





Bayers Climate Scenarios

Climate change affects us all and is one of the greatest challenges that humankind will face in the future. Bayer considers climate protection and the related reduction of greenhouse gas emissions to be a top priority. We support the Paris Agreement and the objective of limiting global warming to 1.5 °C relative to the preindustrial level.

Further information: [Bayer Sustainability Report 2022](#)



2021: Scenario SSP2-2.6 **Taking the Green Road** and SSP3-7.0 **A Rocky Road**

	Near term, 2021–2040		Mid-term, 2041–2060		Long term, 2081–2100	
Scenario	Best estimate (°C)	Very likely range (°C)	Best estimate (°C)	Very likely range (°C)	Best estimate (°C)	Very likely range (°C)
SSP1-1.9	1.5	1.2 to 1.7	1.6	1.2 to 2.0	1.4	1.0 to 1.8
 SSP1-2.6	1.5	1.2 to 1.8	1.7	1.3 to 2.2	1.8	1.3 to 2.4
SSP2-4.5	1.5	1.2 to 1.8	2.0	1.6 to 2.5	2.7	2.1 to 3.5
SSP3-7.0	1.5	1.2 to 1.8	2.1	1.7 to 2.6	3.6	2.8 to 4.6
 SSP5-8.5	1.6	1.3 to 1.9	2.4	1.9 to 3.0	4.4	3.3 to 5.7

Source: IPCC AR6: Summary for Policymaker, p. 14 ([Summary for Policymakers \(ipcc.ch\)](https://www.ipcc.ch/summary-for-policymakers/))

Based on the assessment of multiple lines of evidence, global warming of 2°C, relative to 1850–1900, would be exceeded during the 21st century under the high and very high GHG emissions scenarios considered in this report (SSP3-7.0 and SSP5-8.5, respectively). Global warming of 2°C would *extremely likely* be exceeded in the intermediate scenario (SSP2-4.5). Under the very low and low GHG emissions scenarios, global warming of 2°C is *extremely unlikely* to be exceeded (SSP1-1.9), or *unlikely* to be exceeded (SSP1-2.6). Crossing the 2°C global warming level in the mid-term period (2041–2060) is *very likely* to occur under the very high GHG emissions scenario (SSP5-8.5), *likely* to occur under the high GHG emissions scenario (SSP3-7.0), and *more likely than not* to occur in the intermediate GHG emissions scenario (SSP2-4.5).

We have selected the SSP1-2.6 scenario as 1.5°C reference scenario. Our scenario builds up on the SSP1 assumptions and therefore includes the 1.5°C relevant transitional impacts. On the physical side, we acknowledge with this scenario selection current wide gap within the actual reduction measures needed and current global reduction target (UNEP Gap report 2022). Compared to the SSP1-1.9, we have similar physical impacts until 2060 (our scenario horizon). For the SSP1-2.6 are more agricultural specific information available compared to the SSP1-1.9, therefore analysis can be better performed. This scenario guides the Bayer strategy and our commitment to reduce emissions along the 1.5°C pathway.



Bayer Scenario Description // 2022 - 2050

Taking the Green Road (SSP1-2.6)

- // Average mean temperature increase in **2040: 1.5°C; in 2060: 1.7°C; in 2100: 1.8°C** (best estimate)
- // **Full decarbonization by 2050** (reduction of 90% CO₂e compared to 2019). **Carbon Capture** with high permanency at competitive cost and at scale available in 2040
- // **High transitional impacts** across the world leading to a higher pressure to change and innovate business towards a net zero society (earlier & coordinated policies)
- // **Physical impacts which will challenge the way we are living on the planet, which will stabilize after 2040**
- // Quick technological advances incl. hydrogen and electrification, consequently, energy demand increases by 4 times
- // Fast growth of alternative fuels. First generation biofuels act as transition technology and used for specific areas
- // Population growth reaches **8.5 billion by 2050**. Focus on SDGs, inequality is reduced and emphasis on **human well-being**
- // Food systems move on accelerated path towards low-GHG emission systems incl. changes in animal feedstock, lower food waste, changing diets and food innovations
- // **Full circularity**, less resource intensive consumption

A Rocky Road (SSP3-7.0)

- // Average mean temperature increase in **2040: 1.5°C; in 2060: 2.1°C; in 2100: 3.6°C** (best estimate)
- // Significant amount of greenhouse gases are **still emitted** into the atmosphere
- // **No-additional-climate-policy** scenario; lower and regional different transitional impacts (governments partially fail to introduce strict policies)
- // **High and increasing physical impacts** (increased acute and chronic physical changes with knock on effects)
- // Innovation continues as today. Lack of push and additional investments for fast adaptation of green innovative technology
- // High population growth (**10 billion by 2050**), inequalities persist or worsen over time. Regional focus on achieving energy and food security at the expense of broader-based development
- // **Unequal food security** on current levels of diets, low-GHG emission food systems only partially implemented
- // **Limited circularity** improvements, resource intensive consumption continues to significant extend

Timeframes to be considered for both scenarios

- // Short: today – 2025 (internal reference: 3 years)
- // Medium: 2026 – 2035 (internal reference: ERM / StraCo Frame 10 years)
- // Long: 2036-2050 (internal reference: 2050)



Bayer Scenario Description // 2026 - 2035

Taking the Green Road (SSP1-2.6)

- // Average mean temperature increase in **2030: 1.5°C** (best estimate)
- // Transfer of financial values from rich countries to countries firstly and significantly impacted to enable adaptation
- // **Total 50% emission reduction, with full decarbonization of the energy sector**; carbon emissions from agriculture, forestry, and other land uses crossed into negative emissions
- // **Carbon capture increases to 350% compared to 2022, sequestration** from land use and forest cover peaked in 2030 and began to plateau thereafter
- // **High transitional impacts mainly on carbon pricing, border adjustments, prevention and prohibition** to change and innovate business towards a net zero society (earlier & coordinated policies)
- // **Physical impacts with increased extreme weather events, heat stress impacts workers productivity, product zones must be shifted; innovation and adaptations for agricultural production are implemented**
- // Consumer preferences and awareness continued to drive changes in the business environment
- // Agricultural industry relies on mitigation, innovation and adaptive capacity
- // Local and shorter supply chains emerged to counter carbon taxes and import duties, often enabled by artificial growing environments; regionally resilient local food systems

A Rocky Road (SSP3-7.0)

- // Average mean temperature increase in **2030: 1.5°C** (best estimate)
- // GDP loss from climate damage increased from US\$1.1 trillion in 2030 to US\$2.3 by 2035; migration significantly impact humans
- // Energy mix like today, no real advances in decarbonization, limited decarbonization in the agricultural value chain
- // **No-additional-climate-policy** scenario; lower and regional different transitional impacts (governments partially fail to introduce strict policies)
- // **Physical impacts with increased extreme weather events, heat stress impacts workers productivity, product zones must be shifted; innovation and adaptations for agricultural production are slow**
- // Expansion of agriculturally productive land was prioritized ultimately leading to a 7% increase in croplands in 2040 (vs 2020), high governmental support needed to subsidize agriculture. Continued forest loss, and compounding climate impacts as land conversion resulted in increased climate emissions.
- // Agricultural industry relies mainly on adaptive capacity, investment in automation and ag tech grew. The shifts in agriculture practices led to increased energy use
- // Difficulties for small stallholder farmers. With increasing supply chain disruptions, corporate food retailers, agribusinesses, and large traders gained competitive advantage as they were able to invest resources to shift their production and sourcing practices rapidly.



Bayer Scenario Description // 2036 - 2050

Taking the Green Road (SSP1-2.6)

- // Average mean temperature increase in **2050: 1.7°C** (best estimate)
- // **Full decarbonization by 2050** (reduction of 90% CO₂e compared to 2019). **Carbon Capture** with high permanency at competitive cost
- // **High transitional impacts** across the world leading to a higher pressure to change and innovate business towards a net zero society (earlier action & coordinated policies); planetary well-being and the interconnectedness of socioeconomics, nature, and climate were enshrined in policy frameworks
- // **Physical impacts remain, extreme weather events 1.6 times compared to today; impacts begin to stabilize (new normal in terms of frequency and intensity); unavoidable climate impacts led to some change in crops and growing regions and the use of ag tech to overcome these**
- // Agricultural innovation and automation increased rapidly, including genome modification, lab-grown food, and controlled-environment agriculture; technological advances incl. agricultural yields grow >1% p.a.
- // Changing customer preferences
- // Food systems move on accelerated path towards low-GHG emission systems incl. changes in animal feedstock, lower food waste, changing diets and food innovations
- // 50% of the land is protected, biodiversity faces challenges due to quick climate change, restore ecosystems, and reverse biodiversity loss attributed to a specific company or country

A Rocky Road (SSP3-7.0)

- // Average mean temperature increase in **2060: 2.1°C** (best estimate)
- // GDP loss from climate damage reaches US\$4.1 trillion per year; adaptation technologies become a key economic advantage
- // Significant amount of GHG are **still emitted**
- // Global and conflict caused by climate tension and driving inflation, social unrest impacts, worsening resource scarcity (e.g. water) and changing food production; increasingly severe climate shocks and impacts to livelihoods drove the movement of climate refugees
- // **No-additional-climate-policy** scenario; lower and regional different transitional impacts; focus on adaptation to climate
- // **High physical impacts** (increased acute and chronic physical changes with knock on effects), most significant impact by heat days, lack of precipitation during spring and summer, many areas will be deemed uninsurable
- // Value chains are significantly impacted
- // Innovation continues as today, lack of push and additional investments for fast adaptation of green innovative technology, agricultural yield grow <1% p.a.; new growing regions and shifts in agricultural patterns emerged as a result of changing weather patterns and loss of productivity
- // Biodiversity loss (13% of land is protected), and the decline of watersheds contributed to a decline in crop quality and yield, driving ecosystems to the brink of collapse