Air Quality Forecasts for Delhi

Cambridge Judge Business School

Forecast period: 1 November 2026 to 14 November 2026.

Introduction

This tracker provides a daily outlook for particulate matter pollution in Delhi during 1–14 November 2026, reporting expected concentrations of PM2.5 and PM10 alongside the estimated probabilities of exceeding concentration thresholds associated with different levels of air quality.

The forecasts draw on observations through 31 October 2026 from a set of 32 air pollution monitoring stations operating in Delhi. They cover both daily averages and average station peaks, highlighting periods of intense pollution that daily averages alone can obscure.

Two pollutants and three pollution measures

PM2.5 refers to fine particles with diameters of approximately 2.5 micrometres or less. PM10 includes particles up to approximately 10 micrometres in diameter, including the finer PM2.5 fraction. Concentrations of both pollutants are reported in micrograms per cubic metre of air (μg/m³).[3] The tracker reports three measures for each pollutant:

Daily mean: Station readings are averaged within each qualifying hour to obtain an hourly network mean. These hourly means are then averaged over the day.

Mean of station daily maxima: Each qualifying station's highest hourly concentration over the whole day is identified, and these station maxima are averaged.

Mean of station waking-hour maxima: Each qualifying station's highest hourly concentration between 05:00 and 20:00 IST, inclusive, is identified, and these station maxima are averaged.

Each measure is calculated only when its data-completeness requirements are met. The two maximum-based measures describe average station peak intensity; the peaks can occur at different times at different stations. They are distinct from both the highest individual station-hour reading and the maximum hourly network mean.

Probability of exceeding hazard thresholds

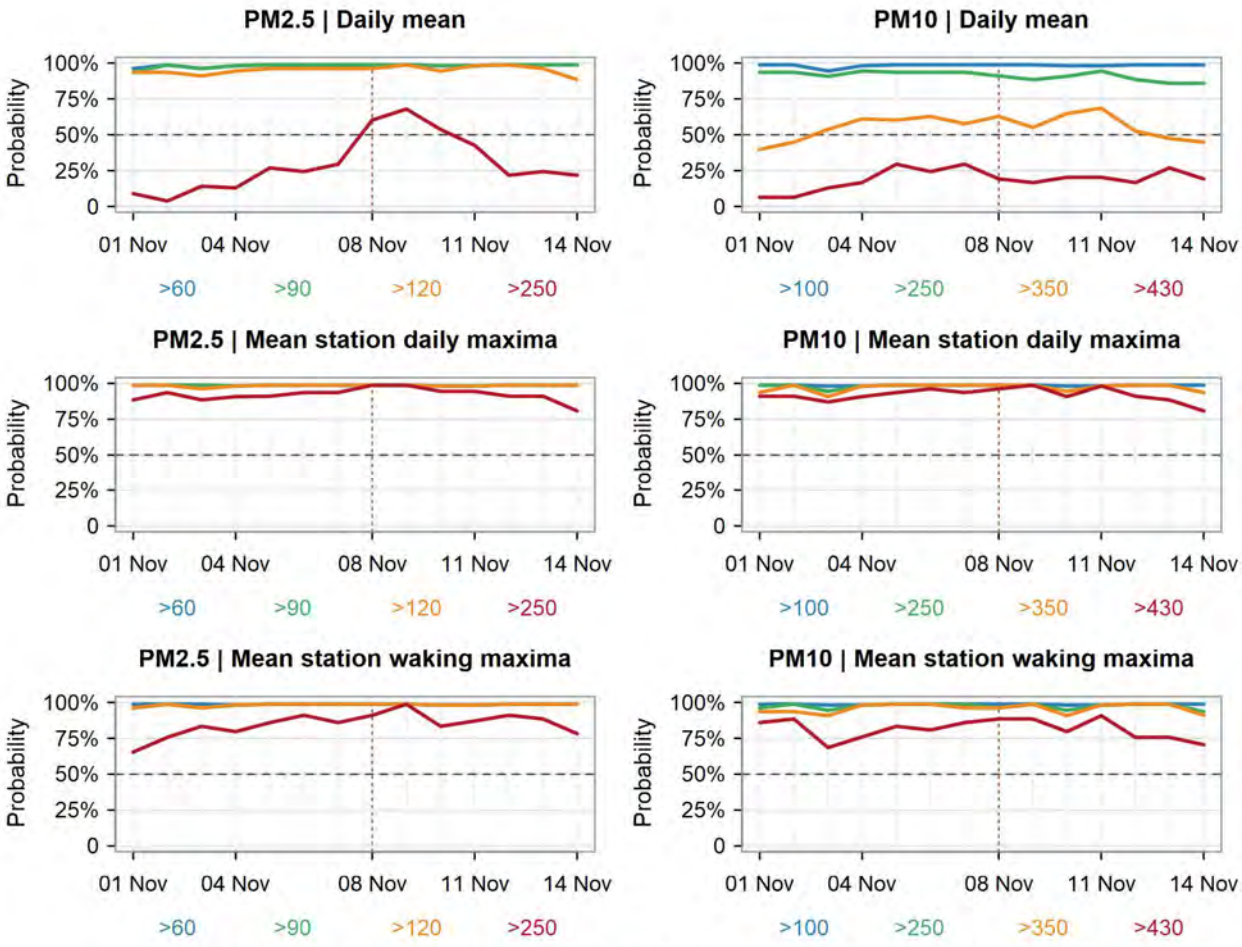
The forecasts indicate an extremely high probability of daily mean $PM_{2.5}$ concentrations reaching "Very Poor" levels or worse, as classified by India's Central Pollution Control Board (CPCB), throughout 1–14 November 2026. The estimated daily probability of exceeding 120 μg/m³—the upper boundary of CPCB's "Poor" category (AQI 300) and 8 times the WHO 24-hour guideline level of 15 μg/m³—remains close to 90% or higher. The estimated daily probability of exceeding 250 μg/m³, entering CPCB's "Severe" category (AQI >400), exceeds 50% over 7–10 November; this threshold is 16.7 times the same WHO guideline level. For PM_{10}, the daily probability of exceeding 350 μg/m³, reaching CPCB's "Very Poor" category or worse (AQI >300), is approximately 40–70%; this threshold is 7.8 times the WHO 24-hour guideline level of 45 μg/m³.

The risk of high station peaks is particularly pronounced for both pollutants. For both maximum-based measures, the estimated probabilities of exceeding the severe threshold generally exceed 75% across the fortnight.

Each panel shows one pollutant and pollution measure. The curves give the estimated probability of exceeding each labelled concentration threshold on each forecast day.

Warnings for the fortnight

A warning is flagged when the estimated probability of exceeding a threshold is 25% or higher, indicating at least a one-in-four chance. This cutoff is a reporting rule: probabilities just below it may still warrant attention. The dashed 50% line provides a visual reference



Concentration references in micrograms/m³. Dashed horizontal line: 50%. Warning cutoff: 25%.

Note: The reference thresholds are 60, 90, 120 and 250 µg/m³ for PM2.5, and 100, 250, 350 and 430 µg/m³ for PM10. These are the upper 24-hour concentration breakpoints for the Central Pollution Control Board's Satisfactory, Moderate, Poor and Very Poor AQI categories, respectively.[3] Thus, the orange curves show the probability of crossing into the Very Poor concentration range or worse, while the red curves show the probability of crossing into the Severe range.

For the maximum-based measures, these thresholds provide concentration reference levels; they do not assign official daily AQI categories.

Warnings

Measure	Highest reference	Probability range	Warning days
PM2.5 Daily mean	250 µg/m³	3.8–67.9%	6 / 14
PM2.5 Daily maxima	250 µg/m³	80.8–98.7%	14 / 14
PM2.5 Waking maxima	250 µg/m³	65.4–98.7%	14 / 14
PM10 Daily mean	430 µg/m³	6.4–29.5%	3 / 14
PM10 Daily maxima	430 µg/m³	80.8–98.7%	14 / 14
PM10 Waking maxima	430 µg/m³	68.5–90.7%	14 / 14

The table summarises warnings at the highest concentration references: 250 µg/m³ for PM2.5 and 430 µg/m³ for PM10. These mark the upper boundaries of the Very Poor range and the transition to Severe conditions for 24-hour concentrations.[3] “Probability range” shows the lowest and highest estimated daily probabilities over the fortnight; “Warning days” counts the days on which the probability reaches the 25% cutoff.

At these thresholds, the daily mean triggers warnings on 6 of the 14 days for PM2.5 and 3 days for PM10. Both maximum-based measures trigger warnings on all 14 days for both pollutants, with estimated probabilities remaining above 65% throughout. This indicates a persistent risk of high average station peaks, including on days when the daily mean does not trigger a warning at the highest threshold.

Forecast of daily PM concentrations

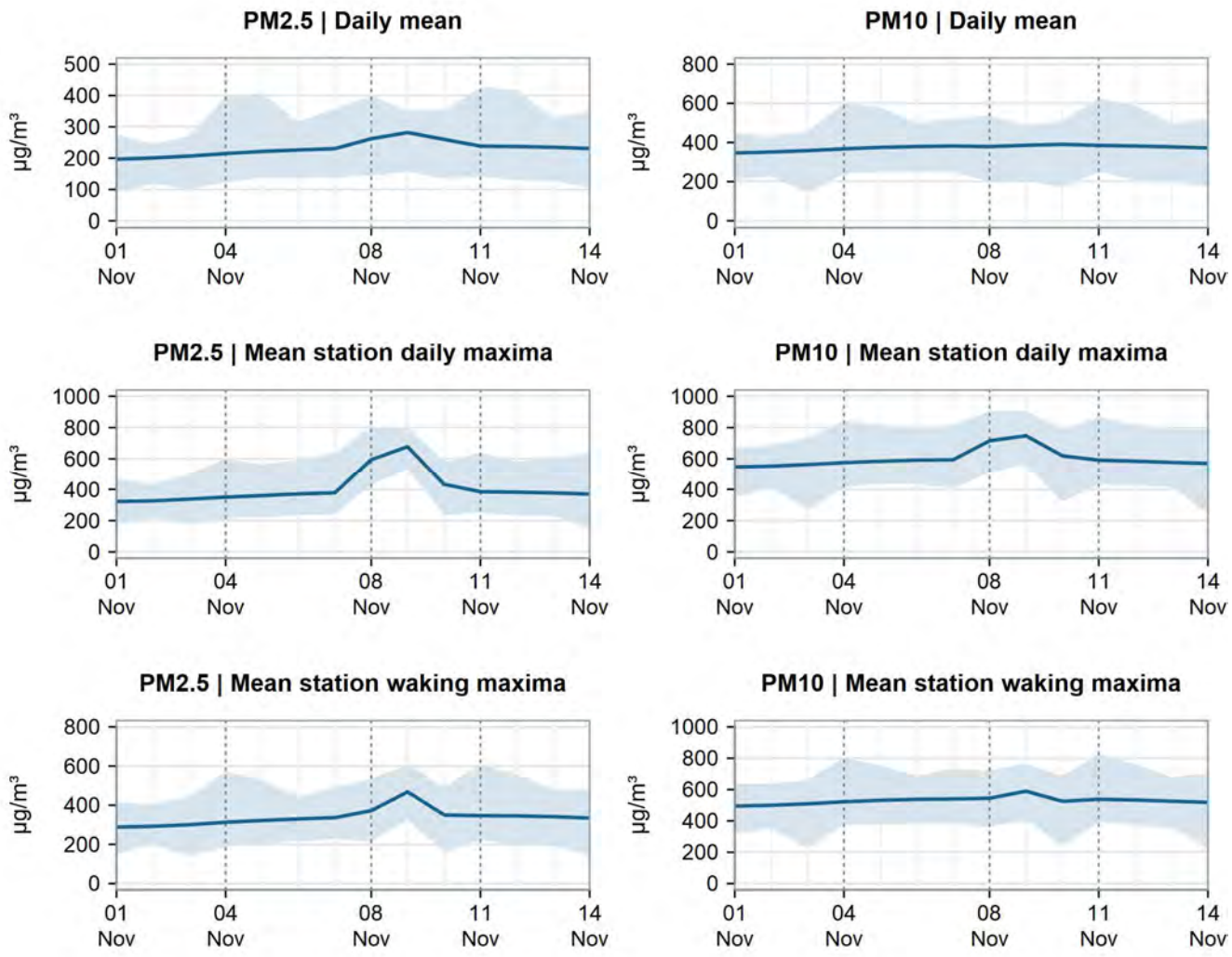
Pollution is forecast to build during the first week of November, with the strongest increases in average station peaks projected for 8–10 November. Five of the six forecast series reach their highest point on 9 November; the PM10 daily mean peaks on 10 November.

The PM2.5 daily mean rises from approximately 197 µg/m³ on 1 November to 282 µg/m³ on 9 November. PM10 shows a smaller proportional increase, from 347 to 391 µg/m³. The forecast daily means average 232 µg/m³ for PM2.5 and 374 µg/m³ for PM10 over the fortnight.

The projected increase in peak intensity is particularly pronounced for PM2.5: its mean station daily maximum approximately doubles, from 322 to 677 µg/m³. The corresponding PM10 measure reaches 748 µg/m³. Both waking-hour maximum measures also peak on 9 November. Concentrations ease after the projected peaks and remain elevated through 14 November.

The wide shaded 90% prediction intervals indicate substantial uncertainty about individual daily outcomes. The projected timing and magnitude of the peaks reflect patterns estimated from historical observations; differences in weather, emissions and crop burning could alter the timing and magnitude of pollution this year.

Forecasts of mean PM concentrations (µg/m³) with 90% prediction interval for each day.



Measure	First forecast	Fortnight mean	Largest forecast / date
PM2.5 Daily mean	196.7	231.5	281.8 / 9 Nov
PM2.5 Daily maxima	322.1	404.4	677.4 / 9 Nov
PM2.5 Waking maxima	288.5	338.8	468.3 / 9 Nov
PM10 Daily mean	346.5	373.7	390.6 / 10 Nov
PM10 Daily maxima	547.6	600.9	747.6 / 9 Nov
PM10 Waking maxima	494.8	529.3	589.8 / 9 Nov

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Forecast generation

Each measure is forecast separately for PM2.5 and PM10, using its available daily history from January 2020 onwards. The model uses historical seasonal and calendar associations to forecast pollution. These forecasts do not establish how much of the predicted pollution is attributable to any particular festival, activity or emissions source.

Prediction intervals and exceedance probabilities are calibrated using historical forecast errors that would have been known at the forecast origin. The calibration uses a two-year lookback, matches errors by season and forecast horizon, and requires minimum sample sizes. A 90% prediction interval is intended to contain about nine out of ten observed outcomes across repeated forecasts under comparable conditions. Actual coverage may differ, particularly during unusual pollution episodes.

Monitoring coverage and data quality

The analysis uses a fixed set of 32 monitoring stations in Delhi. For the daily mean, an hour qualifies when at least 24 stations have valid readings; a day requires at least 18 qualifying hours.

For the mean of station daily maxima, each station needs valid readings for at least 18 of the day's 24 hours. For the mean of station waking-hour maxima, each station needs at least 12 of the 16 hourly readings from 05:00 to 20:00 IST, inclusive. Both maximum-based measures require at least 24 qualifying stations.

Missing pollution readings remain missing and are not interpolated. Zero readings and large positive readings are retained.

Using the outlook for early action

Daily means and average station peaks describe different aspects of pollution. The forecasts suggest that average station peaks may remain high even when the daily mean is below the highest reference threshold. Public agencies, schools, health services and employers can use the outlook to review preparedness and communication plans, alongside current local monitoring and official advice.

A warning signals a plausible risk. Days without warnings may still have elevated pollution, and a warning that is not followed by an exceedance may still have justified precautionary action. Decisions should weigh the cost of precautions, the exposure they could prevent and the consequences of missing a high-pollution day. Wide prediction intervals and imperfect performance on high-pollution days make regular updates important as new observations become available and pass the completeness checks.

Pollution below the forecast could reflect weather, changes in emissions, interventions or forecast error. Attributing an improvement to policy requires a separate evaluation designed to distinguish its effects from these other influences.

References

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[2] ICAR-IARI CREAMS, Paddy Residue Burning Bulletin 48, events and issue date 1 November 2026. https://creams.iari.res.in/Creams_website_bulletin/Fire_bulletin_2026/Fire_bulletin_2026r/48.RiceResidueFireBulletin_01Nov_2026_ICAR.pdf

[3] CPCB, National Air Quality Index, Table 3.11; concentration breakpoints for 24-hour PM2.5 and PM10. https://airquality.cpcb.gov.in/ccr_docs/FINAL-REPORT_AQI_.pdf

[4] CPCB, National Ambient Air Quality Standards, notification 18 November 2009. https://www.airquality.cpcb.gov.in/ccr_docs/Air_quality_standards.pdf

[5] CAQM, revised GRAP schedule dated 21 November 2025, enclosed in the 26 November order; retained Stage 4 official-source review. https://caqm.nic.in/WriteReadData/LINKS/bfd87d19-6f6e-4369-bed7-59710f5e742d.pdf

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