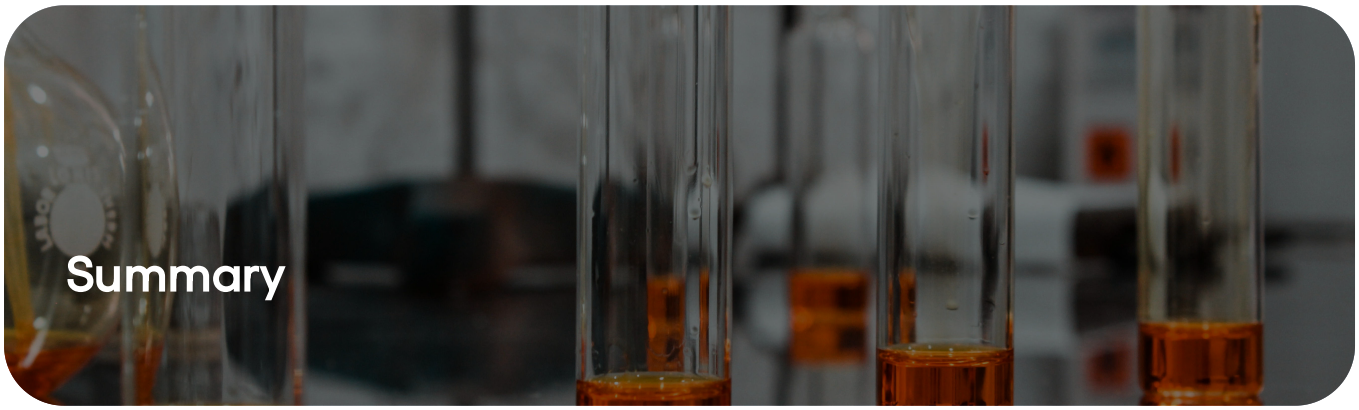
PUBLICATION - JULY 2025

Chemistry: breaking the fossil fuel chain

Overview of companies' climate performance using the CIA methodology from the 2024 campaign

Authors : **Eta Shehu**



Summary

The chemical industry is a major pillar of the global economy, but it is also one of the industrial sectors that emits the most greenhouse gases (GHGs). In 2022, it accounted for approximately 936 million tonnes of CO_2, or about 2% of global emissions[1]. This carbon footprint is due to a heavy reliance on hydrocarbons, both as a raw material and as an energy source.

An essential industry: chemistry is often referred to as the 'industry of industries' because it is upstream of all other sectors (agriculture, pharmaceuticals, automotive, etc.). It transforms materials to obtain substances and materials that are essential to the entire economy. Decarbonising the chemical sector is therefore a necessary condition for enabling the deep decarbonisation of all other industrial sectors.

The CIA methodology covers several key sub-segments: petrochemicals, industrial gases, mineral fertilisers and specialty chemicals. Decarbonisation of the sector requires solutions tailored to each segment:

- **Petrochemicals**: reducing dependence on hydrocarbons.
- **Industrial gases**: promoting low-carbon hydrogen and optimising production processes.
- **Fertilisers**: promoting more sustainable techniques and supporting farmers in their use.
- **Speciality chemicals**: integrating bio-based materials and optimising industrial processes.

Analysis of a sample of 69 companies in the sector reveals significant disparities in terms of low-carbon transition. Specialty chemical companies score better on average due to their flexibility in product choice. These companies have around 20 possible product groups, ranging from the most harmful to the most favourable for the transition. Conversely, nitrogen fertiliser producers and petrochemical companies are more exposed to transition risks due to their heavy dependence on fossil fuels.

Process electrification, low-carbon hydrogen production and, consequently, low-carbon ammonia production, as well as bio-based chemistry, are key levers for

decarbonising the chemical industry. However, these solutions require massive funding and coordination across the entire value chain.

Upstream Scope 3 emissions linked to the purchase of raw materials are neither properly accounted for nor disclosed: companies lack transparency on the scope and methodologies used to report carbon emissions for this critical data, even though the specialty chemicals industry consumes large volumes of commodities. Furthermore, reduction targets for raw material purchases remain insufficiently ambitious, compared to the IEA's Net Zero trajectories (which assume a 30-40% reduction in upstream emissions by 2030).

While some companies are taking significant steps to reduce their carbon footprint, most of the sector remains heavily dependent on fossil fuels. Accelerating the transition will require ambitious investment, stricter regulation and rapid adoption of low-carbon technologies. The success of this transformation will determine not only the future of the chemical sector, but also its contribution to global climate goals.

Download the publication in english

Download the publication in french

IEA (2023), *Direct CO2 emissions from primary chemical production in the Net Zero Scenario, 2010-2030*, IEA, Paris

[1] https://www.iea.org/data-and-statistics/charts/direct-co2-emissions-from-primary-chemical-production-in-the-net-zero-scenario-2010-2030-2

Authors

Eta Shehu
Carbon Data Analyst