

Does Buying an EV Actually Save You from Pollution?

A Data Analysis of Air Quality & Vehicle Adoption in India

Project by Aditya Raj

The Client Challenge

- **Client:** AirPure Innovations (Market Entry Strategy).

- **The Myth:** "We assume cities with high EV adoption have cleaner air."

- **The Question:** "Is this true? Or are EV owners still breathing toxic air?"

- **My Role:** Analyzed 3 datasets (Pollution, Health, Vehicles) to find the truth.

The image shows two side-by-side screenshots of the Microsoft SQL Server Management Studio (SSMS) interface. Both windows are titled 'AirQualityProject' and show a 'Solution Explorer' pane on the left containing database objects like 'Databases', 'Tables', 'Views', 'Procedures', and 'Management'. The top-left window has three tabs open: 'SQLQuery10.asp - Aditya\adity' (with ID 65), 'SQLQuery14.asp - Aditya\adity' (with ID 66), and 'SQLQuery20.asp - Aditya\adity' (with ID 52). The bottom-left window has one tab open: 'SQLQuery10.asp - Aditya\adity' (with ID 65). Both windows have a 'Results' tab at the bottom where the query results are displayed.

Left Window (Tab 52):

```
1 USE AirQualityProject;
2
3 -- Step 1: Find the Top 10 States (that have the most cities monitored)
4 WITH TopStates AS (
5   SELECT TOP 10 state
6     FROM aq_final
7   GROUP BY state
8   ORDER BY COUNT(DISTINCT area) DESC
9 )
10
11 -- Step 2: Analyze Monthly trends only for these big states
12 SELECT
13   state,
14   DATEPART(MONTH, date) as Month_Number,
15   MONTH(date) as Month_Number, -- We need this to sort January (1) to December (12)
16   AVG(aqi.value) as Average_AQI
17   FROM
18     aqi_final
19   WHERE
20     state IN (SELECT state FROM TopStates)
```

Left Window (Tab 65):

	state	Month_Name	Month_Number	Average_AQI
1	Andhra Pradesh	January	1	114
2	Andhra Pradesh	December	12	99
3	Andhra Pradesh	November	11	95
4	Andhra Pradesh	February	2	94
5	Andhra Pradesh	March	3	78
6	Andhra Pradesh	October	10	77
7	Andhra Pradesh	April	4	70
8	Andhra Pradesh	May	5	68
9	Andhra Pradesh	June	6	63
10	Andhra Pradesh	August	8	55

Right Window (Tab 66):

```
1 USE AirQualityProject;
2
3
4 SELECT
5   state,
6   SUM(cases) as Total_Respiratory_Cases
7
8   FROM
9     idsp_final
10
11 WHERE
12   disease_illness_name LIKE '%Respiratory%'
13   OR disease_illness_name LIKE '%Influenza%'
14
15 GROUP BY state
16
17 ORDER BY
18   Total_Respiratory_Cases DESC;
```

Right Window (Tab 65):

	state	Total_Respiratory_Cases
1	Meghalaya	129
2	Uttarakhand	110
3	Kerala	19
4	Jammu and Kashmir	10
5	Karnataka	1

Insight 1: The "EV Paradox"

Uttar Pradesh & Delhi
have the **HIGHEST** EV
Registrations (900k+)

...But they still suffer
from **SEVERE** Air
Quality (AQI 200+)

Conclusion: EVs alone aren't fixing the air yet. These
are prime markets for Air Purifiers

Insight 2: The Invisible Killer (Bengaluru)

- **Observation:** Bengaluru rarely has "Poor" AQI days.
- **The Trap:** People think the air is safe because they don't see smog.
- **The Data:** PM2.5 levels are persistently "Moderate"—enough to cause long-term lung damage.
- **Strategy:** Marketing Pivot: Don't sell 'Fear of Smoke'. Sell 'Long-term Wellness' and 'Invisible Protection'.

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Air Purifier Market Strategy Dashboard

153M
Lives Impacted

111.13
Avg National AQI

5M
Total_EVs

Year
All

Average AQI by Area

state: Delhi, area: Delhi, prominent_pollut.: PM2.5

Average of aqi_value	state	area	prominent_pollut.
111.13	Delhi	Delhi	PM2.5
206.42	Delhi	Delhi	PM2.5
164.94	Jharkhand		PM2.5,PM10
160.26	Himachal Pradesh		PM10
157.16	Bihar		PM10,NO2,PM2.5,O3
141.56	Chandigarh		O3

Market Strategy Page 2 Projected Health Cost Page 4 Product Strategy +

Page 1 of 5 dashboard • Last saved: Today at 2:02 am adityaraj77716@codebasics.in Share

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Count of prominent_pollutants by prominent_pollutants

pollutant	Count	Percentage
PM2.5	1,45K (53.47%)	53.47%
O3	779K (15.82%)	15.82%
CO	3,40K (7.09%)	7.09%
NO2	4,63K (5.44%)	5.44%

Sum of vehicle_count and Average of aqi_value by state

state	Sum of vehicle_count	Average of aqi_value
Assam	0.05M	150
Assam	0.1M	180
Assam	0.2M	120
Assam	0.3M	140
Assam	0.4M	110
Assam	0.5M	130
Assam	0.6M	160
Assam	0.7M	190
Assam	0.8M	220

Average of aqi_value by Year and area

Year	Jaipur	Lucknow	Patna
2022	120	120	180
2023	125	125	190
2024	130	130	160
2025	140	140	190

Respiratory Cases

state	disease,illness_name	Respiratory Cases
Assam	Acute Diarrhoeal Disease	1145
Assam	Acute encephalitic syndrome	1145
Assam	Acute Flaccid Paralysis	1145
Assam	Acute Gastroenteritis	1145
Assam	Acute Malaria	1145
Assam	Acute Hepatitis B	1145
Assam	Animal bite - Dog Bite	1145
Assam	Animal bite - Snake Bite	1145
Assam	Assault	1145
Assam	Chikungunya and Measles	1145
Assam	Chikungunya	1145
Assam	Cholera	1145
Assam	Dengue	1145
Assam	Diarrhoea and Chikungunya	1145
Assam	Diphtheria	1145
Assam	Dysentery	1145
Total	Low Durability	No
Total	High	High
Total	Budget (₹8k+)	Budget (₹8k+)

First Tier 1, App, Control

Brand	First Tier 1, App, Control	First Tier 2, Service, Reach	First Price, Segment
Philips	Too Expensive	Low	Mid-Range (₹40k+)
Dyson	New Brand	High	Mid-Range (₹15k+)
Xiaomi	Old Design	Medium	Budget (₹8k+)

First Tier 2, Service, Reach

Brand	First Tier 2, Service, Reach	First Price, Segment
Philips	Too Expensive	Low
Dyson	New Brand	High
Xiaomi	Old Design	Medium

Market Strategy Page 2 Projected Health Cost Page 4 Product Strategy +

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Projected Health Cost by state

state	Projected Health Cost
Jharkhand	~18M
Maharashtra	~5M
Assam	~3M
Uttar Pradesh	~1M
Odisha	~1M
Chhattisgarh	~1M
West Bengal	~1M
Madhya Pradesh	~1M
Rajasthan	~1M
Andhra Pradesh	~1M
Karnataka	~1M
Nagaland	~1M
Arunachal Pradesh	~1M
Kerala	~1M
Meghalaya	~1M
Manipur	~1M
Bihar	~1M

Market Strategy Page 2 Projected Health Cost Page 4 Product Strategy +

Page 3 of 5 89%

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Refresh Publish Prep data for AI Copilot ...

Strategic Product Requirements & Pricing

The "North India" Edition (Premium)

Target: Delhi, UP, Bihar (High PM2.5 Smoke).
Core Tech: H13 HEPA Filter (Essential for smoke/smog).
Smart Feature: Real-time PM2.5 Display (Trust builder).
Why: Data shows 70% of pollutants here are fine particles (PM2.5).

The "Industrial" Edition (Heavy Duty)

Target: Jharkhand, Odisha (Mining Dust/Coal).
Core Tech: Washable Pre-Filter + Carbon Layer.
Durability: Reinforced mesh to prevent clogging from heavy dust (PM10).
Why: High "Respiratory Case" volume in Jharkhand requires heavy-duty filtration, not just delicate HEPA.

The "Tiered Pricing Model" (The Money Slide)

- 1. The "Eco-Bundle" (₹25,000)**
Target Segment: EV Owners (High Correlation with Wealth).
Strategy: Bundle with new EV purchases at dealerships.
Pitch: "Protect your lungs like you protect the planet."
- 2. The "Health-First" Model (₹12,000)**
Target Segment: Parents in Tier 2 Cities (Patna, Lucknow).
Strategy: EMI options (₹1,000/month) to make it affordable.
Pitch: "Cheaper than a hospital visit" (Leveraging the Health Cost data).
- 3. The "Mass Market" Entry (₹6,999)**
Target Segment: General Public.
Strategy: Basic filtration, no IoT/App (to cut costs). Matches Xiaomi on price but beats them on Service Reach.

Market Strategy Page 2 Projected Health Cost Page 4 Product Strategy +

Page 5 of 5 89%

Tech Stack & Deliverables

- **SQL Server:** Complex Joins, CTEs, Window Functions.
- **Power BI:** Interactive Dashboards & Risk Scoring.
- **Excel:** Data Cleaning & Verification.

[Link to Full Project & SQL Code in the Comments](#) 