Product Requirement Document

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Document Overview

The product recommended is a portable, battery-supported air purifier specifically designed for Indian metropolitan environments, where indoor and outdoor air quality challenges stem not only from fine particulate matter **(PM2.5)** but also from **abundant dust, vehicular emissions, construction debris, and even local sources such as drain emissions**. These pollution sources fluctuate with weather conditions (e.g., dust storms, humidity, temperature inversions), intensifying urban exposure.

Why build this?

Urban inhabitants in cities like Delhi, Mumbai, Bangalore, and Chennai face complex, multi-source pollution:

- Heavy vehicle traffic produces exhaust rich in PM2.5, nitrogen oxides, and ***volatile organic compounds*** (VOC)
- Construction activities contribute coarse dust and fine particulate debris indoors and outdoors
- Road dust and urban grime, often re-suspended by passing vehicles and wind
- Drain emissions and localized organic volatile compounds increasing indoor VOC levels
- Weather conditions (dry seasons, wind patterns, temperature inversions) exacerbate pollutant accumulation and penetration indoors

This complexity demands air purifiers optimized not only for PM2.5 but also effective against coarse dust, VOCs, and odors, with resilient, multi-stage filtration adapted for Indian city pollution profiles.

What exactly is the problem we are solving?

1. **Health Risks Despite Awareness:** Middle-income urban consumers in metros like Delhi, Mumbai, Bangalore, and Chennai know the dangers of PM2.5, dust, and VOCs, yet remain regularly exposed—especially during traffic, construction, and seasonal spikes.

2. **Affordability vs. Features:** Premium purifiers offer UV filtration, smart integration, and large coverage, but remain unaffordable for much of this segment seeking effective, reliable purification.

3. **Gaps in Mid-Tier Options:** Current mid-priced models often lack key capabilities—battery backup for outages, filters for local dust/VOCs, and easy maintenance—reducing practicality and value.

4. **Portability & Power Resilience:** Consumers need portable, battery-supported units for use across rooms or workplaces during frequent power cuts. Few models address this.

5. **Ease of Use & Maintenance:** Complex controls and difficult filter changes deter consistent use, especially for first time buyers, busy households and young professionals.

6. **Pollution Complexity:** Indian metros face diverse sources—vehicle emissions, construction dust, VOCs, industrial fumes—yet no mid-tier purifier is tailored to address this mix effectively at an accessible price.

Solution Overview

A metro-smart, portable air purifier built for India's mid-priced, high-value segment — engineered to handle the unique pollution mix in urban Indian homes, with the flexibility and reliability busy city households demand.

- **Optimized for Indian metro air:** High-efficiency PM2.5/PM10 removal plus pre-filter for heavy dust from traffic, construction debris, and seasonal storms. Activated carbon tackles VOCs and odors from vehicular exhaust, drains, and indoor sources.

- **Uninterrupted protection:** Long-lasting rechargeable battery ensures continuous operation during power cuts — a common challenge in many metro areas.

- **Hassle-free maintenance:** Tool-free, quick-swap cartridges with locally available replacement filters so there's no downtime waiting for parts.

- **Move it where it's needed:** Lightweight, compact design for easy portability between rooms, offices, or balconies.

- **Instant feedback, simple control:** Clear AQI display and intuitive interface make it effortless for anyone in the household to check and improve indoor air quality.

Core value proposition:
"Cleaner air for every metro home — portable, reliable, and designed for India's toughest city pollution challenges."

Solution Features

Must-Have Feature	**Description / Purpose**
True HEPA H13 filtration	Captures 99.97% of fine particles like PM2.5, PM10, allergens, dust, and microscopic pollutants
Pre-filter for coarse dust	Captures large dust particles and debris common in urban environments (construction, road dust)
Activated Carbon Filter	Removes volatile organic compounds (VOCs), odors from vehicle emissions, drains, and indoor sources
Real-time PM2.5 and VOC Sensors	Provides live air quality monitoring and feedback to users
Rechargeable Battery for >4-8 hrs	Ensures continuous air cleaning during frequent urban power outages
Portability	Lightweight and compact design for easy movement across rooms or offices

Auto mode with sensor-based fan speed	Automatically adjusts purification level based on air quality readings
Quiet Operation (<45 dB)	Suitable for use in bedrooms and living spaces without disrupting daily life
Easy, Tool-free Filter Replacement	Allows quick swap of filters with locally available replacements, minimizing downtime
Intuitive User Interface	Simple controls and easy-to-understand air quality display for all household members

Target Audience Demographics

Core Segment: Metro Urban Families & Professionals

- **Age Range:** 20–55 years (primary buyers), influencing purchase decisions for the household.
- **Income Band:** Middle to upper-middle income (₹8–25 LPA household income bracket).
- **Urban Lifestyle Context:** Residing in medium to large apartments or urban houses in Tier-1 metros, often managing busy schedules and valuing convenience.

Geography Focus:

- **Primary metros:** Delhi NCR, Mumbai, Bangalore, Chennai, Kolkata, Hyderabad, Pune.
- **Urban Pollution Profile:**
  - Delhi NCR / Kolkata: High PM2.5 spikes from vehicle emissions, crop burning drift, winter smog.
  - Mumbai / Chennai: Vehicle exhaust, coastal humidity trapping pollutants, drain odors, construction dust.
  - Bangalore / Hyderabad / Pune: Construction dust, traffic congestion emissions, seasonal dust storms.

Typical Use Cases:

- Apartments, high-rises, and gated communities
- Offices or home offices in urban settings
- Shared living spaces or rental apartments in dense city areas
- Bedrooms, living rooms, or workspaces where protection is needed during pollution episodes and power outages

User Personas and User Stories

Persona / Segment	Key Buying Motivation	User Story (Brief)
Young Urban Family (with Kids)	Protect children from city air pollution and allergens	"As a parent, I want our purifier to keep my kids' bedroom air clean—day and night—even during power outages."
Caregiver for Elderly Parent(s)	Reduce health risk for seniors, especially during smog spikes	"As someone with elderly parents at home, I need a purifier that's quiet and easy for them to use while I'm at work."
Urban Pet Owner	Control allergens (dander), pet odors, and city dust	"As a pet lover, I want a purifier that helps with fur, smells, and metro dust—especially in living and guest areas."
Young Working Professional (Single/Couple)	Flexible clean air for dynamic urban life and health-conscious living	"As a busy professional, I want a portable purifier that I can move between my bedroom and home office, and it should run even in power cuts."
WFH Employee	Consistent comfort and cleaner air during work hours	"As someone working from home, I want a purifier that helps me focus and stay healthy in my apartment during peak traffic hours."

Competitor Analysis

Brand	Features They Have	Features They Lack / Are Limited
Dyson	- HEPA H13 filtration capturing 99.95% of particles as small as 0.1 microns - Activated carbon filter - Real-time PM2.5, PM10, NO2, VOC sensors - 350° oscillation for whole room air circulation - Air Multiplier™ technology for powerful airflow - Night mode (quiet and dimmed) - Built-in filter change reminders - Voice control and app connectivity - Heating and cooling with purifier all-in-one	- Limited battery/portable models (mostly plug-in) - Premium priced, less affordable for mid-tier segment
Philips	- HEPA filtration removing 99.97% of particles - High CADR for quick purification - Real-time AQI display and sensors - Intelligent auto mode adjusting speed - Energy efficient, quiet operation - Filter lifetime indicator - Proven virus and allergen removal (tested against H1N1, SARS-CoV-2) - Compact and fast purification	- Limited portability and battery backup - Lacks full smart home integration scenarios
Daikin	- Titanium apatite photocatalytic filter - Streamer discharge technology for odor and allergen breakdown - Plasma dust collection - Dust and odor sensor lamps with color-coded indication - Energy-saving inverter and modes - Anti-pollen mode	- Limited app or voice smart features - Less global brand presence in smart connectivity compared to others

Panasonic	- Multi-stage filtration with HEPA filters - Nanoe™ technology releasing electrostatically atomized water particles for virus and mold inhibition - Energy efficient with ECONAVI technology - Humidifying function - Intelligent sensors for air quality and humidity - Quiet sleep and spot air modes	- Portable/battery models sparse - Limited voice control or full app ecosystem
Honeywell	- 4-stage filtration (Pre-filter, H13 HEPA, Activated Carbon, Nano-Silver antibacterial) - Large coverage area with 3D air flow - Real-time PM2.5 indicator - Child lock and sleep mode with timer - Filter reset reminders - Low noise operation	- Limited cutting-edge smart home features - Mostly plug-in, no battery portability indicated
Xiaomi	- HEPA and activated carbon triple-layer filtration - High CADR with fast purification - Ionizer feature - Laser particle sensor - OLED touchscreen display - Wi-Fi connectivity with app control - Voice assistant support (Alexa, Google) - Child lock feature - Compact, energy efficient	- Battery-powered models are limited - Premium filtration tech like UV/streamer not common

Tiered Pricing Matrix

Tier	Target Segment	Price Range	Key Feature Highlights
Entry-Level	Price-sensitive metro households, young families, and professionals	₹7,000 – ₹12,000	Core HEPA H13 + activated carbon filtration Pre-filter for coarse dust Basic digital PM2.5/VOC sensors Manual and auto mode Portable, quiet operation Rechargeable battery for 4-8 hours Easy tool-free filter replacement
Mid-Level	Urban middle-income families and professionals seeking higher value	₹12,000 – ₹25,000	Enhanced filtration with faster CADR (clean air delivery rate) Full sensor suite (PM2.5, VOC) AQI-linked auto mode Better battery runtime Compact portability Digital display App connectivity with alerts Low-noise performance Easy filter swap with local availability
Premium	Affluent metro users wanting top-end features	₹25,000 – ₹45,000	Advanced filtration, including UV/ionization AI optimization Voice control and smart home integration Large room capacity Fast recharge Premium design and aesthetics

MVP Recommendation

Target tier: Mid- Level

MVP Scope:

- True HEPA H13 filtration plus pre-filter and activated carbon for complex metro pollution mix (PM2.5, dust, VOCs)
- Real-time PM2.5 and VOC sensors with digital AQI display for immediate feedback
- Rechargeable battery providing 4–8 hours of operation during frequent power outages
- Lightweight, portable design for easy room-to-room use
- Auto mode with sensor-based fan speed adjustment and quiet operation (<45 dB)
- Easy, tool-free filter replacement backed by local availability
- Optional app connectivity for alerts and usage monitoring (dependent on final scope)

Rationale:
This **mid-level** focus allows AirPure Innovations to address the **largest high-value opportunity**—buyers who are health aware, affected by multiple urban pollution sources, and willing to invest in reliable, convenient solutions, but for whom premium-level cost/features are out of reach.

MVP Success Metrics

North Star Metric:
Number of metro households actively running the purifier ≥8 hours/day during high AQI periods.

This directly reflects deep engagement and real-life product impact among the target segment.

Other Success Metrics:

1. Monthly Filter Replacement Rate: *Measures sustained usage and successful maintenance/adherence among users.*
2. User Satisfaction Score (NPS or direct survey rating): *Indicates real-world acceptance of MVP features like portability, battery backup, and ease of use.*
3. Average Daily Runtime During Power Outages: *Tracks how effectively the battery feature addresses metro user pain points.*