

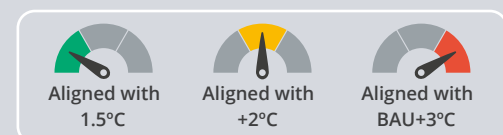


Overall Assessment

Planet Tracker's analysis shows Bayer on a +3°C scenario pathway by 2030. Scope 3 emissions dominate, accounting for 76% of total emissions, with just over half of total emissions coming from purchased goods and services. Management has a target of net zero GhG emissions by 2050 or earlier "throughout the entire value chain". Management does not lack ambition as it also states it can influence 25% of the agricultural value chains worldwide. We applaud ambition but this analysis reveals little to support this.

Management is relying on new technologies, unproven on a large-scale, and there is no roadmap for investors. Bayer discloses no financial information about the risks from any failure to reduce GhG emissions, instead opting for colour-coded, qualitative assessments of relative risks.

Management is spending about 2% of annual capital investment on energy efficiency measures, no doubt attracted by quick payback periods, but very little is being invested in key transition technologies, as these are being developed by third parties. At least the CEO, who also doubles as the CSO, has both short and long-term incentive plans which contain some sustainability metrics.



This report is one of a series examining the climate transition plans of companies in the Climate Action 100+ list. This project is separate to and not affiliated with Climate Action 100+.



Climate Alignment

- Bayer's total emissions were 12,670 KTCO₂e in 2022, of which 15% were Scope 1, 9% were Scope 2 and 76% were Scope 3.
- Just over half – 52% in 2021 – of all GhG emissions came from 'purchased goods and services'.
- The vast majority of Scope 1 & 2 emissions – 83% and 86% respectively in 2021 – were produced by the Crop Science segment.
- Bayer's 2030 Scope 1 & 2 targets (42% reduction versus 2019) look impressive but only the Scope 2 target appears to be on track.
- The 2030 upstream Scope 3 target is much less ambitious (12.3% reduction versus 2019) and 2022 emissions were unchanged from 2019.
- The target of net zero GhG emissions by 2050 or earlier "throughout the entire value chain" is ambitious but presently unconvincing. The target relies heavily on technologies that are unproven in large-scale usage, notably Carbon Capture, electrification and alternative fuels. There is no roadmap.
- Our analysis suggests that only Scope 2 emissions are on track for the 2030 target. The 2050 target is not currently credible.



Policy and Governance

- Bayer's CEO's short and long-term incentive plans do contain sustainability metrics. The CEO is also the Chief Sustainability Officer.
- The short-term plan has a ±20% adjustment based on performance factors including advancing the sustainability strategy.
- The long-term plan is 20% based on being in a corridor to hit the 2030 GhG reduction targets.
- The much more ambitious 2050 target is not part of the CEO's compensation.



Risk Analysis

- Bayer discloses no financial information about the possible risks from any failure to reduce GhG emissions. Bayer provides colour-coded, qualitative assessments of relative risks which are of little use to investors.
- The 2050 net-zero target relies on the development of technologies that are unproven in large-scale usage. We therefore assess the risk as red.



Strategy Assessment

- Bayer is spending about 2% of annual capital investment on energy efficiency measures, which often have a payback of less than 5 years.
- Very little is being invested in key transition technologies, such as carbon capture, electrification and alternative fuels, as these are being developed by third parties.
- Bayer states that it "can influence 25% of the agricultural value chains worldwide"; agriculture is responsible for about 25% of global GhG emissions. Bayer's plans to use this influence as a force for good appear very unambitious, and are mainly educational.

Company Overview

Bayer describes itself as “one of the world’s leading companies in the fields of health and nutrition”. It reports in three segments: Consumer Health, Pharmaceuticals and Crop Science.

The largest segment by revenues is Crop Science (45% of group revenues on average 2018-2022) but the Pharmaceuticals segment is more profitable; it produced 65% of operating profit over the same period – see Figure 1.

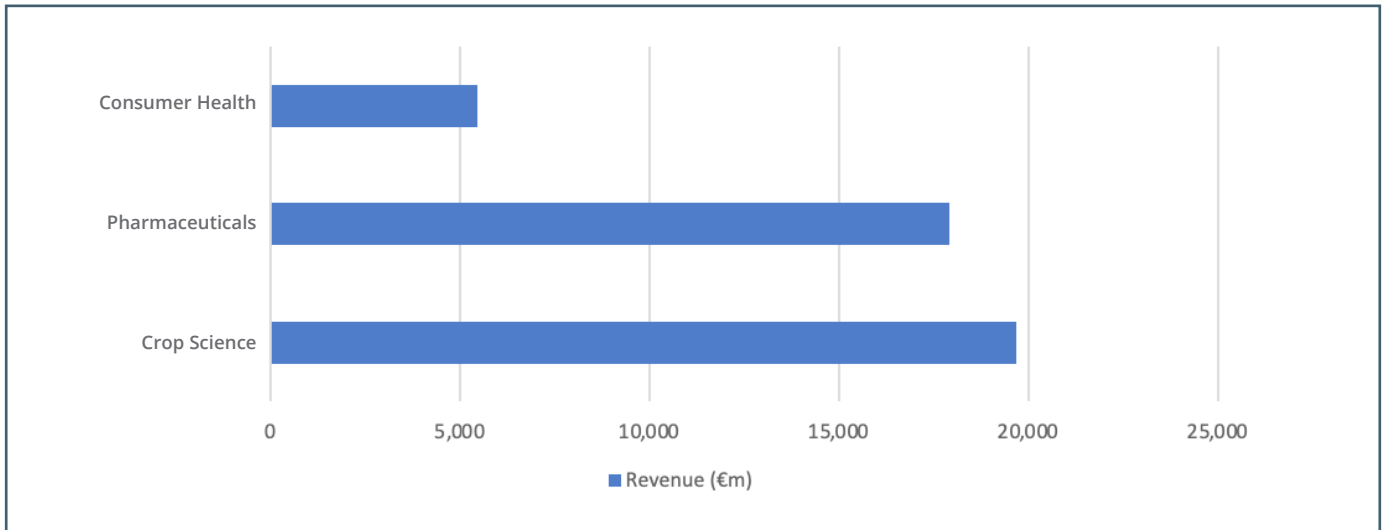


Figure 1: Bayer revenue by segment (5-year average 2018-2022). Source Bayer annual reports.

The three segments operate in very different markets.

- **Crop Sciences** makes pesticides, herbicides and seeds.
- **Pharmaceuticals** makes prescription drugs.
- **Consumer Health** makes health-related, non-prescription consumer products.

The most profitable segment is Pharmaceuticals, with a stable margin in the 26-29% range. Crop Science has the lowest and least stable margin, spanning 9.1-17.5% over the last 5 years. Consumer Health is in the middle with a 13-16% margin – see figure 2.

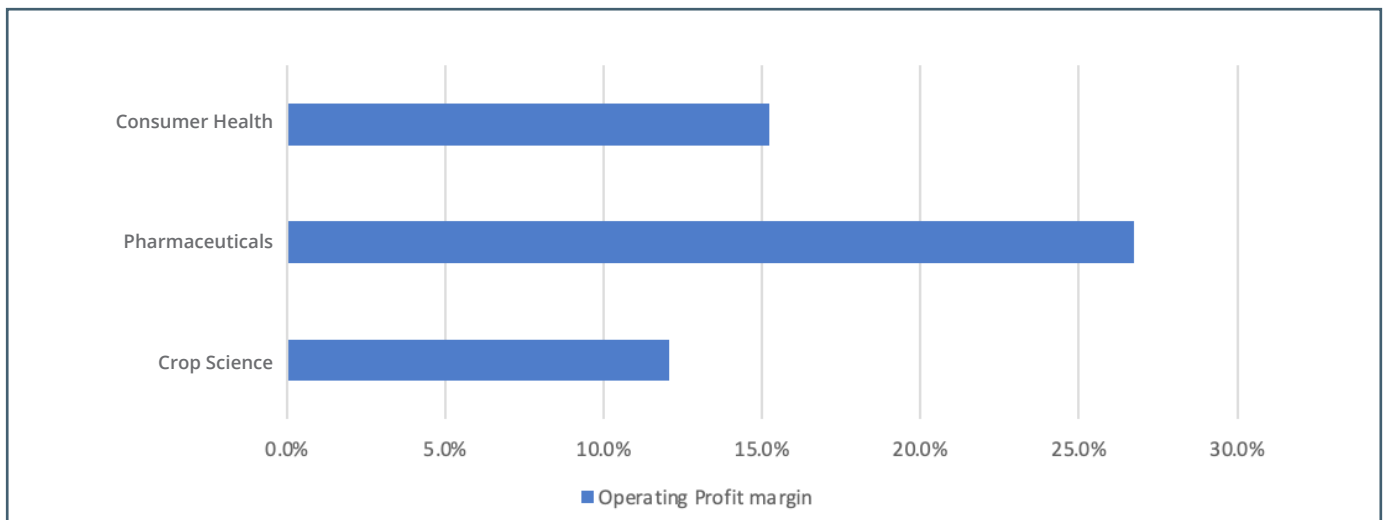


Figure 2: Bayer Operating Profit margin by segment (5-year average 2018-2022). Source Bayer annual reports.

Bayer is a European headquartered business which operates globally. North America is 34% of revenues, Europe is 31%, Asia Pacific is 20% and South America

is 16%. The South American exposure is very high for a European company, presumably because of the Crop Science segment – see Figure 3.

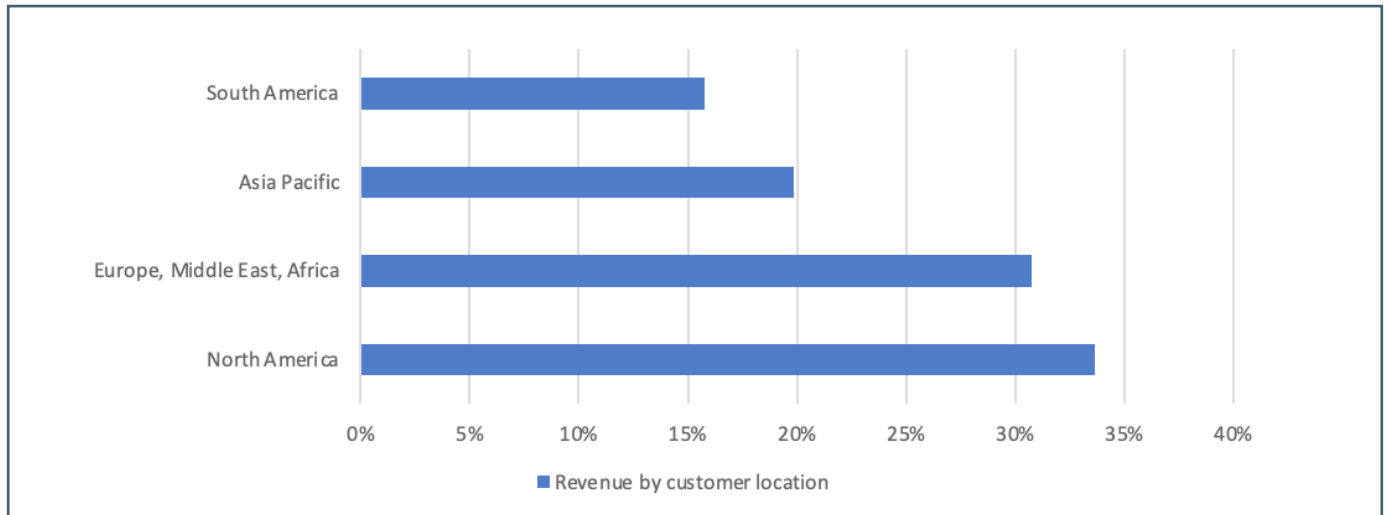


Figure 3: Bayer revenues by customer location (5-year average 2018-2022). Source Bayer annual reports.

1 Source: Bayer 2022 annual report, page 34

2 Source: Bayer 2022 CDP submission, C3.4

Climate Alignment

‘Sustainability is an integral part of our business strategy, operations and compensation system. Through our businesses, we contribute significantly to achieving the United Nations Sustainable Development Goals (SDGs).

We also pursue resolute, science-based climate action along our entire value chain”¹. Unlike pure Chemical companies, Bayer is not energy intensive. In 2021, ‘less than 5 percent of [its] total operational spend was on energy’².

EMISSION INVENTORY

In 2022, Bayer reported total emissions of 12,670 ktCO₂e, with 76% coming from Scope 3, 15% from Scope 1 and 9% from Scope 2. Just over half – 52% in 2021 – of all GhG emissions come from ‘purchased goods and services’.

The vast majority of Scope 1 & 2 emissions – 83% and 86% respectively in 2021 – were produced by the Crop Science segment – see Figure 4.

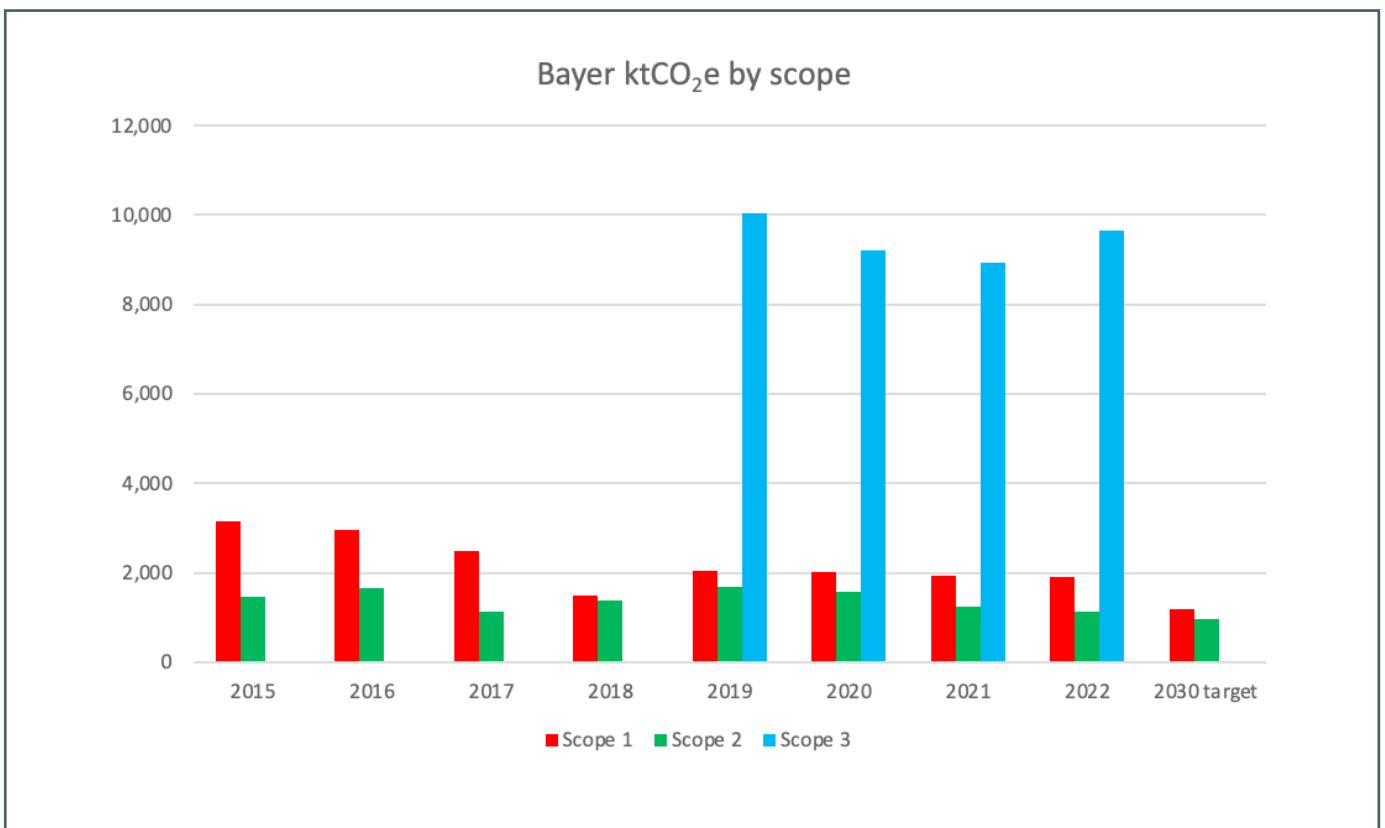


Figure 4: Bayer ktCO₂e emissions by Scope (2015-2022), Source Bayer annual reports.

Bayer's GhG gas emissions have been volatile, making it hard to establish any trends. Scope 1 emissions in 2022 were 6% below 2019 levels; 2019 is the base year for the 2030 targets. Scope 2 fell 33% over the same period whereas Scope 3 emissions were unchanged.

On balance, Bayer appears to be on track for Scope 2 (the smallest source of GhG emissions) but not on track for Scope 1 or Scope 3 - see Figure 5.

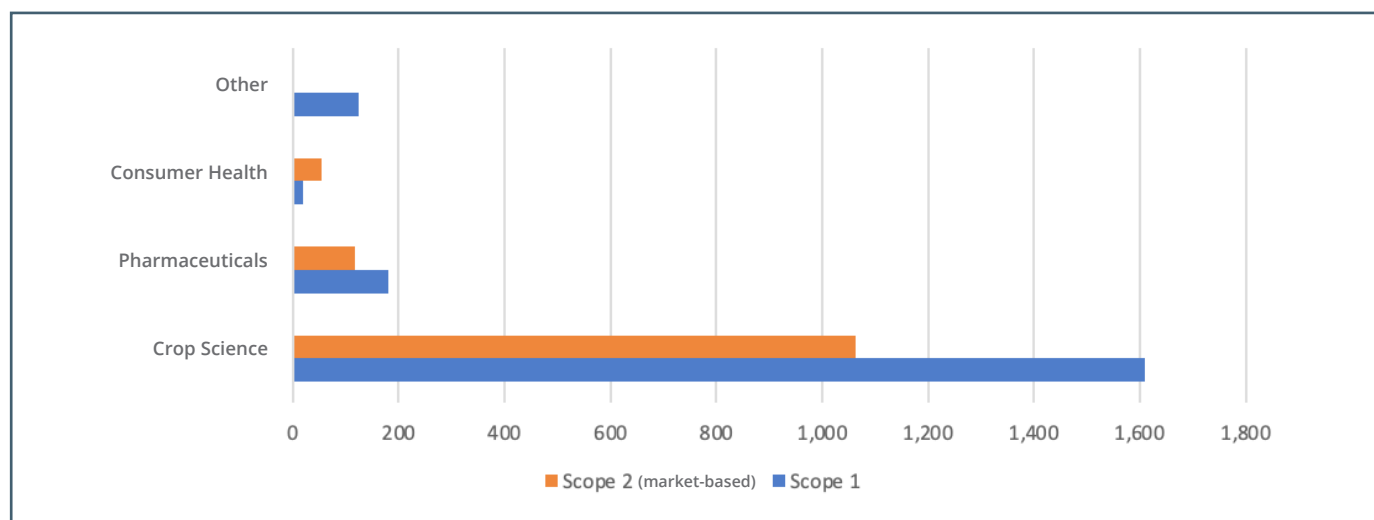


Figure 5: Bayer GhG emissions by segment (ktCO₂e, 2021). Source Bayer CDP submission 2021 C7.3a, C7.6a.

EXTERNALITIES AND TARGETS

Bayer claims to have an active and ambitious sustainability agenda. For example:

'[Bayer is] pursuing ambitious sustainability targets. By 2030, we aim to reduce the environmental impact of Bayer's crop protection by 30% globally, decrease field greenhouse gas emissions by 30% in the most emitting cropping systems that we serve and improve the livelihoods of 100 million smallholders³'.

Bayer has several GhG targets:

- **2030:** Reduce scope 1 & 2 emissions by 42% versus 2019.
- **2030:** Offset 100% of all remaining scope 1 & 2 GhG emissions.
- **2030:** Reduce upstream Scope 3 emissions by 12.3% versus 2019. Note that this is for upstream emissions only.
- **2030:** Source 100% of procured electricity from renewable sources by 2030.
- **2030:** 'We aim to enable our farming customers to reduce their greenhouse gas emissions per kilogram of crop produced by 30%,⁴'. This appears to be more of an aspiration than a target.
- **2050:** 'Bayer has undertaken to achieve a net zero target for GhG emissions throughout the entire value chain by 2050 or earlier⁵'. Interestingly this target is mentioned in the 2022 sustainability report, but not in the 2022 annual report.

³ Source: Bayer 2022 annual report, page 35

⁴ Source: Bayer 2022 CDP submission, C12.1b

⁵ Source: Bayer 2022 CDP submission, C3.1

Bayer claims to be ‘well on track to become completely climate-neutral in our own operations (Scope 1 and 2) by 2030⁶. This is not apparent from Planet Tracker’s analysis, particularly for Scope 1. However, as this target depends on offsetting, it would be relatively simple to mitigate any internal shortfall with extra offsetting.

As most offsetting arrangements are commercial contracts with third parties, they are, in theory, quite quick to set up. However, these offsets need external verification to be credible.

The 2030 Scope 3 target is for a modest 12.3% reduction in upstream emissions but we note that 2022 Scope 3 emissions were unchanged from 2019 – see Figure 6.

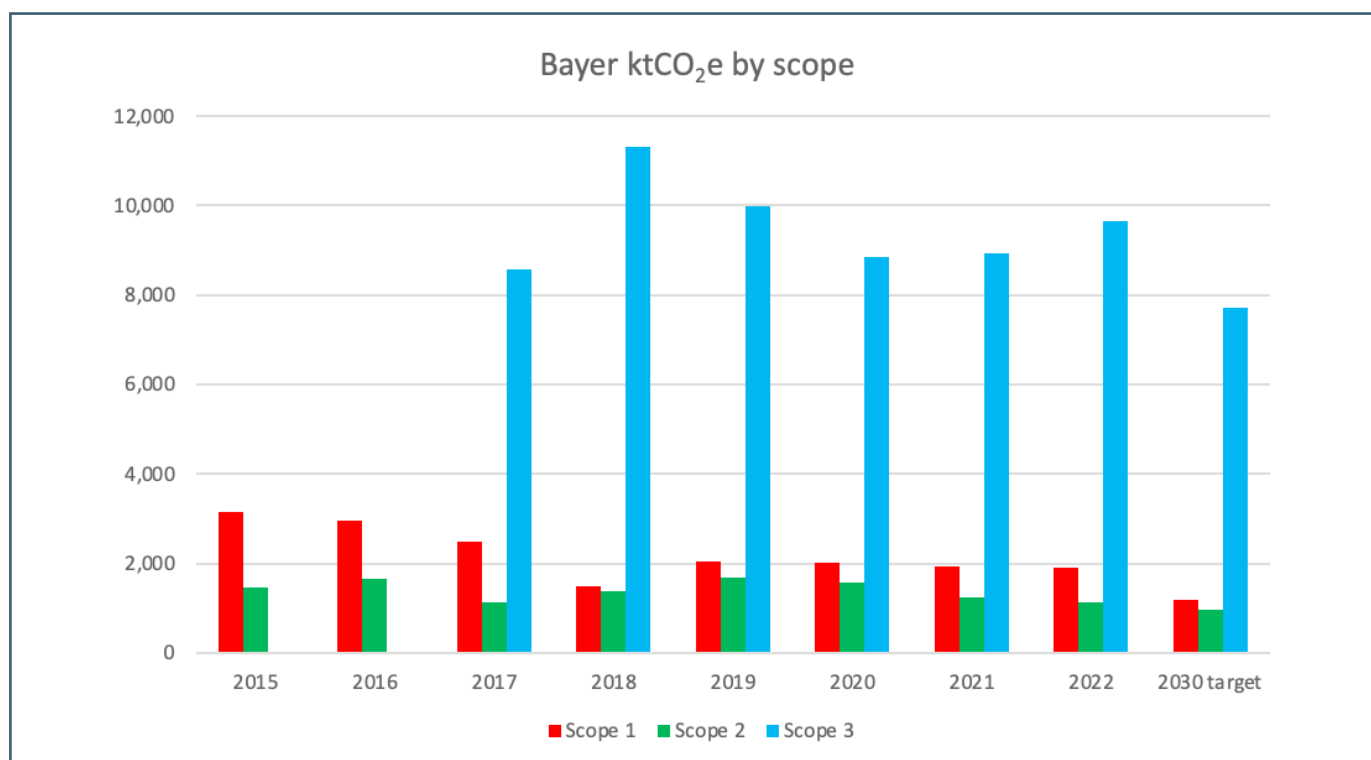


Figure 6: Bayer Scope 1, 2 & 3 emissions. Note the Scope 3 emissions 2018-2022 are for all Scope 3 whereas the 2030 target is for upstream Scope 3 only. Sources: Bayer annual reports and CDP submissions.

Bayer is targeting net zero across the entire value chain by 2050. This is, on the face of it, very ambitious. However we note that the target comes with a number of assumptions, most of which are outside Bayer’s control.

The assumptions include:

- ‘Carbon capture with high permanency at competitive cost and at scale available in 2040⁷.
- ‘Quick technological advances incl. hydrogen and electrification, energy demand increases by 4 times⁸.

- ‘Fast growth of alternative fuels. First generation biofuels act as transition technology⁹.
- ‘By 2029, we intend for 100% of the electricity we purchase to be derived from renewable sources¹⁰.
- ‘We aim to achieve climate neutrality at all our own sites by 2030¹¹.

6 Source: Bayer 2022 sustainability report, page 3

7 Source: Bayer 2022 CDP submission, C3.2a

8 Source: Bayer 2022 CDP submission, C3.2a

9 Source: Bayer 2022 CDP submission, C3.2a

10 Source: Bayer 2022 CDP submission, C4.1a

11 Source: Bayer 2022 CDP submission, C4.3a

Scope 3 in more detail

As mentioned above, Bayer has a relatively modest 2030 target and a very ambitious 2050 target. There are also a number of soft commitments without hard numbers. The most notable is the following statement:

- ‘We aim to reduce greenhouse gas emissions along the upstream and downstream value chain through co-operation with suppliers and customers’¹².

The 2030 target is for upstream Scope 3 emissions only. Bayer reports 5 upstream Scope 3 categories:

- Category 1: Purchased goods and services
- Category 2: Capital goods
- Category 3: Fuel-and-energy-related activities (that are not included in Scopes 1 or 2)
- Category 4: Upstream transportation and distribution
- Category 6: Business travel

By far the largest of these is category 1, Purchased Goods and Services - see Figure 7. Planet Tracker did not have the detailed breakdown for 2022 when this report was written.

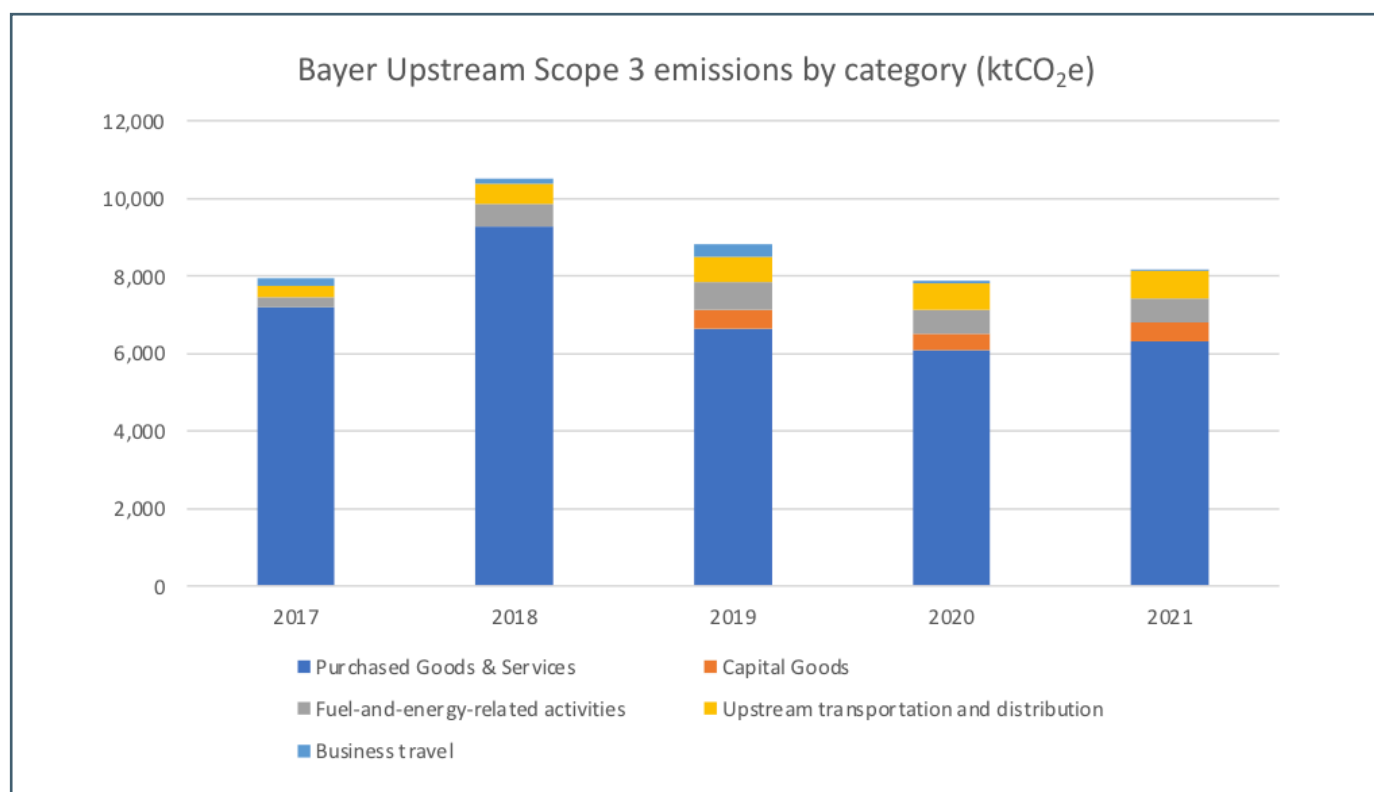


Figure 7: Bayer Scope 3 emissions by category. Source: Bayer CDP submissions.

Compared to the 2030 target, Bayer’s 2022 progress was mixed:

- Scope 1 emissions were down 6% versus 2019, compared to the target of 42% for 2030.
- Scope 2 emissions were down 33% versus 2019, compared to the target of 42% for 2030.

- Upstream Scope 3 emissions were up 1%, compared to the target of 12.3% for 2030.

We conclude that only Scope 2, the smallest source of GhG emissions, is on track.

¹² Source: Bayer 2022 CDP submission, C4.1a

Policy and Governance

ENGAGEMENT AND INFLUENCE

SUPPLIERS' ENGAGEMENT

Bayer's upstream Scope 3 emissions were 70% of total GhG emissions in 2022. Reducing supplier emissions is therefore the single biggest opportunity to reduce Bayer's carbon footprint. 4% of Bayer's suppliers by number are responsible for 44% of total supplier emissions¹³; Bayer is unsurprisingly focussing on this 4%, not the long tail. The main nature of the engagement is to 'collect climate change and carbon information at least annually from suppliers'.

As well as Bayer's overall target of reducing upstream Scope 3 by 12.3% by 2030, Bayer requires 'all strategically important suppliers to present an EcoVadis rating of at least 45 of 100 points or a comparable result in a TFS or PSC audit'¹⁴.

Bayer does not appear to be currently taking concrete action to put pressure on suppliers to take more tangible action, or to cease doing business with suppliers that are unresponsive.

OTHER VALUE CHAIN PARTNERS' ENGAGEMENT

Bayer does work more broadly with other supply chain companies to reduce GhG emissions. The 2022 CDP submission states that 'According to a report of the Intergovernmental Panel on Climate Change (IPCC), agriculture, forestry and other land use account for about 25% of all GhG emissions worldwide. Bayer can influence 25% of the agricultural value chains worldwide'. Bayer does therefore, in theory, have considerable influence over downstream GhG emissions.

Bayer states that 'the scope of our efforts is focused on emissions of major greenhouse gases: carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) from field operations. The sources of GhG emissions include cultivation, decomposition of applied fertilizers and organic matter and irrigation'¹⁵. Progress is monitored by 'field-level data from a third-party market research data provider'.

The main thrust of this programme appears to be educational. There is no coercive or punitive component; indeed, the text implies that such initiatives have to make commercial sense for farmers.

Bayer is part of the Together for Sustainability (TfS) initiative of the chemical industry and heads up the working group on reducing greenhouse gas emissions in the supply chain¹⁶.

¹³ Bayer 2022 CDP submission, C12.1a

¹⁴ Bayer 2022 CDP submission, C12.1a

¹⁵ Bayer 2022 CDP submission, C12.1b

¹⁶ Source: Bayer 2022 Sustainability report, page 102

MANAGEMENT ALIGNMENT

Like all German companies, Bayer has a dual board structure. We will focus on the executive board as this is responsible for managing the company. The compensation of the executive committee is disclosed and discussed in a separate Compensation report, not in the annual report. We will also look just at variable compensation (i.e. not base salary, pensions and other benefits) as we want to see whether management is incentivised to behave in a sustainable way. We will look primarily at the CEO for simplicity; the CEO's behaviour also sets the tone for the rest of the company. The Bayer CEO is also the Chief Sustainability Officer¹⁷.

Bayer states that 'we want to be judged on how effectively we attain our sustainability commitments. Therefore, sustainability targets are being integrated into the company's decision-making processes and into our remuneration systems. 20% of long-term incentive of all managers including the Board of Management is linked to the group sustainability targets, which include climate protection targets. Short-term sustainability targets including climate targets are also a fixed component of annual variable remuneration'¹⁸.

Bayer looks at a basket of 16 companies to ensure that executive compensation is competitive. Over half the 16 are pharmaceutical companies, which illustrates again that Bayer does not see itself as a chemical business. The only chemical peer in the 16 is BASF.

In 2022, the Bayer CEO had a base salary of €1,775,000 and a maximum bonus of €10,225,000, taking total maximum compensation to €12 million.

There are two variable compensation or bonus plans:

- **Short-Term Incentive (STI)¹⁹**. The target STI for the CEO was €1,597,500 for 2022 and €810,000-€837,000 for the other executives.

The actual payout can be between zero and 200% of the target amount, depending on the performance against set targets. There are three equally-weighted financial targets – EPS, cash flow and divisional margin/sales growth – with an additional adjustment of ±20% based on non-financial performance. The performance factor is assessed by the supervisory board. The CEO's individual targets included 'actively manage sustainable performance' and 'advance the sustainability strategy', along with other targets.

- **Long-Term Incentive (LTI)²⁰**. The target LTI for the CEO was €2,840,00 for 2022 and €1,440,000-€1,488,000 for the other executives. The actual payout can be between zero and 250% of the target amount, depending on the performance against set targets. There are three targets – share price performance versus the EuroStoxx50, Return On Capital Employed (ROCE) and sustainability targets – with respective weightings of 40%, 40% and 20%. The performance is assessed after 4 years and executives must also purchase Bayer shares and hold them for at least 4 years. As with most LTI plans, the precise calculations are complex and outside the scope of our analysis.
- Total variable compensation for the CEO is therefore set at 2.5x base salary, if targets are met, and capped at 5.8x base salary if they are exceeded.

Three of the company's 2030 GhG targets are incorporated into the LTI:

1. 42% decrease in Scope 1 & 2 emissions
2. 12.3% decrease in Scope 3 from 5 upstream categories
3. Offsetting of the remaining Scope 1 & 2 emissions. The annual assessment is based on Bayer's performance relative to a target corridor.

¹⁷ Bayer 2022 CDP submission, C1.1a

¹⁸ Bayer Industry Association Climate review 2021, page 8

¹⁹ Source: Bayer Compensation Report 2022, page 6

Risk Analysis

FINANCIAL IMPACT

Bayer's 2022 Sustainability report includes an assessment of climate-related risks²¹. The risks are split into short-term (2021-2025), medium-term (2026-2035) and long-term (2036-2050).

The risks are split into 9 categories and then colour-coded from low to high; no potential financial impact is disclosed – see Figure 8.



Figure 8: Climate Impact Drivers. Source: Bayer's Sustainability Report, 2022.

From a non-financial point of view, it is obvious that Bayer's 2050 target of being net zero across the entire value chain has considerable risk. As we have noted, over 70% of total GhG emissions are Scope 3 and Bayer has very limited concrete plans to reduce these emissions.

The 2050 target is reliant on three main assumptions:

1. Carbon capture becomes viable
2. Technological advances are made, such as electrification
3. Fast growth of alternative fuels

All three of these assumptions are questionable given current trends. None of these developments are directly under Bayer's control and all require major progress to be made by third parties.

Our assessment is that the risk of Bayer missing its 2050 net zero target is currently very high, unless considerable advances are made in all three areas.

20 Source: Bayer 2022 Sustainability report, page 105

Strategy Assessment

CAPITAL ALIGNMENT

Bayer claims to be aligning its capital investment with its sustainability agenda. For example:

'To achieve an absolute reduction in our remaining emissions, we intend to invest €500 million in renewable energies and in increasing the energy efficiency of our facilities and buildings by 2030²².

This equates to roughly €60 million per annum. To put this in context, Bayer's total capital investment was €2,949 million in 2022. The annual €60 million renewable energy investment is therefore about 2% of total capital expenditure.

We would also add that the €60 million includes energy efficiency spending, which tends to have a short payback. For example, two energy efficiency projects cited by Bayer have paybacks of 4-5 years²³. Investing in such projects is simply good business sense.

Bayer adds that 'Capital expenditure projects are underway at various sites to advance the use of climate-neutral technologies such as geothermal energy or emissions-free steam production²⁴, but this is not quantified.

Bayer does state that it is 'aligning [its] capital expenditures to [its] goal of achieving net zero greenhouse gas emissions by 2050²⁵' and assumes a CO₂ price of €100/tonne for capital expenditure modelling.

From 2023, Bayer aims to 'develop an internal CO₂ price to manage [its] Scope 3 emissions²⁶'.

We conclude that there is little evidence of Bayer aligning its capital expenditure with its sustainability goals.

22 Source: Bayer 2022 sustainability report, page 101

23 Source: Bayer 2022 CDP submission, C11.3a

24 Source: Bayer 2022 sustainability report, page 101

25 Source: Bayer 2022 sustainability report, page 101

26 Source: Bayer 2022 sustainability report, page 102

TRANSITION APPRAISAL

It is problematic to assess Bayer's transition plans as they are so vague. The 2050 target is ambitious but relies on unproven technology. As discussed earlier, it assumes:

1. "Carbon capture with high permanency at competitive cost and at scale available in 2040"²⁷.
2. "Quick technological advances incl. hydrogen and electrification, energy demand increases by 4 times"²⁸.
3. "Fast growth of alternative fuels. First generation biofuels act as transition technology"²⁹.

Taking these in turn, we note that:

- Carbon Capture is technically feasible but has not been proved to be commercially viable. There are still very few large-scale carbon capture plants in operation globally despite all the hype. The fact that Bayer hopes that it will be available in 2040 shows just how far away this technology is.
- Electrification is a key transition technology for many sectors but remains commercially proven. It is also heavily reliant on external suppliers and developers who may or may not succeed. As Bayer notes, an inherent implication of electrification is that demand for electricity will increase very substantially for some sectors. This in turn will require heavy investment by third parties in renewable electricity generation, grid upgrades and storage to ensure stability of supply.
- Alternative fuels, such as biofuel and hydrogen, remain a tiny part of the energy mix. As with carbon capture and electrification, large-scale implementation is not imminent. It is also not clear whether alternative fuels will be economically viable without legislative change.

Our overall assessment is that Bayer's 2050 net zero ambition is almost totally dependent on actions by third parties, including the development of new technology. It is little more than wishful thinking at this stage. We therefore score it red.

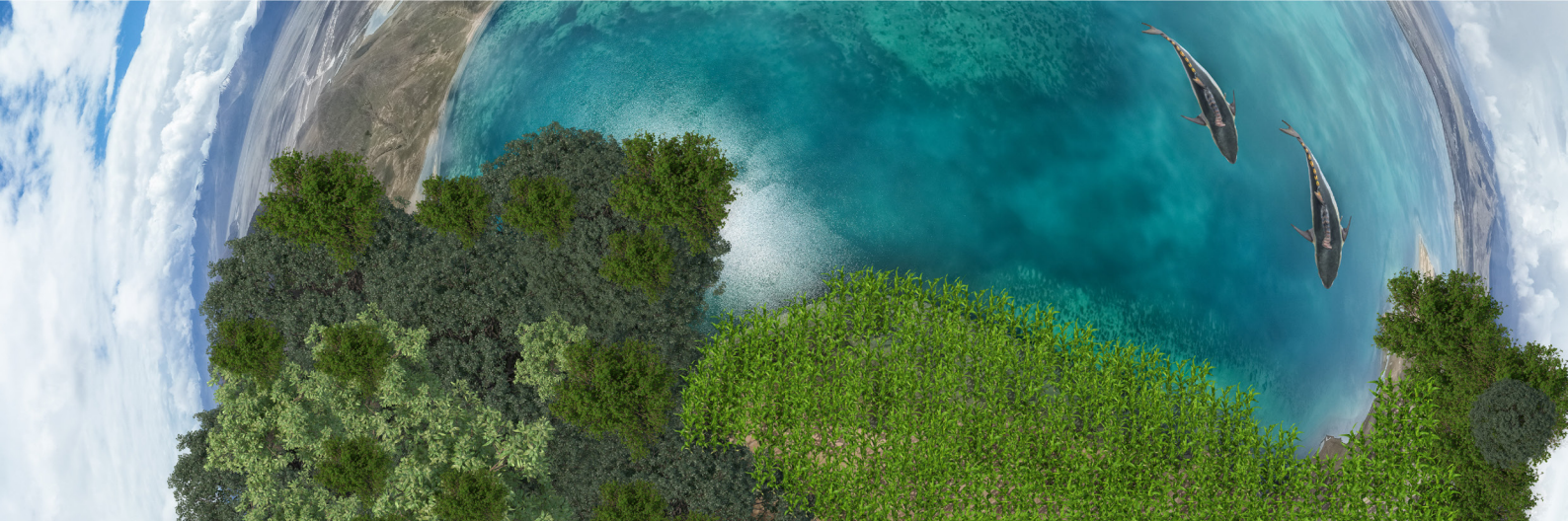
End note

Planet Tracker sent a draft of this report to Bayer Investor Relations Department three times between 13 July and 10 August 2023. The company chose not to respond.

²⁷ Source: Bayer 2022 CDP submission, C3.2a

²⁸ Source: Bayer 2022 CDP submission, C3.2a

²⁹ Source: Bayer 2022 CDP submission, C3.2a



ABOUT PLANET TRACKER

Planet Tracker is a non-profit financial think tank producing analytics and reports to align capital markets with planetary boundaries. Our mission is to create significant and irreversible transformation of global financial activities by 2030. By informing, enabling and mobilising the transformative power of capital markets we aim to deliver a financial system that is fully aligned with a net-zero, nature-positive economy. Planet Tracker proactively engages with financial institutions to drive change in their investment strategies. We ensure they know exactly what risk is built into their investments and identify opportunities from funding the systems transformations we advocate.

PLANET TRACKER'S CLIMATE TRANSITION ANALYSIS – CHEMICAL COMPANIES

As part of its material system transition programme, Planet Tracker is examining the transition plans of the chemical companies covered by the [Climate Action 100+ list](#). Our goal is to provide investors with the key information and analysis they need to be able to hold chemical companies to account for the quality of their climate transition plans and their execution against those plans, and to encourage them to use this information to engage effectively with these companies with the ultimate aim of driving the sustainable transformation of the chemical sector.

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