Interview Patrik Schleicher

Bert Beyers: How much CO_2 is produced in the production of one tonne of concrete?

Patrik Schleicher: That depends on many factors. Concrete consists of several components. Cement as a binder, sand and gravel and water. So you have to talk about the production and transport of these three components and the respective CO_2 content.

Is there a rule of thumb?

If you add this up, you are talking about 600 kilograms of CO_2 emissions per tonne of cement for the whole industry. Concrete contains approximately 300 kilograms of cement.

Schwenk Zement is a medium-sized company from Ulm. But if you take a global view of the concrete industry, production accounts for a significant proportion of CO_2 emissions.

I would say around 7 percent. For modern society, concrete is the most widely used bulk material after water. On the one hand, that's an unimaginably large amount; on the other hand, it's difficult to imagine this building material without it. But the figures also show us that the topic of climate-friendly concrete can be a huge lever.

Let us take a look back in time. Schwenk Zement has now been around for 175 years. How did it all work when CO_2 was not yet an issue?

Yes, of course things were a bit different then. In 175 years, we have already achieved a lot, especially in terms of environmental and process technology. In the past, the focus was on dust, NOx, SOx, TOC, etc., which are emitted via the stack. We positioned ourselves very early on and took a pioneering role in reducing emissions. And now CO_2 is the next step. If you go way back to our founding year, Schwenk was very, very green. Because we started grinding clinker with pure hydropower. So, in fact we had a green start, which we have remained committed to ever since.

Let's look ahead. How do you want to make your concrete and the binding agent cement climate-neutral?

Around two thirds of the CO_2 emissions in cement production are raw material-related and are already contained in the limestone. We burn clinker from it and then grind it into cement.
A large proportion of CO_2 in cement is therefore in the clinker. This is the intermediate product that is produced in the rotary kiln. One of our goals is to develop cements that contain as little clinker as possible. This is a major opportunity in terms of CO_2 reduction.

Concrete with less clinker content, will it be just as good?

Yes, there are already many cements with a lower clinker content that are standardised and approved for construction. Of course, this also has to be conveyed to the customer.

That seems to be the first step. But if you fundamentally think about the topic of CO_2-free cement, how does that even work?

In addition to reducing the clinker in the cement, CO_2 can also be saved in the manufacturing process. Approximately one third of the CO2 is fuel-related, two thirds are produced in the process limestone deacidification. We are also working on process-related projects and ideas to find solutions. However, everything is being done step by step: our first step is to reduce the proportion of clinker and then we will go further technically and capture CO_2.

How do you do that?

This is our homework for the future, so to speak. We want to use a new process to burn not with air, but with pure oxygen. This way, we avoid the entry of nitrogen, which is about 79 per cent in the air, and achieve a high CO_2 concentration in the exhaust gas. This would be good because it will allow the CO_2 to be captured more economically. For now, we have 20 per cent CO_2 in the exhaust gas. This means that the energy required for capture is many times greater than if we work with higher CO_2 concentrations.

How does the separation work?

The exhaust gas stream is cooled down until the CO_2 stream becomes liquid and transportable and can be passed on to other processes.

For this process you will of course also need green energy.

This is, of course, an issue that concerns the entire energy-intensive industry. We need a very clear signal from the top that renewable energies are now being expanded and that the grid infrastructure is being developed.
Here in the south of Germany, in Ulm, we are more or less cut off from green electricity. In the north, green energy is being generated with offshore parks, but it does not reach us. However, we need this energy, and of course at competitive conditions.

What do you mean by this?

Everyone is looking at the price of electricity right now, even at home - noticing it is going up. That's how it is for us, too, of course. These costs are operating costs and sooner or later they will be reflected in the product. Needless to mention that no customer is happy if products only get more and more expensive. In addition, there is the volatility of renewables. If the wind turbine is turning - great! But if there is no wind, electricity costs will naturally go up.

What would be an average price for you that you could live with?

Unfortunately, I can't give you a specific number. Only this much: In the last two years, the price of electricity for industries has doubled.

Does green hydrogen play a role in your considerations?

Yes, green hydrogen can only be produced from green electricity. That´s where we are biting our own tail. If we talk about capturing CO_2 in the south, we will have very high costs if we want to transport it to a gas cavern in Norway. That's why we see more potential in producing hydrocarbons here in Ulm - and that can be done with CO_2 and hydrogen. The global demand for hydrocarbons is enormous, tendency rising.

Hydrocarbons, by which you mean synthetic fuels?

Fuels, lubricants, there are many possibilities and applications.

And you want to market that yourself?

In fact, fuels play a big role in our considerations. Because this seems to us to be the best way to produce a more climate-friendly fuel from industrial waste gases and green hydrogen. This way, we are not only helping ourselves, but also other sectors to get closer to climate neutrality. For example, the aviation sector.

When could this synthetic jet fuel become a reality?

That is very difficult to estimate. First of all, we have to make CO_2 technically available and at good conditions. The next challenge is to have hydrogen available in large quantities, and it has to be green, otherwise the whole plan makes no sense. These are already major challenges that can hardly be met without political support and social consensus.

When could this become a reality?

Of course, we hope to be able to present results by the end of the decade. But many external factors play a role in this.

CO_2 emissions are becoming more and more expensive, even for you. When will it reach a point where it hurts from an economic point of view?

The rising CO_2 price, which is controlled by the EU through certificate trading is a huge issue for us. And of course, that hurts us in international competition - in relation to locations outside the EU that do not have to meet these requirements. We need the support of politicians in order not to lose economic ground to our international competitors. We need a level playing field within the EU and for imports into the EU. Of course, it is once again our task to come up with innovative solutions.

How do you see yourself in all this?

In terms of environmental and process technology, I see Schwenk very far ahead in terms of technical benchmarks. We are proud of that. We also want to get there in terms of climate technology and be a role model. Maintaining this lead remains our goal and our aspiration in the current climate debate.

And how?

We must do something ourselves. I think we are very well positioned with our strategy and corporate structure. We can reach decisions very quickly. It's not only about technology, but also about its social and political acceptance. We must bring people on board. We have proven being able to do so in the past. We can do so again. And I think, we will also find a solution to the climate problem.

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