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[S&P Sustainability Insights: Probabilistic Distributions Of Global Temperatures And GDP: A Technical Guide](#)

In the report “Why Planning For A 2.3°C Warmer World Is Critical This Decade And Next,” Sept. 15, 2025, S&P Global Ratings proposed a probabilistic approach to assessing the likelihood of global temperature rise and the economic questions. Using probabilistic analysis, we estimate a 90% likelihood of the average global temperature exceeding the Paris Agreement’s goal of 1.5° Celsius (1.5 C) above preindustrial levels by 2040 and a 50% likelihood of it exceeding 2.3 C. Here we summarize the principal results of our model and the methodology behind it.

A. Probable GMST Outcomes And Associated GDP Impacts

Our modeling of the global mean surface temperature (GMST) indicator incorporates nearly 9,000 emissions scenarios and includes the effects of uncertainty in climate sensitivity (see chart 1, which shows lower-bound GMST values as a function of time at different levels of probability).

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