

The Chemical Industry Says Goodbye to Fossil Fuels

A new paper by the nova-Institute sets out the path towards sustainability for the chemical industry.

by the Editorial Staff

Michael Carus, in his latest paper on the process of industrial change from a fossil-fuel-based system to one founded on renewable energy, cites the concept of “creative destruction,” taken from the work of Austrian economist Joseph Schumpeter. Rather than being seen as an error, destruction is necessary in bringing about a new functional order. According to Carus, leader of the nova-Institute based in Huerth: “in order to stop climate change we need a new and comprehensive economic structure of raw materials supply towards renewable carbon.”

The position paper, co-written by Carus and his colleague Achim Raschka, is entitled “Renewable Carbon is Key to a Sustainable and Future-Oriented Chemical Industry,” and can count amongst its supporters important figures such as Rafael Cayuela, head economist of the American chemical giant Dow Industrial; Marcel Lubben, President of Reverdia; the Roquette-DSM joint venture; Jean-Luc DuBois, scientific director of the French chemical company Arkema; and Jim C. Philp from the OECDD.

The paper is a manifesto promoting a sustainable chemical industry capable of fully and completely embracing the circular bioeconomy. “The chemical industry,” Carus and Raschka write, “may only develop into a sustainable sector once it bids farewell to fossil fuels such as crude oil, natural gas and coal, and uses nothing but renewable carbon as a raw material in organic chemistry.” The aim, therefore, is not for decarbonisation like it occurs in the energy sector, but a transition towards sourcing carbon from renewable sources for the chemical and plastics industries. This will mean leaving fossil fuels in the ground, the only option if an excessive increase in emissions and global temperatures is to be avoided.

The paper’s authors cite an article by Christophe McGlade and Paul Ekins published in *Nature* in 2015, according to which a third of oil reserves, half of gas reserves and over 80% of coal reserves that are currently available should remain untouched between 2010 and 2050 if the 2°C target is to be achieved. Considering that industry estimates predict a 3 to 4% annual rise in demand for chemical products caused by growth in population and standards of living, it becomes clear that the path to sustainability in the chemical industry,

will inevitably require a switch to renewable carbon.

But what are the sources of renewable carbon? The authors identify three: 1. mechanical or chemical recycling of plastics or other chemical products already in existence; 2. all types of biomass; 3. direct use of CO₂ from fossil sources, as well as from permanent biogenic sources and direct-air-capture.

Carus and Raschka place stronger emphasis on the latter source, because “direct CO₂ utilisation is an inexhaustible and sustainable source of carbon for the chemical industry.” Of course, this is true as long as processes for obtaining carbon from CO₂ are themselves sustainable and use renewable energy. “Our own calculations – the German researchers write – demonstrate that a size of just 2% of the world’s desert areas would suffice to cover the chemical industry’s entire 2050 carbon demand by means of photovoltaics and CO₂ utilisation.”

In terms of jobs, the conversion from chemical to biochemical industry could multiply by between 5 and 10 times the number of workers, which in the EU28 area equates to 65 thousand units. Therefore, what is needed? The answer is politics. The authors’ plan is clear, even though it certainly won’t be easy to implement in the current European context. Among other things, it is based on: the implementation of a carbon tax on a continental level; the interruption of financing programmes for fossil fuels (which currently amount to 100 million US dollars, in the G7 countries alone, for the production and consumption of oil, gas and coal); higher costs for CO₂ emissions from fossil fuel sources in the Emissions Trading System; certificates and labels being required to show the percentage of renewable carbon in products; and a system that rewards plastics and chemical products with lower greenhouse gas emissions. This is the time for political choices. However sustainability analysis is needed, not political dogmas. The strong message sent by Carus and Raschka is to follow all three ways of obtaining renewable carbon, whereas – the authors complain – the European Union seems more oriented towards the recycling of plastics and other chemical products in the context of the circular economy. The key for a sustainable future in Europe should instead involve integration between the circular economy, bioeconomy and the so-called “CO₂ economy.” ●

nova-Paper #10 M. Carus, A. Raschka, “Renewable Carbon is Key to a Sustainable and Future-Oriented Chemical Industry,” <http://bio-based.eu/nova-papers>

Nova-Institute, <http://nova-institute.eu>

Christophe McGlade and Paul Ekins, “The geographical distribution of fossil fuels unused when limiting global warming to 2°C,” *Nature* January 2015; www.nature.com/articles/nature14016