about how we can differentiate and be successful in our strategic aims, critical mass in chemistry. You've heard us talk about chemistry. It's fundamental to the business. This enables us to apply our skills in solving tricky generic problems, for example, coming up with clever ways to work around a process patent. And I'll give an example later on in the presentation.

On the innovator side, it's helping our brand clients come up with novel approaches so they can synthesize and commercialize their drug molecules. And often times, as I mentioned, this leads to patents that can extend the product protection of their drugs. And our market leading capabilities in the area of catalysis underpins our technology advantage.

And when we talk about catalysts, a lot of times it's purification science. And that's our ability to get the chiral purity of the molecules that our customers want. And this can be done through clever chemistry, it can be done through catalysis, and it can also be done by using advanced manufacturing kit that employs chromatography.

So this is a, don't mean to get into technical detail and use words like chiral. You've got your glossary at the back, but I want to highlight it because it's a key selling point that gets us access to more complex molecules.

And our center of excellence in synthetic and analytical chemistry application is in Boston. Catalyst center of excellence is in Philadelphia, but also in Cambridge. Here in Sonning, we tap the vast experience that they have in all facets of chemistry, particularly, surface chemistry. But you're going to hear more about that later, and you'll get a chance to see it later in the day.

So we differentiate ourselves from our competitors by applying these skills and ways to get our customers to market more quickly. We have to do it in a cost-effective way, and we have to do it in a very compliant way because the regulatory environment in pharma is very tough. And what you create in the lab has to be replicated in the plant. And when you go on after complex chemistry doing difficult molecules, it's not always straightforward to go from the lab into the plant, but those are some of the skills that we have.

And speed is the key thing here. For innovator clients, they're always up against the clock to get their products to market and extend their patent life. So you have to be nimble, agile. And the generic side is the same thing. There's a huge prize if you can develop the first generic and be first to market.

In the US, the FDA will grant market exclusivity for a period of time which obviously gives you an opportunity to make very high margins. And finally, we have innovative commercial models on the generic side that create value. And I'll elaborate more on this on the next slide.

Here, I'm going to talk about moving up the value chain where we participate in formulating our APIs into generic drug products in collaboration with our partners and our customers. And the target products here that we're going after, they're not typically controlled substances. Instead, they're complex niche molecules.

And here, we're bringing our generic clients a fully developed dossier, or what we call an abbreviated new drug application, ANDA. In this model, we partner with formulation folks that have the necessary skills of incorporating our APIs into the dosage form, the pill, if you will, and then figuring out how to do it in a way to get bioequivalence to whatever the brand drug is that they're trying to replicate

And the addressable market to us increases significantly when we co-invest in this drug product development some five times. In the example to the right, this is a recent success story where we believe we're first to file in the API. We developed this and then partnered on the formulation side.

You'll note that this isn't an amphetamine or a narcotic, rather, it's a very niche small molecule that's used to treat heart arrhythmia. And the challenge on this molecule was developing a non-infringing crystalline form of the drug and getting around patents that were there. And that's what we're able to do, and that's the value that we brought.

And the total brand sales are 150 million and that's only with supplying a couple of kilograms of API. So you can see how you don't have to high volume of API. You can do a very small quantity. It's all about the difficulty, the cleverness of being able to make that API. And if you participate in getting it to market, well then, the value proposition is pretty significant.

We expect this product, by the way, to launch in our Fiscal Year 2017/18. It's filed now and so about two-and-a-half years out, we expect to see revenues from that investment.

And at the bottom, I've got some more color on what we're doing in this area. It's nothing new. We've got two products that are already creating royalty streams for us if you look at the green line over to the left. And also, we've got six more products that are filed, the ANDA dossier's filed with the medicine agency.

And the lag between the top line, the pipeline that we have filed in when it can actually commercially launch is about two years on average. Can't predict exactly when -- a medicine agency, in particularly, the FDA in this case, gets through them and approves them, but usually there's a lag of about two years. And our aim is four years out by 2019 to have 25 products filed.

And then if you look at the bottom, the target market, this can be a bit misleading, but I use the same language that people in the space use when they talk about their generic pipeline, they talk about the brand sales that they're going after. But don't be misled. Twenty-five products of 2019 going after market of $2.4 billion, that's the brand sales. When the generics come in, that value comes down.

Now, if the generic product is a commodity, it's high volume. If it has six to eight generic competitors, well then that brand value goes down by about 90%. We're not going after those types of commodity generics, we're going after the niche stuff, the tricky stuff.

So we don't anticipate the same level of competition. When we go after a product, we aim to be number 1, and we aim to leverage our technical capabilities to be there. And if we're not number 1, certainly, we expect to be number 2.

So that $2.4 billion market wouldn't go down by 90%, it would go down by 70%, maybe 80%. So the addressable market when it goes generic to us, that $2.4 billion, we translate it to about GBP500 million. And we would aim to have about 25% market share.

So in terms of the investment, we're upping it obviously. And it's been modest in the past couple of years, but we're going to up our game. And this is a key growth engine for the division, and that's why I wanted to highlight it.

This slide highlights what the division is really all about and its pharmaceutical solutions. It shows how our business offerings or position across the entire pharmaceutical lifecycle. On the left under "Custom Services" umbrella, we cover all phases of clinical development supply all the way to commercial scale to the innovator clients. Under "Generics," we cover the API supply, which today is mostly controlled substance as well as higher value-added generic solutions with ANDA filings that I just discussed.

Both the product and services market segments are enabled through our broad technology capability. And we can then execute development and manufacturing through our global network. And as you can see on the right, we have a presence in just about every region on the globe.

I've talked about catalysis today. And when you look at technology and capability, it's such a key hook for the division. For example, most molecules being developed that go into drugs, they have to use a catalyst step. It can be chiral, it can be non-chiral, but it needs a catalyst. And 30%'s a pretty bit number. And often times, it's difficult chemistry.

So you're able to come up with a bespoke solution that creates a tremendous amount of value. So when I talked about our CCT business, our Catalysis and Chiral Technologies business being number 2, they're number 1 when it comes to development and technology capability.

So the JM catalyst brand carries a lot of weight with our customers. And if they have a technical issue, they come to us first, so it's a great hook for the business. All this is aligned with the pharmaceutical lifecycle with the needs of innovator clients versus generic clients are different, as their risk profiles are also different. Most of our competitors tend to focus on one or the other. But over the past 20 years, we've been able to develop skills servicing both those client sectors.

So, yes, excited about this because our capabilities are going to enable us to benefit from the growth in both of these market segments.

And here, what I'll do is map out exactly where we play and where our strategy will take us. In each part of the value chain moving up and across the lifecycle on the bottom axis for pharma. And generally speaking as you move to the right and up in this chart, the value proposition for us increases.

Here's what we currently do. I've talked about most of this, but our strong position in the US custom services in clinical development has led to longer term commercial contracts so retaining our customers and enabling a move further along the pharma lifecycle.

So we start on the left with chemistry services. Then we scale it up and we move in to manufacturing where we make more money as we move to the right on the chart. As I described earlier, we are advancing fromgeneric APIs into formulated products where we can capture more value.

And here are the key elements of our growth strategy, expanding our portfolio in Europe beyond just narcotic APIs. And we can accomplish this organically by leveraging the new capacity that we put up that we bought in Annan, Scotland in addition to getting more from our R&D Center in Cambridge where we do most of our catalyst R&D.

Now, what I mean by this is leveraging our market leading position in catalysis and supplying a broader solution than just developing and manufacturing a catalyst. A solution that includes the manufactured intermediate or the API that that catalyst is used to manufacture.

So this is an easy progression. And now that we have the capacity assets in place, we expect to get more fed from our catalyst business to making the APIs. And the other leg is developing niche generic ANDAs in Europe. I just focused mostly on the US, and those numbers that you saw on the previous slide, there's only a couple of them, a small percentage were European generics.

The market's more fragmented in Europe, but it's still significant. And if we applied the skills that we have in Europe as we do in the US, we expect to see nice growth from them.

So, to summarize and conclude, the fundamentals of our key markets are sound with a nearly $1 trillion pharma market globally poised to grow ahead of GDP over the course of the next decade. Our API position and niche controlled markets are strong, and we will continue with the prospect of emerging market growth down the road. We'll expand our presence in Europe and look to do more in Asia beyond just controlled substances. And where appropriate, we'll move up the value chain into formulated products through partnerships that will increase our value capture.

We won't stray from our competencies, we'll stick to the - our knitting which is difficult chemistry and we'll continue to innovate and invest in technology to make sure we can differentiate. And this is something that's fundamental to us maintaining our competitive advantage in the marketplace. Organic growth strategy is sound, but if there's opportunities with M&A to accelerate that growth we'll pursue that.

And finally, the results over the medium term will be mid to high single digits, you heard that from Robert, but also as the capacity investments that we've made both in Annan and the US a couple of years ago and as the investments that we've made in these generic ANDAs start to launch and come to fruition we expect to move into double digit growth territory.

So, with that, thank you very much and I will turn it over to Alan Myers and then we'll field questions when he's done.

Alan Myers - ***Johnson Matthey - Division Director - Precious Metal Products***

Good morning. Well, there's a little bit of the morning left and I'm in the pre-lunch spot, so we'll give it a go. I'm Alan Myers and this is my first presentation at Investor Day. However, I've been with Johnson Matthey for 27 years, more than half of it in the Precious Metal Products Division, so I'm hardly a newcomer.

So, we talk about Precious Metal Products today. Within PMP we have some of the oldest businesses in the group, we also have the most diverse -- we're the most diverse with many products serving many different markets and industries. However, like most of Johnson Matthey we aim to have leading market positions and we've been very successful in that regard.

In the last decade we saw strong growth in the division as we entered markets such as medical components, high performance ignition alloys for sparkplugs, and black enamels for the automotive industry. Most recently we focused in on the balance sheet and our control of working capital especially our pgms. You all know by now that we've changed our relationship with Anglo and despite the loss of that contract we've maintained a very strong return on invested capital for the division, as of 30 September it was 33%.

As Robert previously mentioned we've announced the sale of our gold and silver business in a transaction that should close by the end of the year. As you can see by the chart gold and silver represented about 10% of our sales. As a division our exposure to precious metal prices has been reduced with most of it now falling in our refineries, a 10% movement in the basket of pgm prices is worth about GBP5 million a year.

As you can see by the lower chart our strongest markets have traditionally been North America and Europe. However, we expect particularly in China growth to accelerate the rest of the decade and I'll give you more on that in a few minutes. So, the loss of the Anglo contract has refocused the division for a return to growth. In the coming slides I'll talk about our investment for growth.

So, when we look at our drivers we're a very diverse business in PMP, so we could probably come up with a lot of different drivers, so I'll only focus on a few right now. A quarter to a third of all modern materials rely on pgms for their manufacture, from fertilizers to automotive catalyst, to active pharmaceuticals, so the sustained needed for pgms will continue.

Our strategic position in refining and pgm management will continue to drive opportunities in those areas. Our recent refining and supply contract with the largest pgm mine outside of South Africa and Russia also puts us in a good position. The need for clean air will also drive the business. This will drive the continued demand for the end-of-life autocatalyst recycling market, but also for more complex pgm salts used in autocatalyst manufacturing.

This will provide growth in refining and for our products business as we utilize our chemistry skills to collaborate with Johnson Matthey's ECT business on new salts. Related to the drive for clean air will also be the need for better fuel efficiency which creates opportunities in the automotive markets in areas like high efficiency sparkplugs.

Healthcare trends will continue to drive our medical components business. This has traditionally come from the pgm based business in noble metals, but in the future we see opportunities in technical glass materials. From our Advanced Glass Technologies business, more on that in a little bit.

So, when we look at our strategy it's about focusing on what our customers want higher efficiency products at a lower PGM content. We do this by leveraging our core strength in chemistry, our best in class pgm management and refining services, that's all about having pgms when our customers need it, where they want it, and in what form they want it in. Individually any of these strengths will be beneficial, but together this is what outdistances Johnson Matthey from our competition.

So, we're investing in technology, people, and process to generate new and more complex products and drive continued efficiencies in our PGM refineries using both novel technology and manufacturing excellence. You'll see some of these technology related to pgm chemistry for refining on our tour of Sonning later this afternoon.

We also see opportunities for bolt-on acquisitions in areas like medical to expand capabilities. And finally, we expect to see accelerated growth in China in part from the use of more complex pgm chemicals there, but also from a planned investment in a refinery in China. First to handle our products business today, but in the future to take advantage of what will be a growing end-of-life autocatalyst market as emissions legislation continues to mature in China. Our black enamel and silver conductive paste for automotive windscreens will also drive continued growth in China.

So, let's talk a little bit about technology. So, whether in solid form, like in alloy, or a liquid form like a complex pgm chemical, our expertise in precious metals and precious metal chemistry and its application is a differentiator. Here's a good example of how we use our skills to create value for Johnson Matthey and for our customers.

We entered the ignition alloy market when customers needed a higher efficiency and longer lasting sparkplug. This consisted of a platinum versus the traditional copper ignition copper plug. As the demand for high efficiency continued we developed an iridium ignition alloy, here our expertise in chemistry and our skills in working with very difficult precious metals drove growth above the traditional car market growth.

Our customers enjoyed the benefits of the iridium plug, but don't like the cost of the iridium plug, so now we've developed next generation alloys utilizing our expertise in minor pgm chemistry to drive higher performance at a lower cost to the customer and a higher value for Johnson Matthey, that's a win-win.

So, technology is a differentiator for us and it's valued by our customers, but they also value our ability to manage our PGMs. We are also best in class in providing pgm market information to our customers and partners. Together these provide a really unique offering that is not available from any other company in the world, another clear differentiator for us.

Moving on to PGM refining, we are the number one secondary PGM refiner in the world. That didn't happen by accident. We started off as a refiner almost 200 years ago, our reputation for integrity it started then and today it remains a core value for Johnson Matthey. There's plenty of competitors in the PGM secondary refining space, some of the competitors interested in secondary refining to fill capacity and others to ensure sources of material.

While some of our business is bid on a spot basis, the vast majority of our business is based on long-term relationships with our customers and our refining partners. Our network of partners is all about the right feed for the right refinery. This maximizes the efficiency of the refining process and creates value for us and for our partners. For all these reasons we feel very secure in our leading position in this market.

As you can see by the two charts the total demand for PGMs will rise faster than primary supply, making secondary refining as important as ever. We expect our throughput to grow by a CAGR of 5% through 2023 mostly due to the end-of-life autocatalyst market growth especially in China. With our refinery network of partners continued enhancement to our refining process and our investment in China we're well-placed for the future.

Now, while growing slower than our products business we continue to expect growth in refining in the mid-single digit range. Of course I'll remind you that PGM prices could impact growth rates either positively or negatively and it could impact both volumes and also revenue per ounce.

Moving on to our noble metals business or industrial business noble metals, here the opportunities for growth in noble metals industrial remain excellent, despite the diversity of the markets we serve our industrial business maintains leading positions in virtually all of our major product areas. Our strategy in industrial will be continued to use our PGM alloy chemistry expertise to reduce or substitute PGM in our products, creating value for our customers and for ourselves.

I've talked about how this will drive growth in the ignition market already, but our work is not just limited to ignition, we're also looking at powder metallurgy to enable the next generation of smaller, more intricate components that lend themselves to additive layer of manufacturing. We're also working on novel technology in a number of other areas and I hope to be able to share those with you at a future event.

Moving on to noble metals medical components, we've talked about the long-term mega trend in healthcare being very favorable for this business. Through 2020 we see a CAGR for medical components at 9%. North America today is over 60% of the global medical component market and it will remain the number one market, but we see the growth rates in Europe, Japan, and China outpacing those in North America. To this extent we plan on adding dedicated development cells in those regions to better increase our responsiveness to our customers there.

We'll leverage our strong relationships with the US customers in those emerging markets. The electrophysiology market will continue to drive growth ahead of that of the overall market. We're providing components to medical device companies that are working on the forefront of medical advances. One medical device we supply components which account for a large portion of our recent growth is the ablation catheter which is used to treat some types of arrhythmia which is a problem with the rate or rhythm of a heartbeat. During catheter ablation a series of catheters are put into the blood vessel and guided into your heart and then a machine sends an energy to the heart destroying small areas of heart tissue where abnormal heartbeats may cause an arrhythmia to start.

Now, interestingly John, he talked about an API related to treating arrhythmia, so our cardiologist has different treatment options for their patients and it's nice to know that Johnson Matthey can help the healthcare industry provide solutions for both.

So, why do our customers use Johnson Matthey? It's our strength in this market is really determined by our expertise in PGM and our expertise in other materials such as Nitinol and also our capabilities in terms of size and complexity.

Specifications will continue to tighten and we will continue our investment in ultra-high-precision equipment, this will expand our capabilities in this market bolt on acquisitions to acquire these capabilities where necessary is an important part of this strategy.

Sorry about that. Good thing you had your books.

In line with our move to a functional product line which now represents 75% of the market, we've changed our name from Color Technologies to Advance Glass Technologies. We have a strong position in this market for black enamels and silver paste for the automotive industry and expect to grow in line with the market.

In October 2014 I had the pleasure to officially open our new manufacturing plant in China, they will manufacture enamels and pastes for our local Chinese customers in that growing market. Leveraging our expertise in silver paste we're also looking at more technically challenging silver based materials for electronics and other industries.

We've exited the ceramic colors business and the focus is on technical glass materials. We've already developed fire retardant and other protective coatings for electronics applications. We're now looking outside of our current market in areas such as medical.

Glass can be biocompatible, it can be inert, it can be active, and it's one of the best materials for controlled release.

So we're looking at applications in area such as bone growth, tissue regeneration, medical devices, wound care, antimicrobials and drug delivery. We would expect to use M&A to jump start our entry into this area.

So you've heard a lot and you'll hear a lot more today. What are the key things that I want you to remember about Precious Metal Products, we have renewed focus on investments and technology and process. We maintain leading positions in most of our products. We see strong growth in China and are making further investments there. So these together with our strong skills and chemistry, pgm management will drive high single-digit growth for our manufacturing businesses from 2016/17. We'll all do this while maintaining our very strong return on invested capital.

We believe though that bolt-on acquisitions could drive even higher growth for the division. Thank you. And we'll have a Q&A session now.

QUESTION AND ANSWER

Robert MacLeod - ***Johnson Matthey - CEO***

Okay. I think it's between few questions now if you want. And then we'll obviously break for lunch. But don't let that be in any way an encouragement not to ask questions. So happy to take any questions. I will just be the host really but primarily the questions obviously go to John and Alan if you have any.

All right. Let's wait for the mics to come out if we can now.

Adam Collins - ***Liberum - Analyst***

Hi. It's Adam. Just for the sake of completeness, could you comment on the outlook and the strategy for the research chemicals business?

John Fowler - ***Johnson Matthey - Division Director - Fine Chemicals***

Sure. Yes. It's a good little business. You've heard us talk about geographic expansion and that's been the primary strategy of that business, adding new products to the catalogue which they've done. But really what underpinned it was the investments in three new warehouses, one in Korea that we opened up in the spring of last year, one in Shanghai and another one in the West Coast US.

So we've made the investments there. We're not going to do a lot more in terms of investing. And the management team is focused on delivering the growth in that business. But I wanted to focus on the chemistry a bit because that's what's really driving the growth of the division. And that's why I've kept it to APIs and CCT today.

Adam Collins - ***Liberum - Analyst***

Okay. Can I just follow-up on a couple of things there. Could you comment on the competitive situation now? I know there's been some intensified competition from Indian and Chinese players. And what kind of growth can we expect in the mid-term from that business?

John Fowler - ***Johnson Matthey - Division Director - Fine Chemicals***

This is RC. Yes. Intensified competition particularly in Asia and it still a very expanding market. There's a lot of chemical -- the very, very front end of the pharmaceutical drug development, you see a lot of companies like [WuXi] doing lots of work there. So there're opportunities for growth because that market is expanding. So I would expect them to grow mid, single-digits something like that.

Robert MacLeod - ***Johnson Matthey - CEO***

Ok Adam, why don't you just put the mic forward here.

Simon Fickling - ***Exane BNP Paribas - Analyst***

Hi. I'm Simon Fickling from Exane BNP Paribas. Can I ask considering on competitiveness in the fine chemicals business. I think a couple of years ago there was a new entry or there was a change in the competitive landscape partly legislation driven in the UK. I think that was the API business. Can you just remind us what that related to, update us on where we are today? And whether there are potential risks either further in the UK or potentially to the US that leg of the business as well? Thanks.

John Fowler - ***Johnson Matthey - Division Director - Fine Chemicals***

Yes. I think what the government has done is done. They weren't following the guidance in terms of how they could control the market. And some imports of one particular API were coming in that shouldn't have. And that's under consultation. So it's been a long drawn out political process as you might expect. But we don't see that expanding beyond the one API that they let come into the UK. And our hope is that that will be reversed.

There's an active consultation going on right now. So, steady as she goes really. We don't see the opening up of the UK market. And why would they? It puts UK manufacturers at a competitive disadvantage because they can't export into the US or into France or Spain. Yes. So, I think there's very compelling arguments for them to maintain what they've got. And I don't expect it to open up anymore than it has and optimistic, cautiously optimistic that we will be able to reverse that.

Simon Fickling - ***Exane BNP Paribas - Analyst***

I'm sorry, just one follow up for Alan. Okay. The last comment you made was a target for high single-digit growth in manufacturing from 2016 and 2017. Is there a reason why that we shouldn't expect that for next years as well?

Alan Myers - ***Johnson Matthey - Division Director - Precious Metal Products***

No. We're making our investments -- we've made our investments over the last year or so. It's just when we see them kicking in with the new product introduction. We've got some trials with some customers. So we'll expect it to be lower next year and then move up in '16 and '17.

Robert MacLeod - ***Johnson Matthey - CEO***

Okay. So I will just hand it over to -- why don't you go first since you're first.

Bill Cross - ***Eaton Vance***

Bill Cross; Eaton Vance. Robert made a good case for why fine chemicals belong in Johnson Matthey. From the Johnson Matthey perspective maybe you could speak from the fine chemicals perspective about why Johnson Matthey is the best owner for the fine chemicals business?

John Fowler - ***Johnson Matthey - Division Director - Fine Chemicals***

Sure.

Robert MacLeod - ***Johnson Matthey - CEO***

Do you have a day?

John Fowler - ***Johnson Matthey - Division Director - Fine Chemicals***

I mean, yes. The fundamental message that you're hearing is the company is all about chemistry and its application. And fine chemicals is probably one of the best examples of chemistry and applying it. And the beauty of it is you come up with bespoke solutions. Every drug molecule is different, it requires different chemistry, different issues that come with it, so the skills that we have embedded within the division.

And also what you'll hear a bit from Liz later today on Sonning, a lot of the basic research that we do supports that business, a lot of its surface chemistry. So we focused on the API side. But even if you were to look at the formulation development side of it most of that is physical and analytical chemistry which is very core to Johnson Matthey, so.

Bill Cross - ***Eaton Vance***

Is there some benefit to being outside of a healthcare business, in other words to being a chemistry company as opposed to having a healthcare owner? Or is that really an incidental feature of this?

John Fowler - ***Johnson Matthey - Division Director - Fine Chemicals***

I think that's an incidental thing. And if you're a healthcare company and you want to be a be all and have all the different parts that go into your value-added solution, it's difficult to be good at every single one of them.

So having a specific bent on APIs for example, that's our focus. And we do it better than most other companies particularly the ones that are vertically integrated. And then us as a chemical company, focused on API in the healthcare industry, you didn't ask this but to kind of reverse it, it almost pushes us to participate and be very much like the companies engaged in the healthcare business because we have the regulatory scrutiny that they have. And everything we do has to be aligned with what they do.

Does that answer your question?

Bill Cross - ***Eaton Vance***

Yes. Thank you.

Robert MacLeod - ***Johnson Matthey - CEO***

We'll come to you guys in a minute. But we'll go -- we'll skip -- give it to Thomas and then we'll go to over here.

Thomas Gilbert - ***UBS - Analyst***

Thank you. I also got question for John. When in the early -- late 1990s and early 2000s the Asians came into the medium and bottom end of the fine chemicals market. One thing that happened is the contracts changed from gram based to batch based. Can you let's say tell us as Johnson Matthey do you get incentivize paid on a per gram based output of your customers or per on a production volume basis? I.e. if you make a drug with six batches rather than with eight, do you keep the benefit of the productivity improvement or you give it away to the customer?

John Fowler - ***Johnson Matthey - Division Director - Fine Chemicals***

We typically keep the benefit of productivity improvements. I don't really know what you mean by gram versus batch but...

Thomas Gilbert - ***UBS - Analyst***

When a customer calls and says, "We want 5 kilogram of the API", do you get paid on the 5 kilogram or on the production units that it requires you to get to the 5 kilogram?

John Fowler - ***Johnson Matthey - Division Director - Fine Chemicals***

You can get paid in very -- in several ways. You can get paid on a volume basis; you can get paid on a fixed contract where you've agreed upon a price. And if you could deliver it under a certain time period that that price is associated with, you get the benefit of it. You take a little bit of the rest. So there're all kinds of ways that you can deliver that.

Robert MacLeod - ***Johnson Matthey - CEO***

And, Thomas, the vast majority of times that extra value goes to Johnson Matthey. No, it doesn't get passed on to the customer. And I said; let's do over this, Peter do you want to go first? Okay. Great. So we can go - keep that one there, Mel, I think some guys still got some questions.

Peter Cartwright - ***Fiske***

Yes. Thanks, a couple for John. First off you mentioned narcotic used in Asia is quite a big step from the death penalty so it's okay for a headache. So are you being realistic and would it require plants in China or in India?

And then the second question on the growth in the market. You mentioned biologicals, I mean, there's an argument now that at least in value terms, they're taking more than all the growth. Are you operating in a shrinking market?

John Fowler - ***Johnson Matthey - Division Director - Fine Chemicals***

Okay. I'll tackle the first part of your question narcotics in Asia. As I said that's a long-term play. Do I think it's realistic? Absolutely. If you look at India, I mean, I think about six months ago they passed a medicine's bill that legislated the use of narcotics that never existed before. In the Indian market was very specific to codeine was the opiatethat went into cough syrup; they had a pretty big market for that, but in terms of palliative care, nothing.

So if you're suffering from cancer you suffered. And so they put laws in place to make that happen. Now there's a lot of stuff that has to promulgate from those laws to make it become a reality. But we see that as certainly an opportunity but one that's going to move around a bit as they do in India.

As far as China goes they put the framework in for it to issue licenses. But there hasn't been any movement in that area. But, I mean, the World Health Organization has a big initiative because it's a matter of quality of life particularly at the end-of-life. And I do think that it's going to happen despite the opium war hangover and things like that.

Most of the doctors, a lot of the doctors in China for example, they're educated in the west and exposed to these things. So it will change but it will take time. But I think India might be a more near term opportunity than China.

And can you repeat the -- sorry, Bill -- or not Bill, Peter, what was the second thing?

Peter Cartwright - ***Fiske***

Yes. On the market in value terms the biologicals is probably taking more than all the obvious growth. So at least in the value component and small molecules, are you operating in the shrinking market or the growing one?

John Fowler - ***Johnson Matthey - Division Director - Fine Chemicals***

There's growth in both, but there's a lot of focus on the biological side just because the -- it's difficult to come up with a generic knockoff when you have a biological drug where biosimilar is the mechanism.

And so a lot of drug companies are shifting or trying. If they can do it with a biological drug first, they will because they can protect it from going generic for a longer period of time. But that doesn't mean that there's not research and development going into small molecules.

For example, I think the two -- my colleagues in the audience can help answer these questions when we have break. But two of the biggest blockbuster drugs that came out last year, one was hepatitis C drug; two companies came out with that. I think Gilead was the big one and small molecule. The other one I talked about Biogen, they came up with a drug for multiple sclerosis, blockbusters. It can be well over $1 billion drug and again, small molecule.

So I think a lot of that is just -- it's the noise, its fashionable I've heard about biologics for a long time. The biologics going to replace opioid narcotics but it hasn't happened. But it's been talked about for a long time.

Robert MacLeod - ***Johnson Matthey - CEO***

Andrew?

Andrew Benson - ***Citi - Analyst***

Yes. Thanks. Andrew Benson, Citi. [I have one] to take two different questions. looking back in my experience of companies, strategies entering for making a products for generic suppliers just about everyone of them have said that, "We're clever than everybody else and so our generics are not going to fall like normal generics."

Well, I just want to test why you think that a thesis in your case is more likely rather than less likely that general 90% rule won't apply? And it if does apply does that blow apart your growth or will you just get less growth? So that's the first question.

The second on the autocatalyst recycling in China. Again, it looks like there's going to be quite a competitive market. And clearly in Europe and America, that's quite a well-established business in China, it's not, so do you anticipate sort of a fierce battle for market share before it settles down? And how do you manage the growth profits in what could be a very competitive environment to start with?

Robert MacLeod - ***Johnson Matthey - CEO***

Okay, Andrew. Do you want to go first, John?

John Fowler - ***Johnson Matthey - Division Director - Fine Chemicals***

Sure. In terms of the commodity nature of generics -- I mean if you're going to develop a high volume API that's going into a massively successful drug, there's going to be a lot of competition. And a lot of companies could do that.

But there're thousands of drugs out there. I mean thousands of small molecule drugs. And if you choose the ones that don't have any competition, the only API being supplied is going into the brand, and that's it. It's a difficult chemistry, multiple chiral centers all that stuff, you can be first to market.

And the thing is we've been doing this for a while. So it's not a leap of faith that we're going to be successful in this space. The two products that we're getting royalty streams from now, we were first to file on. I can't tell you what they were, but they were niche small molecules that we beat everybody else. In fact, we're the only generic on the two that we're getting today.

So that goes to if you have good product selection and you stick to difficult, tricky stuff. And I know you hear that from a lot of companies. But if you have a sophisticated model and you've leveraged what you bring to the party, and from our perspective, it's API, it's chemistry complexity. And you stick to it you can find products where you can have a unique position.

The six filed, a lot of confidence that we'll be one or two on most of those products.

Robert MacLeod - ***Johnson Matthey - CEO***

Okay. Alan, do want a very quick review with China?

Alan Myers - ***Johnson Matthey - Division Director - Precious Metal Products***

Yes. Yes. So the end of life autocatalyst market is really served first by collectors, like in Europe and North America. So we'll expect that market to grow in China with a lot of collectors. And we sit in the space of pgm extraction. So our customers are the collectors, we're not going out to scrap yards in China and competing there.

So there will be a lot of competition in China. But I think in the space that we're in, we'll see a lot of our traditional competitors.

Robert MacLeod - ***Johnson Matthey - CEO***

Okay. It's difficult to do. Initially it's going to be -- our refinery in China is going to be for more industrial products that we're going with someone else. The end of life autocatalyst, it's going to take some time before it comes through anyway.

There're a couple of questions over here or have you given up because you want to have lunch? Neil is good to go. Andrew has given up.

Neil Tyler - ***Redburn - Analyst***

Thank you. Neil Tyler, Redburn. A question for Alan. Looking through your presentation and the components, I think three of the four offered prospects for mid to high single digit growth. In aggregate, you -have managed to convince Robert that mid single digit growth was the target for the division. Is that because the refining business is really likely to grow less quickly in the near term? Is it because the M&A is going to be a bigger component of the high part of that equation? Or is there something else that I'm missing?

Alan Myers - ***Johnson Matthey - Division Director - Precious Metal Products***

No. You actually had it. It's really related to our services business. It's not only our refineries which we expect to grow lower, but also a significant part of our sales is in the precious metal management space which we expect to grow at a low rate as well. So it's in the aggregate.

Our manufacturing business is higher single digit growth, in the aggregate, when you add our services business, mid.

Neil Tyler - ***Redburn - Analyst***

Thank you.

Robert MacLeod - ***Johnson Matthey - CEO***

Thank you for pointing that out, Neil. We're going to do our budget process fairly soon. And it reminds me the he's the past master of budget negotiations.

Anything else? Maybe we'll take one more question if there is one or -- Andrew, you did not -- I'm good. Okay, Andrew, go on. And then we'll go for lunch.

Andrew Benson - ***Citi - Analyst***

Just very quick. The enzyme side of things, is that your own technology, John? Or is that through the company you bought in Germany that you mentioned?

So is it 100% IP or are you doing this in a JV with one of the big enzyme houses?

John Fowler - ***Johnson Matthey - Division Director - Fine Chemicals***

No. This is 100% JM.

Andrew Benson - ***Citi - Analyst***

Yes.

John Fowler - ***Johnson Matthey - Division Director - Fine Chemicals***

We don't have any licensing arrangement with Codexis and some of the big names. They're focused in other areas, not necessarily pharma but they've done a lot of licensing.

Andrew Benson - ***Citi - Analyst***

What's the rough time scale?

John Fowler - ***Johnson Matthey - Division Director - Fine Chemicals***

Pardon?

Andrew Benson - ***Citi - Analyst***

What's the rough time scale for this?

John Fowler - ***Johnson Matthey - Division Director - Fine Chemicals***

These launches are pending.

Andrew Benson - ***Citi - Analyst***

Okay.

John Fowler - ***Johnson Matthey - Division Director - Fine Chemicals***

We expect to have this enzyme launched, supplying the active for the drugs in the next year.

So what we did was we bought that small company in Dusseldorf, X-Zyme. They had a library. And then we spent a couple of years enhancing that library. And the beauty of the enzyme side is you can -- there's a lot of IPs associated with it.

So you develop an enzyme for a certain type of chemistry and you find that it can work. The value proposition to the customer is they get 99% yields versus 85% or 90%. So their cost of goods is significantly reduced. And if they want to replicate it, it's -- you've got a patent on your enzymes and your library.

It's very difficult to replicate. I don't want to say it's impossible, but it's very difficult. So you get a unique position which is atypical when you do a lot of that catalyst development work.

Robert MacLeod - ***Johnson Matthey - CEO***

John, a very detailed answer. Well done.

Guys, ladies, gents, thanks very much for this morning. We'll have a break now. Lunch is out in the main halls you walked in. There's a buffet lunch. Maybe half an hour or so we can get back here for 1 o'clock then that will keep us on schedule. Thanks very much.

(Break)

PRESENTATION

Nick Garner - ***Johnson Matthey - Division Director - New Businesses and Corporate Development***

A number of you have been commenting that this is a rather unnatural thing to do to just go and talk to a bunch of people. A number of people have been coming up and thanking us for making this presentation, what excellent events they are. And I would say quite the contrary. It's a privilege and a real honor to have this opportunity to explain what we do to interact and sort of have the challenge and the discussion. So thank you rather the other way around.

So today, I'll be talking around the long-term growth prospects for Johnson Matthey. Robert put up the strategy pyramid and talked you through that early on this morning. And thankfully didn't talk about the new business growth, so it leaves me to say something.

The growth for new business, creating growth engines for the future they're nothing more or simple than this sort of huge reaching-for-the-stars long-term growth prospects. So that's great. We'd all like some of that, tick. But it doesn't sound that simple, is it?

But just a sort of a slight reality check here I think. We'll take you through the details of what we're doing and an update today. But this isn't a new thing for Johnson Matthey. This is not uncommon. It isn't this sudden magical pulling rabbits out of a hat. This is really an ongoing process.

The Johnson Matthey of today is definitely not the same as the Johnson Matthey of 10 years ago. We have developed new businesses and 10 years back, and 10 years back, it's a regular habit of ours.

It is a fundamental building block, however, of our strategy. That's the way it fits in. A couple of years ago, we had the opportunity to explain what we're up to. And we set out this strategy for new business. The scale, where we were looking, and how we're getting on.

And today, I'd like to update on the process, but more particularly, give you a good idea of the really exciting future prospects that are emerging. So we think we've got some good niche high value, high tax, we're going to come back to that chemistry and application again -- the sweet spot of Johnson Matthey -- into markets that have fundamental drivers where, however, our technology is valued. Those things all have to exist together.

M&A will come into it. M&A is kind of -- we haven't got this enormous shopping list. I don't want to sort of panic you. M&A has been mentioned by everyone I think today. We can add the word bolt-on onto that.

When I talk of M&A, I'm talking about enabling M&A into new markets. And I think we're talking tens of millions typically, so don't panic. However, it does open up the opportunities down the road to do more. We'll talk more on that later.

Developing a portfolio of opportunities. I mean the scope of developing new growth drivers for the business for the future. The scope of opportunity, the range of potential is of course vast. It's universal.

So how do we get that? And that I think you have to start at why? You have to be really broad in your approach to this as a starting point looking for innovative new areas.

But clearly there's a high attrition rate. Now we've thought of this GBP5 million to GBP7 million. And just for clarity because there was a question this morning on it, that GBP5 million to GBP7 million represents like an ongoing process cost. That's the cost we spend every year investigating very wide scale of range of opportunities, broadly divided between market research and technical assessment. Because as we look at new areas, clearly we may pay for market study, we may engage in marketing consultant, we may start testing the technical feasibility.

So that's what that money is. It's an ongoing spend investigating concepts. It's not the investment in the businesses themselves. That's an addition.

There is a high attrition rate, as I say, from this vast possibility but rapidly, you start honing down the things that kind of make sense, things where strong fundamental drivers can be responded to by the kind of technical competencies that Johnson Matthey has. And there's a recognition that those competencies deliver value. There's value to be had for the appropriate player.

And those start to form into concepts where we start honing down further. And each -- and in that point, there's a sort of rigorous ongoing assessment. Chief amongst those targets is can this thing in a credible business plan deliver the returns that Johnson Matthey requires in terms of margins and returns on capital investment? That's the fundamental first question.

Clearly, there's a cascade of milestones and things that have to happen to confirm that. But that remains first and foremost in the mind, and that's the assessment. Even when we go into commercialization stage, that we'll mark against and continue to assess against.

So just the fact that it started commercializing doesn't mean it has to get all the way there. We will only do things and will focus on things that have the best success rate.

And to that end as we move along, as we enter into new markets, I think there is a transition. Once you go from concept, theory, study, second-hand research to firsthand experience of the market, piloting, dealing with real customers, reality comes to you in a way that isn't achievable through simple research. And as those concepts are tested then some drop by the wayside and indeed as you learn more and as we have learned more.

Two years ago, we talked about the air purification business. We have stopped those projects. The exciting prospect that it was in terms of market drivers, we simply weren't seeing the potential returns and scale that we could achieve in those markets. I think it's a good market for someone else, a different player with different maybe aspirations in terms of financial returns, but it wouldn't work for Johnson Matthey. And so that represents how we have stopped other projects and we will continue to have this rigorous assessment as we go along.

I will, however, talk about the other things on this page. I'll explain briefly the drivers, the underlying growth prospects, why Johnson Matthey is a good player, what the fit is, and our plan. And hopefully give you some flavor and color on what our aspirations are in each area.

The one I won't to talk about is low carbon vehicles. This is an ongoing project. We've been looking for about 12 years -- 12 years! actually 20 years if we think about some things. We've done a specific project for 12 MONTHS in this area.

And we have -- apart from our ongoing activities in low carbon vehicle, clearly we have exposures in this market already. But we haven't found anything particularly dramatically new, of scale. There's sort of intriguing product development and some researches and some opportunities but we haven't identified a large business prospect. Beyond that we're already working on.

Moving on then, taking on the other elements on that screen, and starting with batteries. Well, the opportunity here, the driver here is clear, I hope. It is the diversification of the powertrain.

It's this changing of the powertrain supply into a whole range of different solutions, and I think that's well-established and the importance of electrification across a wide number of those powertrains. That's the driver. I won't spend a lot more on that. I think you all are familiar of that area.

I think the intriguing and more subtle issue here is -- the sort of the real opportunity is defined by the fact that current energy storage devices, batteries, are simply -- their performance isn't good enough. Now that's the opportunity. That's what you're looking for. Good market driver, yes. But what's the opportunity for Johnson Matthey to play here?

And the biggest single factor -- there're a number of other factors, clearly they're relevant onto the battery system. The biggest single factor currently is the cathode and the cathode material itself as a limitation. And so that's where we start.

So moving on to battery technologies or better still, cell chemistries, cathode chemistries, the lithium ions, this is the area we are starting on and starting to build from. And I just want to spend a few minutes on this. There are five broad classes we've put up here. This can be a baffling and indeed was for us some years ago, a baffling and unintelligible world of complexity.

But really there are five broad classes of chemistries. Within those classes, incredible range of variants, incredible range of possibilities to manipulate, adjust, enhance and change the performance of those fundamental chemistries. And therein that variation, the ability to tweak, adjust and move things around within them. Therein lies the opportunity to enhance performance.

And then later -- Liz will take you through some of the things we're doing on battery materials, but that's the scope for improvement, that's the opportunity for Johnson Matthey to play.

Within the chemistries themselves, LCO, very well established, this is the original lithium ion commonly used in the electronics industry, so this is broadly applied today throughout the electronics industry.

We are focusing on automotive. We are focusing on automotive as that drives the cutting edge of technology. That's where you need to be to be really at the limits of performance, and that's where you need to enhance.

LCO is not used in automotive due to safety concerns, and also durability, but perfectly good material and used universally throughout the electronics industry.

LMO, moving across the page there, LMO is currently being used in EV's launched today. Early stage, good cost basis on there and a reasonably decent energy chemistry. Energy, [there is a mixed] -- defined terms.

Energy quotes as range, energy is amount of electrons, and of energy, you can store anything, so how much energy you can release over time gives you range, range for vehicle, basically, very, very important, so energy density is extremely important in the automotive world.

And LMO is used and has recently, today, it's currently going ahead being -- increasingly replaced by enhanced chemistries, better performance, given by NMC and to a degree, NCA. NMC probably we see -- giving the larger share of future prospects, but they both have good energy characteristics and they're both being used. Sometimes, in combination so it gets more complicated because you mix chemistry classes.

On the far right, LFP, is not an energy dense application -- chemistry. This is power dense. So power dense there's a lot of electrons releasing one [got surged] it's power. So if you want to push something heavy, you need power density, if you want to go a long way, you need energy density.

LFP, power dense is used in things like heavy vehicles, where you need to do a start-stop duty, you're up and down a lot, and you need to give a lot of torque suddenly, and then release energy in and out quickly.

Those are the broad classes of chemistries. They've been around for a long time. The latest is LFP, it's over two decades old. So those actually are relatively stable situation. However, each class has its own characteristics, no one class is good enough. But a good solutions provider needs to play across those. A good solution provider needs to respond to his class and needs in both energy and power, and the combinations therein. And that's our plan.

Familiar cogs, hopefully you're getting used to them by now, cropping up. But to get Johnson Matthey, you have to get these. The Johnson Matthey operating model is beyond chemistry, it's beyond the type of chemistry we do. It's clearly driven by a fundamental understanding of the applications because you can only drive the development of chemistry by really understanding what matters for your customer, what value, what improvements give value to them now and in the future indeed.

And only that profound understanding of the application, every successful Johnson Matthey business model has this. We very much have the linkage into our customs applications and our test centers look like customers' test centers.

Liz will come back to this later on, but in batteries, the chemistry, the sorts of chemistry that are needed for good cathode development, material development, exactly the sorts of things we do currently, everyday. These are the sorts of surface since, the sorts of manipulations in terms of form, morphology, the way things are presented, I'll leave it to Liz because she's got a very good example of this coming up.

So this is very, very heartland territory, this is very familiar ground to Johnson Matthey why we easily find ourselves capable of dealing and manipulating the chemistries. So we're well advanced on the technical side.

I think the business model build is about developing the application understanding from a standing start. Clearly, this isn't a market we're present in, haven't been. And so the first step was develop application understanding, and that's one of the reasons we bought a battery systems company because a battery systems company has an overview of the whole model, what matters, what's the relevance of an improvement on a cathode to the entire system, and therefore, to the customer's hands.

And that's been essential and continues to deliver good information. Now of course we are present in the battery materials business through actual supply of products. We're getting to spend time with OEMs, Tier 1s, and continue to enhance that relationship and that application understanding to feedback to our chemistry development.

So we want to be more than just a material supplier. We want to be a solutions provider, so we need to have that application understanding.

Just to review of where we are today, how we got there, the journey so far. And this is quite a rapid journey and I'm very pleased with this kind of progress, performance.

Back in 2012, I mentioned that we bought Axeon. That bought us not only this really good application understanding in automotive into the overall system, it also gave us really good insight into the market itself. So that's paid back in spades in terms of that sort of information allowing us therefore, to refine and better define, de-risking our business plan.

Last year, we completed the purchase of the manufacturing assets of materials for A123 based in Changzhou, China. And later this financial year, so within the end of March, we will compete on the purchase of the Clariant battery material system.

So together, those assets would represent production capacity between China and North America of some 5,000 tons of powders, a turnover of somewhere between 40 million pounds, 50 million pounds with a really good quality order book. A123 clearly, we've built a long-term relationship into our arrangement with them. A very advanced provider in this market.

But through Clariant, we also get a good order book with major OEMs and Tier 1s in Asia, principally China, but as well as North American. So a good established customer base who we can start developing this application understanding with.

We also get good IP in LFP, and an ongoing inherited development program, and development improvement clearly as I've emphasized here, is key. You need to move the marker up and develop better products.

Just to pause because it's mentioned on here, again, I received a lot of questions, why LFP, what's this obsession Johnson Matthey seems to have with LFP? Well there is no obsession. I shall pound that home again. We want a broad provider of chemistries.

I think why we started here in sort of simple words is, if you got back to the previous slides, they were a range of energy dense chemistries, remember the energy dense, the range delivering chemistries in automotive.

There were choices to be made. And from a standing start, where do we start, which choice did we make? In power dense, there was one choice, there was one clear winner in power dense and so it eliminated some of the risk about where did we start.

If you started in power, there was a clear, absolute answer. Whereas we started in energy, we would need more information to make that decision. So that's why we started in LFP. But the intention, if I move on -- and the roadmap going ahead, today, we have this well established position materials, but we will invest in a broader materials portfolio, absolutely working across the spectrum.

Continuing to invest however and step out long term R&D, and Liz will talk about some of these, investigating beyond lithium ion. This is 20 years ahead, theoretical stuff. This is just enhancing and delivering that chain of possible solutions down the road. That's where we are today, that's what we're doing.

Consolidating all those pieces together, next year, we'll have a business that breaks even on a reasonable turnover there between systems and materials. And from that base, steady, solid growth up to year three by then, a consolidated profitability level. And moving on to year five, sales up to GBP300 million, and most of that growth is coming from materials. This is our bottom-up view, by the way. Sales up to GBP300 million and you could work out on -- and so the returns we would expect -- the fact that we have to do very little further investment in this area, some, but very modest, we get returns of investment by year five. So incredibly quickly, of 20%.

Going beyond that, and certainly the intention is, sooner or later, and certainly years 5 to 10, the plan would actually have this, we want to add new chemistries, we want to add new products. The work that we're currently doing -- being led by Sonning, but in the other development centers around the world in these areas, we'll start to deliver second, third generation, enhanced performing products, new products into the portfolio. That enhancement if it came before year five, we enhance that number, and it's certainly the intention which drives accelerated growth beyond that.

So I hope you get the impression. This is a very exciting prospect for us. It's a very exciting prospect that I think we've done incredibly well to set ourselves up to deliver.

Going through the other elements of new business currently in the portfolio; fuel cells. Again, let's focus on automotive, this is the key driver here. Exactly the same driver, diversification of powertrain.

The fit for Johnson Matthey is our profound experience a lot of experience in the MEA. The MEA is the membrane electrode assembly that sits in the heart of fuel cells. We don't make fuel cell systems, we don't make fuel cells stacks, we make the membrane assembly, that's what we do, just those. We do the chemistry bit of the fuel cell system. And that's our intention, is to provide those into the market.

So we're well established, I think a world class leader in MEAs, and clearly a long profound experience in this business.

I think there is a change in the story of fuel cells vehicles. I think it's always been the when, when's that going to happen. And I think the CARB zero emission mandate, it means it is happening, there are launches, there have been launched fuel cell vehicles, a number of credible launches coming on the roads in response to that zero emission.

So wide range on future prospects, expectations, but there are vehicles and will be fuel cell vehicles on the roads in the near term, next year or two.

So the question is not when, because that's resolved, the market has happened, that opens up a rather more delicate question, how will this market evolve?

It takes away the market risk or -- certainly crystallizes it to a degree, there's still kind of a vast range of potential outcomes. So now we're dealing with some certainty as to what the market is. OEMs are putting vehicles on the roads.

So the bigger question and the profound strategic issue coming back to us for this one is, within the next two to three years, the development programs that we're currently working on with a number of OEMs, converting those development programs into volume sales, actually converting them to sales that go into production vehicles rather than prototype vehicles.

If that happens, our intention, this business and the development of the fuel cells, we become a chemistry supplier into that industry, that would be great. We've proven our point. If this doesn't happen, and there are alternative scenarios, OEMs could in-house, they could maintain all production in-house. They have other tunes to play, let's say. We still believe there's good prospects of our solution, but we will see that -- the point is that, that will crystallize in the next two to three years. We will know the answer. And if the answer is negative, then, clearly, we'll have to view other ways of monetizing our investment and our technology in this area.

Water purification. This is a bit like batteries, EVs -- this is one of the first areas we hit upon in new business, really, really exciting, very strong drivers. And we're talking about fundamental scarcity of water. This is something that gets people excited, it gets people wanting to come to work and this is a key world issue.

Water scarcity, the competition between demand by urbanization problems, industry and agriculture itself feeding those populations, is getting so intense. And the response is confirmed and we're seeing it more and more. The regulatory driver to kind of keep the water clean and to enable those completing recycling, reuse by industry is a big theme which means you've got to purify your systems. And that's the driver here.

Johnson Matthey has considerable experience in a range of the appropriate absorbent and chemistry applications here. The precise selective removal of contaminants, that's not easy. It's easy to just put a filter and take everything out of water, but to take out the thing you want, let's say parts per billion, that particular contaminant let's say, selenium, whatever it might be, that is really clever stuff and that's the kind of thing that we have in Sonning, and we've been working on for a number of years.

So we feel like we're well tooled up for this market and we made significant progress through the key niches one of them being mining and some metal treating areas of getting pilot scale and demonstrating that our technology actually works. So good progress, nice business.

Where we are today, looking ahead, nothing further -- no further investment, working in the niches we currently have access to, this is a reasonable business, some tens of millions of turnover in about three to five years time and that's kind of it.

So what's needed here? That's not to limit of our ambition at all. What's needed here and this is what we develop is a range of technical solutions addressing a range of contaminants and we want to apply that range of solutions, range of technical solutions across the whole series of niches.

So we're not talking about one solution to one market not even one solution to multiple markets. We want to have an accomplishment of several solutions that we can play across the diverse contaminant problems of a whole range of different markets.

Now that talks about being at scale. To do that you need to have a certain scale and a certain presence across a number of markets. And so here, to achieve that scale, we're looking at M&A, I'm going to use the word again.

M&A here, I think it is different, I talked about M&A being tens of millions, that's getting into one market. I think here we would have ambition to do slightly larger M&A, bolt-on still, hundred pluses sort of areas, not terrifying and clearly M&A, it will bring decent profitable businesses with it and will always meet the kind of returns that Johnson Matthey aspires to.

So this business is rather stuck in that position. We've had great progress technically, entered a few minor niches, but to really now, launch on and fulfill our ambitions, we need the enabling of global M&A.

Atmospheric control, we've talked about a couple of years ago. We called it packaging then. And just to remind you what this means and why we kind of renamed it. This is about the manipulation of the head gases in a packet, so a closed packet, head gases and the produce within it.

Once something is packeted, the produce and the environment around it are interacting. The produce is releasing things, absorbing things and the gases and the environment are changing. And that affects the decay or the freshness however you want to place of the produce in that packet. By manipulating and controlling those gases, you can extend the freshness of the product.

Well proven in science, we already have a product in this area and we are continuing to develop further products and that there's been a good stream and enhanced program of R&D over the last couple of years in this area.

The opportunity I think, I hadn't dwelled on that one is really about the well-established inefficiency of the food supply chain, 30% food wastage. A lot of that is in the home. A lot of that is in the field. And we are principally targeting the supply chain from field to the retail store. These solutions work at home as well, but initially we're looking about the supply chain itself and there's plenty to go through there. There's plenty of savings to be made.

And the other, the rather more attractive driver is the enhancement of the value, convenience food, ready-cut food are difficult to maintain fresh and that's where you can apply these sorts of solutions.

The first objective I think we're well advanced on, we got really good products, novel products coming out of the R&D, these are proving well in the lab and in limited trials. We're well on the road to the second objective which is modest, minor M&A, more of the tens of millions sort of level. This really gets us into the market. This is the enabling. It gets us the presence and the application understanding in this area. This is a foreign area to us. We don't have presence in this area today.

So that is enabling M&A to allow us to then develop further understanding and build further product development pipelines. And then the long-term objective here is to build a wider portfolio based on those key fundamental gas manipulation techniques into a wide range of packeting solutions and answers on a global basis.

We believe there's really good evidence for a market here of some low single so $2billion to $4 billion type market. It is, however, our new area, this is the new market. What we're imagining is quite a new solution to the world and I think that's mitigated by the fact we see really, really good strong fit for our technical solutions and by the fact we see this quite clear route in terms of the business plan that we can assess against and make careful stage gate judgments of progress.

So we think there's a really good prospect for establishing a business. Within about five years, and after that, the exciting thing is because it's a new area there's an acceleration of growth rate potential. There's a rollout of take up of these sort of solutions, so this is potentially very high growth delivery 5 to 10.

Summarizing all that, numbers, hooray, a little bit of kind of bringing it back to reality, kind of today, as you know, we're kind of just under GBP20 million of operating loss in this area. We've invested GBP150 million principally in the battery's area, excellent progress there, I want to underline of where we set off three years ago , to date, I think we're absolutely in line with all our stretch targets and much more than we kind of really hoped for.

So I think there's really been fantastic progress in this area in the past three years. And the next three years is really about accelerating that delivery. We've got things now. We've got the underlying pipeline and ready to work on.

So the next (inaudible) further delivering and broadening our position and the more commercially advanced products, let's say the ones with sales and profits coded for will cover the cost of the ongoing investment in the other areas and so we should be a breakeven by year three with moderate M&A in there.

Going ahead to year five, a well established operating profit. From where we see today, the prospects we're looking at and weighting some of the risk in that, there's a good well established GBP30 million operating profit, relatively small further investment, so we're taking up the amount up to 250 mark and so you're covering a cost of capital within five years of where we are now.

Beyond that, of course, is the ambition. Why we're doing this isn't about where we want to get to in year five. Clearly that's a good indicator and confirmation of success. It's about where do we want to go to year 10 and beyond. This is long term growth prospect for Johnson Matthey.

So year 10, from where we're sitting today, so knowing what we know is 100 million plus operating profit. Relative view again, not wanting to [part] M&A's mentioned but relatively modest further investments. But I think our ambitions are higher than that and I think it's inevitable. As you go into new market areas and become familiar with them, you've become an established player, we want to work in each one of these places a leader in that market.

We're not there to be an under sort of follower, we want to be a leader, an established, a strong position in our niche, careful to say. So our niche is about advanced material science. We want to be lead positions in those niches and that sets the scale of ambition.

To get there, within that timeframe, we want to view whether there's possible for other M&A and I think once you get more familiar with these markets, that potential opens up. It opens up potential for investment, worthwhile investment in new areas and that's another area of unlocking where we can invest for further growth.

Key takeaways that I want to leave you with, key points, this is about long-term growth. This is about creating engines, potential growth engines for Johnson Matthey over the long term and I think we got a series of really fantastic opportunities already.

However, and I want to sort of reflect back to where I started. Johnson Matthey has done this before. We got form in HDD, new business, whole fine chemicals, new business; we didn't have that 30 years ago. PT as it exist today, very much a new business formed principally out of M&A as it turns out. So we've done this. We have done this over and over again as Johnson Matthey has grown and evolved as a business.

What we're doing now is organizing it principally in one place. We're organizing it in one place to give it the best opportunity for success so that we can dedicate resource and we're really focused on these issues, but also to ensure that they are adequately controlled and reviewed appropriately with the strict rigor that is necessary to ensure that we're going to hit the investment criteria.

So in summary, new business, new business growth is a key strategic issue with Johnson Matthey, one of the nine blocks. And we believe and I hope you will get some sense of that, that we're well on track for the delivery of that strategy.

And that, I'm done. Thank you, I'll speak to you later.

Robert MacLeod - ***Johnson Matthey - CEO***

Thanks, Nick. We're now over to hear about PT. We're running a little bit behind schedule, but it wasn't just you. So lunch was actually not bad for (inaudible). Try to keep going Geoff. Make sure you catch up.

Geoff Otterman - ***Johnson Matthey - Division Director - Process Technologies***

All right. Well I'll dive right into it. So I'll pass on the -- since Nick gave you a warm greeting, I'll pass on it. So I'll give you a bit of an update on the strategy we outlined a year ago and give you some updates on where we see the business.

So if I can, let me start out with a bit of a refresher of what PT is. Well to start with, we manufacture specialty catalysts. We license technology and provide services across the chemicals and oil and gas industries.

We have to work closely with customers to help understand their plans and really to help them optimize a transformation of hydrocarbon from one form to another which gives them added value.

Organized into two groups, Chemicals which is about 60% of our sales, Oil and Gas the remaining 40% of the sales. And the sales are really balanced across the globe, half of it split between North America and Europe and a balance among China, Middle East, in Asia and then the rest of the world.

And what's typical across most of our product lines is that we're leaders in those marketplaces. So if you look at methanol, or ammonia, we're really one in two -- one or two in those markets. And as noted yesterday, business is certainly starting to face a couple of headwinds predominantly in oil and -- due to the oil price and China.

Now, I'll start with the oil price. The only real direct impact on our business has to do with one part of our diagnostics business, so it's less than 10% of the sales. And just a good reminder, the rest of our oil and gas business really works topside, so the better drivers are really what's going on in the refineries not so much with the oil price.

So then we have also in the downside, we really haven't seen any effect of that in the third quarter. However the lower oil price does inevitably affect some of the sentiment that people have in making investments and new plant in the chemicals markets. So we do see some nervousness from investors on new plants which will affect our business if those low oil prices are sustained and we'll continue to monitor new investment trends in the petrochemicals industry.

Secondly, in China, well as you know, the pace of licensing across our product portfolio has certainly slowed as we said yesterday and we now expect that slowdown to continue into next year. So there are a lot of moving parts in trying to estimate what's going to happen here and it's tough to attribute all this to one thing.

As you know PT has really benefitted quite handsomely over the years in licensing new technology into China. But as expected there's now a short-term hiatus in this is in a lot of our technology heart lands, there's over capacity. And a couple of examples of that would in butanediol and oxo alcohols, areas where we've been really successful.

In addition the coal to substitute natural gas or SNG technology that we have talked to you about is not delivering as we expected and again a lot of moving parts in this. A couple of reasons, I'll highlight a couple of reasons, oil price is definitely part of the reason as you might have investment decisions on whether to choose SNG as you're chosen feed stock or maybe LNG.

Secondly, we're now seeing the investment decisions for building new plants being slowed by the China state as a really more thoroughly assess the impacts on some of the environmental concerns such as water, water usage and carbon emissions due to the coal gasification part of the SNG.

So as a result of this, we see a lot of delays in the decision making. But taking that all into consideration, we still see strong drivers in China for energy security and petrochemicals driven by its growing population. So overall, we still see a good strategy to expand. We think that's still sound.

We believe the fundamentals that I'll talk about a little later, will continue grow, to drive growth in the long-term for PT as I'll go on next.

I've highlighted three global drivers and you've seen those colored boxes there on the left before. The three that I'll talk mostly about that impact our business mostly would be population growth, environmental pressures and natural resource constraints.

The impact for PT is we do see opportunities for better than GDP growth in a lot of these and it also provides us a number of opportunities to grow beyond our base business. So the four that I'd like to highlight, be transportation fuels, coal based chemicals in China, asset integrity and utilization and I'll start the fourth on shale gas.

Shale gas. This is really the opportunity for our customers to make investments in North America -- new plant investments, really, to take advantage of the low natural gas price, a key feedstock and a big component of the overall price.

This benefits our core technologies such as ammonia and methanol. And we see benefits from this already. We see new ammonia plants going in and we expect them to be operating starting in 2016, 2017.

In methanol -- one of our key technologies -- we do see a good pipeline of projects. And we get that visibility through our Davy licensing business. But we also see some other things, for example, Methanex just opened up -- just commissioned a new methanol plant that it relocated from Chile. So they have just started that in the Gulf of Mexico. And another opportunity that we're seeing there is we're now seeing interests from some Chinese firms who are looking to build methanol plants in the US, then take that methanol and export it back to China for them to use further on in their petrochemicals value chain.

So that's something that we hadn't envisioned last year. And hopefully that will give us some positives as we're going forward.

The last part of this that I highlighted last year -- I'll give you a refresh run -- is in gas to liquids. The business model here is taking a low cost natural gas and converting it to a higher price diesel in this case. So the economics are really based upon the arbitrage there. But if you look at the end use -- John's going to talk later on about the increasing demand for diesel, so we do see good growth even besides the differential on the price.

So with this model, the lower price has certainly hurt some of the economics, though when we look into details, you can still make good money on this if there's a natural gas price of $3 compared to oil price of 60. So we look to have a differential of something in the upper teens. And that's when you can start making money on them.

So with shale gas, we still see this as a very good opportunity for us, a very good driver for us. But in the gas to liquids area it would be helpful if the oil price climbed back up a bit.

Next, it's really transportation fuels. And this really speaks to a big part of our oil and gas business. And again, most of the -- or a big chunk of the products in our oil and gas business really focused on the performance of refineries. So not so much on the exploration part. So the indicator to look at this is what capacity a refinery is running.

So the main products we have in here are catalysts to make hydrogen, and we also have FCC additives that go into refineries. Both of those products can help customers make clean fuels which is important especially if you look at the trends of how sour oil is getting. So we have -- you need to remove the sulfur from it using our products.

Further, our products help refiners crack longer chain hydrocarbons into smaller chain ones for which they can get higher value for in the marketplace. We're also seeing good -- we have good visibility of new hydrogen plants going up. Again, refineries are running in good capacity. And all those things bode quite well for this driver for us.

Coal-based chemicals. Well, I've given you a bit of -- a bit on this just to expand a little bit more. Overall, we do still believe in the overall drivers for this if you look at some of the macro economic factors. If you look at this, energy security in China, we believe this is still one of the key drivers. And if China is able to use its own coal reserves, then it can reduce its dependency on imported fuel.

Two major areas for Johnson Matthey in coal-based chemicals in China, there's a converting coal to chemicals, and this could be like to methanol which is done quite a lot already in China. And this is slow but -- it's not dead. We just -- we did just sign a license for a 5,000 ton per day methanol project in China that we expect to come online over the next several years.

And the next one is converting coal to natural gas, so SNG. And as I mentioned, there has been a slowdown on this front but we have signed a few smaller projects. We signed up a few smaller projects in the last year.

Just a reminder, that in this area, we are one of the market leaders in this. We've signed up nine large plants already. We've signed the licenses for those a couple of years ago. One of the plants is operating, two are in commissioning phases, and the balance are in -- or in either in construction or some phase of permitting. So those -- we see those projects still progressing.

So we still believe that SNG is a sound investment for JM and a sound aspiration for us in the number of years. I'll touch on a couple of reasons.

What underpins all this really is the overall demand that we see from China in natural gas. And on the supply side, SNG can fit well into their overall portfolio of how natural gas is delivered. So using SNG, you can bring coal into the portfolio of LNG, maybe its domestic sources. In the long term, there might be shale sources in China and complemented with any pipeline gas that would come. So we think it fits well into there.

The economics. Well, we see the economics of SNG working well against LNG if the oil price gets around 70 or above. So we need that to climb up a bit. But again, it's not purely an economic play in China, there are the pollution issues that you have in the big cities in the East, and there's also the drive for improved energy security. So overall, hopefully still a positive for us.

On asset performance and integrity. We see a trend in the petrochemicals and the oil and gas markets to use assets -- use them harder, use them for different duties, and to use them for longer periods of time. And so how does JM get value out of this? Well, a lot of it is by working very closely with our customers and understanding what some of their needs are, how they want to make money going forward.

Just highlight a couple of examples. By talking to some of the customers that we have in the oil and gas area, we know that pipeline inspection is an important issue for them. So working closely with them, we've been able to develop a tool that helps companies inspect subsea pipelines. And we've just been test-trialing something with a couple of major oil companies and we expect to deploy that more robustly around the globe over the coming year.

Secondly, another example is where a customer might want to change its product portfolio using -- if it already has a chemicals plant. And just recently, we've worked with a company in China to help it convert its product from what's a product that's in overcapacity, low margin to one that's in more demand and help them get overall bigger margins. So those are just two examples in this area where we see good growth opportunities for us going forward.

So that's the four, kind of extra growth opportunities that we see in PT. And I'd like to revisit some of the overall strategy parts of the division. I've listed four themes there and just highlight our progress with each of those.

First off, maintain our leading positions in catalysis and in technology. And key here is that we find ways to differentiate our offering while engaging closely with customers. And I'll talk about that a little bit more on the next slide.

Secondly, we want to develop a larger presence in the oil and gas area. A couple of ways we're looking to do that. We'd say we're on track with that as we're looking to extend the use of some of our products. And an example of that is the zeolite that we use, that we bought in that expertise with one of our -- with the Intercat acquisition we did a couple of years ago.

Zeolites are a key raw material they use and it's also one that you use in ECT. Liz will talk about zeolites in a little bit. So we're seeing what we can do to use that zeolite platform to get us more revenue in the future.

Again, just want to reinforce that when I talk about oil and gas, it's not just dependency on oil price. It's the performance of some of the topside assets that drives our business here.

We'll continue to invest for growth. And though some of the markets are down, we want to maintain our investments as we do believe in the long term. So we know we'll have to endure some ups and downs in this. It's a normal part of the chemicals industry and we want to invest for the long term.

Finally, I'll talk about expanding capabilities. We will look to see if there are any opportunities for M&A. I know Nick didn't want to scare you too much. But we'll look for good opportunities to complement the portfolio of products and technologies that we already have.

And so you can see at the bottom part, trying to pull it all together. Our strategy really is to broaden offering to deliver superior growth.

I noted this on the previous slide about differentiation technology. And for us, what does it mean? Well, it's taking our catalyst expertise, the technology -- the process technology expertise we have and really pulling it together with a know-how that we've acquired over the years.

So what does chemistry and its application mean to me? Well, I don't have the spinning parts like they had. But what does that mean to PT? Well, for us, it's first we invent and develop processes and catalysts in our laboratories. We'll then look to scale them up in pilot plants or use rigs that mimic what we think will happen in a customers' plant. And then we apply it to customers' plants in designs, products, and services.

We have a global presence and a long heritage in this area that gives us credibility with customers. And they trust us with their money, with their investments to build safe plants for them which is highly important for us. We want them to be safe, but also we have a lot of our people on their plants. So it's a very high priority for us.

And if they invest with us, they'll know that we'll deliver. They'll get the returns on the investment that they expect. And then in the long term, we help them maintain their plants with continued services and catalyst to help them optimize the economics.

So examples of these things we've talked about before. But places where we merge the catalyst and the technology -- it could be a 5,000 ton per day methanol plant in Trinidad, it might be an oil platform in the North Sea, it could be a refinery that's in the Middle East. Looking longer term, maybe it's taking a biomass and making green chemical out of it. Or -- the one I'll touch on next -- could be VCM, vinyl chloride monomer.

VCM, we'll talk about here, is a building block for PVC which is a key construction material. And what we're talking about here has global implications but it's largely a China play because right now in China, this product, VCM, is made with a mercury catalyst that is being banned.

And the exciting part on this is that we saw this opportunity. And Johnson Matthey chemists both ones in my divisions as well as in the technology center got together, saw the opportunity, and invented a new gold catalyst to replace the mercury one.

So that in itself was good, but it wasn't enough for us. What we saw is the big win is if we could also bring the technology in-house. So we did that. About a year ago, we bought-in the technology. Now, what that gives a flexibility to do is take this whizzy new catalyst that Liz will tell you more about, combine it with the technology, we'll look to refresh the technology around the catalyst and put it together for a better joined up offering in the marketplace.

So I'm pretty enthused about this both for the business opportunities it will give us as well as the environmental improvement that it'll make especially in China.

So if I can, I'd like to leave you with a handful of messages on key takeaways. Hitting a bit of a -- maybe a bit of a slowdown and some headwinds, but we absolutely believe in the long term in this. We believe that the fundamental drivers that affect some of the opportunities for us are still in place. And we'll -- what's key to us is we've got to stay close to the customers and we have to be nimble in helping to service them.

Yes. We do have some headwinds. We'll get through those. So, yes, we talked about some in China and a bit on the oil price, the indirect effect of the oil price.

Confidence that we have comes from our commercial offering in the technology, in the catalyst, and the know-how that we put together. Again, we got to be close to our customers and understand what's happening in their plants and what's happening in the marketplace.

We'll continue to invest. We'll look to be proactive during this downturn to see opportunities to broaden our portfolio as we're hoping this might be a good time for some acquisitions. And finally, after getting through the slowdown we'll be poised for mid to upper single-digit average growth through the medium term.

And with that, that's it for me.

Robert MacLeod - ***Johnson Matthey - CEO***

Thanks Geoff. That's it. John, if John is still able to speak to us.

John Walker - ***Johnson Matthey - Executive Director - Emission Control Technologies***

Good afternoon. So I'm John Walker the Division Director for ECT; Emission Control Technologies Division. So I'm happy to report since the last time we met in 2013 to discuss strategy that we've executed our plan and delivered on our strategy to-date. And hopefully, what I can tell you today we'll give you more confidence that there's more of that to come in the future.

So I'm also going to try and address the death of diesel that seems to be everywhere these days in the press. Unfortunately I have to do that in one slide.

So I'll point out to you, two of my colleagues who I think are here in the audience who after this session will be available if you want to take a little bit more time and have any detailed questions that we can't handle in the Q&A. So that's Dr. David Prest, please stand up there, who's the MD of our European business for ECT and Dr. Chris Morgan who's the European Technology Director. So both of those guys will be around after the session if you want to pick this up further, if it's a topic you want to spend more time on.

So most of you are familiar with ECT. But for those who are not. We are global leader in emission control catalyst with about a third of the global light duty market and a little more than 60% of the heavy duty market. We have 15 manufacturing plants and 10 technology centers around the world. And as you know we've continued to invest in both of those areas.

Our business has benefited both from volume growth in vehicle markets. And from value growth from new legislation which generally requires more advanced technology than the previous generation. So we've had a particular focus on operational excellence. And this has driven improvements in ECT and EHS, manufacturing and sustainability. And we also have had -- and we applied some of these techniques at our R&D area and we've increased the efficiency of a lot of our test cells.

So our market positions are stable in both light duty and heavy duty. And in Europe remains our biggest market. The emerging markets combined now make up about 30% of our global sales contribution, so that's all three of those colored bars there. And this will grow as legislation continues to tighten.

Air quality and its impact on public health remains a major global focus. And we tend to take a positive spin on this and look at the emission legislation progression as a continuous improvement story on our -- under any drive cycle.

And finally, there's some positive signs coming from China with regards to addressing some of their polluting levels in their cities. And they have some new legislation proposals that are looking pretty interesting for the future.

Drivers that are affecting ECT again, no real big change here. Population growth urbanization and increasing wealth are also associated with trends in the emerging markets. And this has led to tailored fit for market solutions and volume growth from increased car ownership rates.

Environmental factors have continued to focus on improving urban air quality. And this is affecting cities worldwide. Emerging markets can still tighten legislation up to the current developed market levels. And the developed market still have some more stringent testing regimes like real world driving which we'll talk about a little bit later.

So finally, there's a trend towards improved fuel efficiency or CO_2 reduction. And the current strategy to achieve this is a mix of smaller turbocharged gasoline engines, diesel engines, and hybrid systems to meet the corporate average fuel economy and the fleet CO_2 regulations.

So there's an increasing number of hybrid sold but this still a very small number in the big scheme of things. And in Europe gasoline powered vehicles are increasing in the mix but again, only slightly. So with no advance notice it will be practically impossible to meet the CO2 reduction target of 95 grams per kilometer of CO2 by 2020 without diesels in the mix.

So diesel vehicles have higher fuel economy and less CO2 than their gasoline counterparts. And the way we look at diesel is, diesel is our friend not our enemy. So if the ban diesel voice was successful it will obviously take years for the supply chain to switch from diesel to petrol or diesel to electricity. And there will have to be significant changes in the infrastructure for those options as well as for the vehicle power plant infrastructure.

Strategy, again, as I said in the opening, ECT strategy hasn't really changed. We're basically continuing to invest in our people products and technology. Emerging markets have driven technology to develop high performance catalyst matched to local needs. And developed markets to focus on material science and manufacturing technology as many of our new catalysts for these markets are using high valued non-platinum group metal materials to meet tighter emissions legislation. And that's really for NOx legislation as where those materials are being used.

On the customer side we're increasing our collaboration with customers and one way to describe this is that we've been winning with the winners. And we also don't talk about this very much but I think Johnson Matthey also delivers a very high quality of service to our customers. And our customers enjoy that as well.

So our operational excellence program continues to deliver value. And we have a very nimble supply chain that's a source of competitive advantage. And soon, I hope to be able to tell you a little bit more about some of the work that we've been doing in the supply chain space but that will be for a later date.

We've continued to deliver value ahead of the market by positioning our sales to deliver a superior mix. And this goes back to the win with the winners comment but this is for vehicle platforms instead of talking about car companies.

So in the chemistry and its application space it's no longer enough to simply develop new products in isolation. So our new products introduction process now requires us to develop the end to end system capabilities at the same time as the catalyst innovation.

So we now develop the process technology at the same time as the catalyst innovation so that when these new products come to the manufacturing plant we also are delivering superior manufacturing technology at the same time. And I think Macedonia for all of those of you who have heard about that that's our example of success in that area.

So the trend towards complicated multifunctional catalyst does not necessarily mean that the production process has to be complex as well. And the picture on the right here is actually of one of our test cells in Royston.

So in the past, being less than probably five or six years ago I guess, I probably would be very afraid to show you one of these pictures that would have been oil and grease, and clutter and wires, and pipes and hoses there. But today as you can see we have a very organized space.

And as I mentioned earlier we've applied some of the lean techniques in the testing area. So they've applied five S in visual factory techniques here which had allowed them to organize the workplace and improve the overall equipment effectiveness and the planning of the test cells.

So today we collaborate much more closely with our customers and we can set up these test cells to do advanced transient emission work on the future models. So we can make these engines look like a car of the future.

So trends and -- so what are the global trends in the light duty market? One positive in this sector is the low oil price. So this is attractive to light duty market and they help increase cells especially in the US but also potentially in Europe. And I think I've said before we still haven't gotten back to the 2007 peak levels of automotive production in Europe. So there's probably some pent up demand there.

So as you can see from this graph. This is a death of diesel chart. This is the global view on a light duty vehicle production that came from LMC. And as you can see there, diesel actually grows over the plan. And a lot of that growth is obviously in North America and Asia. And gasoline volumes grow even faster. So diesel as a percentage of the global light duty market is actually declining.

And in Europe I think we stand by what we said before, we continue -- we see a gradual shift in the diesel to gasoline ratio from 50% to 45% and that's a Western Europe number. And we also see hybrids in that picture growing from around 2% of the total to 5% of the total by 2020.

And on the legislative side I'm not going to talk about all these points I'll just highlight a few. Euro 6c comes into force in 2017 and this will force the fitment of filters to some gasoline direct injection vehicles. And we now see this is a more gradual ramp up than we did when we portrayed the market in 2013. So you'll see that on the market slide to come.

And also in 2017 we see this real world driving emissions come into force and this will directionally require a variety of improved catalyst. So, again, generally beneficial for Johnson Matthey going forward.

In China there's some interesting things happening there. China 5 is going to come into place around 2018 and that will force filter fitment into the light duty diesel vehicles in China nationwide. And then Beijing what we're now calling Beijing 6, some people call it Beijing 5 plus, some people call it China 5 plus. It's obviously a changing terminology and call it whatever you want. In any case it's going to create a particle number specification similar to Euro 6c and may require a fitment of filters to gasoline vehicles starting firstly in Beijing.

So very early days on this. But before you start going crazy and updating your models with massive volume increases I think we want -- this is more of a demonstration program to begin with. But it's a very important demonstration program for the future of emission control in China.

And then finally in the United States there's drive for storage and improve fuel economies similar in Europe. And eventually we also see filter fitment to gasoline vehicles but that's post 2025 timeframe.

Now this is my one slide to talk about the death of diesel. So why do we believe that diesel will not and should not be banned from European cities? So the European CO2 fleet average targets are dropping as you can see on this chart here from130 grams per kilometer in 2015 to 95 in 2020 to -- a still undefined, possibly 75 in 2025.

So diesel is essential to the mix to meet tighter CO2 limits. And the actual CO2 in 2013 was actually 127. So as far as these levels are going, they're actually two years ahead of the market for the 2015 target. And then from 2015 to 2020 effectively all of the manufacturers have to drop their fleet CO2 levels by 27% in that five year period. So whatever you fleet average is, you draw the fleet average line and then move it down 27%.

So if you look at the middle chart these are the vehicles that are available today in the UK. And effectively you kind of assume that that's a European mixed of vehicles. And what you can see here is that these are the vehicles that can meet the 2020 target right now. So of that, more than 50% of the offering in the marketplace today are diesel vehicles.

So if you said that you're going to ban that section unless you could dramatically change the buying preferences of consumers, so it's kind of a little hard to figure out how car manufactures would be able to meet the CO2 limits.

And there's severe penalties for the automakers if they don't meet the CO2 target. So the four parameters that impacts CO2 are vehicle mass engine power, engine displacement and fuel consumption.

So, over the last 10 years the trends in vehicle mass and power have been both mass and power have been going up, engine sizes has been going down and fuel economy has been getting better. And diesel by far is clearly the high power option and I think this is what people like, they like the driving experience of diesel cars and that's something that you're not going to get from some of the other alternatives.

So, I'm not really going to talk about the other things, but light weighting I guess up until 2013 over the last 10 years with all the options that are available on vehicles, the mass of vehicles have just been getting heavier and heavier and heavier, but from 2013 the light weighting concept has finally started to take hold and 2013 was the first year that vehicles actually started getting lighter again, thats fleet average vehicles.

So, as far as emissions level go, as I said we see emissions legislation as a story of continuing improvements. Diesels are continuing to get cleaner. So, from the year 2000 until 2009 when Euro 5 filters were first added to diesel vehicles there has been a 90% reduction in particle matter and in the same period NOx levels were reduced by 64% and then in the next five years when we move to Euro 6 the NOx levels drop by another 55% and as you now know a particle number specification is also been introduced.

So, in 2017 gasoline or direct injection vehicles are also going to have to meet that particle number specification. So, real world driving in a new world harmonized light vehicles test procedure both come into effect in 2017 and this will push emissions levels even lower. Now, I think I put a little question mark about that because the exact details of how and when all this is going to happen, the test cycle and real world driving isn't 100% defined yet, but it is going to happen, just what the final details are going to be and something that is still being worked out.

So, diesel technology would deliver low NOx emissions and we've already dramatically reduced the mass of particles and now we're going to go after the number of particles and this is what we do, difficult emission solution is what Johnson Matthey does. So, as a problem, if you want to look at this as a problem, we love it because we're the solution to the problem.

So, the final thing to point out here on this graph is this point here, there's one little red data point and that just highlights that today in California diesel technology exist that has dramatically lowered NOx and particularly emissions than the current Euro 6 gasoline vehicles that are available today, according to the Euro 6 legislation. So, this just demonstrates that diesel can be as clean or cleaner than gasoline technology.

Now, when you put this all together based on those assumptions and assuming not the death of diesel we end up with this kind of market position which are largely unchanged from our 2013 view and we continue to show European diesel as a key value driver. The gasoline market in Asia continues to grow and future legislation will offer opportunities for new technologies there.

Light duty diesel sales continue to grow in both Asia and the United States. In Asia these sales are coming because of adding filters to the vehicles and in the United States these sales are coming because of a bigger uptake of diesel vehicles because the fleets are struggling to meet their corporate average fuel economy so they're adding diesel especially on big trucks and things like that.

So in summary in 2015 to 2020 we see a growth in the light duty market of about $2 billion and we should win about a third of that as Johnson Matthey, so that should add about $667 million of growth over the next five years for JM.

Same story on heavy duty trends in the heavy duty market. Currently we're seeing very strong demand for class 8 trucks in the United States and we expect this to continue through 2015, the year we're in now. LMC predicts a strong European growth forecast for heavy duty from 2016 onwards and this is kind of the same argument as why we're seeing the boost in the US now, pent up demand and an aging fleet, and continued exports, but I think with all the economic uncertainty in Europe right now we're probably a little less optimistic about this LMC forecast than what's posted up there.

And I think the big story in this graph is that there's obviously very large growth in Asia through this period. And from 2014 the story in China was mostly about city buses that were fitted with Euro IV compliant systems and now the clean fuel is available from January of 2015. We should see some growth in the medium heavy duty sector over the next three years or so, but we still expect that to be a relatively long fitment cycle.

And as with light duty on the legislative slide there's a lot of stuff happening there, I'll just talk about a few. In Europe we expect stage 5 non-road legislation to come into effect in 2019 and this will also introduce a particle number specification and that will effectively require the use of filters to meet that specification, so this adds back the filters that we lost under the tier 4 legislation that we've talked about in the past.

In China we see progressively tightening legislation first in Beijing and then nationwide typically two years later and that will force fitment of filters to some city vehicles and add more advanced SCR catalyst for NOx control to some of the other diesel vehicles in China. And then finally in the USA we see discussions in California around tighter NOx standards and again this is all about non-attainment NOx levels in big cities and that will drive more advanced NOx control catalyst there as well.

So, the heavy duty market slide, we've attempted to update this. The details in the middle have changed but the story is still the same, so the shape is changed a little bit mostly because of the rollout of the China legislation, but we see the market size in 2015 at $1.8 billion previously I think we said $2.1 million. And the two things that affected that were the removal of filters from non-road vehicles and the slower uptake of heavy duty fitment in China.

But as you see from the graph these all come back at the end so the math still kind of works the same. So, non-road filters come back in 2019 as I said when the tier 5 legislation comes into play and the China volumes are kind of pushed out to future years progressively, but the volumes have increased as the nationwide standards have come into force.

So, when China 6 comes into play post 2020 this is when you start to see what's going to become a very large market and in fact the China heavy duty market then will become the largest heavy duty market in the world. One other thing that's very difficult to see maybe is this little top sliver there that's the marine sector, a lot of you sometimes ask about marines, so yes there is a marine market, yes it does exist. But in the big scheme of things it's relatively small especially during this timeframe.

So, in summary on the heavy duty side of things from 2015 to 2020 we see the market growing from $1.8 billion to $3 billion and JM's share of this growth is expected to be about half, could potentially be a little bit more than that, but around half and that's around $600 million of growth there.

So, in summary key takeaways from ECT, we see growth in all of our markets, legislative tightening continues to deliver value and that comment's especially Europe and Asia. We've created value from developing our catalyst and process technology together and that example was Macedonia. We continue to invest ahead off growth

opportunities and in China we've acquired the site just adjacent to our original manufacturing site in China and we've already retrofitted the building and installed a production line in there and the rest of the building is ready to grow into, so we're very, very good position and poised for any growth that comes in the China market.

We also have some smaller investments in filter capacity in Asia, so as the legislation tightens and requires filters we may have to make a few small investments for filters. And in Europe we're in the process of completing our Royston expansion plans. And when this is complete we'll then be able to deliver the balance of the Euro 6 product mix and we'll also be in a position to deliver some of these improved catalysts that I talked about that are going to be required by the real world driving.

And finally, as I think Robert alluded to, we may see some future investments in South America, not on a grand scale but possibly something happen there. So, we've maintained our strong positions in light duty and heavy duty and we expect to continue with high single digit sales on average in the future. And last but not least Johnson Matthey does not believe that diesel is dead nor do we believe that anyone should try and kill it.

Robert MacLeod - ***Johnson Matthey - CEO***

Well thanks very much. I said right up front we had plenty of time for questions, maybe we enjoyed our lunch too much and my colleagues enjoyed their presentations too much, but we do have time, there is a bit of flexibility in the program as I've said already.

I know we've just gone through three large and long presentations, but I'm sure there might a few questions, so we can take a few now and then we'll break for coffee and of course we're all welcome to add and you can attack them and ask them more questions over coffee if you like. (Inaudible) but anybody got any questions? Yes? I think that's Rakesh in the back there.

QUESTION AND ANSWER

Rakesh Patel - ***Goldman Sachs - Analyst***

(Inaudible - microphone inaccessible)

Robert MacLeod - ***Johnson Matthey - CEO***

Can you speak a bit higher, for some reason the (inaudible) is not working, so we can't hear you.

Rakesh Patel - ***Goldman Sachs - Analyst***

(Inaudible - microphone inaccessible)

Robert MacLeod - ***Johnson Matthey - CEO***

So it's a question about NMC.

Nick Garner - ***Johnson Matthey - Division Director - New Businesses and Corporate Development***

NMC is one of our other classes of high energy and I think that would be one of our preferred targets, yes. The IP situation is much less complicated and you can in-license. Our chosen in-license basic IP and then develop from there. So, that would be our route and that's pretty much the intention to go ahead and we're currently in negotiations on just that.

Robert MacLeod - ***Johnson Matthey - CEO***

A few hands went up together. You haven't asked any questions yet, so I think you get to go first. Hopefully the mics will work now.

Oliver Reiff - *Deutsche Bank - Analyst*

Thanks. Oliver Reiff from Deutsche Bank. I have two questions, first is on diesel and I think a lot of the concerns surrounding diesel have been around NOx emissions and then the real world testing that it performs quite badly. So do you see the risk that, that actually offsets to the CO2 benefit all the vehicles in circulation at the moment have. And then the second question is on PT and just if you give any indication for the sensitivity of sales to sustained lower oil price over the next five or so years? Thanks.

Robert MacLeod - *Johnson Matthey - CEO*

John, do you want to go first?

John Walker - *Johnson Matthey - Executive Director - Emission Control Technologies*

Yes. I think I explained our story as one of continuous improvement, so whether there's an offset in real world driving, which clearly there is, car companies have to have a standard test to be able to show conformity or not, but as legislation has tightened we believe that the levels have continued to come down. Yes, absolutely there's an offset, that offset will be dealt with when the Europe union comes up with the final details of the real world driving plan. So, people have been working on that for the last couple of years and there is a solution that is just ready to be introduced.

Robert MacLeod - *Johnson Matthey - CEO*

I think a lot of the media today is about the cars of yesterday and we're talking about now the cars of tomorrow which actually in many ways actually deliver the benefits to cities that people are asking for. Now, your second question on oil price sustained oil price.

Geoff Otterman - *Johnson Matthey - Division Director - Process Technologies*

Yes, I think I heard you. The indication is impact to sales on the long-term on the lower oil price? Is that?

Unidentified Company Representative

Sustained.

Robert MacLeod - *Johnson Matthey - CEO*

Yes.

Geoff Otterman - *Johnson Matthey - Division Director - Process Technologies*

Sustained, yes. Well, I guess it depends on what lower means, but I guess for us I would want to make a distinction between the direct impact on our business versus kind of the indirect. I mean the direct impact where it involves -- that would be on some of our diagnostics business and that part is really pretty low. In terms of the indirect part on new plant build, well I tried to note earlier on that it's pretty complicated equation we're looking at especially when you dive into China when the oil prices isn't the only factor that's looked at. It has taken into consideration with some of the environmental factors and some of the portfolio as well.

So, I think right now China is about 18% of our overall sales, most of that is in the chemicals area, so if their new plant builds then that's going to hurt our growth in the long term.

Robert MacLeod - *Johnson Matthey - CEO*

I think it's quite hard to give you an absolute number to be honest. I think we talked about mid to high single digit growth, I think if the oil prices stayed low for a long time you are saying it's low to mid single digit growth probably.

Oliver Reiff - ***Deutsche Bank - Analyst***

Thanks very much.

Robert MacLeod - ***Johnson Matthey - CEO***

Peter, you got a question? And then we'll come -- Andrew do you still got a question? Peter at the front there. We only got one mic. Watch out.

Peter Cartwright - ***Fiske***

I'm not sure if it's a question or a comment but a recent Ricardo event they were demonstrating gasoline engines which met the CO2 standards. This was achieved by direct injection and stratified charge multiple spark, but the point they made was that the more you make your gasoline engine more diesel like, the more the emissions matched the diesel, so in a sense does it really matter to you whether which way it goes?

John Walker - ***Johnson Matthey - Executive Director - Emission Control Technologies***

With the way you spun that argument, no.

Peter Cartwright - ***Fiske***

Thank you very much.

Robert MacLeod - ***Johnson Matthey - CEO***

Excellent. Do you want to pass -- can you pass the mic over, we'll get it to you Andrew. Let's get one to Andrew. And then we'll go to [Adam] and then Simon.

Andrew Stott - ***Bank of America - Analyst***

Yes, thanks. Two quick ones. First of all to John, what happened to India? Light duty delayed past 2017, heavy duty never seemed to happen, what's going on in India please?

John Walker - ***Johnson Matthey - Executive Director - Emission Control Technologies***

So, I've put India on the slide so I didn't talk about it in my words, but India is the great hope. The potential for India, that's the one thing that's intriguing about India, the market potential is huge but the market value that you're able to achieve out of that market is right on the low end of things and it's been a disappointing story.

So, I think there's always potential there. I think what needs to happen next in India that'll drive our business is legislation. So India's been on the back foot in pushing forward, hopefully this new government will drive things forward a little bit. And what you'll see there is you'll see the progression like you're seeing in China of India going from the Indian version of Bharat 4 to Bharat 5 which will add filters to Indian diesel vehicles.

Of course with what they're doing on diesel they're backing off on the diesel ratio there as well, but still it's a good opportunity for us to grow our business if filters are added to Indian passenger cars on the light duty side. So, that's the next big thing that would happen in India for us. There's always growth in the motorcycle market but you have to sell a lot of motorcycle catalyst to make much money.

Robert MacLeod - ***Johnson Matthey - CEO***

So, if that's the short question what's the long question?

Andrew Stott - ***Bank of America - Analyst***

The second question was the licensing income just to be clear. You've never given a number on licensing income for process?

Robert MacLeod - ***Johnson Matthey - CEO***

Yes, we have.

Andrew Stott - ***Bank of America - Analyst***

Can you just remind me of that number?

Robert MacLeod - ***Johnson Matthey - CEO***

I think it was GBP90 million.

Andrew Stott - ***Bank of America - Analyst***

GBP90 million and then --

Robert MacLeod - ***Johnson Matthey - CEO***

Out of about 565.

Andrew Stott - ***Bank of America - Analyst***

And then the comments about the forward looking, you're at a stage now where any major licensing income, so you talked about a number of small one you've sign for example in SNG, but any major ones at the moment you can't see?

Geoff Otterman - ***Johnson Matthey - Division Director - Process Technologies***

Well, we see it in methanol and we'll see that in the US and when we saw some in China and we are focusing on other parts of the world as well. I mean we have signed a license in India. So, it's not just about China, China has been the big growth area over the last five years, but we're looking everywhere for it.

Robert MacLeod - ***Johnson Matthey - CEO***

Okay. So, a quick couple more questions. [Adam], waving your hand -- you've already got a mic well done.

Adam Collins - ***Liberum - Analyst***

Okay. John, question on 6c which will affect principally GDIs, what's your assumption for the GDI penetration of gasoline at that point? And what percentage of those GDIs do you think will have filters? And then just finally you showed a chart historically which showed the value accretion from going 6c compared to previously, it was a pound sign going to a two pound sign, is that still the value accretion that you're expecting?

John Walker - ***Johnson Matthey - Executive Director - Emission Control Technologies***

Three's been some slight modifications, but effectively what we're saying is that 50% of the gasoline market would be GDI and 50% of that in around 2017 would have filters on them, so that would be about 25% of the total gasoline market would have filters. And from a value standpoint this is when we're using a one plus one example. The one plus one example we effectively doubled the sales value when you added a filter. And because there's more than one option, maybe that'll be 1.8 times, something like that but rounded to 2 times sales value.

Robert MacLeod - ***Johnson Matthey - CEO***

Simon, do you have a mic?

Simon Fickling - ***Exane BNP Paribas - Analyst***

Yes, I have. Is it on?

Robert MacLeod - ***Johnson Matthey - CEO***

Yes.

Simon Fickling - ***Exane BNP Paribas - Analyst***

A question for Nick on the batteries business. Just can you give a sense of what the competition is in that area? The growth potential is obviously huge but there are some competitors there who have been operating in the market for quite some time, sort of how do you assess competitive landscape and how you can differentiate yourself and therefore carve out your opportunity?

Nick Garner - ***Johnson Matthey - Division Director - New Businesses and Corporate Development***

I think we have to distinguish market between the existing supply of lithium ion materials into the electronics market and evolving, let's call it, automotive market, the high end market as you can refer it to. There are a number of players clearly very, very strong players in the lithium ion space at the moment, that have historically supplied mainly into the bulk electronics market and some of them have positions into the automotive. But I think there're key distinctions as we're learning, as we're talking to our customers in the automotive area.

The esogentsand the demands on performance in automotive is just so much higher than the bulk electronics market that requires a different sort of skill set from your supplier. And that's why as I emphasizing a straight forward material supply is not what they're looking for. The quality of powder alone isn't enough it's actually there's such a demanding performance criteria they need to make. They're looking for a much more holistic relationship and that's where the application model comes into.

I don't think we're unique in delivering that, but I will say amongst the material or lining up the material suppliers today we are unique in owning a systems business and taking this approach of dealing with the top end of the supply chain which helps inform where we are at the materials end.

And so there's some differentiation there, but I think there's a new evolving market and the different players are lining up. The winners in the automotive market aren't necessarily the people that are strong today in the bulk electronics market.

Robert MacLeod - ***Johnson Matthey - CEO***

Okay. If you don't mind we'll -- since there are no hands up anyway we'll take a break now. We originally had 20 minutes for coffee. I think coffee is at the back, if we just make it 15 minutes. And if we get back together let's say five to 3:00 then we can try and get closer back on schedule. Thank you.

(Break)

PRESENTATION

Liz Rowsell - *Johnson Matthey - R&D Director - Technology Centre*

My name is Liz Rowsell and I am the R&D director for the Johnson Matthey Technology Centers and although it is my own opinion, I believe I have the best job in Johnson Matthey and I'm going to tell you about how we support our businesses in their R&D requirements.

Okay. You've seen this diagram a lot and you noticed because I'm a scientist I said diagram, but however, I'm going to talk to you about the chemistry that we do and how we apply that to our businesses for their existing product improvement, but also for new product development.

So, how do we structure our R&D to deliver growth? Well, it's very important that we have a sustainable technology pipeline and that means that we have a balanced portfolio of short, medium and long-term research. This is how we structure our pipeline. On the left-hand side here you will see that we have external projects and university collaborations. That's very much on the long end of this timeline to market.

Unusually compared to other industrialist we do not expect academics to invent products. We love our collaborations with universities. We like to access their world-class academic abilities and we use them to underpin our fundamental understanding of science. So, we sometimes perhaps might access techniques we don't have in-house, but typically we're looking for fundamental science knowledge to underpin what we do in applying that science.

Core science is an area of Johnson Matthey Technology that is exactly what it says. It's the core expertise that applies across division. You've heard all of the divisional directors today talk about their technologies and their requirements, in core science we try to underpin those.

So, some of the areas that we would have in core science would be things like computer modeling, we would have precursor chemistry. So you've heard today, John talked about fine chemicals, well in precursor chemistry we might be looking at coordination complexes of PGMs that might be able to be used in chiral synthesis for John's area, those same complexes might be applied in Alan's area to develop models for refining of PGMs. So, the chemistry is core, its, that's the expertise but it can be applied across divisions.

The business funded R&D is exactly what that says, that's business funded projects. So, the projects will identify key areas that they're interested in and they will align these to their long-term business plans and it's our job in the R&D community to make sure that we have the right expertise to investigate the feasibility in those areas and deliver that technology.

Typically these areas reside within our Johnson Matthey Technology Centres and I would say in the Sonning site that you're going to and in our Billingham site in the northeast about 80% of our science heads are funded by the business and about 20% of core scientists and we feel that's about the right balance.

Finally, on the right-hand side here is where most of the R&D community sit and that's in the businesses. So, they sit in the businesses around the world and they're in the development groups that feed into our production groups. So, this chain provides a balanced portfolio of long-, medium- and short-term R&D work that delivers the business needs.

Okay. Some of those stats we've already heard that Robert and the divisional directors we put a lot of importance on R&D, we are a technology company. We will maintain our current 5% of sales on R&D. That equates at the moment to about 1,400 employees and about 21% of those you will find in the Johnson Matthey Technology Centres and we abbreviate that to JMTC.

If you look at the pie chart on the right here, in 2013/2014 our R&D spend was about GBP150 million and this is the proportion of how that spend was allocated. And as you wouldn't be surprised to see most of that spend is with the big two divisions, so that's John's ECT division and obviously PT. But the NBD division is growing at the fastest rate because it's very important that we support Nick in his efforts to look at the feasibility of some of these longer term projects for his business growth.

Within JMTC we sponsor work at about 30 universities in 9 different countries. We work with lots more academics than that but those are the ones that we actually sponsor and we do that to gain access to expertise but also we do it to create talent for us in the future. So a lot of those students if you come to Sonning in the summer you will see a lot of those students doing their industrial placements with us, PhD students and you will see them piling high their plates at lunch because they normally have one lunch and then they survive the whole day on that. But it's a fantastic way for them to understand what Johnson Matthey does and it's a fantastic way for us to look at them and think about them as potential employees.

This is a very important part of the JMTC function, it's to support Johnson Matthey's IP portfolio and to create that portfolio.

Okay. We are a growing network of technology centers, traditionally we've had most of our technology centers in the UK and that's still the case. So when you go around Sonning this afternoon it is still the biggest technology center. There's about 250 people on site currently and we have a sister site in the north of England with 50 scientists in Billingham.

Sonning tends to concentrate on catalyst materials and we also house the materials characterization techniques for the group. So, anyone in Johnson Matthey globally can access that analytical and it is a world-class analytical facility.

Billingham, we concentrate a lot on the PT division, process catalysis, but also very importantly engineering and scale up. It's very, very important for Johnson Matthey although we do very clever chemistry at the lab scale, I think John mentioned this, it's absolutely vital that we can translate that chemistry to manufacture. It's no good making something on a gram scale if you can't scale up.

We have a site in Pretoria in South Africa which is a site where we incubate computational modeling. We have access to some high computing power in South Africa and our modellers there will be looking across the scales. So they'll be looking at everything from modeling perhaps a ligand that will serve the fine chemical area and produce a good active catalyst all the way up to helping JM Davy in reaction engineering and process design on plant. So it's a massive input across the scales.

And it's very important because modeling is really an important part of Johnson Matthey's expertise. And what it means is that we can save time and effort in practical experimentation and make sure that we focus on the right experiments.

At the end here we have our site in Singapore. We are building this facility at the moment. I'm going to talk a little bit more about this on this slide. So JMTC Singapore is a new venture for us. We believe it's very important that we have R&D support for our businesses in Asia and also that we get to access to the very strong talent bank in Asia particularly in Singapore around materials chemistry.

So we are building a research facility. We will have access to that facility in the autumn of this year. And we'll start to populate those labs and put our scientists there. So currently the model is that when we recruit we recruit locally in Singapore. We bring the scientists over to the Sonning and the Billingham sites for training. And then we place them back in Singapore. And we really very much hope that we gain a really highly talented individuals and increase diversity.

The other new venture that I'd like to briefly mention. I said that characterization is really important to Johnson Matthey. If we can understand our materials at very fine scale and understand how they work fundamentally which means that we can improve what we already have. But more importantly we can design new products, we can have a better understanding of how things function and how they function in the product they need to be in.

So we have a very good collaboration with the synchrotron at Harwell. I did say yesterday this isn't our syncrotron unfortunately. Robert is not that generous. But we do have access to it. And we are donating a multi GBP1 million electron microscope to Harwell and that will be there from September. Oxford University are doing the same thing. And we're building up a capability in surface science there.

We will be accessing what's called the nanoprobe beam which sounds very new age. But what it allows us to do is have access to the highest spatial X-ray resolution. And that's all about understanding our materials more fundamentally to improve, to always improve current products and make new products.

So it's also allows us to look across the scales. So for instance with this technology we'll be out to look at the atomic scale where the catalyst is actually functioned. So right on the metal surface where all the chemistry happens and also to take that to the micro scale where we're actually putting the materials into products and they've functioned in the product itself.

So I'm going to talk about some examples of where R&D has created value for Johnson Matthey. This is the SCR catalyst that John mentioned earlier. These are copper zeolite based catalyst that are used for NOx control in diesel engines. On the left-hand side there you will see a video playing of a zeolite material. And zeolites are important catalyst in their own right. They're very high surface area, materials. And you can see by looking at the video that they have lots of pores and channels in.

And these channels are typically the size of the atoms that you might want to absorb. And you can either absorb them and keep them there or you can absorb them and can do some catalysis on them. And what we've done in this area is the scientists in the research facility at Sonning worked with the development group at Royston, Chris Morgan's group to understand the chemistry at this modeling scale and then to try to make those materials.

And originally we doped them with lots of different based metals but we found that copper gave us very highly selective and active catalysts. And in the first generation that we made they were good but they weren't good enough, they weren't firmly durable. So is that piece about its all very well to make them but they've got to operate and in real life environment with high temperature.

So we discovered that by changing the shape and the size of the pore and also understanding where the metals were we could improve those materials. So how did we do that? We looked at modeling to begin with. And we tried to understand where these copper metal sites were inside that zeolite.

And that sounds quite easy but actually it was very tricky to do. We use reactive probe chemistry and we found that the copper could sit in one of four sites. We then use our friends at Diamond to help us look at X-ray diffraction and we discovered that the sites of interest were actually Sites 2 and 4.

And so that's quite interesting but what does it mean. What it means practically is that you can then make this exactly with the copper sitting in those sites. So you use less of your material but you have maximum activity. And you get that firm or durability because you've understood where they need to be and what the pore sites needs to be. Okay. So this is an example of R&D across the research community into the divisions and into production and this is a product that's creating revenue today.

Another example that's close to commercialization is in Geoff's area. And he's mentioned the vinyl chloride monomer catalyst. As he said this is a gold catalyst that is a direct replacement for a mercury based catalyst. And in China they tend to use acetylene derived from coal to make the vinyl chloride monomer which then reacts to produce PVC.

So we have developed a very benign process to make a gold catalyst which is a much more toxicologically friendly catalyst to use for the same reaction. And the beauty of it is that it is a direct drop in. China signed up to the Minamata Convention last year which is going to phase out the use of mercury in this area.

We're currently commissioning the catalyst production plant in Shanghai and that should be producing commercial quantity this year. So this is a nice story of how chemistry helps solve the problem because people have known for years that gold could do this. But the challenge has been to stabilize the gold in the environment that its got to work in. So it's all very well knowing the chemistry I think as Nick said, you've got to be able to apply it to the working duty.

We have a long history of gold chemistry in Johnson Matthey. We've looked to everything from decorative effects on glass all the way through to catalysis. We've made inks of gold for sensors. And we've also looked at biomaterials in the past. We've looked at antimicrobials and we've looked to antirheumatics. And we can use all that knowledge because actually it's all gold chemistry just applied in different forms. And we applied it to this problem.

And we've developed a carbon catalyst. And on the left-hand here you can see what it is called it's an element map of the catalyst. The dark area is of the carbon and you can see that the gold is on the surface here. This lighter green color is where the gold sits. And this is called an eggshell catalyst. And it's design to be that way.

So first of all our challenge was to stabilize the gold in the right form and then it was to just decorate the surface of the carbon. And that means that you don't need very much gold but you get the activity and the stability that you need in the duty.

Materials characterization I've said is very important. And when you go around the facility at Sonning you'll hear everybody talking about how they analyze and understand their materials. And we do really have a superb set of techniques that allows us to look at the materials. All of these are applied across the products in Johnson Matthey whether it's from fine chem., noble metals, PT, ECT or NBD.

They do different things. So in this area here this XPS looks at the very surface chemistry of the material and in fact it only looks at the top two nanometers. And you might think, "Well, that's not very much and what's that going to tell you about anything." But actually a lot of the chemistry happens there. And if you can understand it of that top surface you can change the way that your material behaves and the way that you understand it.

We have elemental mapping which I've just shown you. We have things called the XRDs which look at the crystallinity and give you a fingerprint of the compound. So you actually can understand exactly what's in it and what phase it's in. And that's very important particularly in the fine chem area where you are looking at crystallization and you're trying to get different crystal forms.

How do we use those in the new areas? So for instance we've heard a lot today about battery technologies. And I think people were surprised originally to think that Johnson Matthey would be in this area. As a chemist we're not surprised at all, most of us are chemists in the R&D community. And it looks really like something Johnson Matthey would do. Okay.

So how can we apply our knowledge to this area? So these we've heard a lot about cathode chemistry today. But we do need to understand anode chemistry. And we need to understand electrolyte chemistry because it isn't just a single cathode system that makes a battery.

So the R&Ds job is to help understanding of the whole system. And in the projects that you can see on the slide at the moment on the left-hand side we worked in a European framework program with a consortium of partners to make a anode material called lithium titanate. And this is just one of the possibilities for anodes. It's not all of them. And none of these materials are a done deal. But we need to understand how they behave.

And our job was to come up with nano material here. It had to be highly crystalline. And the reason that we have to do that was because in order for a battery to work the lithium-ions have to move between the anode and the cathode. And if you can make those lithium-ions very small nano particulate you can facilitate that transfer.

And if you facilitate the transfer, you potentially have a much more efficient charge/discharge battery. You don't want them too small because you don't want them getting very, very active and then running off and doing lots of different side chemistries that you don't want. So control of particle size and crytallinity is very important.

Coatings are very important. We use coating chemistry in all of our divisional products. In here, we're using it -- this is a cathode material and we're using it to coat the cathode with a very, very thin layer of silica. And if we can do that, what we can do is prevent the metal leaching from the cathode and causing any unwanted side reactions. And also it stops it reacting with the electrolyte in the battery system.

Dispersion is very important. You don't want all your metal active surface clumped in one area. And batteries, as you heard Nick say, are made up of a lot of different base metal materials. So this example is lithium manganese cobalt oxide. And that for us, as catalyst chemists, sounds like co-precipitation preparation of lots of base metals. And we do that at scale in our facilities already.

So all of these areas, although it's taken us to a new application, it relies on our core expertise and R&D.

So longer term, where do we want to go in batteries? What we do -- wanted to do longer term is understand metal Li-on battery -- lithium air batteries, so metal air or metal sulphur batteries. Why do we want to do that? Because these materials potentially have 10 times the energy density of existing lithium batteries. But these are not viable at the moment. And the challenge here is in the chemistry and the materials that are needed to deliver this.

So we really see this is an opportunity for Johnson Matthey and this is very much in the research phase for us. And we're working with really world-class internationally-renowned academics in this area to understand and further our knowledge so that we can apply it 5, 10, 15, 20 says Nick, 20 years down the line and be strong in this area.

So what do we do? Okay. So electrodes -- lithium ion -- lithium air electrodes rely on the lithium electrodes here which reacts with the oxygen from air and forms lithium peroxide. And it's lithium peroxide that's decomposed and produced as the battery works.

Now you can see that these are a very particular shape. They're called a toroid, which to the rest of us means the doughnut. And if we can understand that, we can perhaps understand how you might block an electrode surface and how you might try and protect that.

We're also looking at how we might enhance electrodes. So actually this is very familiar to Johnson Matthey. We feel well why can't we catalyze them. Let's understand what would happen if we put a bit of PGM in these carbon electrodes, could we control the chemistry? And we're trying to promote the oxygen dissociation. This will look very familiar to Jack and Fuel Cells. And can we stop any undesired side reactions?

So all of these are very speculative but does rely on our knowledge of chemistry and the application of our material surface characterization techniques.

Okay. So JMTC, very finally, what's it for? It really is to deliver the right science at the right time for the Johnson Matthey businesses. It's to be outward-facing, to understand what the academic communities are doing and the other science institutes are doing and to bring that in-house if we don't have it and to learn from it.

So we are the central expertise for innovation and knowledge. We support Johnson Matthey's IP. We deliver the median term R&D into the businesses and also help with the longer term new product development.

The core science program underpins the R&D business projects and is applicable across divisions. And we collaborate, as I said, with all the world-leading academics in state-of-the-art facilities. One of which, you'll see this afternoon at Sonning.

Okay. So I'm going to end there. But I would just like to say there are six tour stops today at Sonning. These are my team that are going to take you around. The very first tour stop -- I will just mention -- is refining research for some of you.

And Emma will talk about an application in refining where she's trying to remove precious metals from each other in a stream and she's using chromatography. And really what that is, is a functionalized support. It's got good chemistry that grabs the metals of choice and holds on to them.

We use exactly that same understanding in the water cleanup business where we're trying to use functionalized supports for ion exchange. And then we take that right across into John's business. And we're removing proteins and purifying proteins for John. Same chemistry applied across.

Okay. I won't go through all of them. Just to say, there are six tour stops. You will only see four because you've got really short time. So I really do hope you enjoy that. And please ask my team as many difficult questions as you like as you go around. Thank you very much.

Robert MacLeod - ***Johnson Matthey - CEO***

Thank you very much, Liz. We've got a chance -- time in a minute just to ask questions of Liz later on. But is there a doctor in the house? There are loads of them. And there are loads of doctors when we go around Sonning.

But I just wanted to say a few words to close and just to wrap up, and as I say, give an opportunity right to the end to ask questions.

What I hope you've heard today is about what our strategy is and what our vision is for Johnson Matthey going forward as we build into our third century. Quite an -- the third century is quite important as I said already for our internal people but it really is part of sustainable technologies is all we're about.

Our strategy is sound, we believe. It's very similar to what it was four years ago, a little bit of tweaking you've heard about. But fundamentally, I hope you've gone away with -- if you don't forget -- if you remember one thing, just remember a lot about the technology and in answer to the question how does Fine Chemicals fit - You heard from Liz, there're a lot of applications of how some of the science, the underpinning of the organization, makes a difference and is applicable across the group.

The chemistry and its application, is absolutely core to Johnson Matthey and absolutely core to what we do. We need to keep that leading edge going forward.

So key takeaways from the day, we think we've got a robust strategy in place. I strongly believe we do. We're going to continue to focus on sustainable technologies as I've said. We're going to keep driving the R&D spend. It's absolutely fundamental to what we do.

New businesses you heard about. We'll continue to grow new businesses. But the growth isn't just about new businesses. But that's just the next engine of a potentially larger scale growth.

Operational excellence, that continued improvement and in delivering what we do on a day-to-day basis. And that's about continuous improvement. It's about having this rigor to get better day after day after day in everything we are doing across the group.

But if we're successful in doing that, we strongly believe -- and I strongly believe -- we can deliver to you, the shareholders, double digit growth in earnings over the next foreseeable future. And as we've been talking about, we're talking about not just 5 years time but 10 years time and beyond.

That's all I wanted to say today. And so I want to give you the opportunity to ask questions. But before I just finish, I want to say a few thank yous.

Thank you first of all for coming. I know many of you are coming to Sonning. I hope you enjoy the tour there and quite a lot of you coming for dinner. And please make the opportunity to talk to as many of my team and the Johnson Matthey people who are there as you can.

I'd like to say thank you to my colleagues, the division directors. A lot of work got onto those presentations. Thank you very much for all of those. And to Liz as well, 10 slides doesn't take a long time to do, but trust me it does. Let's make sure we get the right message and get the right themes.

And of course, you've all met Sally and Katharine, and her team. They've put an awful lot of work and effort to make this happen. So I want to thank them for all their efforts in making this happen too.

And just -- again, just talking about Singapore -- I mentioned Singapore. Many of you remember Godders, he's over in Singapore now being part of setting up our technology center over there.

So that's it. That's all I wanted to say. We've got to get on the buses -- on the bus in the next sort of 10 minutes or so. So if you want any more questions of Liz or of me, I'm very happy to take them now. If not, we'll go to the buses. Yes.

Do you need mic? Or --

Bill Cross - ***Eaton Vance***

No. I'm okay to go.

Robert MacLeod - ***Johnson Matthey - CEO***

You got a mic.

QUESTION AND ANSWER

Bill Cross - ***Eaton Vance***

So in addition to the scientists that we'll meet with at Sonning, it seems -- given the frequency with which you've talked about M&A -- that there's another set of key people who are business development M&A specialists. Can you give us some insight into that piece of the picture, how that's organized and where that's going?

Robert MacLeod - ***Johnson Matthey - CEO***

Yes. Let's be clear on M&A. I don't want to give you the impression that all of a sudden there's a massive splurge of spending about to happen. That's not the case. We've done, over the last few years, a number of acquisitions, mostly small, mostly modest. And I would imagine the modest size is going to carry on.

Most of the M&A ideas are generated from the businesses. They're the ones that come up with the idea. They're the ones who say that's an area where I want to go strategically. The acquisition is a way to enable me to get that growth quicker. And so they're the ones that come up with the ideas in the main.

We then have a small group led by Nick Garner which has the sort of expertise to do the actual transaction itself. So that's the sort of legal expertise, the commercial expertise, the negotiating expertise, et cetera. So relatively small group, less than a handful of people.

Then the integration process obviously happens in the businesses but the businesses are being a part of the decision-making process to go into that area. And that's how it works.

The decision and the challenge about is it a sensible thing to do is partly done by the business but partly also done by the small central M&A team and then the divisional -- as a team, as the division directors, we all review it and challenge ourselves. We're quite comfortable to challenge each other, and it happens all the time.

Bill Cross - ***Eaton Vance***

Should we think of that capital as going with some percentage to enabling technologies on the one end and to businesses with revenue and earnings that complement what you have already on the other? And if so, what are those percentages?

Robert MacLeod - ***Johnson Matthey - CEO***

I think that's hard to say, really. It will depend on opportunity. I think there are some in both camps. There's more about enabling technology probably in Nick's area. But the other area is probably about broadening portfolio where you'll be adding technology where there's also probably existing markets already. Because there in the main divisions, you've got existing businesses and existing markets which are broadening and establishing which we're buying revenues and profit stream.

In Nick's area it's much more around enabling and facilitating that access to the market and that knowledge -- that market knowledge.

Any other questions? Well, look at that. We're bang on time then. Now I'm not sure if that's because you all want to -- for those that wanted to get away or want to get away.

But, seriously, thank you very much again all of you for coming. I hope you found today useful.