



Capital Markets Day 2022

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Mobility Transformation: Rechargeable Battery Materials – Capture Profitable Growth and Create Sustainable Value

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Yeah, good afternoon to everybody here in London and from wherever you are joining us. I hope you're all re-energized by the break and ready for Rechargeable Battery Materials. Rechargeable Battery Materials are at the heart of Umicore's 2030 RISE strategy and they are at the heart of the mobility transformation. While there is consensus and there is no doubt that this industry has exponential growth, there are at times questions whether the industry and Umicore can manage it in a sustainable and in a profitable manner? And yes, we can and we will.

Agenda

I will now walk you through, in the next 45 minutes or so, how the mobility transformation creates exponential growth for Umicore's demand in cathode active materials; how Umicore, with its unique business model, will differentiate itself and create values for its customers, for its partners; and how we will translate it in profitable and in sustainable growth.

1. Mobility Transformation Driving Accelerated Demand for Cathode Materials

Let me start with the market.

Electrification Increasing At Fast Pace, Triggered By Regulatory Push and OEM Commitments

As Frank already mentioned, this exponential growth is driven by a couple of levers. One is the regulatory push in all major regions, but most pronounced in Europe, where the European Union just announced two weeks ago to ban internal combustion engine sales as of 2035.

But we see even stronger OEM commitments. Stellantis, for instance, announced recently to have their fleet 100% electrified in Europe by 2030, and 50% in the US. Mercedes Benz is going in a similar direction with 100% electrification, except for niche markets and application. And in North America, GM is also pulling, by decarbonisation, the fleet by 2035.

And of course, you have the ever stronger consumer sentiment going into electric vehicles. We have translated this for light duty vehicle in our forecast in our market model, starting with BEV ratio of 5% in 2021, up to about 34% in 2030. The remainder still for plug-in hybrid vehicles and of course internal combustion engine vehicles.

For medium- and heavy-duty vehicles, we see also clearly an uplift in battery electrical vehicles but here it's more differentiated. It's more in the medium-duty vehicle and the short-haul, heavy-duty vehicles. Why for the long-haul, heavy-duty vehicles? It's more the fuel cell driven electrification, where Umicore has also very strong offerings via the fuel side catalyst. So we translated this in about 17% battery electric vehicle penetration by 2030.

While there is clearly an upside potential for the medium- and heavy-duty segment, we have focused right now our strategy on the growth of the light-duty vehicle segment.

Umicore Chemistries Addressing ~75% of Total Light-Duty EV CAM Demand

What you can see here are our estimates, our expectations in this massive growth from 2022 to 2030, with an average CAGR of 25%. And we see this rather on the conservative side, and this may even further accelerate.

To give you an example, we have projected at our Capital Market Day in 2018, for the light-duty vehicle cathode active materials demand, 500 gigawatt hours. Now we project one terawatt hour for 2025, so doubling it. So there's enormous growth in the market. We are addressing, with our technology portfolio, all major design-to-performance and design-to-cost segments with our high-nickel, mid-nickel and the emerging manganese-rich technologies. So with that, we see that we are covering about 75% of the total addressable market. So there will be a remainder for LFP but with a clear regional differentiation most pronounced in China.

The 75% also addressing emerging technologies, like solid-state batteries, where we have an innovation and a development pipeline for cathodes and for catholytes, and this we see ramp up still to a one-digit percentage by 2030.

>20% Annual Market Growth across All Regions

While we see a growth of annual, more than 20% in all regions, there are three major regions who account for about 90% of the total demand. This is China with about 40%; Europe with about 30%; and North America with roughly 20%. 10% will then – between different countries and regions, such as developed economies like Korea, like Japan, or more emerging economies like India. So we see the growth rather accelerating in the second half of the decade here, more pronounced even, but coming from a much lower basis. So three major regions account for 90% of the total worldwide demand.

What we also see is a clear trend in regionalisation. And that has different reasons. Reasons are from economy side, from countryside that they have local content requirements. We see also in a geopolitical context, that imports from one to another country may become prohibitive, due to tax and duty requirements and restrictions. This is the one hand. On the other hand, it's coming from the customers, from the OEMs, clear requirements, a) on security of supply, and this backward integrated, and b) also have sustainability requirements. So to ship all raw materials and intermediates around the world is really becoming also prohibitive in the quest of the decarbonisation of the value chain.

2. Rechargeable Battery Materials Well Positioned To Capture Profitable Growth And Create Sustainable Value In Fast-Growing Market.

And this brings me already to the next point, how will Umicore, with this offering, be profitable and be sustainable with this growth?

Cathode Active Materials Crucial for the Mobility Transformation...

Let me take a step back, what is it about cathode active materials? Cathode active materials are a key component in terms of technology for the battery, it determines, for instance, range, it determines energy density. Safety is a critical feature. You have also site life or from the cost side, is recyclability.

Cathode active materials account for one-third, of the value of the cost of a battery. So, it's very clear that this is a very critical component on the cell technology roadmaps of OEMs and of cell makers.

...Requiring Critical Competencies and Skills for CAM Producers to Succeed

To produce cathode active materials, along the value chain, requires very specific competencies and skills around three areas; product and technology, process and operations, and supply and value chains. We emphasised this already in our Capital Market Days in 2018, but it becomes more and more relevant and further refined now.

Product

Starting with product and technology, you need to have the right and higher performance technology produced with the right quality requirements, to meet the customer specifications. So you need to have the right chemistry, but also the right processes for it. Joint development with the customer give you access to the right specification to the requirements of the customers but also to their technology roadmaps. So this is another important angle.

And of course, to provide this offering, you need to have the right technology portfolio, also backed up by IP, to develop with the customers the innovation roadmap for this generation, but also for the next generation and for the next cycles.

Process

Then process and operations. Here it's really to master the complexity of the operations, be it industrialisation, be it scaling up, producing at economies of scale, and do it with the right efficiency and quality. Efficiency determines the productivity and, finally, also the profitability.

And another very important criteria is quality and purity. While on the one hand, with the cathode active materials, you have CAPEX requirements, like for larger chemical plants or refineries; you have purity requirements, like in the pharmaceutical industry. So this requires really specific skills to manage this spread.

Supply

And last but not least, it's the supply and the value chain to really have access to the right raw materials that means meeting all ESG requirements, but also with a local carbon footprint, which becomes more and more critical in the future with the requirements of the customers. Having refining and leaching competencies, and the right footprint for it, further facilitates that, because it gives you more flexibility and supply security for your in-feet.

And last but not least, having the value chain, a backward integrated value chain, in these three major regions. We were talking about 90% in three major region, so having the regionalised footprint approach is also critical for the supply and value chain.

And Umicore has these skills along the value chain to really create benefit for its customers and partners, for their own success and can really differentiate itself versus competitors for that.

Capture Profitable Growth and Create Sustainable Value*Where to play?*

And with that, we have a clear strategy to establish this backward integrated value chain in all the major regions. To start with Europe, to extend our leadership that we have in Europe, we have been an early mover with the setup of the operations in Poland, for cathode materials, but also in Finland, for precursor and for refining. We have set up agreements with our customers – Mathias spoke about the JV intention for Volkswagen, we have a long term agreement with ACC – and this really provides the basis for our footprint development backward integrated in Europe and further grow from here.

The next pillar is entering North America with a local footprint along with our customer qualifications and with platform awards. So, we are in the very final phase to acquire land in North America and we expect this to announce it before the half year results. And this land will give us the capability to do the backward integration with our footprint in North America, as we have in Europe. The start of production is planned towards the end of 2025, starting with cathode active materials, but also then backward integrated with precursor, and later on also with refining and with leaching.

And thirdly, it's reinforced our position in the Asian market by expanding our platform exposures with more customers and towards 2025, then fully utilising our footprint, our backward integrated footprint in Asia, and then further develop and grow from there.

How to win?

So, how we will do this along the RISE strategic and execution pillars?

Capture Profitable Growth and Create Sustainable Value: Value Creative Strategic Partnerships across the Value Chain

Let me start with the R, the reliable, the go-to transformation partner. Going forward, this means to create, to set up partnerships along the value chain, and this is clearly different from the traditional supplier customer relationship that have been dominating in the past.

Mobility transformation radically accelerating uniquely positioned to help the world transition to clearer mobility

You still will see this slide a few more times, and that is not a coincidence, because this shows how Umicore is uniquely positioned to be a transformation partner for the whole mobility transformation, be it internal combustion engine, including plug-in hybrid electric vehicles, be it battery electric vehicles, but also be it fossil driving battery electric vehicles. We have decades long experience, close customer interaction, customer intimacy, and understanding with all major OEMs as well as with cell makers. So for the automotive catalysts, the experience goes almost back 50 years; for cell making for the battery materials, about 25; and roughly the same also for the emerging fuel cells. So we are uniquely positioned to serve our customers along the whole mobility transformation.

Supporting customers on the path to electrification, right from the start

Let's have a bit more closer look for the cathode materials and the rechargeable battery materials. I don't want to go through all the years here, of our long-standing track record, just explain that we have over 25 years' experience to develop cathode active materials, first for portable electronics application, then for EV application; have built a backward integrated manufacturing footprint, with the experience to produce at scale, and with the highest quality.

And we will now accelerate it and have already started with it, with our entry into Europe with providing the latest technologies to our customers and partner, and setting up the right partnerships.

Strategic partnerships key to accelerate decarbonisation and electrification

And this brings me to a key element of our RBM strategy. This is partnerships for the decarbonisation and for the electrification along the value chain. We have started this and you can read this already with the announcement around VW and ACC.

This creates value for Umicore, and also for the partners of course. It gives access to long-term demand, and with that, security to scaling up to economy at scale, with the capacity roadmaps of the customers. And for the customer, it provides security of supply.

We recently were in a discussion with a major OEM who said, 'We need security of supply, we don't want to face a second chip crisis.'

The next one is really to industrialise, and to develop technology roadmap, based on our technology portfolio and our industrial know-how, while keeping, of course, our FTO and our IP. And so defining together with the customers, the technology roadmaps for the shorter, but also for the longer term.

Having partnerships models means working along the value chain, to really decarbonise the battery value chain. And that can start from sourcing, the wire refining, and of course precursor into cathode manufacturing production.

And last but not least, having the investments, having co-funding for the customers, having customer commitments, and our own commitment, of course, which will be value creative for both partners.

Upstream know-how and integration closing the loop

But our value chain proposition doesn't stop here. I just mentioned critical access to raw materials, which we have with our long-term agreements on the raw material side, low carbon footprint, and ESG requirements covered. Having a proven footprint for refining leaching, and the competencies, of course. And also having the same for precursor and cathode materials. But what is critical is that we are able to close the loop with recycling, and Umicore, has the clear competencies and Kurt Vandeputte will give you more details later on about that.

So with closing the loop, having the full requirements of the customers, which includes, meanwhile, recycling as well, recycled materials, so we got these first requirements from OEMs, so we really will provide peace of mind to our customers from sustainable sourcing to security of supply.

You may now ask, yeah, how will Umicore this now translate in our – in its footprint ambitions? Let me explain this right now to you.

Expanding our global manufacturing and R&D footprint along the value chain, close to customers

This is our Asian footprint, Korea and China – again, backward integrated from cathode materials to refining. It includes also our R&D footprint. With our headquarter in Korea, we just announced two months ago, that we have an expansion with a new R&D centre to really

even serve our customers better and faster. So we have also applied technology competencies for Asia, for Europe and for North America as well.

This we complemented with our early moving approach into Europe, being early on in Nysa, for cathode materials, and in Kokkola, for precursor and refining, and also having set up a process competence centre in Olen in Belgium. And here we have the same centre for R&D incubation for our long-term roadmap, and I will come to this in a minute.

The next step is that we set up plans, a clear roadmap, to expand our European footprint by the – starting by the end of 2023, by further expanding into cathodes, precursor, as well as setting up for the nickel refining and leaching competencies. And also establishing in Europe, a battery technology centre to be even closer to our customers here, and to serve them faster and better along their technology roadmaps.

Our North America ambition, and I just said it, is clearly to be local by the end of 2025, starting with cathode materials, but then also backward integrating, and also from the technology, applied technology side, having a battery centre in North America to also serve our customer there.

So with this footprint approach, we will cover all major markets. So the 90% all major markets and the other 10%, because, of course, also from there – which we do, by the way, because we are located in Korea. And serve them backward integrated from cathode materials into refining, and have also R&D footprints in all regions. In Asia, we will complement this investment, as of 2024, with selected investment and plan to further growth then in CAPEX in the second half of the decade.

Transformation growth serving our customers in all regions

How do these ambitions translate in capacity? And this is what you see on this slide. We started last – as the basis from last – 65 gigawatt hours in Asia, with a clear ambition to go to 230 gigawatt hours by 2026. Most of the growth will be accounted for in Europe, but also complemented with our entry in North America by 2025. And then with the vision to further grow towards 400 or above 400 gigawatt hour by 2030.

You may ask now, is this just a linear projection and growing with the market? No, it's more concrete behind. As you have already seen from the announcement for VW and for ACC, their clear ambition is to go combined to over 200 gigawatt hours by 2030. So having 50% of the envisioned capacity already in the roadmap eight years ago is a very strong signal.

Capture profitable growth and create sustainable value: Technology & IP Portfolio Covering Performance & Cost

This brings me to technology and innovation leadership. Technology and innovation leadership will be, and remain the core of Umicore. It will not be – and this is clearly confirmed by the customer roadmaps they are sharing with us - that there will be one size fits all solution. No, there will be customised offerings for design-to-performance, for the design-to-cost elements for different applications.

Umicore is covering this, and is very competitive right now, with this design-to-performance offerings in high-nickel and design-to-cost offerings in mid-nickel high voltage and also the emerging manganese-rich technologies. And of course, we are also early on working on the next generation of technologies like cathodes and like catholytes for solid-state batteries.

Broad technology and IP portfolio covering current and future's chemistry spectrum

To give you a bit more detail, you see short- and medium-term, the focus is in high-nickel. So, this is from 80% nickel to the mid-90s percent on nickel, with further developments like on low cobalt, like additional safety features for instance. On design-to-cost, it's mid-nickel high voltage and also manganese-rich. And manganese-rich, that really gains attraction by the customers. So, we have development cooperation with numerous customers, with OEMs but also with cell makers.

But we don't leave it here. We are proactively preparing also the long-term roadmap. So, working, I mentioned it already, on cathode and catholyte materials for solid-state batteries, having an [inaudible] for silicon carbide anodes, but also for further cathode – longer-term cathode development, like sulphur-based cathode, like disordered rock salt or sodium ion based cathode. These, of course, are currently still in a more exploratory phase.

Complete portfolio for performance and cost on short- to medium-term

Here, a snapshot about the introduction schedule of our high-nickel technology based on the current customer qualifications roadmap starting towards the end of 2023 and then, depending on the customer, in a staged approach towards 2025. For the design-to-cost with mid-nickel in a similar fashion and manganese-rich, we see emerging towards the second half of the decade, so, with a roadmap projection currently starting in 2026.

And of course, the next generation R&D developments and so on, on these different technologies are continuously ongoing and also shared with our customers with early sampling and so on.

Manganese-rich/HLM leading technology portfolio for design-to-cost

A word on manganese-rich as a very promising technology for the design-to-cost segment. It has, on the one hand, features like for NMC – that means energy density – like recyclability and very important, is the footprint reach, so, the supply chain. Manganese-rich can be produced with Umicore's acid bases that we have for high- and for mid-nickel. That means with our footprint development globally, we will be able to produce it in every region of the world. And it has also the advantage that especially outside China, it's really cost competitive with LFP, and LFP needs a totally different manufacturing footprint.

Leading in next generation performance technologies - Zoom in on Solid State Batteries

Zooming in on solid-state batteries. Here, the introduction schedule with smaller programs or demonstration programs we see emerging towards the mid of the decade, and then further also in a staged approach, emerging in the second half of the decade with a final market share, to be seen, but we estimate somewhere between 5% and 10% towards 2030.

We have numerous agreements in place; Matias said it already, about 15 agreements with partners, with OEMs, with start-ups. We are proactively working with academics, so we can really claim to be in a leading position for our cathode development, but also, we are working, in detail, on catholytes.

Catholytes, provide a pre-integration, a chemical bonding early on between cathode and electrolytes, and has a clear potential for that, to further boost and increase the energy density, and finally also reduce costs.

And so I'm very excited that I can inform you right now, that we will do an announcement today to cooperate with Idemitsu, who is a leading technology manufacturing – leading technology company in the area of sulphur-based, solid-state battery electrolytes. So, we will put our forces here in the development together, and this will further accelerate our leadership for the catholyte development and for the industrialisation.

Again, a word on the manufacturing footprint. Also cathodes and catholyte, with some additions, can then be produced with Umicore's global manufacturing footprint. So these materials will be available for our customers in all regions.

Capture Profitable Growth and Create Sustainable Value: Key Partner in Transition to Low Carbon Mobility

Sustainability. Also, at the risk to repeat what has been said a couple of times, sustainability is really close to our heart and it's in our DNA. We have been pioneering in responsible source materials, setting up a cobalt framework and really increasing the standards for Umicore on the one hand, but for the industry on the other hand as well. And going forward, our clear ambition is to be pivotal to be a leading partner for the decarbonisation of the battery value chain.

Decarbonising the battery value chain

But decarbonisation of course, first of all, starts on our end. So we do it on all scopes. Scope 1 is to further optimise increased efficiency by energy efficiency improvement. For Scope 2, Geraldine already provided you details on that, for each and every green and brownfield investment, it is mandatory from the beginning on, that we are 100% provided with green energy.

So we started with that, with our operations in Nysa with the power purchase agreement, and about renewable energy, we complement this right now in Kokkola for our precursor, for our refining operation. And we will, of course, extend it wherever possible also to our existing operation. But very clear, every expansion will be 100% fed by renewable energy.

And in Scope 3 we have signed already contracts in the past, looking at a very low CO₂, a very low carbon footprint, of course, meeting all the ESG requirements, with cobalt, with nickel, and also having the first zero-carbon agreements in place for lithium.

And we have set up a clear ambition and roadmap to reduce the carbon intensity for our cathode materials. Industry average right now, it is about 30 CO₂ equivalents per kilogram. We are today at 20 and we have a clear ambition and set up a roadmap to go to about eight. So reducing the carbon intensity by more than 50%, and this will, of course, be supported for areas like recycled material coming then also from Umicore. And with that, we can have a reduction potential of more than 3 million tonnes of CO₂ by 2030.

Capture Profitable Growth and Create Sustainable Value: Step-Change in Process, Operational and Organizational Excellence

Last but not least, excellence in execution. And here, I have to clearly state for rechargeable battery materials, excellence in execution – be it innovation, be it operations, be it supply, be it transformation of the organisation to cope with the huge growth requirements – is really mandatory for the success.

Continuous improvements delivered... and further to come...

Let me give you examples on continuous improvement. Operational excellence and continuous improvement, of course, will not only start tomorrow. We have a 20 years' experience in Asia to efficiently operate our cathode active material plants and to continuous improvement.

And to give you some examples, we have reduced the – or increased the energy efficiency by about 15% over the last five years. With the introduction of the latest technologies in Nysa, we will further reduce it. We have looked in downtime optimisation in other areas, and we have increased our output by about 20% on a comparable asset basis.

One area to mention, there is a very close link between R&D development and process development. Step changes in process require a close link with the R&D product development. This is a reason that we also spent sizable amounts for our R&D process development. So, R&D product process development go hand in hand and this will translate it then step-wise for the next step changes into engineering, into footprint and into industrialisation. And here, we have concrete programs set up to really optimise our operations footprint with the latest process technology.

Set up for further optimisation and innovation

So, we have, around innovation, continuous improvement, three levels. I just mentioned the process development, which is closely linked also with the product development. We have operational excellence, which includes of course, de-bottlenecking. Also Denis mentioned it already today for the refining business. We have – we are doing this for a year, and this is part of the business model for long time in Automotive Catalysts as well. Then it's, of course, CAPEX optimisation; like for sourcing, its digitalisation. If it's digitalisation, on having automated KPIs, having HEVs, having also the analytics digitalised, because with the high purity requirements, you have very high quality requirements.

Last but not least is the plant design with the expansion to really leverage the economy of scale; with modular plant design – I come to this in a minute; and also having of course, the right footprint selection, which allows you green energy access from the beginning on, which allows you to have the right logistics for the customer, to have the right permits in place when you have a backward integration from cathode material to precursor and to refining. So this is very critical, access to talent and other areas.

So, we have the clear ambition and roadmap to improve our CAPEX efficiency by 30% for the next years until 2030, and also substantially optimise and reduce our OPEX. So this will be a key lever for our efficiency, and finally for our profitability.

Modular plant design leverages footprint expansion

Here, an example of our innovative modular plant design. Traditionally you have a more line-by-line design really tailored to a specific battery grade, to a specific technology. We have now introduced, for our Poland operation, a modular design which gives you flexibility between the different building blocks and also optimise, individually, the different building blocks. That means with this modular plant design, we have flexibility for all the different grades we produce now and will be producing in the future. High-nickel, mid-nickel, manganese-rich cathode, catholytes for solid-state batteries. It allows also for

standardisation, and then the transferability to scale, let's say, in a quick time manner. And also that innovation can be transferred to these different building blocks.

So, this is part of our roadmap of efficiency here right now to reduce the CAPEX density by 30% over the next years.

3. RISE 2030

And this brings me back to the key takeaways into what you should remember from today.

Rechargeable Battery Materials - RISE

Capture profitable growth and create sustainable value

Umicore has a unique value proposition. And our strategy is to roll this unique value proposition out to all the major regions for Europe, extending our leadership; North America with an entry plan for 2025; and to further reinforcing our position in Asia. And we will do this along the four RISE pillars. Reliable transformation partner means clearly having value creative partnerships along the value chain. Innovation and technology will remain at the core of our doing – innovation and technology is always the entry card for the customers. And that will not change for the foreseeable future. Sustainability, really work with our partners to decarbonise the value chain. And last but not least, and this is bringing everything together, really excellent in everything what we do, and to be very supportive in this area, to reach the right profitability.

And with this value proposition, we have the clear ambition for sustainable EBITDA growth, going up to a 20 – having a 20% EBITDA margin, and becoming value accretive after 2026. Thank you very much.

And with this one, I would like to hand it over to my colleague, Bart, who will give you an introduction and our roadmap for the Automotive Catalyst business.