

BASF Research Press Conference 2020

# News Release

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## **Batteries, plastics, renewable raw materials: new ideas for the circular economy**

- **Scientists present solutions at the digital Research Press Conference**
- **BASF launches ambitious Circular Economy Program**

Presentation by

Dr. Martin Brudermüller, Chairman of the Board of Executive Directors  
and Chief Technology Officer of BASF SE

The spoken word applies.

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Ladies and gentlemen,

I want to wish you a warm welcome to this year's Research Press Conference. For the first time, it is an entirely digital event. And as much as I like new developments and innovations, I do think this format is a bit unfortunate. For me, the personal impressions and discussions at this event were always especially valuable and inspiring. I therefore hope very much that – even in this format – you will experience our excitement – and my excitement – for research. This is research which touches on aspects of everyday life. Including mine, of course.

I therefore brought along a few everyday items: for example, bottles of soap and detergent. These show how we all consume resources and produce waste every day. But it is possible to do things differently: These items here were made with recycled plastics. And this is exactly what we are talking about at today's event: the circular economy. How can we keep raw materials circulating to be reutilized as long as possible? How can we avoid waste, conserve resources and protect our environment? And how can we ensure that this is all affordable and therefore sustainable?

With the circular economy, we decouple economic growth from resource consumption. This means we conserve our planet's limited resources and use them as efficiently as possible. In some ways, we have been doing this for a long time: Our Verbund is well suited to recycle by-products and waste. In many areas of the chemical industry, however, production is still designed along linear models of value creation. The path to a circular economy will require enormous efforts on our part. And it is not the only challenge. In parallel, we as a company are pursuing an energy transformation towards carbon neutrality. Ultimately, therefore, this means a carbon-neutral circular economy. I am absolutely convinced that this is the way of the future: our success will have a direct effect on our future profitability and competitiveness. And that is exactly why we are committed and harnessing our vast creativity to achieve a leading position in the carbon-neutral circular economy.

At BASF, we have been conducting research on innovations to close material loops for many years. We are currently pursuing more than 20 circular economy projects in total. The transformation to a circular economy affects practically all customer industries.

**[Chart 2: The European Green Deal]**

The circular economy is a key issue of the future, in society and in politics. It is a pillar of the European Green Deal. With this project, the E.U. has set itself a goal of carbon neutrality in Europe by 2050. Our contributions to the circular economy are just one example of how BASF helps to achieve the objectives of the Green Deal with our innovations. Other levers include efficiently using resources and providing people with healthy food, and also protecting biodiversity and reducing CO<sub>2</sub> in our atmosphere. For all these important questions facing us today, we want to deliver answers with innovations from BASF's research labs.

Ladies and gentlemen,

There is no doubt: We must mitigate climate change. We therefore support the goals of the Green Deal. But to realize them, we also need an ambitious industrial strategy from policymakers. Europe will only achieve the Green Deal targets with the full innovative strength of an internationally competitive European industry.

As Ms. von der Leyen put it so succinctly: "The Green Deal is Europe's man on the moon moment." We share this view and we are intensively working on developing technologies to make this possible. And this means industry is leveraging innovations based on research. In return, policymakers must create the right regulatory environment.

**[Chart 3: BASF's Circular Economy Program]**

In order to drive forward this exceptionally ambitious transformation of our company, BASF has launched a Circular Economy Program, which we want to present to you today. We have set ourselves very ambitious goals: BASF has committed to transforming 250,000 metric tons of recycled and waste-based raw materials into new products each year as of 2025. And we will increase our sales with solutions for the circular economy to €17 billion by 2030 – this is double the current figure!

**[Chart 4: BASF's Circular Economy Program]**

In order to achieve this and close as many loops as possible, we are concentrating on three action areas. First: new feedstocks. Second: new material cycles. And third: new business models.

This means we will continuously increase our share of recycled and renewable raw materials from sustainable sources. This also means, though, that we will need to consider recycling already at the design stage for materials. And we are working on developing or closing new product-specific material cycles. Last but not least, we are developing business models in which digitalization helps to conserve resources. One good example of this is smart farming.

#### **[Chart 5: BASF's Circular Economy Program: Today's focus]**

Today, at this digital Research Press Conference, we are focusing on the first two action areas: new feedstocks and material cycles. Our researchers will give you an exclusive peak into their work and present their solutions and concepts.

#### **[Chart 6: BASF's Circular Economy Program: New Feedstocks]**

Let's begin with the feedstocks for our Production Verbund. We will gradually replace fossil primary feedstocks with renewable or recycled raw materials. One key element of the specific implementation is our ChemCycling project: We have started transforming plastics that were previously not recycled into pyrolysis oil using a thermochemical process. This oil is already being used as an input in the BASF Production Verbund, where it replaces fossil primary feedstock.

#### **[Chart 7: Mechanical and chemical recycling]**

What is the difference between chemical recycling and mechanical recycling? In mechanical recycling, a specific kind of plastic is recycled into the same kind of plastic again. By contrast, chemical recycling can process a mixture of plastics to produce various types of plastic. This means that the different types of plastic waste do not have to be separated from each other. Using a new technology that we developed with partners, we are working on producing pyrolysis oil to a constant specification even when the composition of the plastic mixture changes. In doing so, we are also tapping new sources of waste for recycling: For example, we are not only using mixed plastic waste; we are also using old car tires. Together with partners, we are currently working on closing this material loop as well. If we think in terms of integrated systems and, for instance, intelligently combine mechanical and chemical recycling, then we will be able to achieve a significant increase in the current unsatisfactory recycling levels.

Christian Lach will tell you more about the ChemCycling project shortly. In our virtual exhibition online, you will also find other examples of how waste can be transformed into valuable resources again.

### **[Chart 8: Biobased products across BASF's portfolio]**

Ladies and gentlemen,

Another way to close material loops is with the use of renewable raw materials. With our Circular Economy Program, we therefore also want to further increase the volume of renewable raw materials from sustainable sources we use in our production. In a wide variety of businesses, BASF has already developed products based on renewable raw materials and launched these on the market. Here, you can see current examples from all BASF segments.

Recently, BASF researchers discovered a completely new source of raw materials in organic residual materials that were previously not used. The plant in question might be familiar to you. David Hérault will tell you more about the Rambutan program. It combines innovative chemistry with an innovative supply chain. This is a very exciting project that benefits the environment and people – and, of course, our customers.

### **[Chart 9: BASF's Circular Economy Program: Material Cycles]**

Now, I would like to introduce the second action area of our Circular Economy Program: new material cycles.

As early as the R&D phase, our scientists in the lab make sure materials are not only long-lasting but also recyclable at the end of their useful lives. And we are working on establishing product-specific recycling loops.

One example that is garnering a lot of attention lately is the recycling of automotive batteries. Why is this topic so important?

### **[Chart 10: Footprint of key battery materials]**

We estimate that more than 7 million electric cars will be registered in Germany alone by the year 2030. And therein lies a dilemma: The number of vehicles with electric battery or hybrid engines is growing. At the same time, the raw materials for producing key vehicle components are limited. Moreover, extraction of these

materials is very complex and resource-intensive. For example, mining 1 kilogram of nickel or lithium creates over 7 kilograms of CO<sub>2</sub> emissions. Around 270 kilograms of drinking water are also required per kilogram of lithium. Because these raw materials are in limited supply and mining them requires so many resources, they should be recovered as fully as possible. These materials must be kept in circulating in the economy.

### **[Chart 11: Value chain for electric vehicles]**

Ladies and gentlemen,

BASF supports the European Commission's goals of establishing a sustainable value-adding network for batteries in Europe. The circular economy is a key prerequisite for a "green European battery," which is to be produced with raw materials sourced in an environmentally-friendly manner with a small carbon footprint.

According to experts, more than 1.5 million metric tons of battery cells from electric vehicles alone will have to be disposed of in the year 2030. We urgently need to find solutions to recover the valuable raw materials contained in these batteries in an economical and environmentally sound way. And this is exactly what our researchers are working on. In a moment, Kerstin Schierle-Arndt will present ideas of how this gap in the circular economy for batteries can be closed in the future.

Ladies and gentlemen,

Our researchers are not only closing gaps in entirely new circular systems, they are also improving the existing systems. And this brings me back to plastics. At the beginning, I mentioned chemical recycling of plastic waste. Of course, there are already closed-loop systems to recycle plastics using mechanical methods.

### **[Chart 12: Global production of plastics and generation of plastic waste in 2018]**

You all know, for example, the mechanical recycling system for PET bottles. This specific cycle has been well established for some time.

In total, around 50 million metric tons of plastics are mechanically recycled worldwide every year. This sounds like an impressive number. But it is not sufficient: This represents just 20% of plastic waste! Each year, 200 million metric tons of

plastic waste are not yet mechanically recycled. Why is the percentage so small? For one thing, to make good recyclate, the plastic waste must be sorted into homogeneous streams at the recycling plant. But this is not always successful and that has a negative impact on the quality of the recyclate. Moreover, the quality of the plastic deteriorates with every cycle – meaning with every processing and use phase. This significantly limits the working life of plastics. To address this, new technical solutions are needed. Our researchers are working on developing additives that can specifically stabilize recycled plastics and improve their properties. This enables plastics to be mechanically recycled multiple times and the material loops can be closed more effectively and more often. Alice Glättli will tell you more shortly about the solutions that BASF researchers have found.

### **[Chart 13: Putting the Green Deal into practice at BASF]**

Ladies and gentlemen,

In addition to the circular economy, I would like to talk again today about the topic of CO<sub>2</sub> emissions.

With the Green Deal, the European Union has set itself the ambitious target of climate neutrality by 2050. With its strategy, BASF has taken a clear position. Reducing CO<sub>2</sub> emissions is immensely important. We have therefore committed to climate-neutral growth until 2030. This means that we will even further reduce our specific CO<sub>2</sub> emissions per kilogram of product sold, by an average of one-third. To reduce CO<sub>2</sub> emissions even further, we need fundamentally new technologies. They are being developed under the auspices of our comprehensive Carbon Management Program.

### **[Chart 14: Product Carbon Footprints create transparency for customers]**

In order to achieve our goal, we need transparency at the product level. We therefore recently announced that by the end of 2021, we will be the first chemical company to provide our customers with a carbon footprint for all of our 45,000 sales products. With our proprietary digital solution for calculating carbon footprints, we will be able to determine the overall CO<sub>2</sub> values for all our products. This product carbon footprint will be reported as CO<sub>2</sub> units per metric ton of product. It will include all emissions that occur until the product leaves the factory gate for delivery to the customer, meaning Scope 1, 2 and 3 emissions. This gives our customers

exceptional and unprecedented transparency about the carbon footprint of their products. And they value this very much.

Sustainability and digitalization are core elements of our corporate strategy, which we are systematically implementing. The carbon footprint calculations bring both these elements together.

**[Chart 15: Circular Economy and Carbon Management Programs: BASF's way to drive sustainability]**

Ladies and gentlemen,

The topics circular economy and carbon management are our most important drivers of innovation - across all customer sectors. Our programs in these areas enable us to support our customers from all industries with tailor-made innovations. We help our customers to increase their sustainability profile and further improve their products all the way to carbon neutrality. These innovations therefore fuel BASF's sustainable growth. And this requires excellent R&D with creative, highly motivated employees. Which is exactly what we have at BASF. Innovations have made BASF large and successful. And with innovations, we will continue to be successful in the future. I am certain that you will agree once you have heard my colleagues present their work to you.

Thank you very much!