

## R&D Webcast

# Circular Economy at BASF – Transcript Q&A

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## 1 General Topics

**Christian Faitz, Kepler Cheuvreux:** Can you talk about alternative power sources for running your crackers?

**Dr. Martin Bruder Müller:** That is an interesting topic and that is more a question for the Carbon Management Program. You know already that we studied very much in detail to understand where our limitations are and what kind of technologies we need. But one thing is very clear. If we want to go towards CO<sub>2</sub> neutrality, then we need masses of renewable energy at cheap prices, because you have to replace fossil resources by electricity to produce some of the steam, but also steam-driven turbines have to be converted into electrical drives. That means roughly that our electricity demand will be three to four times higher than it is today.

So, at the very end, it has to come from all kinds of renewables. But let's be very clear in Germany here: You have some contribution from local solutions like windmills and solar parks close by. But if you look at the potential and the amount of energy, it is actually only offshore wind parks that can deliver these masses of energy. So, that will be a very important part of the future, how companies like BASF can tap into sufficient and stepwise increasing amounts of renewable energy, certainly at competitive prices.

**Georgina Iwamoto, Goldman Sachs:** Can circular economy work if not all regions are participating? It makes sense in a net consuming region such as Europe or a one-party state like China. But how do you convince regions that are net exporters of natural resources to adopt a circular approach?

**Dr. Christoph Jäkel:** I think where the real development is currently happening, you are totally right: This is happening in Europe. Here the foundation of the circular economy is developing very quickly, also on the regulatory side, driven also by consumer demand.

I think that brings us as BASF a competitive advantage because we are already here and working on our concepts to address these opportunities. We see also, if you think about single-use plastic for example, initiatives on legislation. You see it all over the place, actually. You see it happening from China to California. So, I say this is a global opportunity, although I see Europe moving faster than the other regions. This is basically our home-base and this is where we can build up our expertise to also make it then happen in the other regions.

**Dr. Martin Bruder Müller:** Georgina, to add on that: We have big discussions now with policy makers. I said there is a lot of ambition and vision, but it is also not yet clear how to do it actually.

I make a very clear statement here: If we consider from day one that we need border adjustment measures to put somehow cost and control at the border of Europe to other regions, then, I think, you confess already that it is not economical. That is why I tell the politicians: "Let's be really smart with an enabling framework, tax schemes, funding schemes, opex, capex, all this kind of things where we bring together something that the society and politics want to happen with how we can support this transformation."

I think, if we manage that – and I am convinced, it is possible both on the circular part as well as on the CO<sub>2</sub> part – then we don't have the problem that we have this distortion between the regions. It is basically a no-brainer that other regions will follow us. I think this is a much more constructive proposal to go forward than imposing fees and penalties.

Because one thing is very clear: The other regions will be very innovative, too, how they fight back on this kind of market distortions. At the very end, we in Europe depend on global trade. That is why I think we have to have a little bit of a different ambition.

**Raj Chinthapalli, nova-Institut:** Do you think biomass is losing to recycling or do you still see this as part of the solution?

**Dr. Martin Brudermüller:** If you look at the total volumes which we consume as raw materials, I would say, there is ample space for all kind of materials. So, it will take a long time until we really convert everything. In the extreme case, I would say, we might have a good mix that could be recycled pyrolysis oil, but this could be at the same time also bio-based oils. So, it is also dependent on what direction customers want to go.

But we clearly proceed with both because you also have a difference between industries. There are some industries that are more on the journey to become bio-based. They certainly would always love to have something which is starting from bio-based and is 100 percent ending in bio-based. If you then tell them what the investment costs are for the necessary new plants and how you price that in and how long it takes to fill those plants, they are actually less happy than when they came with the idea.

So, when you explain our drop-in solutions and the mass balance, they acknowledge that this is a very smart concept for both, for us ramping up and for them growing into these new business models.

I would say, there is a good space for both, and I would not bet on which is bigger in 20 years. I think now, in the first instance, we will accelerate ChemCycling™ very quickly; that was also mentioned by Christoph and I made that, I think, very clear with the partnerships. But it could easily be that also in ten years biomass is catching up. So, the good thing is: Our concept can actually cater to both.

**Andrew Stott, UBS:** Is there any way to monetize the extensive work you are doing for customers on product carbon footprints or is this just a future cost?

**Dr. Martin Brudermüller:** The interesting thing is – and that surprises also some of the customers –: If you start to talk with them about the product carbon footprint, they have not thought so much about it. But if for example a car maker sends me a letter and says: “Our cars in 2039 will be CO<sub>2</sub>-free in production,” and then you talk to them and ask: “What does that mean?” All the scope 3 materials or, for example, the engineering plastics of BASF have to come in without CO<sub>2</sub>.

Then, if you discuss what we bring in today with industry standards, you basically talk in detail about transparency and say: “Okay, this part of the total CO<sub>2</sub> is coming from raw materials, this part is coming from energy, this part is coming from traditionally produced, high-emission hydrogen etc.”

Then you can discuss with them how to replace piece by piece and work down the CO<sub>2</sub> backpack in steps.

But then you have to tell them and say: “Okay, if I use green hydrogen instead of the classical hydrogen by steam reforming, it has a higher cost.”

Then the question is: What is the final cost for their product for the consumer regarding also increasing CO<sub>2</sub> costs and brand image, because they also want to build their reputation at the very end, and how that translates in maybe paying more for the raw material, but decarbonizing my final product?

I have to say, there are some pioneering customers who are very advanced in that thinking; they have good discussions with us. I have also to say that there are some customers who have not even started to think about it.

But you cannot start something with the customer if you have no product to offer. This is why we want to advance relatively quickly to have this ramp-up. Then we will see if there is more demand for green hydrogen and they pay for it. Then we have to actually build capacities for green hydrogen.

But once again, Andrew, this is what I like: I don't have to build a green hydrogen plant with 50,000 tons of hydrogen and no one buys it. So, I can go stepwise and, with this, also can go into a much better utilization of capex.

But let's be very clear: This whole thing starts to roll. The first thing is: What is the technical enablement? I think we know how to do that. Now we have the product carbon footprint, translate this into reality on product level. We will see how the customers buy in. We have very advanced and very, very innovative customers who go quickly and we will have also customers who run behind in the field.

That is nothing that settles out immediately, but it will settle out over time. At the very end – I mentioned that – the products with a lower carbon footprint are actually Accelerator products; we defined Accelerator products as those that have a competitive advantage in terms of sustainability.

The nice thing is – and we saw that even during the corona times –: The Accelerator products have a higher growth rate. And they have a comparably higher CM1 margin compared to other products.

I think that is good news; this is actually what we want. It has to translate into profitable growth. I am convinced that the customers will come to us because we will be the ones who can offer the best way to go with them towards CO<sub>2</sub> neutrality. That includes certainly the circularity part.

**Olivier Eugène, AXA Investment Managers:** Can CO<sub>2</sub> be captured and used as a raw material in a Verbund logic?

**Dr. Martin Brudermüller:** Let me very clearly say, CO<sub>2</sub> and water are the two most stable molecules in the world. That is why you burn a carbon source and it ends up in CO<sub>2</sub> because that is the sink of the energy landscape. You do that because you want to use that energy.

So, if you think from that perspective, now taking the CO<sub>2</sub> and bringing it back into some functionalized carbon-based products, would require reinvesting all the energy which you got by burning it.

I know some politicians dream and there are some people who say, the raw material of the next century is actually CO<sub>2</sub>. Clearly stating: This is nonsense. You have to at least put the same amount of energy into it. Normally, you lose efficiency; so it is actually more energy required. There is always the better option not to burn fossil fuels in the first place and to have another energy source.

With this clearly said, directly using renewable energy for running certain reactions or processes, there will be some last CO<sub>2</sub> emissions left at the very end and we can talk more about this last mile. If we have, for example, 95 percent of CO<sub>2</sub> avoided by smart electrification and you have to consider, then the last 5 percent, you might actually use that with green hydrogen to do something like the Fischer-Tropsch process where you build alkanes and gasoline fractions from CO<sub>2</sub>. This, I think, is not a very economical part, for sure, but important for real CO<sub>2</sub> neutrality.

It can make sense to supplement something; there are also some very few chemical reactions where you can feed in CO<sub>2</sub> like we, for example, have dry reforming, which is an interesting thing. If you produce syngas, you can use a methodology where it consumes CO<sub>2</sub>. That is why it is dry and not steam reforming. But if you look at the volumes for that, it is negligible.

So, I would say very clearly: The clear strategy has to be to avoid CO<sub>2</sub> generation.

One clear word also on carbon capture and storage (CCS): There might be some local circumstances where you can do that. But I strongly doubt that this is the big solution in the world because you have to put it into the ground, and you have to be sure for generations that the CO<sub>2</sub> never comes out. I also think that the societal acceptance to live on big bubbles of CO<sub>2</sub> is very, very limited once they understand what that means. So, I think, the prime strategy has to be to avoid CO<sub>2</sub> and to use renewable energy as smartly and as effectively as you can.

**Chris Counihan, Credit Suisse:** If you review your current business portfolio using the circular economy framework, does this suggest that further changes, either M&A or divestments, are needed?

**Dr. Christoph Jäkel:** As usual, when the markets are changing dynamically – and this is what is actually happening right now –, then obviously we take a keen look at the opportunities, and also the risks. So, I will not exclude that. We also think about portfolio topics. But right now, I would say, it is too early for that. Right now, we need to see how these markets are developing. We will make sure that we capture all the opportunities that might arise.

We will also make sure that we work together with the regulatory bodies to ensure that this transition is happening in an economically sound manner so that it is really possible. Then, depending on this development, we also have to take a look at the portfolio, for sure.

**Dr. Martin Bruder Müller:** Very clearly, there are companies who actually drive their portfolio in the low-CO<sub>2</sub> direction. So, they sell everything that is CO<sub>2</sub>-intensive. At the very end, if you go to the product carbon footprint, you have to include scope 3. So, it doesn't help you to bring that out of your own portfolio. At the end, if you purchase the petrochemicals, it's in your balance as well.

I tell you very clearly: BASF is the company, that has long value chains and, with this, the most comprehensive portfolio, including the energy-intensive, capital-intensive, CO<sub>2</sub>-intensive starting point and the less CO<sub>2</sub> and energy-intensive end of the value chain.

We have the ambition to also enable the transformation at the front end, at the beginning of the value chains because someone in the world has to do it. In the future, we will need ammonia that is low CO<sub>2</sub>. We need olefins that are CO<sub>2</sub>-free. So, just to take that away and say, "I will now change the whole Verbund principle," is not the right strategy.

I actually want to win by showing that this is competitively possible. And competitively possible means it is maybe not the one-to-one replacement in cost because some of this will be more expensive. But if I can translate that into margin at the very end, by having this low CO<sub>2</sub> footprint, then the whole equation works.

Europe is now the starting point with the Green Deal. But let's be very clear: Under Biden the U.S. will follow quickly. I can tell you from my experience and my contacts in China: They talk about 2060 carbon neutrality, but they have already started with high speed to work on the same topics.

So, we have to consider at the very end: We will have a society which has to pay more and spend their disposable income differently. There will be parts that are more expensive because there is CO<sub>2</sub> pricing.

At BASF with its technology breadth, we have the ambition that we also enable base chemicals to become less CO<sub>2</sub>-intensive and then maybe at the end of the road also CO<sub>2</sub>-neutral.

We think, if we can do that, then we also have a competitive advantage because it translates to the whole chain.

We will also create pressure on our suppliers because we will ask the same question to them that our customers pose to us about our CO<sub>2</sub> footprint. We will start to talk to our suppliers and say: "What do you actually do to bring down the scope 3 for BASF?"

I think this will be an interesting discussion in the future. Not all the business models are clear yet. But I am very confident that we are moving into a different world and we at BASF want to be prepared for that.

**Thomas Wrigglesworth, Citi:** Do you see the shift to a less carbon-intensive profile resulting in a higher or lower margin for BASF or will this ultimately be competed away?

**Dr. Martin Bruder Müller:** We will have areas of businesses where, I would say, that goes very smoothly. We will have some other business areas where this will be a long fight and maybe it takes a few years more, which, however, could be easily coming from the consumer or it can come from politics where they say, "you cannot sell that product anymore unless it has a certain amount of circularity." There will maybe be benchmark methods where you see how much CO<sub>2</sub> is in there. There will be products that have more CO<sub>2</sub> than industry average and they will face pressure or get a penalty.

At the very end, it is a long journey. BASF's transformation will not happen overnight. With our portfolio and our Verbund, we can grow with a lot of customers in a lot of industries and progress on these individual paths. Some will be fast, some will be slower. But I am deeply convinced: There will be a total mindset change in the future on how things operate. And there will be a license to operate.

Just to remind you: We have 8 million tons of CO<sub>2</sub> emissions in Ludwigshafen, which is roughly 1 percent of Germany's total emissions. If anyone believes that we can just keep that, it will not work.

Maybe one day, we have also to talk to you, guys, if everybody wants to have ESG, about what the price for that is. I think, it is a very, very interesting journey. And don't expect now that huge parts of BASF's portfolio will not be competitive tomorrow. It will be a long journey.

**Edlain Rodriguez, Jefferies:** How much capex over the next decade is allocated to this? How does the new technology affect the steepness of the cost curves?

**Dr. Martin Bruder Müller:** We have not detailed it totally down because, as you can imagine, you can categorize capex from a different point of view. You need for example new capacities and then you say, "okay, I create capacities based on different technologies with lower CO<sub>2</sub>." Then you ask yourself: "Is this now circular? Or is it growth?"

In that respect, several things will come together. I think the whole battery materials investments are catering also to that direction because we have the Schwarzheide production. We have also shown there how we go down stepwise with the CO<sub>2</sub> footprint. That means also, we have to apply renewable energies there.

Then you can actually back it. If you succeed in that, you can totally attribute this to circular and low CO<sub>2</sub>. I think we don't divide that very clearly.

You also know about our future Verbund site in Zhanjiang, our big investment in China where we are now in the technical discussions stage. Exactly the same discussions that we have here in Europe, we also have with the Chinese government. We talk about green energy. We talk about certain profiles. We will do that whole investment with a much lower CO<sub>2</sub> footprint than the normal petrochemical site of that kind.

With that, I would even partially include the China investment into a kind of low carbon. I think we cannot divide that in buckets very clearly. But be sure that more of the capex in BASF will consider this aspect as part of the decision as to where we spend.

**Dr. Christoph Jäkel:** We just had a discussion on ChemCycling™ and the lightness of ChemCycling™ in terms of capex. We will definitely look for opportunities to have light-capex approaches to cater to a circular economy.

**Bernhard Brunner, BNP Paribas:** How does BASF handle the digital transformation and the need for more and more modern devices regarding the production of more and more e-waste after their lifetime?

**Dr. Martin Bruder Müller:** There are many parts in that one. Digital transformation, I think, is a third dimension. That makes it so difficult for us because if you look at what we have to do at the same time, we have also the chemical strategy for sustainability. So, we have to get digital, circular, low carbon and even zero tox. That is already four dimensions which we have to do at the same time.

Fortunately enough, things comes together. When we talked about the product carbon footprint, a project which, by the way, was run by Christoph, there is also a very big digital part in there; it is actually methodology, AI and whatever you need for that and the huge amount of data we have within BASF.

You also know that we have in Ludwigshafen the target of an own 5G network where transportation within BASF sites will be done by automated guided vehicles without drivers, at all hours. This is partially cost saving because it will be cheaper transport, less volumes in the working capital and at the very end, a lot of these things go together.

Also, the China investment, again, will be the most modern, most digitalized plant BASF will have for a long time because a lot of the solutions are used there and partially the solutions also help you to reduce capex.

The last part of your question was around electronic waste. We have not dedicated ourselves much to that one because displays and the like are not part of our business. So, we have not had a very close look into this.

But that is definitely something like the battery value chain and other materials: There is an ever-increasing number of devices – just think about smartphones and also the valuable metals like rare earths in them – and there is more and more recycling in that space too.

BASF will to not jump on every bandwagon because we will do what, I think, is closer to our heart and to our technological strengths.

**Markus Dufner, Dachverband der Kritischen Aktionärinnen und Aktionäre (Association of Ethical Shareholders in Germany):** BASF buys commodities from companies such as Norinickel from Russia and Sibanye-Stillwater from South Africa, whose business model has so far not been circular. Both companies have a history of human rights and environmental violations. Will BASF commission independent audits?

**Dr. Martin Bruder Müller:** Markus, we have had the discussion on precious metals in South Africa for quite some time. But let me take also Norilsk Nickel. Let's look, for example, at where cobalt is coming from today. About 80 percent of cobalt comes from the Democratic Republic of the Congo where, as we all know, there are poor working conditions and child labor which are a problem for the whole value chain.

I am actually quite proud that BASF is working with a company which has a European value chain in this case, also with our investment now, where we actually are not having exactly this issue because we come from different circumstances.

Is everything perfect there? No. I think there is also work to do on sustainability issues, as we all know. But overall, I think, this is exactly the right direction.

What we elaborated here is the recycling. The more material we have in the cycle and we put that then into a closed loop, then we neither have the child labor issue nor poor working conditions in the mining area. But we have then a much better material balance in terms of energy. Then we will have an increasingly higher share of circular material.

I think the direction is the right one. We certainly try to work with those partners that are going that way and have a similar understanding with us. Is everyone perfect in today's world? No. But that is the direction we want to go with our partners.

**Olivier Eugène, AXA Investment Managers:** What about circularity for products that are consumed quickly, for instance in consumer products? Is it about circularity or biodegradability?

**Dr. Christoph Jäkel:** This is where both things are coming together. If you think about circularity, just think about our product portfolio: We have our ecovio® foils. They are biodegradable and we consider them to be circular because they are being recycled through nature. It is not like millions of years; it is happening in one or two years. So, that recycling loop is taking place. I think this is where things come together.

Why not rely also on the power of nature to bring together the thought of circular with the thought of bio origin?



## 2 Chemical Recycling

**Christian Faitz, Kepler Cheuvreux:** Can you please give us some information on the economic value proposition for products coming out of the ChemCycling™ process? What are the production costs versus conventionally produced materials?

**Dr. Martin Brudermüller:** Christian, this is very tough to answer because we are now in the phase where we implement the concepts in several projects with our customers. It is very clear that at the very end, there will also be partially higher costs for the customer. But they have, on the other hand, costs for not doing anything.

What I think is very important is the regulatory framework because what, in Europe at least, happened so far is that Brussels has very high-flying ambitions and visions. But we have not talked about what is the right regulatory framework to make this happen.

So we have to land in reality and we need a regulatory framework that is aligned with an actionable industry strategy because, otherwise, if we don't do that, it is not a competitive transformation, and that is not what we are aiming for.

So, for chemical recycling for example, there is not so much regulation yet because the system was totally focused on mechanical recycling. For that reason, there are many loose ends which we have to combine: regulation on the one hand, our own supply and capacities build-up, and also the customer projects where we certainly discuss costs at the very end.

I would say, there are some cases that are evident, that are very economical today. Certainly, in the whole area of this transformation with the Green Deal, there are some question marks for the future where we have to see how they are workable with the combination of technologies from our side and the right regulation from politics on the other side.

**Laurent Favre, Exane BNP Paribas:** How likely is it that Antwerp and Ludwigshafen could run on pyrolysis oil by 2030? Is it a possibility or a probability? What would be the magnitude of related investments? And are you seeing tractions among customer companies regarding their willingness to pay a significant premium?

**Dr. Christoph Jäkel:** Let's start from scratch, at the beginning, square one. If we are filling all our crackers in Antwerp and Ludwigshafen, this is going to be a huge amount of material. Just remember that we just published our commitment to feed in 250 kt of recycled feedstock into BASF by 2025. So, this will definitely not be enough to fill all our capacity of our steam crackers in Antwerp and Ludwigshafen. I think this will be still a long way to go until we would be able to fill them fully.

I would also pose the question whether it will be fully possible because much has to happen also on regulation and on sorting and making the material available. Please consider that we also have, with the mechanical recycling, a very good technology already in place. The benefit of chemical recycling is really to use the material, the mixed plastic waste that mechanical recycling cannot sufficiently recycle. This is the material that in the very end also needs to be available and collected and be made available to enable it as a feed-in into our production capacity.

Now to your question in terms of investment: I would say it is way too early to answer that question right now. We are still in the ramp-up of this technology and we have to see where we end up.

But let me give you maybe one thought to that: Essentially, what we need to do is, we need to make this pyrolysis oil available and that means there needs to be a build-up of enough pyrolysis capacity. Now, will BASF own all those pyrolysis units?

I don't think so. We will make sure that we have access to this material. But there will be a whole industry developing. That means I would not expect that BASF would have to take the burden of all those investments.

**Dr. Martin Brudermüller:** Maybe just to quickly add on that because we talk about capex constraints as well. At the very end, this is the advantage of this solution. As I said, it is a drop-in solution and the Verbund actually has the facilities without further investments to step by step replace the raw materials. Another advantage of the Verbund is the mass balance approach. We have the broadest portfolio to allocate the atoms that are coming in via the recycled materials, via the certification system. I think we can actually offer materials based on recycling feedstock which others cannot do.

So, I would say, it is also from that aspect a very, very interesting concept because it is rather "capex light," I would say.

**Andrew Stott, UBS:** Is there a revenue target for the Quantafuel JV? How differentiated is this to other recycling projects out there?

**Dr. Christoph Jäkel:** I make it quite short: This is a single project. We will not disclose single-project revenue streams right now; please understand that.

But let me also say that we have a structured partnership and we are constantly checking and evaluating to further broaden that partnership, depending on the milestones that we reach together.

**Dr. Martin Brudermüller:** If we did not have the scenarios that this could pay out economically, we would not build on and go for partnerships for one plant after the other to lose money; that's also very clear.

I think there will be good chances, certainly. And that has to happen quickly, not after building five plants. We are now making the first experience with the Skive plant and the other plants to see how we can convert that, as I said, into a business model and earn money with it, very clear.

### 3 Battery Recycling

**Thomas Wrigglesworth, Citi:** Do you think that the returns are more attractive in recycling batteries than manufacturing? Will BASF only build recycling capacity in line with building cathode materials? Do you see these businesses separately?

**Dr. Christoph Jäkel:** Those businesses are inherently connected to each other; this is very important. To enable electromobility, you have to make batteries available and for that, you have to make battery materials available. This is the business we are in.

Right now, if you look at the volume ramp-ups, it is actually quite a challenge to make sure that you have access to all the necessary raw materials at the moment. But at the same time, you also see that the lifetime of a battery in a car is around ten years. So, if you look at battery recycling right now, you cannot really have the material coming from battery recycling. So, right now we still heavily need to rely on other sources.

But I would say, in ten years' time, you have developed that business and it needs to be then integrated and fully connected to close the loop because, in the very end, it is going to be a stretch to make such an amount of materials available, just taking it from the soil.

**Charlie Webb, Morgan Stanley:** Most battery recycling is done in Asia. What gives you the confidence that this will become a localized industry? And can you provide a sense on your return expectations for such an investment longer term?

**Dr. Christoph Jäkel:** This is something that we clearly have on our radar screen. So, we are not only focusing on the European market, as you probably know. We are also looking for opportunities in Asia and in North America. If you follow us, you know that we have certain assets already in North America.

We believe that, in the very end, we need to collect the recycled battery material. This is then the challenge that you have, let's say, a more tedious logistics set-up. That is the reason we believe that first you will have to collect this all locally before you bring it together. This is the simple logic behind that.

## 4 Agricultural Solutions

**Laurent Favre, Exane BNP Paribas:** You talked about the Green Deal. One of the sub-parts is the Farm to Fork Strategy and the reduction of usage of harmful pesticides. How much of a threat is that? Is it an opportunity to gain share from generics?

**Dr. Martin Brudermüller:** We address this with our strategy in Agricultural Solutions. When we had the Capital Market Day, we also partially touched this.

First of all, if it is the direction and the clear intention in Europe to reduce the amount of chemicals going on the field, then this means, we cannot abandon that because we all know that this is nature and we need to do something against weeds and insects damaging food.

So, we have to do it in a smarter way. I think the solution is here the digital farming approach. You know the drones that apply per plant much less quantity.

That means we will see a reshuffling a little bit on how the value is generated in this chain. So, you might in the future earn less with the chemical part. You might earn more with the digital service to do that. And you might, on the other hand, earn more with the seed which is designed in a way to perform better under these circumstances.

You have weather parts where we have more weather fluctuations. So, we have to make the plants more resistant against these extreme weather conditions. That is why in the ag world it is important that you have all these ingredients to design new solutions.

So, as long as we have that innovation, we are less worried. That will change the business and it will undergo a significant change in the next decades. But on the other hand, I feel that BASF is preparing itself well to cater to that and to be among the winners.

I think this is why this value chain is interesting. The agricultural industry is receptive of innovation and it is also driven by innovation. I am quite sure that this business will have different business models in the future from the ones it has today.

**Christian Faitz, Kepler Cheuvreux:** What is your Agricultural Solutions segment role in circular economy? Why do you believe Agricultural Solutions is seen so critically by many ESG investors?

**Dr. Christoph Jäkel:** If you look at circular economy, it is not all about making the cycles, but it is also about decoupling growth from resource consumption. That is exactly what is so important in the ag chem area.

Just as Martin alluded to: If we have digital farming and predictive farming, then what we do is reduce the amount of material that the farmer needs to bring out to make sure that the crop is growing as a healthy crop and generating the yield he wants to achieve. So, this goes exactly into that direction. From that perspective, it is very important to make it more circular.

Now coming back also to the thought of bringing it together with a cycle through nature: If we ensure that all the material that we bring out on the acres, like the plastic foils, the mulch foils, are biodegradable, then this is the right path to go. This is a circular solution for ag chem. In this respect, I think, this is the right connection and the right path forward.

**Dr. Martin Brudermüller:** If you listen to the European Executive Vice President Timmermans talk about where CO<sub>2</sub> stems from, then we are addressing the mobility and transportation area; and we also address the industry. But, actually, a huge amount of the CO<sub>2</sub> is coming from agriculture.

I think politicians in Europe don't see that there is adequate and fast enough movement to reduce CO<sub>2</sub> in agriculture. This is why I think this is something very high on the agenda, also from an ESG perspective.

But that translates exactly into what I said: The farmer needs help to do things differently in the future. It will not come from himself because he depends on buying seeds and buying the right chemistry and buying services and new digital solutions.

Actually, these innovations have to be driven by companies. One company among them is BASF. This is why this is an interesting field.

I would predict: Agriculture has to look different. If we are serious with CO<sub>2</sub> reduction, then it cannot proceed over the next decade as it proceeds today. For that reason, I can only say from a business perspective: If something has to move, this always means innovation and new business models are required, and with that opportunities arise to earn money. So, we want to be part of that journey also in agriculture.