



Catalyst Technologies Seminar: Driving growth in a net zero world

Tuesday, 8th March 2022

Introduction

Stephen Oxley

Chief Financial Officer

Thank you for joining, and welcome to our Catalyst Technologies seminar. As you know, Catalyst Technologies sits within our Efficient Natural Resources business, along with Platinum Group Metal Services. Our aim today is to give you a teach-in on our Catalyst Technologies as a CT business, giving you a better understanding of what we do and our growth prospects.

Before I introduce the team, let me say a few words to put this session in context. Johnson Matthey's technologies and our solutions are completely aligned with our challenge as a planet to reach net-zero. Sustainability is our business. That's why we're targeting high growth, high return opportunities in hydrogen, in circularity and in the decarbonisation of chemicals and fuels. And I hope you'll see today why we are well placed to success given our leading technologies, our strong market positions, and our deep customer relationships.

The foundations of Johnson Matthey are strong. We are the world leader in Platinum Group Metals, and our metals expertise is at the core of what we do. It's been developed over many years. And this, combined with our catalyst expertise in CT, is fundamental to our past and future success. It underpins our competitive advantage and is critical to developing the new technologies needed to tackle climate change.

And as the world accelerates its transition to net-zero, our opportunities are coming towards us quickly. And to deliver on them, we're improving our execution, driving greater efficiency across the group, allocating capital in a disciplined way, and aggressively commercialising these opportunities. This is a critical juncture for JM as we position the company to take maximum advantage of growing demand driven by regulation and for new technology and solutions built on the scientific expertise that has been at the core of our business for centuries.

In recent weeks, we've been working with our new CEO, Liam Condon, who has now officially joined the company, and you'll hear more from Liam in May.

So, let me introduce our presenters today. Jane Toogood, Jane is our chief executive of Efficient Natural Resources. Jane has been with JM since 2016 and has over 30 years of experience in the chemicals industry, much of it outside the U.K. Jane is also a non-executive director on the board of Victrex Plc.

And also, Alberto Giovanzana. Alberto joined Johnson Matthey recently as a Catalyst Technologies managing director. Alberto brings over 25 years of experience in the chemicals industry, built across a variety of sectors.

So, with that, I'm delighted, Jane, to hand over to you.

Introduction

Jane Toogood

Sector Chief Executive, Efficient Natural Resources

Thanks, Stephen.

I'll start with a brief introduction, and Alberto will then give you an overview of Catalyst Technologies. Then I'll take you through our future growth opportunities, which are exciting as new markets open up for us. We'll talk for about 40 minutes and then take your questions.

I'd like to start by explaining why we believe Catalyst Technologies is well-positioned for success. We all know the world is moving to a low carbon economy, and carbon emissions need to fall significantly over the next 20 years to meet the Paris climate goals. Johnson Matthey has a vital role to play in helping our customers meet their net-zero agenda. And we're operating from a position of strength for four reasons.

First, we are a market leader in process technologies and catalysts. Our technology essentially helps our customers increase the yield and efficiency of their chemical processes.

Second, we have built strong relationships with our customers over decades. We work in close collaboration with them to offer customised solutions that deliver superior performance. And this means they keep coming back to us, helping us sustain and grow recurring revenue.

Third, decarbonisation is driving growth for Johnson Matthey. Our existing technology is essential in helping our customers decarbonise chemical processes. As the world enters this new era, we are focused on significant opportunities driven by demand for sustainable energy and fuels, which is underpinned by a regulatory drive to drastically reduce emissions.

And fourth, we already have proven and trusted technologies to address these opportunities, which is why we are winning business and have been chosen to pioneer some of the first large-scale projects in this space. These strong foundations give us competitive advantage. And as these opportunities scale, we're targeting high single-digit growth over the medium term.

With that, I will hand over to Alberto.

Catalyst Technologies overview

Alberto Giovanzana

Managing Director, Catalyst Technologies

Thank you, Jane.

Let me start by giving you some background. Sales in Catalyst Technologies, or CT, in 2021, were around £450 million, which is around 12 percent of the group. And we deliver mid-teens operating margins. Our business serves two key end markets, industrial and consumer chemicals, which is the core, represents about 65 percent of sales. These are used in a large range of end products, including fertilisers, food ingredients, wood products, and paint. They typically have fairly stable GDP growth rates. The remainder of sales is traditional fuels, where we provide catalyst additives and absorbents that are used to remove impurities, produce lower-emission fuels, and increase the yield of high-value petrochemicals from refineries. We are also seeing the start of a new sustainable fuels market which is a really exciting growth opportunity. And we'll talk more about this later.

So, what do we offer our customers? CT provides leading process technologies. These are the engineering design and process flow sheets for world-class production plants. We also provide catalysts which are specifically developed to work in synergy with these designs. Our customers build and operate complex chemical plants. When they invest, they need to generate maximum returns. We design plants with optimised footprints so that our customers can minimize CAPEX. When they operate, they need maximum efficiency. Our catalysts increase plant efficiency and yield so that our customers can produce more with less feedstock. The conversion stage of production is indeed a critical step, allowing our customers to create the building blocks for a wide range of essential products. And although our catalysts deliver a large benefit, they're only a small part of their costs. For example, our methanol catalysts are only about 1 percent of catalysts' total production costs. But they can increase the yield by 2 percent which, at current prices, provides extra annual revenue per plant of millions of dollars, somewhere in the high teens. We have a long track record of delivering high-quality engineering for new plants and sustained technical services over the life of the plant. So, we had a critical position in the value chain, which makes us important for our customers and supports our future growth.

So, let's have a look at the chemical value chain. I talked about the end applications in our key markets, which you can see here on the slide. Around 40 percent of major primary chemicals use methanol and ammonia. These are produced from syngas. Syngas is a mixture of hydrogen, carbon monoxide, and carbon dioxide, which are basic chemical building blocks. In addition, syngas is an important resource in the production of hydrogen for fuels. Syngas technology has been at the heart of our business for many decades. And syngas, as you see, is also at the heart of the chemical value chain. In the context of the new era the word is entering the really critical point is that syngas can be produced from both traditional and sustainable feedstocks. So, our technologies are relevant today in a net-zero world --

they are feedstock agnostic. We have the technology to respond at whatever pace the market evolves.

We have built leading positions in syngas and key market segments. We are the global leader in methanol. We are the global leader in formaldehyde. We are the global leader in hydrogen. And we are the global leader in natural gas purification. We are in the top three in ammonia and refining additives. And our segment shares typically range from around 25 to 40 percent. We also have long-standing relationships with our customers and partners based on mutual trust and value.

As you've heard, our success is underpinned by science and engineering. We are leveraging our expertise in catalysis and metal chemistry, along with our own machine learning models and data visualisation branded as JM Levo. Together, these enable our customers to optimise their plant operations and increase their productivity. For example, a customer in Europe recently used JM Levo to improve the average yield for a full catalyst campaign by around 100 basis points, which for a chemical plants is significant. We also develop and deliver new solutions in long-term partnerships. For example, we recently worked with Virent on Sustainable Aviation Fuels, which Jane will talk about later on. All these factors lead to very high customer satisfaction. In a recent survey, 96 percent of key accounts said they're very likely to recommend us, which is 12 percentage points above the industry benchmark.

Our business model is based on three key revenue streams: licensing, first fill catalyst, and refill catalyst. Licensing includes the upfront payment for process technology and engineering for the new plants. As these plants become operational, we earn revenues from first fill catalyst sales as well as refill catalyst sales to existing plants. It is the combination of our process technology and catalyst that drives superior performance and underpins our long-term customer relationships, creating predictable recurring revenue.

Let's add some figures to this -- our revenue varies hugely depending on the particular project. But when we have sold the license, the average license is around £5 million, which we recognise over the period of the plant build, approximately three to four years. First, fill and refill catalysts are also around £5 million each. In general, refills tend to happen every two to five years. Looking at our overall business, 80 to 85 percent of our sales are recurring.

So, that is our business today. And I will now hand it over to Jane, who will take you through our future growth opportunities.

Growth opportunities

Jane Toogood

Sector Chief Executive, Efficient Natural Resources

Thanks, Alberto.

Our industry is on the cusp of a transformation driven by the need to address climate change. I think of it as a global industrial revolution. There are four megatrends shaping our business and opening up large new markets for us. First, there is an urgent need to cut carbon emissions to decarbonise our planet. Second, we're moving away from dependence on fossil fuels, which means a major upheaval in energy markets. This is a once-in-a-lifetime transition. Third, we need new raw materials, replacing fossil fuels, and there will be challenges accessing, transforming, and recycling these efficiently.

Finally, governments around the world are increasingly targeting emissions reductions through policy and regulation as they race to close the 30 percent gap between current policies and a two-degree warming target. So, these megatrends are here to stay, and they unlock significant opportunities for JM.

As chemicals and energy markets need to decarbonise, this is opening up large new markets for us: sustainable chemicals and sustainable fuels. These markets call for new applications based on sustainable feedstocks. Hydrogen, methanol, and ammonia will increasingly be used for sustainable transportation fuels, including marine and aviation, and to displace traditional fuels for heat and power generation. Producing these chemicals for sustainable fuel applications requires the same catalysts and process technology used for current applications. So, our existing syngas process technology and catalyst expertise gives us first-mover advantage and positions us to win as demand for sustainable fuels increases. But these emerging sustainable fuel markets require the production of decarbonised syngas for conversion into fuels, and we developed new technologies to enable this.

As we address the need for large-scale decarbonised energy sources, we're seeing the emergence of a multibillion-pound sustainable fuels market. These new hyper-growth markets represent a significant opportunity for our business with an addressable market size of 2 to 10 billion by 2030. Of course, these emerging segments rely on regulatory support and incentives to make projects economically viable. Policies include carbon pricing, national and regional hydrogen strategies, and sustainable fuel mandates. They will be a key indicator of market adoption. So, these are great opportunities, but they won't come overnight. We expect to progressively scale over the next few years, with growth accelerating over the medium term.

More importantly, we are strongly positioned to become the leader in these markets and capture value through our blue hydrogen, sustainable fuels, and low carbon solutions offerings, where we have existing technologies and a strong competitive advantage. I'll talk about each one of these, in turn, starting with blue hydrogen.

To achieve net-zero, the world needs to change how we supply and use energy. This means switching from fossil fuels to renewable sources when generating electricity, for heating homes, powering businesses, fueling light-duty vehicles such as cars and vans, as well as many industrial processes. That's where hydrogen has a vital role to play. Hydrogen can be produced in a number of ways, but the vast majority is currently manufactured by steam methane reforming - so-called grey hydrogen. In this process, natural gas is converted into hydrogen and carbon dioxide, with the CO₂ escaping into the atmosphere. This process can be decarbonised through carbon capture and storage by capturing the carbon dioxide using advanced gas reforming technology and then storing it. This is blue hydrogen. We are a leader in blue hydrogen technology, providing licensing of process technology, catalysts, proprietary equipment, as well as digital solutions. We offer a cost-efficient solution for our customers whilst enabling significant carbon reduction.

Our ambition is to be the number one technology supplier for blue hydrogen projects. And our award-winning technology differentiates us in a number of important ways. First, we've been selected for the HyNet project, the first and one of the most advanced low carbon hydrogen projects in the world. I'll come back to it in a moment. Second, our technology has already been proven scale, given it builds upon our years of experience and leading technology in syngas and methanol. Third, we have low capital costs: 40 percent lower than conventional steam methane reforming technology with carbon capture. Our greater efficiency and lower capital intensity come from our intelligent process engineering, where we use heat as efficiently as possible. And the carbon dioxide created can be captured more easily and cheaply because it's at high purity and high pressure. In fact, more than 95 percent, and in some cases, as much as 98 percent of the carbon dioxide produced, is captured for storage or use in other applications. Importantly, our technology is also highly efficient. For example, to produce a kilogram of hydrogen, our process uses 9 percent less natural gas compared to steam methane reforming with carbon capture. And finally, our technology complements our existing portfolio of catalysts, which are widely used in existing refineries hydrogen and other syngas segments.

We expect blue hydrogen to remain a strong option in certain geographies, where renewable energy is more expensive, natural gas is plentiful, and there is suitable CO₂ storage. Blue hydrogen benefits from the ability to leverage existing infrastructure to deliver step-change progress as we transition to net zero. This graph shows blue hydrogen production volumes based on the International Energy Agency's sustainable development scenario, which could be considered relatively conservative. To produce the amount of hydrogen needed in 2030 in their projections requires about 100 plants of the size of the first HyNet plant.

So, let me tell you more about HyNet. HyNet is a hydrogen energy and carbon capture project in the northwest of England. The facility will deliver low-cost, low-carbon hydrogen at scale and high efficiency with a very high carbon capture rate. Over 95 percent of the carbon used in the process is expected to be captured and stored. Once the plant is operational in 2026, it is targeting production of three terawatt-hours, or 80 kilotons of hydrogen per year, equivalent to a natural gas consumption of 250,000 houses. It should also capture 600,000 tonnes of CO₂, the equivalent of taking over 250,000 petrol or diesel cars off the road. And by 2030, this is planned to increase to 10 million tons.

HyNet chose us for three main reasons. First, the technology risk is minimal. We use similar process technology and methanol, so it's already proven at scale. Second, the economics are attractive. Our technology is the low capital intensity and cheap to operate option. And finally, we're known as a trusted partner to our customers with decades of experience and a strong reputation. This first deployment is an important milestone in demonstrating our leading technology at scale, and the initial plant is the first of multiple plants on that site. Beyond this, we are at various stages of development with more than 35 projects globally that we believe can benefit from the deployment of our technology.

Sustainable fuels also represent a big opportunity for us. Today, I'm going to focus on aviation fuel, where market regulation is already coming into play. Sustainable fuels can decarbonise the aviation sector, using existing aircraft and fueling infrastructure. So, there's no need to change equipment. They are drop-in fuels. There are four main processes for the production of sustainable aviation fuel. Fischer Tropsch converts a mixture of carbon monoxide and hydrogen into hydrocarbon. Hydrogenated vegetable oils and derivatives, namely HVO and HEFA, this process is limited by vegetable oil feedstock availability. Alcohol to jet, which enables the conversion of alcohol into jet fuels. And importantly, Bioforming, which uses sugar as a feedstock and produces hydrocarbon molecules, the same found in today's petroleum products, but from renewable feedstocks. The Bioforming route is critical to make a 100 percent drop-in fuel. Because when mixed with fuels produced from other pathways, you get a blend with the same properties of current fuel. This makes it possible to fully replace fossil jet fuels.

We have a broad range of patented solutions and catalyst technologies. Our award-winning FT CANS process developed with BP efficiently converts syngas produced from waste, biomass, CO₂, and green hydrogen into sustainable fuels. Virent Bioforming, which, as I explained, converts biomass sugar feedstocks into renewable fuels. Virent Bioforming technology has already enabled the first passenger flight using 100 percent sustainable fuel. Our HyCogen solution enables the conversion of green hydrogen and captured CO₂ into syngas for Fischer Tropsch processing. This is a really exciting development, two years ago, people thought a commercial process was years away. We've moved quickly as the world has changed. We announced in January that we can license full-scale production. And we're already working on a project to deploy this groundbreaking technology. These are just some

of our leading-edge solutions, supporting our ambition to be the number one technology supplier for our addressable market.

So what is our competitive edge? Our leadership in syngas underpins our strong position in the production of sustainable fuels. The technologies we offer allow for a broader range of feedstocks to be used in their production and for the full decarbonisation of these processes. We already have a growing pipeline of more than 25 potential projects. And as I just mentioned, the Virent Bioforming technology has enabled the first passenger flight using 100 percent sustainable fuel. Importantly, our solutions reduce production costs. The CAPEX required in a Fischer Tropsch plant unit is 50 percent lower than conventional technology.

The demand for sustainable fuel is expected to ramp up rapidly in the next decade, driven by regulation in Europe that's already in place. This chart shows the scale of demand in million barrels per annum. The part that is addressable by us will equate to 230 million barrels per annum by 2035, 40 percent approximately of the total sustainable aviation fuel market.

I talked about a project using our LCH blue hydrogen technology. So, let me tell you now about a project using our sustainable fuels technology. In partnership with BP, we are supporting biofuels producer Fulcrum as they convert municipal solid waste into a synthetic crude oil that is further processed to Biojet fuel. In other words, sustainable aviation fuel based on biomass. We provide our Fischer Tropsch technology, which is simple to operate and offers Fulcrum cost advantages. This technology can operate economically, both at large and small scale, to convert syngas generated from renewable biomass into products that can be made into diesel and jet fuels. Fulcrum will use the technology in their new Sierra BioFuels plant in Nevada. Sierra will convert approximately 175,000 tons of household rubbish which would otherwise be landfilled, into approximately 11 million gallons of fuel each year, equivalent that needed for more than 250 return flights between London and New York.

Methanol can also be used as a sustainable fuel, and our technology has been selected for the world's first Climate Neutral methanol plant. The Haru Oni project in Chile is being developed by Siemens Energy in partnership with us and several other major corporations, including Porsche and MAN. It will become the first large-scale commercial plant producing sustainable methanol and sustainable gasoline from green hydrogen and carbon dioxide recovered by direct air capture. We will license methanol technology and supply the engineering catalyst and equipment for the project. Our technology is being used in the pilot plant that will produce 900,000 liters of sustainable methanol per year as early as this year. The customer is looking to grow this to 55 million liters of sustainable fuels by 2024 and about 550 million liters by 2026. To put this into context, gasoline demand globally is around 1,300 billion liters. Of course, sustainable methanol produced by such a plant could also be used as a sustainable chemical to enable decarbonisation. These are just some of the exciting opportunities we're working on to address these brand-new markets for sustainable fuels and chemicals.

I've talked about some new projects, but what about existing chemical plants? How will they respond to the net-zero challenge? Today, over 1,500 syngas plants emit around 800 million tons of CO₂ every year. As the industry moves towards net-zero, more than 85 percent of captured emissions this decade will come from plant retrofits and adjustments to existing infrastructure. CO₂ capture and storage is therefore essential for the decarbonisation of chemical processes. The chemical sector alone represents 18 percent of total industrial CO₂ emissions, and it must address this if we are to reach global climate goals. This is against the backdrop of demand for primary chemicals increasing 25 percent by 2030, which means direct emissions from primary chemicals need to decrease 10 percent from current levels by 2030 and 95 percent by 2050 to meet decarbonisation goals.

In Catalyst Technologies, we apply our gas reforming expertise into existing customer plants to offer them enhanced carbon capture solutions. The initial 150 projects are likely to be decarbonising existing grey hydrogen plants with carbon capture and storage. I'll talk more about our technology on the next slide.

We are a leader in low carbon solutions, with over 60 years of experience designing some of the world's largest thin gas plants for the production of methanol and hydrogen. Our customers choose us because we enable an efficient carbon capture process. Our technology allows for more than 90 percent reduction in CO₂, 20 to 30 percent lower CAPEX, and a 40 percent reduction in space compared to some other technologies.

Chemical plants are expensive assets with operational lifetimes of decades, and low carbon solutions are key to enabling their continued operation and a decarbonising value chain. Our ambition is to be a leader in decarbonisation solutions for syngas plants. We expect to retrofit 20 to 30 plants by 2030/31, which should reduce CO₂ emissions by approximately 20 million tons per year.

Before we wrap up, let's look at our pipeline of opportunities. As I've talked about, they're increasingly supportive market dynamics as the world moves towards net-zero. We're unlocking new fast-growing markets with our technology in blue hydrogen, sustainable fuels, and low carbon solutions. And importantly, these technologies are available today. We have over 35 potential projects in blue hydrogen, over 25 in sustainable aviation fuel, and over 10 in low carbon solutions. Two years ago, these were only a handful. So, this is moving quickly.

In blue hydrogen and sustainable aviation fuel, we expect to see early revenues over the short to medium term as projects move through the pipeline. And in the longer term, we'll see breakout growth as the market scales. In low carbon solutions, we'll see licensing income initially from the retrofit of grey hydrogen plants. And over the longer term, we'll expand our

offering to the wider syngas and chemicals customer base. All of this underpins our confidence in our growth targets.

So, in conclusion, we are a leader in the syngas value chain, which is essential for the decarbonisation of chemical processes. We are entering a new growth era with a once-in-a-lifetime shift to sustainable energy and fuels driven by regulatory trends. Our differentiated technology, integration with customers, and robust business model means we are strongly positioned to win. And we are already leading the way with our technology, enabling some of the first large-scale projects. These opportunities mean we continue to target high single-digit growth over the medium term. Growth will progressively scale over the next few years and accelerate as adoption of these new applications increases. Given that a lot of the growth will be licensing activity, we expect this to be beneficial to the mix and to increase our margins over time.

So, with that, I'll hand it back to Stephen.

Q&A Opening remarks

Stephen Oxley

Chief Financial Officer

Thanks, Jane.

Now, before we open up to questions, I wanted to make a few remarks about the current conflict in Ukraine. First and foremost, our thoughts are with all those affected by these tragic events. We have put in place support for our Ukrainian employees and also financial support for humanitarian purposes, including aid for refugees. We are completely aligned with the wider chemical industry and are shocked by recent events.

In terms of the impact on our operations, we have one small Clean Air plant in Russia, and we are working to ensure the wellbeing of our employees at that facility. Catalyst Technologies also has a small office in Moscow that employs 10 people. And we have now stopped any new business to the country. Overall, for JM, we have around 1 percent of group sales in relation to Russia.

I know many of you will have asked questions or will have questions about the impact of the conflict on precious metals. JM is the leader in PGM recycling. And we are well diversified in our supply of PGMs from various geographies, and we have little exposure to Russia.

It's hard to say what the direct and indirect impact of the war may be on JM. The situation is fluid and developing all the time. And we will, of course, provide a further update along with our upcoming year-end results when we issue our pre-close trading update shortly.

I hope that provides you with some helpful color on the Russian situation. And now we're happy to take your questions on CT.

Q&A

Operator: Of course. If you'd like to ask your question, you can do so by pressing star followed by one on your telephone keypad. If you join us online, please click the request to speak flag icon. If you choose to withdraw your question, please press star followed by two. When preparing to ask your question, please ensure your phone is unmuted locally. As a reminder, that's star followed by one on your telephone keypad now.

Our first question comes from Sebastian Bray of Berenberg. Sebastian, your line is now open.

Sebastian Bray (Berenberg): Hello, good afternoon, and thank you for taking my questions. Can I start with a few on what's happened at this business over the last five or six years? What has the historical growth profile been like? Because back when Johnson Matthey was reporting the different segments of process technologies separately, there were progressive declines in areas like refinery additives, FCC, or oleochemicals. If the business as a whole is now 450 million of sales, where were we five or six years ago on the current structure?

And a related question to that, the last time that there were major acquisitions in this business was in 2014 with Davy and CATACEL. Are you considering going and acquiring assets, again, to broaden the technology base and accelerate the trend? Perhaps more so than the last few years? Thank you.

Stephen Oxley: Sebastian, thank you. I think, Jane if you're able to pick up the first point on the sales trends, and I can cover the acquisitions.

Jane Toogood: Yeah, I'd be happy to do the acquisitions budget. So, let me just cover the acquisitions first, Sebastian. Then -- what we've put forward here is not dependent on acquisitions. And so, in fact, our leadership position means that we don't need to depend on acquisitions to look for these amazing growth opportunities. However, it's possible in the

future that there could be acquisitions in adjacencies that could make sense to add to our business.

With respect to the last five years, I don't propose to go into a detailed analysis of what's happened. I think we have talked in the past about trends in the refinery market, as we had the oil crisis, the oil crisis that occurred, and we talked about that. I think what we have done through this business is we typically see a business that operates at mid-teen margins, roughly stable mid-teen margins. And, of course, as COVID also impacted, we saw the impact of COVID.

Stephen Oxley: I might just add on the acquisitions; obviously, when we come to the market in May, we will talk about the strategy both for business organically and indeed inorganically. So, we'll come back to you on that, then.

Sebastian Bray (Berenberg): Thank you. If I may quickly just follow up with one on the growth rate. I appreciate you've guided for high single-digit percentage; I assume that's sales growth over the midterm. Is perhaps another way of phrasing this low to mid-single-digit percentage over the next two to three years and then 10 percent plus from 2025 onwards as these opportunities accelerate, or is this a more straightforward, we're going to grow high single-digit percentage in a reasonably consistent manner for the next few years?

Jane Toogood: Yeah, so when we talk about the new opportunities, we've talked about a really healthy pipeline that we've got over 70 projects. And what we need is we need a small proportion of that pipeline to actually be underway by 2025 to meet our growth targets that's totally consistent with the leadership position we've got.

With regards to the existing business, we still got some recovery from COVID. And typically, as Alberto described, we operate a GDP-plus type of business, with these leadership positions being the foundation for our growth. I mean, naturally, any further specific guidance, you probably wouldn't get over the short term.

Sebastian Bray (Berenberg): That's understood. Thank you for taking my questions and useful presentation.

Jane Toogood: Thank you.

Operator: Thank you, Sebastian.

Our next question comes from Maggie Schooley of Stifel. Maggie, your line is now open.

Maggie Schooley (Stifel): Hi, good afternoon. I have a couple of smaller questions. On blue hydrogen, can you give us some indication of what you are producing per kilogram, the cost per kilogram of hydrogen you're producing under the blue scenario? I think before, it was about \$1.50 to \$3 range, but if you could give us an update on that.

And secondly, in the slides where you outlined the addressable market for low carbon solutions, you simply say 150 plants. If we can have some idea, perhaps even high level, of what the financial implications that could be? That would be helpful.

And then lastly -- sorry, three. Just an odd question. FT CANS, when you say municipal solid waste, can you give us some indication of how much sorting and processing needs to occur prior to it going into the system to produce sustainable aviation fuel?

Thank you.

Jane Toogood: Thanks, Maggie. So, that's three completely different areas. In blue hydrogen, I can't give you a specific number on cost per kilogram at the moment. Some of that, of course, is quite commercially sensitive as we look at the individual projects. And each project, of course, will have its own individual ecosystem, which affects the cost per kilogram, naturally. So, I can't give you anything on that, I'm afraid.

The same actually will be true when it comes to the 150 plants. Because you're looking -- so, you're talking about low carbon solutions and modifying existing plants. There, you're looking at plants that are sitting within an existing infrastructure, and usually an infrastructure that's been quite well developed over time. And you do get quite a degree of variability then, depending on a number of factors that that particular chemical facility will have. So, that's quite tricky to give you a general number on.

Then, let me think about the FT question. And the degree of sorting required to municipal solid waste. So, the feed for FT CANS in terms of the sorting the municipal solid waste; municipal solid waste, of course, contains a multitude of things. And different providers at waste provide that in different forms, so they may have something that's high in certain contents and high in others. The FT CANS process and actually deal with -- can handle waste that comes rich in biomass or not rich, so rich in biomass. And that's something that is, again, usually set up depending on the local waste stream. And so, people like Fulcrum are experts in making sure that the waste is coming in an appropriate amount, and an appropriate form to feed through into the process.

Maggie Schooley (Stifel): Just a follow-up on that, can it take high levels of plastics? Or does it need certain forms of chlorine guards to be able to process?

Jane Toogood: The plastic? So typically, a very good feedstock for these sorts of things, so plastics are usually a good feed.

Maggie Schooley (Stifel): Okay. Thank you.

Stephen Oxley: Okay?

Jane Toogood: Yeah.

Operator: Our next question comes from Charlie Bentley of Jefferies. Charlie, your line is now open.

Charlie Bentley (Jefferies): Brilliant, thanks. Thanks, Jane, for the presentation. So, I just had a couple. So one was just on the current portfolio. Can you give any indication of your regional exposure? I mean, particularly considering, I guess, feedstock in -- well, region and feedstocks, specifically considering coal to chemicals, and how much that is a -- what that accounts for, in terms of your resale business today?

Then kind of just another one, just on the kind of 2 billion to 10 billion number. Is that a recurring revenue number? Or can you split it out between kind of the licensing-based, one-off revenue stream and the kind of underlying recurring revenue potential?

And then if I could just squeeze one more in. I guess if I think about the existing portfolio, and you talk around the ability to attach CCS, some of those assets; I mean, have you kind of done like portfolio analysis on this? Like to understand which of those are probably going to struggle to kind of fit in with existing basins. And clearly, we've had some issues, and false starts to CCS before. So, kind of any thoughts around that would also be very helpful.

Okay, thanks.

Jane Toogood: Okay. So, if I take those, one by one, the first thing was about there rough split of geographies. And about basically a third, third, a third, if you take Americas, Europe, Asia. Okay.

The second one was about that 2 billion to 10 billion target market, and how they split down. I haven't got a split to provide you on that. So, it's the overarching picture, of course, based on two scenarios about where the market might go.

Then on CCS, and whether we've had a look at where CCS is easier or not so easy to apply; and that was referring to the Low Carbon solutions piece?

Charlie Bentley (Jefferies): Yes, exactly.

Jane Toogood: So, on the low carbon solutions piece, when we looked at this, I think our view is that the first plants to decarbonise are likely to be grey hydrogen plants because they have the highest carbon footprint. Okay? And so, those are the most likely to go. And that number that we put in about the number we expect to basically work with until 2030 is clearly based on detailed discussions with our customers and deep knowledge of how our customers operate and indeed what they are pulling forth from us.

Charlie Bentley (Jefferies): Okay, great. And just on those, I mean, can you give any indication of the geographical footprint of those 10 projects?

Jane Toogood: On the total pipeline that we've got is basically a third, a third, a third, across the whole piece that we've got. So, I think that's probably enough. Thank you.

Operator: Thank you, Charlie.

Our next question comes from Chetan Udeshi of JP Morgan. Chetan, your line is now open.

Chetan Udeshi (JP Morgan): Yeah. Hi, thanks. A few questions. And apologies; I think, you know, I might have missed some of these responses earlier. But did I hear a comment saying that the margin profile in this business is roughly mid-teens at the moment?

Jane Toogood: So, the business historically has operated with a mid-teens margin.

Chetan Udeshi (JP Morgan): And where are we today? Can we get any color on the margin profile? Because I remember you guys have done a lot of restructuring in this business over the last three or four years. So, I think, in theory, the margins should have improved. Is that the right assumption?

Stephen Oxley: Yeah, Chetan, it's Stephen; I'll just jump in there. So, the business has obviously been impacted by COVID. So, we've had some volume drop-off. We're not yet back to pre-COVID levels. As you can imagine, that has had some impact on margin. But as Jane talked about earlier on, the expectation is we get back to those historical levels.

Jane Toogood: And in the longer term, of course, because of the mix of the business, switching more to licensing, we'd expect it to be margin accretive.

Stephen Oxley: Yeah, as we discussed.

Chetan Udeshi (JP Morgan): And then when I look at some of your competitors, etcetera, especially Clariant, you know, they tend to do like, you know, high teen, you know, EBIT margin from time to time. So, is there an element of mix? Which is why, you know, Johnson Matthey's business today is not as profitable as some of your closest peers have in terms of margin profile? I think the related question was I think you mentioned some number on recurring revenue; can -- I did not capture that. So, can you repeat that?

And the last question for me would be, given the cyclical recovery, given some capacity increases that we've seen in the chemical industry, how do you see the outlook for maybe the next two or three years? I thought you -- or I heard you guys talk about, you know, high single-digit, probably more, you know, maybe post-2025. But when we think about the trajectory between now and 2025, how should we think about the growth in these intermediate three-year period? Or four-year period?

Thank you.

Jane Toogood: Okay, so I think the third question there was about Clariant. I can't comment on Clariant. I mean, any business always has a mix impact, of course, on margins, but I couldn't -- I can't really compare that to their business.

On the recurring revenues, so, what we talked about there was really in the presentation about the recurring revenues and about 80 to 85 percent of the CT sales being recurring. I hope that's the question that you're asking there.

With regards to the outlook, I mean, I think what I did say just a minute ago was, you know, look, we're very confident about medium-term high single digit growth because we have a healthy pipeline of over 70 projects. And we need a small proportion of those to be underway by 2025 to meet our growth targets, and that would be wholly consistent with our leadership position. And then, with the existing business, we still see some recovery from COVID.

Typically, as Alberto described, this business operates at GDP plus and has the core leadership positions that are the foundation for our growth.

Stephen Oxley: So, Chetan, I hope you're hearing there is a reasonably cautious or prudent expectation of that future sales growth. It doesn't take many of those projects that Jane has talked about to drop through to drive that sort of breakout growth from historical levels.

Chetan Udeshi (JP Morgan): Understood, thank you.

Jane Toogood: Thank you.

Operator: Thank you, Chetan.

As a reminder, if you'd like to ask your question, please press star followed by one on your telephone keypad now.

Our next question comes from Jean-Baptiste Rolland of Credit Suisse. Jean-Baptiste, your line is now open.

Jean-Baptiste Rolland (Credit Suisse): Hi, good afternoon, and thank you for taking my questions. I wanted to ask on the potential downside risks related to mix switch from grey hydrogen to blue hydrogen, given that you've been number one in hydrogen catalysts for years? And I think you mentioned that the vast majority of production today is and historically has been great.

The second question is related to the potential complexity in grabbing the opportunity related to sustainable fuel. Given that, if I remember well, a number of the segments in which you historically operated, notably chemical and oil and gas, had multiple segments. And I think you had mentioned that you were present in a selected number of them, on the overall something maybe like a third of these segments.

And then putting growth aside, my third question is about the uplift that you expect to margins; I understood that you expect an uplift coming from the license moving more towards a licensing model. But is there any more expectation that you can give us in terms of how you expect these models to be accretive? Or whether you would even expect these to be accretive to the returns? Not just margins but also the returns for ENR assuming normalised metal prices?

Jane Toogood: Okay, thank you, Jean-Baptiste. Okay, so let's start with the question about downside risk to grey hydrogen and blue hydrogen. And I think, to be honest, I would have absolutely expected this the other way because this is an opportunity. Blue hydrogen is an opportunity. So, with regard to grey hydrogen, we have the opportunity to decarbonise grey hydrogen, through our LCS solutions, through our low carbon solution, and for blue hydrogen, which is the way that we will need to go as an industry, there is the opportunity to bring our leading blue hydrogen technology to bear. So, in fact, this is more opportunity than downside risk for Johnson Matthey. And that's not only technology, but it's also about catalysts, of course, in both cases.

And of course, we mustn't forget that blue hydrogen is not only addressing a, if you like, a chemicals market, it's actually addressing a much bigger fuel market in the future. So, it's a much bigger overall market opportunity compared to the past for hydrogen. So, that's the hydrogen question.

You asked about the potential complexity and grabbing the opportunity with regard to fuels and where that would come because we are present in part of those segments, perhaps if I just step back from this for a second. And I hope I'm answering the question you've asked me and if not, please just ask me again. There are basically a number of ways to make sustainable fuels, okay, there are four pathways to make them, and we're not in all of them. One of those, which is actually current today, is HEFA. So, that pathway is feedstock constrained. So, it will grow to a point, and then it will no longer grow because there'll be no feedstock. The pathways that we have leading technologies in are pathways that represent an exciting growth prospect and right the way through as the aviation industry decarbonises. And you need these other pathways to reach a higher percentage of sustainable aviation fuel in the fuel blend, which is going to be required by regulation. And if I think about the policies today; there are already 36 countries with sustainable aviation fuel policies. And this means countries that will mandate a higher proportion, an increasingly high proportion of sustainable fuels in the future. So, we're in the bit that scale massively in the future here with leadership positions in the leading plants that are piloting this way forward.

And your next question -- oh, sorry; Jean-Baptiste, were you about to --

Jean-Baptiste Rolland (Credit Suisse): -- if I can just -- thank you so much. If I can just -- and thank you for the explanation, it's very clear. Can I ask if you've, given the confidence that you have in this growth and the fact that you're technologically well positioned to grab it, what is the sort of CAPEX that you would need to devote to that growth? Or is it more a case of your plants being currently underutilised, and so you're going to be able to basically bring them back to higher utilisation? Or if this is going -- you are, at some point, you expect to move into overutilisation? When would that happen, and when would you need to invest CAPEX? And what does the capital intensity look like?

Jane Toogood: Okay. So, with these opportunities, we're licensing technology and then supplying catalysts. And these use catalysts that are based on our existing catalysts. So, we can use our existing facilities to support that growth and continue, as we already do, continue to optimise the use of those existing facilities.

As the market scales, we will need some CAPEX. But relatively speaking, this is a modest CAPEX that's required for the catalyst facilities. Of course, the licensing activity is not capital intensive. So, relatively speaking, this is a low capital intensity growth.

But any capital allocation questions, of course, Stephen would answer on behalf of the group.

So, I come to your last question, which is around the margins. You asked about the uplift margins coming from licensing activity. And this, we do expect an uplift in margins because, of course, we'll see a higher mix on licensing. What we're talking about is a high single-digit revenue growth in the medium term. And, of course, we'll update on the margin guidance as we come forward, potentially in May, at the end of May. But we do expect this to be a margin accretive growth and quite a change to the profile of the business, actually.

Jean-Baptiste Rolland (Credit Suisse): Thank you so much.

Operator: Thank you, Jean-Baptiste.

Our next question comes from Alex Stewart of Barclays. Alex, your line is now open.

Alex Stewart (Barclays): Hi there. Good afternoon. Thank you for the presentation.

Just to go back to that question on hydrogen. Johnson Matthey has invested quite a lot of money and time in low carbon hydrogen, LCH, blue hydrogen processes. How does the admittedly nascent developments in Russia and Ukraine affect the development of hydrogen over the next 20 years, with natural gas prices having gone up very, very sharply? Does that change the economics of blue hydrogen, even over the transition period as we move into a totally carbon-free hydrogen?

I'm very interested in any initial thoughts, given how fluid everything is, but that's really been quite a big change in the gas markets, in Europe in particular. So, interested in your views there.

Jane Toogood: Thanks. Now, look, obviously, I can't possibly predict what's going to happen with regard to the pricing of these things, we are in a volatile world, which is why we use scenarios actually for planning the business. So, the technology itself is leading, which means that it is really cost-effective and effective from a capital-intensive point of view for people to put in.

People will move to blue hydrogen; there are actually already 26 countries that have hydrogen strategy. And there are further 22 countries who are now developing those hydrogen strategies. And in a world where people are looking at how they can source energy in different ways, you can imagine that this will only continue. Of course, relative, you know, costs to feedstocks will adjust. But what that will do is simply to change potentially the pace at which these things come. And as I say, it's why we've used scenarios for the way that we look at the target market.

Alex Stewart (Barclays): Okay, thank you.

Jane Toogood: Thank you.

Operator: Thank you, Alex.

Our next question comes from Adam Collins of Liberum. Adam, your line is now open.

Adam Collins (Liberum): Yeah, hi. I have three, please. So, firstly, on the low carbon hydrogen inflation. And I'm happy for this to be discussed in the context of HyNet more generally. Are you able to give us a sort of sense of what the revenue contribution is per kiloton of capacity? And I presume it sort of, to some degree, works the same way as the rule of thumb you gave at the beginning of the teaching, a third, a third, a third, in terms of licensing, refills, and first-fills. Could you just sort of discuss that in the context of either HyNet or a business overall?

Second question was on the grey retrofit opportunity. As I understand it, your solution relates to an auto thermal reformer, which is combining reforming with a separate oxygen plant, cryogenic separation plant. They're not many ATRs in use today, although I know they have a lot of promise in terms of capture rates. So, is it actually the case that that technology is going to be the main technology used for retrofits to extend? Do you have to add new bits of equipment in, in order to make it happen? And just on a related note, if there isn't a separation plant involved, why do you say that the overall CAPEX bill is 30 percent lower than your flow sheet?

And then just finally, a lot of excitement about ammonia as a hydrogen energy carrier looking forward. Could you talk about your plays in ammonia? Talk about methanol; we haven't heard a lot about ammonia. And what role do your Catalysts play in cracking ammonia?

Jane Toogood: Great list of questions, thank you very much. So, I'll talk a bit about the low carbon flow sheet. I'm not going to talk about the flow sheet clearly. And what I won't do is to specifically talk about HyNet because that's an individual project with, you know, sort of commercial sensitivity. But I think it would be fair to broadly look at the sort of shape of the revenues on a similar line to that which Alberto described early on in the presentation. I can't remember what slide number now. But -- so, that would be broadly the same. Okay.

You talked about the -- you asked the question around the grey retrofit. So, basically, in terms of what we have there on offer, we have a solution which achieves that combination of excellent reduction of CO₂. So, this is really quite important because why you're doing this is to reduce the CO₂ footprint. Otherwise, you don't want to do it and it achieves more than 90 percent reduction in CO₂, which is critical for enabling the longevity of those long-lived chemical assets for a 20-30 percent lower CAPEX and a 40 percent reduction in space, and that's to do with the way that the solution is engineered. Okay. And that is a very interesting solution. I would say that a number of -- there's a lot of interest in this space, but of course, a number of people who are doing this that you'll see promises from different players, different customers, and their own net-zero targets, which is something that will start to come through during this decade and will continue in the next decade. So, I don't think that this is -- there's a lot of track record of anybody doing this yet.

On ammonia, we're in the top three on ammonia. We are a catalyst provider and work in partnership with a technology provider in that space. And you asked the question about ammonia cracking. That's something that we have active programs on at the moment.

Adam Collins (Liberum): Active programs because you've been doing it a long time or because it's a new area?

Jane Toogood: So, ammonia cracking is a relative -- so nobody cracks ammonia today. Okay. So, it's been R&D programs on ammonia cracking. So, nobody cracks ammonia at the moment.

Adam Collins (Liberum): Ok, and the legacy business; what are your areas of involvement in ammonia production?

Jane Toogood: So, with regards to ammonia, we have catalysts, and we work closely in partnership with a leading technology provider. But I should also add that in doing so, we're also optimising performance and efficiency for the production of ammonia from those plants.

Adam Collins (Liberum): Right. Okay, thank you very much. Just to circle back to the beginning, are you saying you're not in a position to give any sense of the revenue contribution from HyNet, either phase one or phase two?

Jane Toogood: No, I can't share that that's commercially sensitive.

Adam Collins (Liberum): Okay, thank you.

Operator: Thank you, Adam. As a final reminder, if you wish to submit a question, please press star followed by one on your telephone keypad.

We have a follow-up question from Jean-Baptiste of Credit Suisse. Jean-Baptiste, your line is now open.

Jean-Baptiste Rolland (Credit Suisse): Yes, hi. Thank you for taking this last one. I just wanted, an apologies if you have already touched on that and I have missed it. Did you ever say what historically the proportion of revenues between licensing and -- sorry, first fill and refill was? I know there has been a bit of volatility, just by the nature of the refill business being moving. But are you -- I'm trying to understand whether what you are assuming is a meaningful step up to what you had historically as a licensing business? And if so, wondering, you know, whether this is -- why you wouldn't have been able before to actually increase the proportion of your licensing revenues?

Thank you.

Jane Toogood: Thank you. So, let me deal with the second part of that first. Because the second part is why would we have done that before. Actually, and it goes back to what we're trying to describe about the market, and I talked about the Industrial Revolution. Really what you're seeing is something that's completely a change in the industry. And so, ordinarily, you see plants being built of capacity when needed as demand grew and then the parts get built that fulfills the needs, et cetera. And it kept on a relatively continuous type of basis, a sort of GDP type plus sort of basis. But this is a complete change, because actually what you need are not only to decarbonise existing facilities, which require engineering adjustments, but you also need to have new facilities that are built that has a completely sustainable feedstock, sustainable carbon, sustainable hydrogen, to meet the need for sustainable fuels and then

ultimately, chemicals. So, basically, that's why it historically, it was just a different world, frankly, so a huge, completely different once in a lifetime Industrial Revolution type of transition.

With regard to the split of the revenues. Basically, we've had about 15 percent to 20 percent of the revenues being based on the licensing --

Stephen Oxley: -- and first fuel combined.

Jane Toogood: And the rest being refills.

Jean-Baptiste Rolland (Credit Suisse): Thanks very much.

Jane Toogood: Thank you.

Operator: We currently have no further questions. I'll hand back over to Stephen Oxley for any closing remarks.

Stephen Oxley: Yeah, thank you, Charlie. And thank you, everybody, for joining. And for your questions, I hope that's been helpful and informative to your understanding of CT. Our next communication will be in a few weeks' time, and then we look forward to our strategy review with Liam at the end of May.

So, thank you for joining. Obviously, do come back to us with any further questions. Thank you.

Jane Toogood: Thank you very much.

Alberto Giovanzana: Thank you, bye-bye.