

DELHI'S WINTER AIR

# Enough, or *Eyewash*?

An evidence review of the GNCTD winter-pollution notification of 23 June 2026 – and a policy framework that can actually cut the poison.

**NO.** It re-issues a decade of measures that never moved the real number, fights at the city line while two-thirds of the poison blows in from outside, and mandates water-spray theatre – with no target it can ever be judged against.

THE MAPS – ANNUAL-MEAN PM2.5 ACROSS NORTH INDIA, BY DECADE

[ MAP PLACEHOLDER – drop the LongPMInd / MERRA-2 decadal PM2.5 raster here ]

Peer-reviewed LongPMInd satellite reconstruction (Wei et al., ESSD 2024) + NASA MERRA-2, de-weathered in-house. Delhi sits in a worsening regional belt (area-mean 44→66 µg/m³): visual proof that Delhi cannot clean its air alone.

# Delhi’s Winter Air — Evidence & a Framework for Action

Is the 23 June 2026 GNCTD notification enough to fix winter pollution? The evidence, the gaps, China’s playbook, and what to do – in five parts.

|   |                                                                                                |    |
|---|------------------------------------------------------------------------------------------------|----|
| 1 | <b>Executive Summary</b> <i>the verdict, in one page</i>                                       | 03 |
| 2 | <b>The Notification, Measure by Measure</b> <i>recycled – and already disproven</i>            | 06 |
| 3 | <b>For the Common Citizen</b> <i>what this means for you, in plain words</i>                   | 08 |
| 4 | <b>The Health Impact</b> <i>our children and our elders pay the price</i>                      | 10 |
| 5 | <b>The Science Behind Our Findings</b> <i>source, airshed, chemistry, de-weathering, China</i> | 12 |
| 6 | <b>The Action Table</b> <i>a prioritised framework you can champion</i>                        | 16 |
| ▪ | <b>Bibliography &amp; Sources</b> <i>58 peer-reviewed and official sources</i>                 | 19 |

## HOW TO READ THIS BRIEF

Every figure is cited [n] to the 58-source bibliography at the back; contested numbers are given as ranges, not false precision. The sharpest accountability lever runs throughout – **judge policy by the weather-normalised trend, not the lucky-weather headline.**

# 1 Executive Summary

*The verdict – through four expert lenses*

The GNCTD notification of 23 June 2026 is an administratively tidy consolidation of tools Delhi has used for years – and the government’s own preamble proves those tools failed: winter median AQI 312–342, maximum 461–494, across three seasons under exactly these measures [37]. Five GRAP seasons on, the weather-normalised PM2.5 trend has not moved and NO2 has worsened in real terms – a decade of activity mistaken for progress.

|                                                                                                             |                                                                           |                                                                          |                                                                        |
|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------------------------------------------|
| <b>~65%</b><br>of winter PM2.5 comes from <b>outside</b> Delhi – a city-line order can’t reach it [30] [38] | <b>~2–3%</b><br>real, weather-removed PM2.5 change – the rest is luck [7] | <b>~70%</b><br>Beijing’s PM2.5 cut, 2013–2025 (89.5→27.0) [13] [25] [56] | <b>0</b><br>measurable / de-weathered targets in the notification [39] |
|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------------------------------------------|

## THE FOUR-HAT VERDICT

### STATISTICIAN

No numeric target, no baseline, no weather-normalised metric – it is un-scoreable. It confuses weather with policy: a windy winter is claimed as success, a stagnant one blamed on the wind [7][39].

### ENVIRONMENTAL SCIENTIST

A scale mismatch: ~two-thirds of the PM2.5 is regional. Airshed-wide burning control cuts PM2.5 ~10% vs just 2–3% for Delhi-only action [17][38]. In winter, dust falls below ~15% of the load – the notification over-weights it [1].

### CHEMICAL ENGINEER

It manages symptoms. Much of winter PM is secondary (sulfate, nitrate, ammonium, chloride) needing SO2/NOx/HCl cuts at source. Anti-smog guns are the wrong tool – water fog does nothing for fine PM2.5 [5][11][26][32].

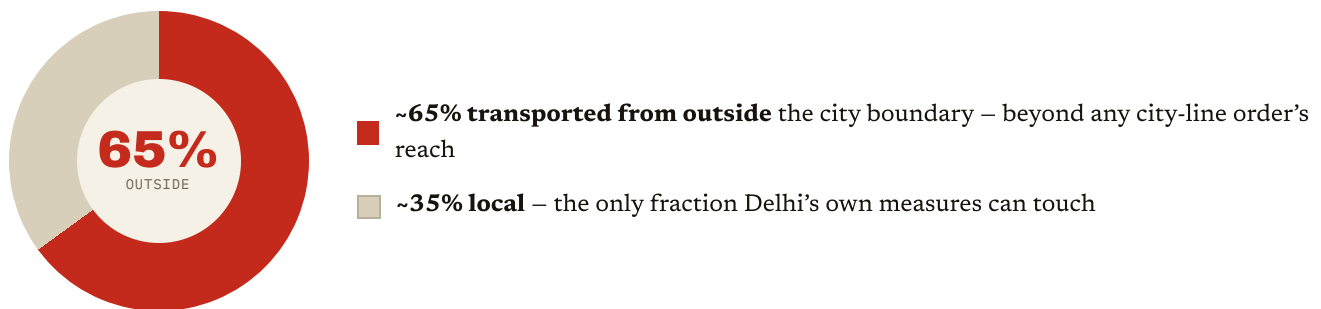
### INVESTIGATIVE JOURNALIST

Mostly repackaging, with the hard duties offloaded onto RWAs, contractors and the poor; PUCC rests on a fake-certificate racket; WFH is court-ruled advisory-only [22] [34][36].

## THE RECORD, IN ONE BREATH

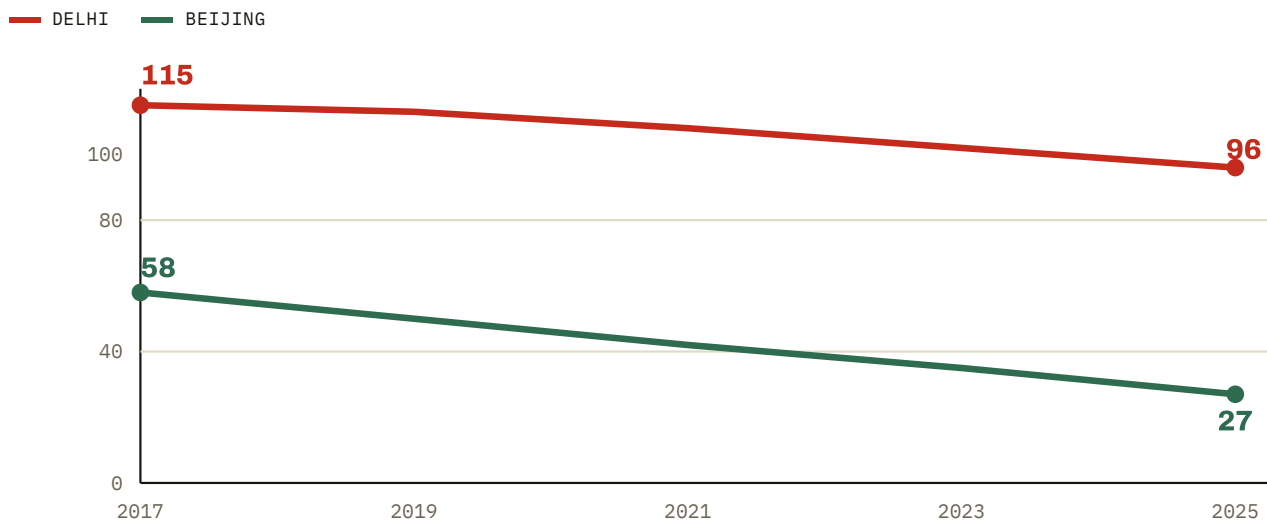
Five GRAP seasons and a decade of action plans – and the weather-normalised PM<sub>2.5</sub> trend has not moved, while NO<sub>2</sub> has worsened **+7.7%** in real terms. The Government did not merely fail to act: in July 2025 the Centre exempted **~78%** of India's coal plants from the SO<sub>2</sub> scrubbers that would cut the sulphate drifting into Delhi [54] – weakening the single biggest lever, months before winter. This is not a plan that fell short; it is a decade of theatre while Delhi's people lose close to a decade of life.

**FIGURE 1** WHERE DELHI'S WINTER PM<sub>2.5</sub> COMES FROM



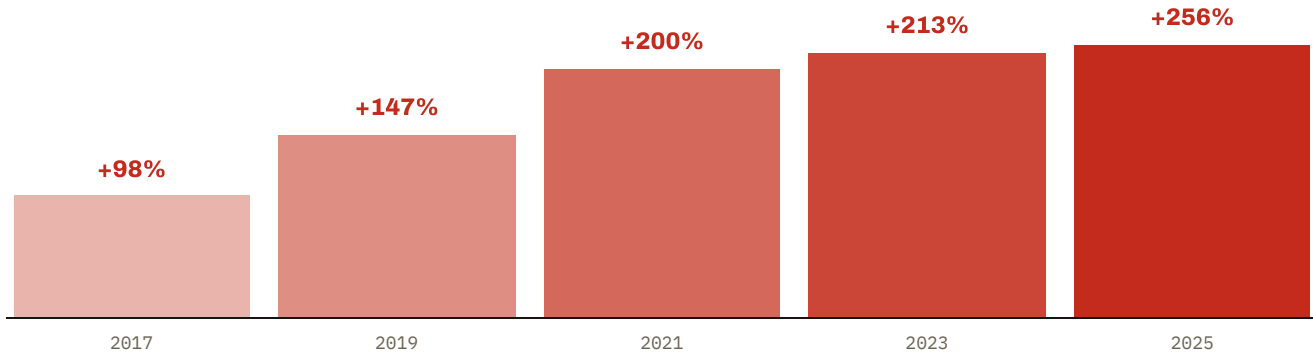
~65% of Delhi's winter PM<sub>2.5</sub> is transported from outside the city boundary [30] [38].

**FIGURE 2** CHINA DID IT — DELHI DIDN'T



Beijing kept cutting – 58 µg/m<sup>3</sup> (2017) to 27.0 (2025), now ~70% below its 2013 peak of 89.5. Delhi stalled: 115 (2017) to a weather-flattered 96 in its 'best' year, 2025 – still ~20× WHO and ~3.5× Beijing [13] [25] [56].

**FIGURE 2B** THE GAP ONLY WIDENS — DELHI'S PM2.5 AS % ABOVE BEIJING'S



Delhi was about double Beijing in 2017 (+98%); by 2025 it is ~3.5× (+256%). As Beijing kept cutting and Delhi stalled, the shortfall didn't just persist – it grew, year after year [13] [25] [56].

#### CREDIT WHERE DUE

PUCC-enforced-at-the-fuel-pump is a smart design (it fails only because the certificate is gameable – fix that and it works); site-level dust suppression is legitimate; year-round framing correctly admits this is not only a seasonal problem. The failures are of ambition and scale, not of every clause.

#### THE ONE LINE THAT WINS THE ARGUMENT

### “Judge policy by the weather-normalised number, not the lucky-weather headline.”

On the office's June-2026 parliamentary submission (adjudicated matched-station panel), the observed 2024→2025 PM2.5 fall of -7.4% shrinks to a real ~2-3% once the weather is removed (ceiling ~6%) – much of it the unwinding of a uniquely stagnant January 2024 – while the GRAP season shows no real improvement in five seasons and NO<sub>2</sub> worsened +7.7% in real terms. **Delhi did not turn the corner; the wind turned it for a season.**

# 2 The Notification, Measure by Measure

*Recycled – and already disproven, by the Government’s own admission*

The notification’s own preamble concedes it merely “reviewed, consolidated and subsumed” a decade of earlier winter directions into a single order. Below is that admission made concrete – every headline measure, when it was first tried, and the peer-reviewed research showing it does not move the air.

| FIRST LAUNCHED                                                                                                                                                                                                                                                                             |  | THE RESEARCH SHOWING IT DOESN’T WORK                                                                                                                                                                                                                                                                                                                                                         |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <div>VEHICLE</div> <div>“No PUC, No Fuel” + PUCC / ANPR-VAHAN checks</div> <div>Fuel pumps must deny petrol/diesel/CNG to any vehicle without a valid Pollution Under Control Certificate, verified on VAHAN via ANPR cameras – year-round.</div>                                          |  | <div>1989 · PUCC under the Central Motor Vehicles Rules (fuel-pump denial bolted on only in 2025)</div> <div>The PUCC certifies only a brief idle test – already defeated by a fake-certificate racket – and ignores cold-start and loaded emissions; vehicles are only ~a quarter of local winter PM2.5, and the weather-normalised trend has not moved. [34] [43] [7] [38]</div>           |  |
| <div>VEHICLE</div> <div>Entry ban on out-of-Delhi / below-BS-VI vehicles + doubled parking charges</div> <div>Bars non-Delhi, below-BS-VI commercial vehicles (1 Nov–31 Jan; CNG/EV/emergency exempt) and doubles parking fees to deter private-car use.</div>                             |  | <div>2015 · Supreme Court (M.C. Mehta) truck-entry curbs; parking-fee hikes from the 2017 GRAP</div> <div>Delhi’s own traffic-intervention trials cut PM2.5 by at most ~4–6% (often statistically zero) because ~65% of the load is regional; a city-boundary ban riddled with exemptions displaces emissions rather than removing them. [57] [17] [30] [38]</div>                           |  |
| <div>VEHICLE</div> <div>Staggered office hours + 50% Work-From-Home</div> <div>Government and private offices must run at 50% staff with staggered timings (1 Nov–31 Jan) to shrink commuter traffic.</div>                                                                                |  | <div>2021 · CAQM / Delhi Govt Diwali-smog WFH orders (Nov 2021)</div> <div>The Delhi High Court held that GRAP creates no enforceable work-from-home right, so a private-office order is merely advisory – and even if achieved, commuter-traffic cuts yield only the marginal ~4–6% (often null) change traffic measures produce here. [22] [57] [17]</div>                                 |  |
| <div>DUST</div> <div>Seasonal construction / demolition ban + mandatory anti-smog guns &amp; mist</div> <div>Bans dusty construction 1 Nov–31 Jan (a full ban 10 Dec–20 Jan) and mandates anti-smog guns / mist systems on G+5 high-rises (&gt;3,000 sq m) and sites &gt;1,000 sq m.</div> |  | <div>2014–15 · NGT dust orders; anti-smog guns first trialled at Anand Vihar, 2017</div> <div>Construction/road dust is under ~15% of the winter load, and the de-weathered trend stays flat; Delhi’s own Anand-Vihar anti-smog-gun trial showed little effect, and peer-reviewed work finds water/mist spraying can raise PM2.5 by forming secondary aerosol. [8] [26] [32] [33] [11]</div> |  |

OPEN BURNING

Open-burning ban + “clean / electric heating”; drone night surveillance

Prohibits open burning of waste/leaves (RWAs & institutions made liable), promises electric/clean-fuel heating to deter biomass fires, and adds drones to spot night-time burning.

2014–15 · NGT open-burning ban (₹5,000 fine); drones added in the 2024 Winter Action Plan

The order only prohibits and vaguely “provides” clean heat – with no budget or delivery to reach the poor; the burning that drives the smog is crop residue outside Delhi’s jurisdiction, and enforcement is pinned on RWAs amid a court-noted record of “total non-compliance”. [1] [9] [45] [58] [27]

FRAMEWORK

GRAP (CAQM) invocation + a decade of orders “consolidated”

Re-issues the reactive Graded Response Action Plan and folds ~a decade of prior winter directions into one permanent annual Delhi framework.

2017 · GRAP notified (EPCA / MoEFCC); CAQM took over in 2021

GRAP is reactive and episodic; after a decade of exactly these orders the weather-normalised PM trend is flat, the Supreme Court found “total non-compliance”, most NCAP money was mis-spent, and Delhi-only action cuts PM2.5 just ~2–3% while ~65–74% blows in from outside. [7] [27] [20] [49] [17] [30]

THE PATTERN

Not one headline measure is new. The newest – work-from-home and drones – are already four-plus years old; the rest predate this Government by a decade. The notification’s real value is as a **consolidated admission** that the same tools, tried and re-tried, have never bent the weather-normalised curve [7] [55].

# 3 For the Common Citizen

Why the air is deadly – and why the fix on paper won’t save you

You do not need a science degree to see the problem. Here is what is actually happening to the air your family breathes every winter – and why a notice full of activity is not the same as clean air.

**Why winter is worse**

Cold air traps a lid over the city. In summer, pollution rises and blows away; in winter the “mixing height” collapses to a few hundred metres, so the same smoke is packed into a thin layer near the ground – and levels spike [4].

**Where it comes from**

No single villain. In winter it is burning – home & waste fires, crop stubble, vehicles, industry – plus “secondary” haze that forms in the air itself. And ~two-thirds drifts in from beyond Delhi’s borders [1] [38].

**Why the water guns won’t save you**

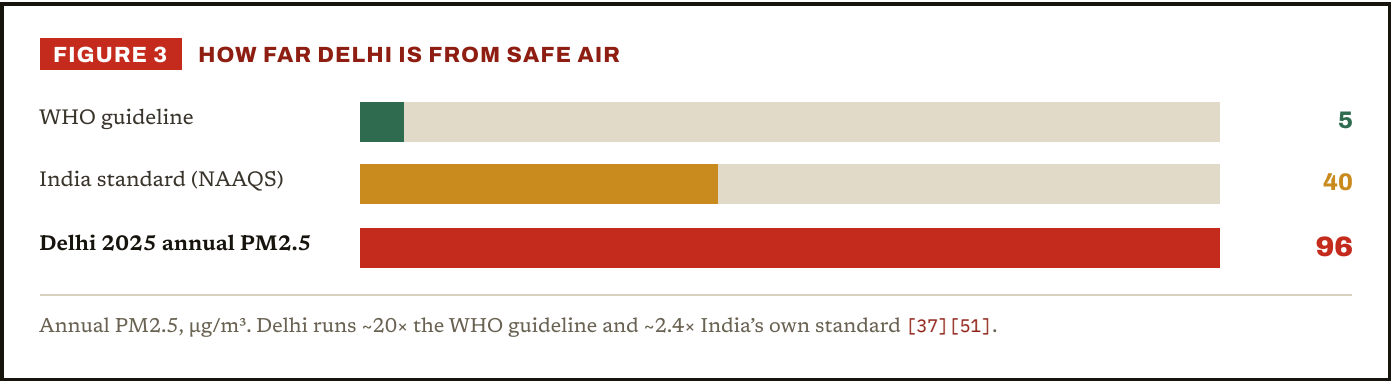
Anti-smog guns spray a fine mist. It knocks down heavy road dust for a few minutes in a tiny radius – but does almost nothing to the fine particles (PM2.5) that reach your lungs. Delhi’s own trials showed pollution still rising during spraying [11] [26] [32].

**Why ‘Delhi can’t fix it alone’**

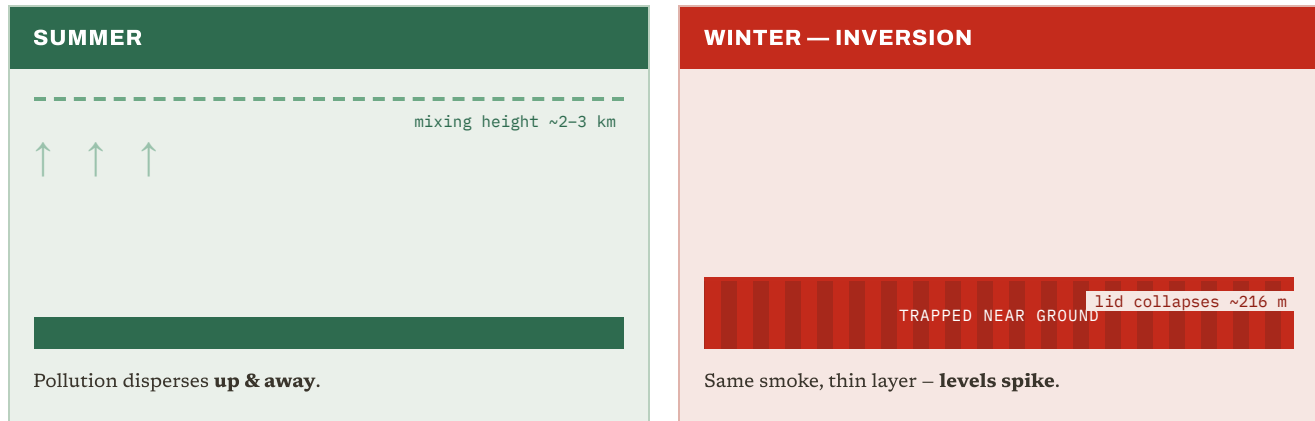
The dirty air is a regional cloud. When Delhi alone bans stubble smoke it cuts PM2.5 ~2-3%; when the whole region acts together it cuts ~10% – and a serious regional push reaches ~30% [17] [38].

≈20x

Delhi’s 2025 air averaged about **96 µg/m³** of PM2.5 – roughly twenty times the World Health Organization’s safe limit of 5. Even the government’s “best year” was a health emergency [37].



**FIGURE 4** WHY THE SAME SMOKE CHOKES YOU IN WINTER



In winter a temperature inversion traps emissions in a shallow layer near the ground [4].

#### WHAT 'DE-WEATHERING' MEANS — AND WHY YOU SHOULD DEMAND IT

It is simply asking: if the weather had been normal, how dirty would the air really be? It stops a lucky, windy winter being sold to you as clean-air policy. Insist the government report the weather-normalised number – that is the honest scorecard [7].

# 4 The Health Impact

*Our children and our elders pay the highest price*

This is not an aesthetic problem. Air pollution killed an estimated **1.67 million Indians in 2019** (17.8% of all deaths); ambient PM2.5 alone caused ~0.98 million – and Delhi carries the country’s highest per-capita exposure and economic loss [51].

**≈ a decade**  
of life

lost by the average Delhi resident to sustained PM2.5 – the University of Chicago Air Quality Life Index puts Delhi’s loss at close to ten years [52]. Every winter of inaction is paid in the lungs of children and the lives of the elderly.

**ON THE DAY OF THE SPEECHES**

This is not history. On World Environment Day, 5 June 2026 – the cleanest month of the year, amid official clean-air speeches – **every one of Delhi’s 43 monitoring stations breached the WHO limit** (the worst, IHBAS, by 5.7×), and 42 of 43 breached even India’s weaker PM10 standard [55]. If the capital cannot give its people a single clean-air station on its cleanest day, the ‘record’ is meaningless.

|                                                                                    |                                                                                                 |                                                                                                      |                                                                                   |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <b>1.67 M</b><br>Indian deaths from air pollution, 2019 – 17.8% of all deaths [51] | <b>217.6</b><br>Delhi’s population-weighted PM2.5 (µg/m³), GBD 2019 – highest of any state [51] | <b>75–86%</b><br>of outdoor / informal workers show abnormal lung function (vs 45% in controls) [24] | <b>11.3 hrs</b><br>a Delhi auto-driver spends in that air, every working day [24] |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|

## THE TWO GENERATIONS WHO CANNOT PROTECT THEMSELVES

**Our children & future generations**  
Growing lungs exposed to this air develop permanently reduced capacity – a lifelong deficit set before adulthood. Prenatal and childhood exposure is linked to low birth weight, stunted lung development and lasting cognitive harm. The damage done to a child this winter is not undone by a cleaner year later [51] [52].

**Our elderly**  
For older residents – especially with heart or lung conditions – winter smog is acutely lethal: it triggers heart attacks, strokes and respiratory failure, and drives the winter surge in hospital admissions and deaths. The elderly are least able to ‘wait indoors’ for months [51].

**THE BURDEN IS INVERTED — AND THE NOTIFICATION MAKES IT WORSE**

The people who pollute least suffer most and are protected least. The 50%-work-from-home and construction-ban clauses shield salaried professionals at zero loss, while daily-wage earners, vendors, delivery riders and traffic police keep working in the worst air – with no income support and no masks. Of 13.78 lakh registered construction workers, a one-time relief reached only ~90,000 [24] [42].

### **WHAT'S MISSING: PROTECTING PEOPLE, NOT JUST CUTTING EMISSIONS**

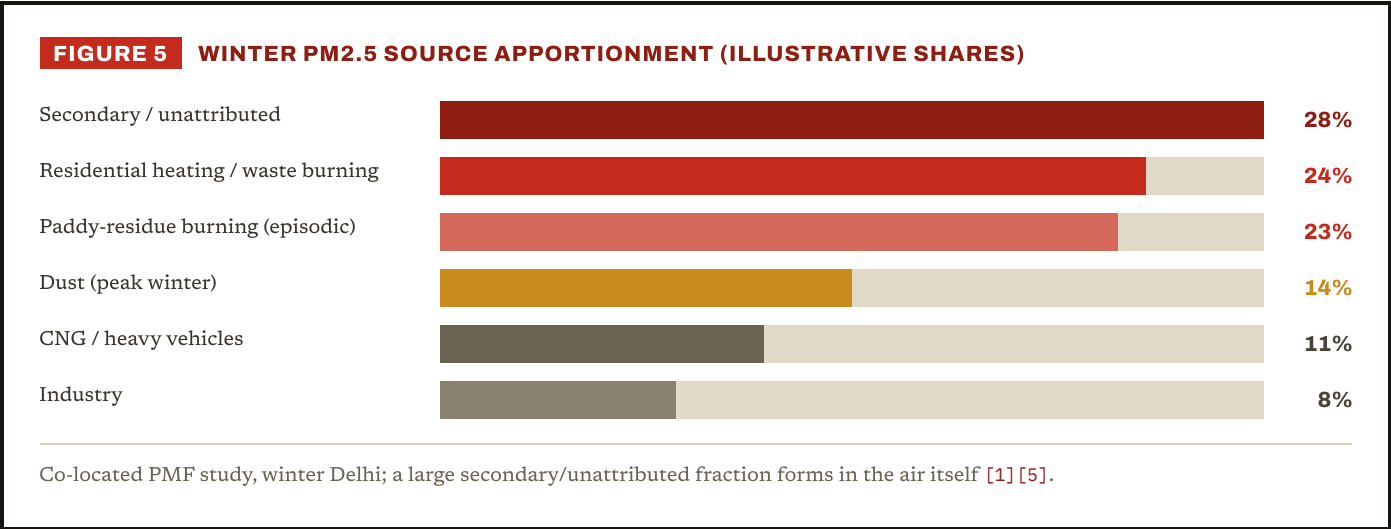
Even under the best clean-up, Delhi's winter air stays hazardous – so exposure protection is essential and entirely absent here: no clean-air shelters, no filtered classrooms, no school-closure protocol, no subsidised N95 masks for outdoor workers, no real-time exposure alerts. Beijing pairs every pollution alert with pre-defined public-protection triggers; Delhi copies only the emission-cut half [40] [44] [48].

# 5 The Science Behind Our Findings

Sources, the airshed, the chemistry, de-weathering – and China’s proof

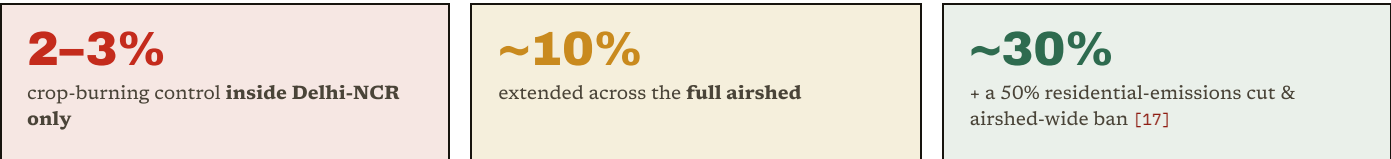
## 5.1 What Delhi actually breathes in winter

Winter pollution is combustion-dominated. A co-located receptor study apportioned winter PM2.5 as below; note that dust collapses to under ~15% in peak winter (against 36–66% of annual PM10) – so a winter order that leans on dust control is aimed at the wrong season [1]. Shares vary 2–4× by method and year; treat them as ranges [8].



## 5.2 The airshed: why the city boundary is the wrong map

~65% of Delhi’s winter PM2.5 is transported from the wider region [30] [38]. The peer-reviewed airshed model is blunt about what different scales of action deliver:



A city-only order is **structurally incapable** of the result its preamble promises.

## 5.3 The chemistry a water spray cannot touch

Much of winter PM is **secondary** – formed in the air from precursor gases, not emitted directly. Delhi’s haze is unusually chloride-rich; ammonium chloride pulls in aerosol water and accelerates nitrate/sulfate formation ~1.6×. The effective levers are cutting the acid precursors at source – NO<sub>x</sub>, SO<sub>2</sub> and HCl – not spraying mist [5].



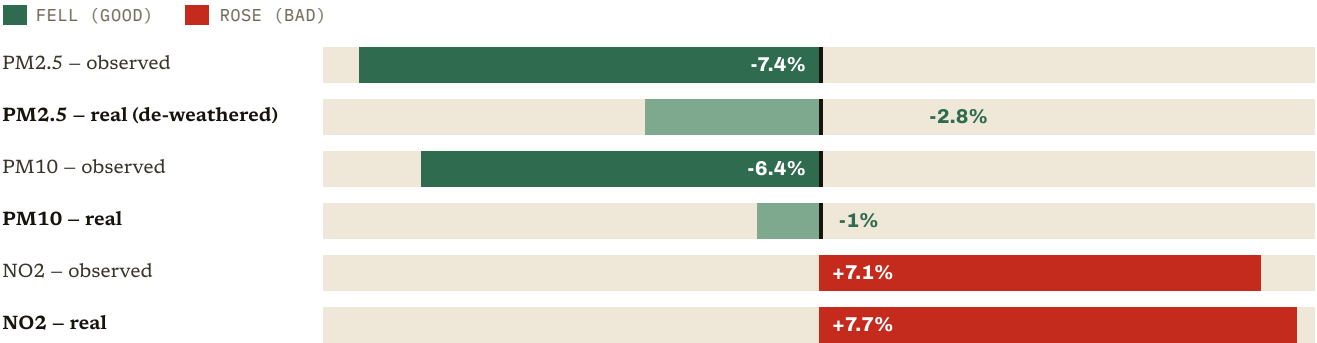
### THE VERDICT ON ANTI-SMOG GUNS

Delhi's own trials show PM<sub>2.5</sub> **rising** during spraying (Anand Vihar 412→426 µg/m<sup>3</sup>); CPCB called them ineffective in open areas; the ₹20-crore Connaught Place smog tower works only within ~20 m, and DPCC told the NGT that ~40,000 towers (≈₹11.8 lakh crore) would be needed for a ~17% city cut. You cannot vacuum a city clean – you must stop the emissions [11] [12] [26] [32].

5.4 De-weathering: separating policy from luck

We trained two independent model families (random forests and boosted trees) on ~1.5 million station-hours of pollution and weather to compute what each pollutant would have been under normal weather. The result: the observed 2024→2025 PM2.5 fall of -7.4% shrinks to a real -2 to -3% (ceiling ~6%) – within the method’s own error – and NO2 actually **worsened** (+7.7% real). Over 2019–2024 the de-weathered decline is statistically insignificant; meteorology alone shifts winter PM2.5 by ~17 µg/m³ [7].

FIGURE 6 OBSERVED CHANGE VS THE REAL, WEATHER-REMOVED CHANGE (YOY %)



Negative = fell. The observed particulate ‘improvement’ mostly evaporates once weather is removed; NO2 rises either way. Model skill R²≈0.74/0.84 [7].

WHY THIS IS THE HONEST SCORECARD

Raw seasonal AQI rewards good weather, not good policy. A weather-normalised target – stated with confidence intervals – is the only metric a government cannot spin. This is the single reform that would make every other one accountable [7] [39].

FIGURE 8 THE WINTER CRISIS, YEAR BY YEAR — DELHI PM2.5 BY MONTH, 1980–2022

|     | 1980s | 1990s | 2000s | 2010s | 2020s |
|-----|-------|-------|-------|-------|-------|
| Jan | 78    | 101   | 127   | 155   | 187   |
| Feb | 60    | 80    | 103   | 129   | 157   |
| Mar | 42    | 51    | 60    | 69    | 78    |
| Apr | 34    | 43    | 52    | 61    | 70    |
| May | 30    | 39    | 48    | 57    | 66    |
| Jun | 26    | 35    | 44    | 53    | 62    |
| Jul | 24    | 33    | 42    | 51    | 60    |
| Aug | 26    | 35    | 44    | 53    | 62    |
| Sep | 40    | 49    | 58    | 67    | 76    |
| Oct | 72    | 94    | 119   | 147   | 177   |
| Nov | 104   | 131   | 161   | 194   | 230   |
| Dec | 96    | 122   | 150   | 182   | 216   |

Satellite reconstruction (LongPMInd / Wei et al., ESSD 2024 + NASA MERRA-2), de-weathered in-house. October–January deepen into the worst bands decade on decade, while warm months ease. Levels are ~10 km area-averages; the satellite under-catches the most extreme early-winter days, so the true winter worsening may be larger, not smaller.

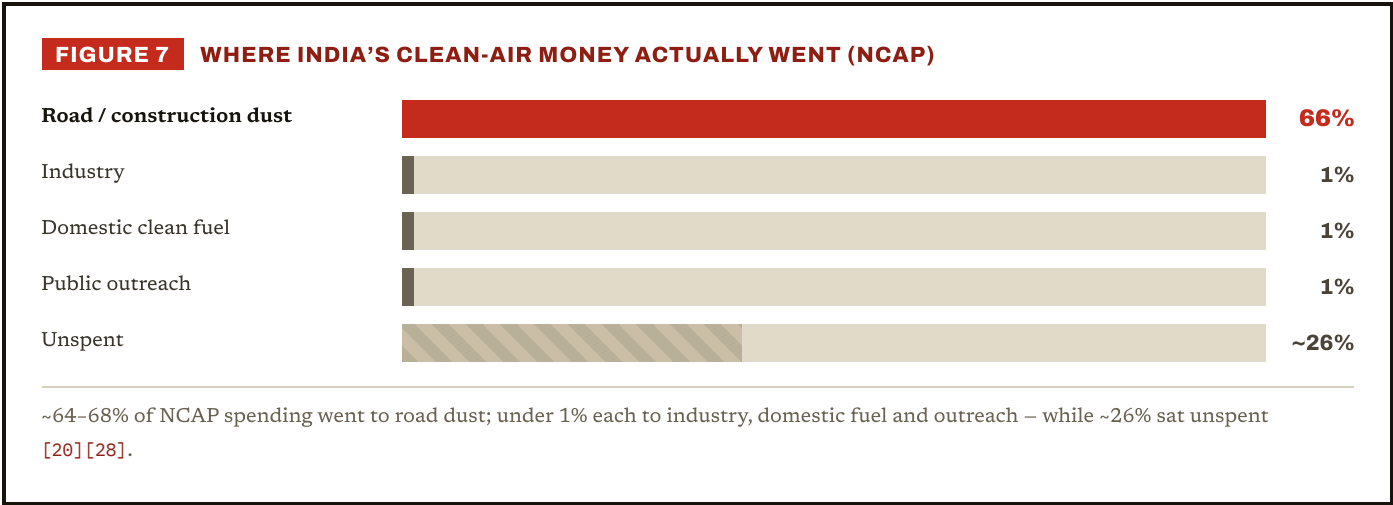
5.5 China’s proof: it is a choice, not fate

China ran the fastest big-country clean-up on record. Beijing’s annual PM2.5 fell from **89.5 µg/m³ (2013) to 27.0 (2025)** – about 70%, its first sub-30 year on record [56] – and peer-reviewed attribution finds ~80% of the 2013–17 fall was emissions, not weather [13] [25]. The biggest levers were **industry-first**: industrial emission standards, boiler upgrades, ultra-low-emission coal-power (SO2 –65%), and coal-to-clean household heating (~16.4 M homes, ~60% of the winter cut) – coordinated across a “2+26 cities” airshed with central inspections that disciplined 18,448 officials [15] [16] [23] [25].

**89.5→27**  
Beijing PM2.5, µg/m³, 2013–2025

**~80%**  
of the 2013–17 fall from emissions, not weather

**16.4 M**  
homes switched to clean heat (~60% of the winter cut)



**THE HONEST LEDGER ON CHINA**

Even after this, China’s air is still ~5.5× the WHO guideline, and campaign-style gains can partly rebound when inspectors leave – so durability needs permanent standards + monitoring, not one-off drives. Delhi starts **above China’s 2013 peak**: promise the trend, not a miracle.

# 6 The Action Table

*A prioritised, evidence-grounded framework you can champion*

Much of the highest-leverage action sits with the Centre, CAQM and neighbouring states – so the posture is: “**Delhi will do its share in full, and here is exactly what the Centre and CAQM must be forced to do.**” Each action is tied to the evidence in Part 5.

| HORIZON       | ACTION & WHAT IT DOES                                                                                                                                                                                                                                  | OWNER                     |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| IMMEDIATE     | <b>Wage-replacement with every activity ban</b><br>No construction/WFH curb without automatic DBT to registered and on-site-verified informal workers. [42] [24]                                                                                       | GNCTD                     |
| IMMEDIATE     | <b>Stand up the missing public-health half</b><br>Clean-air shelters, filtered classrooms, published school-closure thresholds, subsidised N95s for outdoor workers. [40] [44] [48]                                                                    | GNCTD + Health            |
| IMMEDIATE     | <b>Fix PUCG integrity, not just volume</b><br>Tamper-proof, camera-linked certificates + random re-tests – kill the fake-PUCG racket that hollows the pump rule. [34]                                                                                  | Transport                 |
| IMMEDIATE     | <b>Redirect anti-smog guns → site dust only</b><br>Keep mist/wheel-wash at construction sites; drop the evidence-free rooftop-gun mandate; move the spend to combustion control. [11] [12] [26] [32]                                                   | DPCC                      |
| 1–3 YEAR      | <b>Reverse the July-2025 FGD exemption; hard deadline on NCR/300-km plants</b><br>The Centre just exempted ~78% of coal units; restore + enforce FGD – a ~67% SO <sub>2</sub> cut on ~281 kt/yr, the single biggest fixed-source lever. [54] [35] [17] | Centre / CAQM             |
| 1–3 YEAR      | <b>Year-round NCR industrial standards + zig-zag kilns</b><br>China's attribution says industry & boilers, not tailpipes, delivered the biggest cuts. [16] [20]                                                                                        | CAQM / States             |
| 1–3 YEAR      | <b>State-funded clean heating + PNG/CNG expansion</b><br>For the urban poor & site labour – phased with gas supply (learn from China's 2017 shortage). [16] [17] [36]                                                                                  | GNCTD / Centre            |
| 1–3 YEAR      | <b>Crop residue: guaranteed off-take + MSP / diversification</b><br>Fix the paddy-window trap the 2009 groundwater law created; subsidise in-situ machinery. [31]                                                                                      | Centre / Punjab / Haryana |
| 1–3 YEAR      | <b>Triple real-time monitoring + 3–4 source-apportionment super-sites</b><br>You cannot manage – or assign blame for – an airshed you cannot measure. [29]                                                                                             | CPCB / DPCC               |
| LEGAL / INST. | <b>A statutory AIRSHED authority matching the physical airshed</b><br>Full Indo-Gangetic-Plain, not just NCR – or CAQM empowered and forced to act (it never has). [27] [30]                                                                           | Parliament / Centre       |
| LEGAL / INST. | <b>Hard, legally-enforceable, DE-WEATHERED targets</b><br>A mandated %-cut on a weather-normalised metric with confidence intervals; consequences fall on the State, not only citizens. [7] [19]                                                       | Parliament / CAQM         |
| LEGAL / INST. | <b>Ring-fenced, multi-year funding tied to combustion control</b><br>Reverse the ~26% underspend and the ~64–68%-on-dust skew; publish utilisation. [20] [28]                                                                                          | Centre / MoEFCC           |
| LEGAL / INST. | <b>Personal accountability + public dashboards; use CAQM §14</b><br>Named officers, published compliance – India's democratic analogue to China's cadre accountability. [25] [27]                                                                      | CAQM / Courts             |

## THE POLITICAL FRAMING

✓ **“Judge them on the weather-normalised number, not the lucky-weather headline.”**

Rigorous, honest, un-spinnable – our de-weathering is the proof.

✓ **“They’re spraying water at a chemistry problem.”**

The guns fail Delhi’s own tests; the killer particles need SO<sub>2</sub>/NO<sub>x</sub>/HCl cuts at source.

✓ **“Delhi can’t clean its air alone — and they know it.”**

Two-thirds blows in from outside; a city-only order is designed to fail.

✓ **“The poor breathe it, pay for it — and now they’re told to fix it.”**

No masks, no shelter, no wages, but handed the duty to provide clean heating.

✓ **“China proves it’s a choice, not fate.”**

A ~70% cut (89.5→27.0 µg/m<sup>3</sup>, 2013–2025), ~80% from emissions – by copying seriousness, not authoritarianism.

✓ **“They didn’t just fail — they disarmed.”**

Months before winter, in July 2025, the Centre exempted ~78% of India’s coal plants from the SO<sub>2</sub> scrubbers that cut the pollution drifting into Delhi [54].

### BOTTOM LINE

The notification is not nothing – but it is not enough, and it is not honest about how it will be judged. **Fix the certificate, protect the people, price the SO<sub>2</sub>, empower the airshed, and publish a weather-normalised target.** That is a plan. A consolidation of failing tools is not.

# REFERENCES Bibliography & Sources

All figures in this brief trace to the 58 peer-reviewed and official sources below (numbered [n] as cited). Where studies disagree (e.g. crop-burning share), the brief reports ranges, not single points; de-weathering models are skilful but imperfect ( $R^2 \approx 0.74/0.84$ ), so targets are stated with confidence intervals. A few primary papers were consulted via abstracts/secondary reporting – verify exact figures against full text before publication.

- [1] ACP 24, 10279 (2024) – Biomass-burning sources control ambient PM in Delhi <https://acp.copernicus.org/articles/24/10279/2024/acp-24-10279-2024.html>
- [2] CSE – Beyond the burn (SAFAR DSS local/regional split) <https://www.cseindia.org/beyond-the-burn-delhi-s-winter-smog-intensifies-even-after-stubble-fires-fade-12982>
- [3] RSC Env. Science: Atmospheres (2025) – CRB & PM2.5 variability 2022–2024 <https://pubs.rsc.org/en/content/articlehtml/2025/ea/d5ea00052a>
- [4] ScienceDirect – Meteorology and fog over Delhi, peak winter 2024 <https://www.sciencedirect.com/science/article/abs/pii/S0048969724066348>
- [5] ES&T/PMC (2022) – Ammonium Chloride Aerosol Liquid Water Enhances Haze in Delhi <https://pmc.ncbi.nlm.nih.gov/articles/PMC9178790/>
- [6] Water Air Soil Pollut (2022) – Review of Secondary Aerosol Formation, Delhi NCR <https://link.springer.com/article/10.1007/s11270-022-06047-0>
- [7] EGUsphere preprint (2025) – Meteorology & emissions on PM2.5/PM10 via ML (de-weathering) <https://egusphere.copernicus.org/preprints/2025/egusphere-2025-2300/>
- [8] CEEW – What is Polluting Delhi's Air? (source-apportionment review) <https://www.ceew.in/publications/delhi-air-pollution-sources-and-causes>
- [9] npj Climate & Atmospheric Science (2025) – Weak coupling of Delhi PM2.5 with Punjab/Haryana CRB <https://www.nature.com/articles/s41612-025-00901-8>
- [10] AAQR – Action Plans to Reduce PM2.5 in Hotspots of Delhi-NCR (coupled modelling) <https://aaqr.org/articles/aaqr-21-12-ssea-0377>
- [11] Down To Earth – Smog towers ineffective; ~40,000 needed (DPCC to NGT) <https://www.downtoearth.org.in/pollution/smog-towers-ineffective-at-least-40-000-needed-in-delhi-to-combat-toxic-air-dpcc-tells-ngt-92841>
- [12] ThePrint – Smog tower ineffective beyond 500 m, ₹20 cr apiece <https://theprint.in/india/governance/ineffective-beyond-500-m-costs-20-cr-apiece-why-smog-tower-isnt-the-answer-to-delhis-nasty-air/1795125/>
- [13] PMC8392899 – Clean Air Actions and Air Quality Improvements – Beijing <https://pmc.ncbi.nlm.nih.gov/articles/PMC8392899/>
- [14] PNAS (Zhang et al. 2019) – Drivers of improved PM2.5 air quality in China 2013–2017 <https://www.pnas.org/doi/10.1073/pnas.1907956116>
- [15] Nature Energy (2019) – Emission reductions from Chinese power plants after ULE standards <https://www.nature.com/articles/s41560-019-0468-1>
- [16] PMC11795148 – Coal-to-electricity transition in China's "2+26" cities <https://pmc.ncbi.nlm.nih.gov/articles/PMC11795148/>
- [17] npj Clean Air (2026) – Delhi cannot clean its air alone; airshed > local <https://www.nature.com/articles/s44407-026-00065-6>
- [18] IIT-Kanpur/CERCA – Comprehensive Study on Air Pollution in Delhi <https://cerca.iitd.ac.in/uploads/Reports/1576211826iitk.pdf>
- [19] China.org.cn – China's three-year battle for blue skies (official results) [http://www.china.org.cn/china/2021-01/09/content\\_77096962.htm](http://www.china.org.cn/china/2021-01/09/content_77096962.htm)
- [20] Mongabay India – 5 years of NCAP: why it hasn't worked (fund misallocation) <https://india.mongabay.com/2024/09/its-been-5-years-of-the-national-clean-air-programme-this-is-why-it-hasnt-worked/>
- [21] ICCT (2021) – A retrospective review of China's clean diesel program <https://theicct.org/wp-content/uploads/2021/12/review-china-diesel-jun2021.pdf>
- [22] LiveLaw – GRAP does not create enforceable WFH right (Delhi HC) <https://www.livelaw.in/high-court/delhi-high-court/delhi-high-court-scientist-dust-work-from-home-grap-enforceable-right-513169>
- [23] ScienceDirect – Impact of China's Clean Air Action; regionally dominant sources <https://www.sciencedirect.com/science/article/abs/pii/S0301479725036564>
- [24] PMC – Health impact assessment of Delhi's outdoor workers exposed to air pollution <https://pmc.ncbi.nlm.nih.gov/articles/PMC9200945/>
- [25] ACP (2019) – Anthropogenic emissions ~80% of Beijing PM2.5 decrease 2013–2017 <https://acp.copernicus.org/articles/19/13519/2019/>
- [26] Business Standard – Anti-smog gun in Anand Vihar; little effect [https://www.business-standard.com/article/current-affairs/anti-smog-gun-used-in-anand-vihar-little-effect-on-reducing-pollution-117122000735\\_1.html](https://www.business-standard.com/article/current-affairs/anti-smog-gun-used-in-anand-vihar-little-effect-on-reducing-pollution-117122000735_1.html)
- [27] Business Standard – “Total non-compliance”: SC raps CAQM (Sept 2024) [https://www.business-standard.com/india-news/total-non-compliance-sc-raps-caqm-over-failing-to-curb-delhi-s-pollution-124092700860\\_1.html](https://www.business-standard.com/india-news/total-non-compliance-sc-raps-caqm-over-failing-to-curb-delhi-s-pollution-124092700860_1.html)
- [28] CREA – Tracing the Hazy Air 2026: Progress Report on NCAP <https://energyandcleanair.org/publication/2026-progress-report-on-national-clean-air-programme/>
- [29] Newslaundry – Two-thirds of Delhi lacks reliable air-quality data (Dec 2025) <https://www.newslaundry.com/2025/12/01/two-thirds-of-delhi-does-not-have-reliable-air-quality-data>
- [30] World Bank – Striving for Clean Air (airshed; ~74% external; coordination ~45% cheaper) <https://cerca.iitd.ac.in/uploads/Reports/1671526269World%20Bank%20Document.pdf>
- [31] Kumar et al. – Groundwater-preservation policy, stubble burning & air pollution NW India <https://pmc.ncbi.nlm.nih.gov/articles/PMC8825838/>
- [32] PMC8229925 – Large-scale road water-spraying contributes to, not prevents, air pollution <https://pmc.ncbi.nlm.nih.gov/articles/PMC8229925/>
- [33] ACP (2023) – Mist-cannon trucks can exacerbate water-soluble organic aerosol and PM2.5 <https://acp.copernicus.org/articles/23/6775/2023/>
- [34] The420.in – Fake-PUCC racket (Delhi-Haryana emission-check fraud) <https://the420.in/fake-pucc-racket-delhi-haryana-emission-checks-fraud/>
- [35] Business Standard – FGD can cut SO<sub>2</sub> by 67% at NCR power plants (study) [https://www.business-standard.com/india-news/fgd-installation-can-cut-so2-emissions-by-67-at-power-plants-in-ncr-study-124111700501\\_1.html](https://www.business-standard.com/india-news/fgd-installation-can-cut-so2-emissions-by-67-at-power-plants-in-ncr-study-124111700501_1.html)
- [36] Frontiers – Elemental characteristics & source-apportionment of PM2.5, post-monsoon Delhi <https://www.frontiersin.org/journals/sustainable-cities/articles/10.3389/frsc.2021.648551/full>

- [37] Down To Earth – Revised GRAP: how the plan evolved, what can improve <https://www.downtoearth.org.in/pollution/revised-grap-from-october-1-how-the-pollution-control-plan-evolved-what-can-improve>
- [38] Business Standard – 65% of Delhi's 2025 air pollution originated outside the city (CREA) [https://www.business-standard.com/india-news/delhi-air-pollution-in-2025-65-per-cent-traced-from-outside-city-126010300515\\_1.html](https://www.business-standard.com/india-news/delhi-air-pollution-in-2025-65-per-cent-traced-from-outside-city-126010300515_1.html)
- [39] RiceIAS – India's Air Quality Crisis: Analyzing the 2026 CREA Report (year-round) <https://riceias.com/indias-air-quality-crisis-analyzing-the-2026-crea-report/>
- [40] EPIC (U. Chicago) – Delhi's air is a public-health emergency; why aren't more wearing masks? <https://epic.uchicago.edu/insights/delhis-air-pollution-is-a-public-health-emergency-so-why-arent-more-people-wearing-masks/>
- [41] The Secretariat – Biomass Burning, Dust Main Culprits Behind Delhi Pollution <https://thesecretariat.in/article/biomass-burning-dust-main-culprits-behind-delhi-pollution>
- [42] Down To Earth – With GRAP-4 construction ban, is government compensating daily-wage labourers? <https://www.downtoearth.org.in/governance/with-grap-4-enforcing-construction-ban-is-government-compensating-daily-wage-labourers>
- [43] Down To Earth – From episodic smog to structural pollution: why vehicles remain Delhi's challenge <https://www.downtoearth.org.in/air/from-episodic-smog-to-structural-pollution-why-vehicles-remain-delhis-biggest-challenge>
- [44] Beijing Municipality – Heavy Air Pollution Contingency Plan (official English text) [https://english.beijing.gov.cn/latest/lawsandpolicies/202007/t20200723\\_1957677.html](https://english.beijing.gov.cn/latest/lawsandpolicies/202007/t20200723_1957677.html)
- [45] ScienceDirect – Critical review of Delhi air-pollution contribution from paddy stubble burning <https://www.sciencedirect.com/science/article/abs/pii/S1352231025000330>
- [46] ACP (2025) – Impact of post-monsoon crop residue burning on PM<sub>2.5</sub> over northern India <https://acp.copernicus.org/articles/25/7137/2025/>
- [47] Nature Communications – Combined short- and long-term emission controls improve air quality <https://www.nature.com/articles/s41467-024-49539-9>
- [48] CNN – China smog red alerts shut down factories, schools <https://www.cnn.com/2016/12/19/asia/china-smog-red-alert/index.html>
- [49] The Federal – Delhi spent just 17% of NCAP funds in 5 years (RTI) <https://thefederal.com/category/states/north/delhi/delhi-spent-just-17-pc-of-ncap-air-pollution-funds-in-5-years-rti-223943>
- [50] CAQM Act 2021 (full text) <https://caqm.nic.in/>
- [51] Lancet Planetary Health / GBD 2019 (PMC7805008) – Health & economic impact of air pollution in India <https://pmc.ncbi.nlm.nih.gov/articles/PMC7805008/>
- [52] AQLI (EPIC-Chicago) – Delhi residents losing ~8 years to air pollution <https://aqli.epic.uchicago.edu/post/delhi-residents-losing-8-2-years-of-their-lives-to-high-air-pollution-report-en>
- [53] UNEP – A Review of 20 Years' Air Pollution Control in Beijing <https://www.unep.org/resources/report/review-20-years-air-pollution-control-beijing>
- [54] Health Policy Watch (2025) – India reverses key policy, exempting most coal plants from FGD (~78% of ~600 units) <https://healthpolicy-watch.news/india-reverses-key-policy-exempting-most-coal-fired-power-plants-from-emission-rules/>
- [55] Ajay Maken, MP – “Delhi's Air Remains a Public-Health Emergency”: submission to the Parliamentary Standing Committee on S&T, Environment, Forests & Climate Change, June 2026 #
- [56] Beijing Municipal Ecology & Environment Bureau – Status Bulletin: annual-mean PM<sub>2.5</sub> 27.0 µg/m<sup>3</sup> in 2025 (89.5 in 2013) <https://english.beijing.gov.cn/>
- [57] Chowdhury, Dey, Tripathi et al. (2017) – ‘Traffic intervention’ policy fails to mitigate air pollution in megacity Delhi <https://www.sciencedirect.com/science/article/abs/pii/S1462901117300424>
- [58] MDPI Forests (2023) – Accuracy Assessment of a Drone-Based Real-Time Open-Burning Imagery Detection system <https://www.mdpi.com/1999-4907/14/9/1852>

## AJAY MAKEN

MEMBER OF PARLIAMENT

An evidence review – spanning statistics, atmospheric science, chemical engineering and investigative analysis – of the GNCTD winter-pollution notification of 23 June 2026. The de-weathered figures draw on the office's adjudicated matched-station analysis and its June 2026 submission to the Parliamentary Standing Committee on Science & Technology, Environment, Forests & Climate Change; satellite reconstruction and design produced in-house.

