

Our Carbon Management

The transition towards a climate friendly society remains a huge challenge, especially as population growth and wealth level go along with a need for more food, housing, comfort, mobility – and of course energy. In all these areas chemical products play an essential role. They are key for enabling low emission mobility, energy efficient housing or CO₂ free power production. To provide these in future with less emissions, new ideas are needed. These ideas, however, cannot be separated from the societal and political framework. On the contrary: they need to be embedded in such a framework to make further development and implementation possible.

For BASF, climate protection and reaching the goal of limiting global warming to below 2 degrees Celsius, is a core task. Hereby we focus on our strength to address new challenges with innovative solutions. Measures that help reduce the GHG emissions of our own, energy intensive production, are bundled in our Carbon Management.

We have achieved a lot

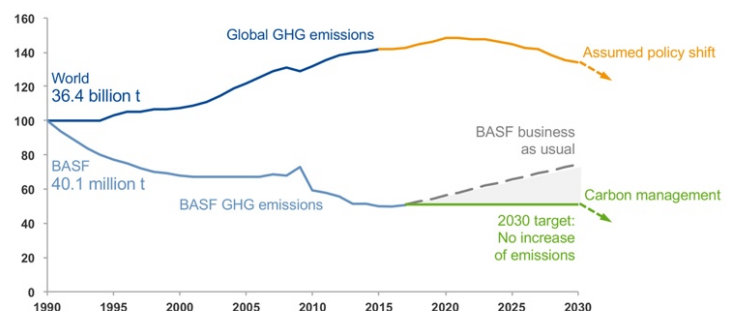
Since 1990 we have cut our GHG emissions by half – while more than doubling our production. This was reached by efficiency measures as well as the use of catalysts to reduce nitrous oxide emissions. Further reduction of greenhouse gas emissions will be increasingly difficult due to the high degree of efficiency that we have already reached with our processes. Nevertheless, we will tap into the remaining potentials where possible. This we will continue to publish transparently within our corporate carbon footprint. BASF has published a comprehensive corporate carbon footprint since 2008, the only industrial enterprise worldwide to do so.

Our target 2030: CO₂-neutral growth

We are convinced that economic success and climate protection must go hand in hand to ensure that the innovations needed for global climate protection continue to be developed.

We have therefore set ourselves the target of CO₂-neutral growth until 2030*, which means growth without an overall increase in GHG emissions. In order to enable further GHG savings in the chemical industry in the long term, completely new technologies are needed, which we are already starting to look into.

Absolute GHG emissions
Indexed (1990 = 100)



Our Carbon Management

In 2018 we bundled all measures that will help us reach our new climate target 2030 and enable further reductions in the long term, in a global Carbon Management, with the following three core elements:



Reducing the CO₂ emissions from our production by improving energy and process efficiency



Increasing the share of renewable energies in our global power supply



Developing breakthrough technologies for low emission production in a Research & Development program

*Our goal includes other greenhouse gases converted to CO₂ equivalents

Fundamentally new technologies for further GHG avoidance after 2030

Within the Carbon Management Research and Development (R&D) Program we develop technologies and processes that are capable to substantially reduce CO₂ emissions – and can be realized in practice. We therefore focus on the base chemicals: These are responsible for 70% of the GHG emissions of the chemical industry but are an indispensable starting point for the value chain and all our innovation. By electrification and new processes, base chemicals could be produced almost GHG emission free.

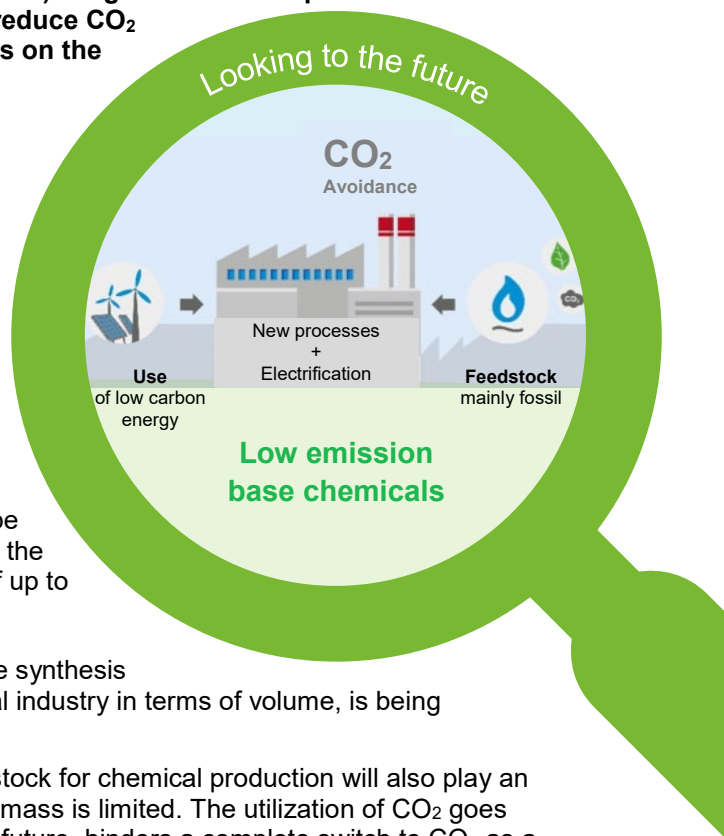
Currently around 100 employees are involved in the R&D program. The first pilot plants are to be built in the coming years.

- A core element will be the production of emission-free hydrogen based on (initially) fossil methane.
- The world's first electric heating concept for steam cracker is also to be developed. BASF's steam crackers require a temperature of 850°C to split crude petroleum (naphtha) for further processing. If this temperature could be reached with electricity from renewable sources, instead of the currently used natural gas, a reduction in CO₂ emissions of up to 90% would be possible.
- On the basis of innovative catalyst systems also a CO₂-free synthesis pathway for olefins, the largest intermediate in the chemical industry in terms of volume, is being developed.

Other options such as the use of biomass, CO₂ or waste as a feedstock for chemical production will also play an increasing role. However, the potential for sustainably available biomass is limited. The utilization of CO₂ goes along with a very high energy demand – which, at least in the near future, hinders a complete switch to CO₂ as a feedstock.

Already with the new processes envisaged in our R&D program we expect a significant increase in the demand for electricity from renewable sources, estimated to be around three times as required today. In addition to technical feasibility, this is the biggest challenge. Therefore, the question of the competitiveness of such new technologies is closely linked to the political framework.

Industries such as the chemical industry, which are facing international competition and cannot pass on additional costs caused by low-carbon technologies to their customers, depend on a compensation of these additional costs. This is a prerequisite for making investments in low-emission production processes sustainable in the long term. Globally comparable carbon pricing would be the best solution to achieve this. Climate protection must therefore take place at a global level in order to be effective, cost-efficient and economically compatible. It is only with such an approach we can best advance a climate-friendly economy and society with innovations from chemistry.



Summary

- Large potentials for GHG emission reduction in the chemical industry have already been realized. A further substantial reduction requires development and scaling of completely new technologies.
- With our Carbon Management R&D Program we aim to provide almost GHG emissionfree basic chemicals. These are responsible for around 70% of the GHG emissions of the chemical industry.
- The high amount on energy needed for these technologies has to come from renewable sources and needs to be available at competitive prices.
- A globally harmonised CO₂ pricing is the key for a climate friendly and internationally competitive chemical industry.

Further information

on our corporate carbon footprint, our climate protection solutions and Carbon Management activities are available under:
<https://www.basf.com/global/en/who-we-are/sustainability/we-produce-safely-and-efficiently/energy-and-climate-protection.html>

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