

## R&D Webcast

# Sustainability Starts in Research – Transcript Q&A

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## 1 New R&D setup

**Christian Faltz, Kepler Cheuvreux:** BASF has always had central research functions, in my recollection. With the reorganization, by how much R&D headcount will this central research setup grow? What is the current status there?

**Dr. Melanie Maas-Brunner:** Nowadays, we have 10,000 people working in research and development. When we do now the embedding in the operating divisions, around 1,800 people will move from those former central divisions into the operating divisions. The new central platform will consist of around 3,500 chemists and researchers and developers and supporting people. I hand over to Detlef to explain what the central platform is doing.

**Dr. Detlef Kratz:** As mentioned, the central platform will have 3,500 employees. Fundamentally in one division you have the R&D part. It will be mainly the research parts, so the core what BASF does, but it will also be the enabling units, because everybody will need units such as analytics, toxicology and scale-up of pilot plants. This will be the core of what we do. And that is chemists, engineers, toxicologists, and biologists, but also, for example, the biotechnology part that we were talking about today will be included, including scale-up capabilities.

The idea is to have a whole innovation value chain, from idea all the way to process and finally to the customer. And that, of course, is based on the competencies that we then have bundled in this one unit.

**Chetan Udeshi, JP Morgan:** How does BASF evaluate the effectiveness of BASF's huge R&D spending per year? Externally, we can't see any obvious benefit in terms of faster growth and/or higher margins versus closest peers.

**Dr. Melanie Maas-Brunner:** This is always also, obviously, a question we are internally discussing up and down. We have €10 billion sales generated from products not older than five years coming out of the R&D pipeline. This is one thing. Here you might then really discuss: Is this figure really moving over time?

What I foresee now, especially with our new organization, is to speed up the innovation cycles in the operating divisions together with customers to help us significantly generate more organic growth. We will be able to start tailor-made projects earlier and we will also be able to stop some of them if we see that they are not valuable for the customers. And with this, we will also have a better output here.

This would be also the KPI that we will see moving once this new organization is up and running.

**Dr. Detlef Kratz:** Maybe another point to add to this: One is the new products we make; the other one is the processes we make. We have divided this into two categories because new processes, sustainable ones, are obviously the ones that will drive what we want to do. Of course, we calculate new products with new processes together.

And operational excellence should never be discarded. That alone saves around 200,000 tons of CO<sub>2</sub>, and also that incurs a profitability on both sides. It is, of course, sustainable on account of being valuable in terms of business, but also in terms of sustainability, and we have a whole database calculating that as well.

## 2 Electric mobility

**Andrew Stott, UBS:** In revenue terms, where do you think you have the most scope from your project pipeline in e-mobility? Is it plastics, coolants, or coatings?

**Dr. Melanie Maas-Brunner:** I am coming from the plastics arena. I think, the e-mobility batteries first, plastics and then comes the rest.

**Andreas Heine, Stifel:** How much will the share of group sales to the automotive industry be by the end of the decade? Which polymer materials benefit most from the new properties required in EVs? Which polymers might see a lower demand?

**Dr. Melanie Maas-Brunner:** I mentioned in the presentation that the chemical demand in value terms is 2.5 times higher in an e-vehicle than in a combustion engine. With this, you can compare a little bit the €12 billion sales that we are right now doing, what kind of potential is opening up for us.

On the plastics question: I think the plastics portfolio we have on hand right now, is a well-suited portfolio also for e-mobility. We just have to tweak it – I showed one example – a little bit here and there to make this also usable and beneficial for e-vehicles. It's like the color example I mentioned or like the plastic as protective material for the lower part of the car.

We have the right portfolio, and we can live with this. We don't have to think in terms of different plastic materials, adding something that's completely new to us. We will work with what we have in our hands.

**Christian Faitz, Kepler Cheuvreux:** For innovations in electro mobility, you are missing one chemical that contributes significantly to weight reduction in the car body: polycarbonate. Would you ever consider investing into polycarbonates, obviously via an acquisition?

**Dr. Melanie Maas-Brunner:** I think that comes with the statement I made before: I'm quite happy with the plastics portfolio we have in our hands.

## 3 Process innovations

**Sebastian Satz, Barclays:** On methane pyrolysis: What do you intend to do with the solid carbon? Would that be a major challenge for the large-scale application of this technology?

**Dr. Detlef Kratz:** I'll take that question, as the pilot plant that Melanie showed is in my unit. For sure we have been thinking about this because it's a typical question.

The hydrogen is split into hydrogen and highly purified carbon. I think this is very important to note. You come out with extremely high carbon quality, different to what you have typically from refining in petcoke and other carbon sources.

The beauty of this system is that you can use it in various formats. The carbon that we see will be substituting, for example, activities – we talk about e-mobility – in anodes, in the battery segment; that is one. That can be in the electrical vehicles, but also in large-scale applications. This is a core of where carbon goes. Again, with the purification effect, it has an enhancement.

But there are many other carbon uses. You can use it as a soil improver, for example. You know carbon from tires, asphalt, and the like. It's really about tweaking the properties of this carbon, highly pure as it is, to the different uses.

We are already there. We have, of course, sampled this already, and we know that carbon has many uses. We do not really see the problem to substitute a certain amount of hydrogen with the methane pyrolysis and then adding the carbon as an additive in various applications. Please remember: The carbon also is CO<sub>2</sub>-neutral. That is an added benefit, even though we haven't even calculated it into the benefit calculation of the hydrogen. So, we'll have two CO<sub>2</sub>-neutral products because it's all based on renewable energy.

**Retail investor:** Which of your low-emission technologies has the largest emission reduction potential?

**Dr. Detlef Kratz:** I would like to differentiate the question a little bit. Direct operational excellence has, in terms of the amount of energy capex and even energy we require to reduce CO<sub>2</sub>, the quickest impact. It's huge at BASF because we have so many plants at which to make potential improvements. All the savings of the past – or many – came exactly from that. So that's one bucket. We still focus that also in the new central division because this is where the operational excellence ideas come from.

The other one is fundamentally looking at the biggest CO<sub>2</sub> emitters: It is the steam cracker right at the beginning of the value chain, the hydrogen, which is connected to ammonia. I would say, those two alone make the biggest bars.

Hydrogen – to give you an indication – has a potential of about 3 million tons of CO<sub>2</sub> savings. And if you put that into perspective – Melanie mentioned our ambition of 25% reduction by 2030, coming from the 22 million tons of CO<sub>2</sub> emissions we had in 2018 – this would be a huge achievement and a huge lever to do that, wherever the hydrogen goes.

That is one, and the other is the steam cracker. And then comes the whole value chain, which we also focus on, but which is, let's say, a little bit more fundamental in changing the technologies. But those two are the big ones.

**Retail investor:** Which sustainable innovation are you working on that is most impressive for you?

**Dr. Melanie Maas-Brunner:** Detlef mentioned the very bold technology moves we are doing. This is impressive because it takes some courage to do this. It's with high investment. It's obviously also with high risk. We need endurance, it needs time. Something like a methane pyrolysis is not developed within two or three years. It takes time.

But when you look at the possibility of the 45,000 products we are selling, to offer real customer solutions by having kind of smaller, sustainable benefits being created faster and you add this up, this is a kind of huge portfolio. This is maybe something which is even more impressive: that we are able in the chemical industry to support our customers here.

**Sam Perry, Credit Suisse:** How much demand are you seeing from customers for solutions which enable them to reduce their scope 3 emissions versus two years ago? How much of a pricing and market share growth opportunity does this present?

**Dr. Melanie Maas-Brunner:** Basically, defining us as scope 3 for our customers, yes, there's lots of discussions ongoing.

Customers have, depending on their industry, a little bit faster, defined their climate targets. Some have also very significant targets to reduce their CO<sub>2</sub> footprint for their consumers. We are part of the game, obviously.

What we do: We have created this transparency, so that we really can talk about the CO<sub>2</sub> footprint of each of our products. We have now a carbon footprint for each of our 45,000 products that we are selling. This is really helping in the discussion with the customers. We can clearly say: There is a product with a certain footprint. You can compare to us. You can also ask us for reducing the footprint by using bio-based materials, for instance, or by inventing a new technology.

And then for us also the discussion is quite useful because we can then make it very transparent. This comes, obviously and most of the time, with a little bit higher cost. And then we can discuss: Is this worthwhile in reducing the scope 3 from a customer perspective when we change something in our system?

We are able to change now and tweak here and there and offer already very good solutions. It's really accepted. It was completely different maybe five years ago when there was no kind of feedback coming when we were starting something. Now, really the whole industry, regardless where they are active, is changing here.

#### 4 Digitalization in research

**Christian Faitz, Kepler Cheuvreux:** BASF made big steps in computing a few years ago with the supercomputer Quriosity. Has this paid off for you, as Quriosity was mainly also geared at research and development functions? How easily can you update or upgrade this computer with the newest computing power?

**Dr. Melanie Maas-Brunner:** Quriosity is really a great tool, and it's really used heavily by our researchers. It helps in modelling tasks, modelling difficult systems. It helps in speeding up when calculating something.

It also helped, by the way, in the corona crisis by supporting different external partners in developing something that might help with the pandemic.

It's so fully booked that we are now on the way of deciding to add capacity here, and this is then also maybe answering your question. This will also then enhance the capability of the Quriosity computer.