





Breathe Easy India: A Solar-Powered IoT Air Purifier for the Next Generation

Tackling India's air crisis with sustainable technology designed to protect our most vulnerable—newborns and children.

 SUSTAINABLE

 IOT-ENABLED

 SOLAR-POWERED

THE INVESTIGATION

Born Into a Gas Chamber

The Crisis

Delhi's air quality has reached catastrophic levels, with PM2.5 concentrations regularly exceeding safe limits by 10-15 times. Newborns and children are the most vulnerable, breathing toxic air from their first breath.

Every child born in Delhi today enters an environment that threatens their developing lungs and long-term health.

300+

PM2.5 Levels

Average micrograms per cubic
meter during peak pollution
season

15x

WHO Limit

Times higher than safe exposure
levels for children

The impact on infant respiratory systems is severe and lasting. We must act now to protect the next generation.

Our Solution: Clean Air for Every Family

We've developed a low-cost, sustainable air diffuser and purifier specifically designed for families with newborns and young children. This system combines traditional cooling methods with modern filtration technology, all powered by renewable solar energy.

Affordable

Low-cost design
accessible to all
families

Sustainable

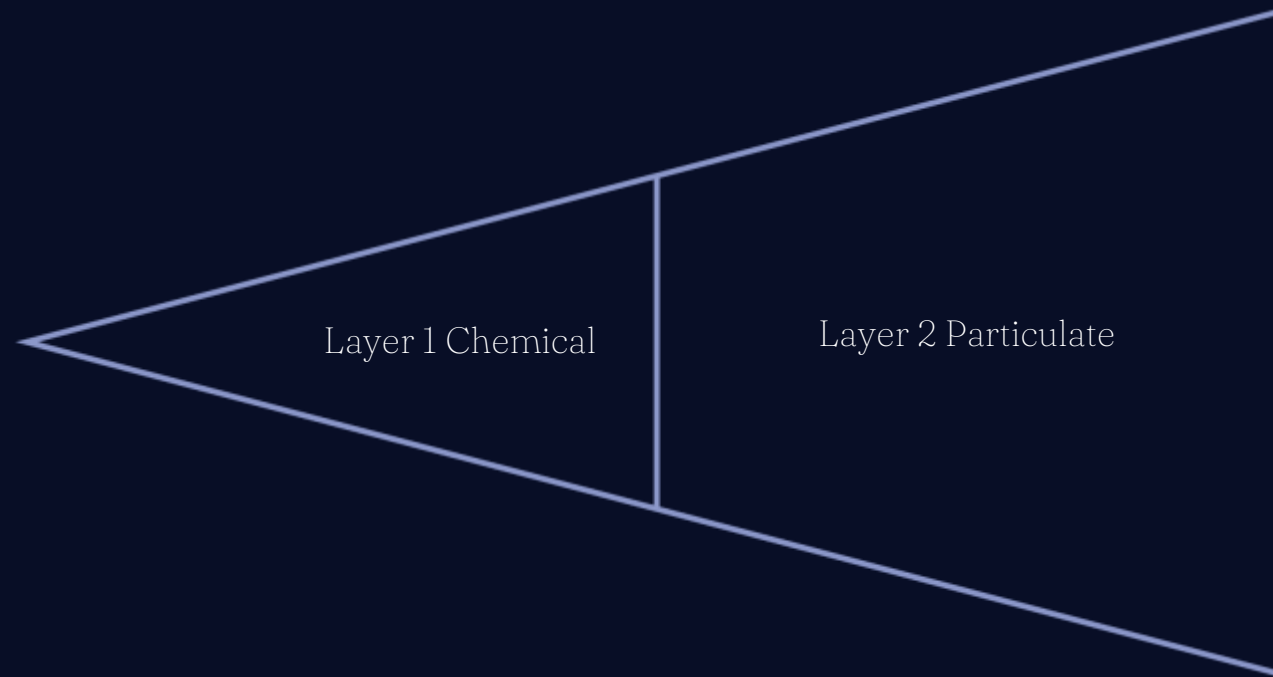
Zero electricity
costs with solar
power

Effective

Dual-layer filtration
for maximum
protection



The Cooling & Filtering System



Our innovative dual-mesh system provides comprehensive air purification through two distinct stages of filtration.

1

Layer 1: Chemical Filtration

Water cooler mesh integrated with carbon rods effectively removes chemical pollutants, odors, and volatile organic compounds from the air.

2

Layer 2: Particulate Trapping

Secondary cooler mesh with replaceable cotton filters captures fine particulate matter including PM2.5 and PM10, protecting delicate lungs.



Airflow & Power: Maximum Efficiency, Zero Grid Dependency



Dual-Fan System

Two high-efficiency fans work in tandem to maximize air displacement, ensuring rapid circulation and purification throughout the room.



Solar-Powered Circuit

Fully off-grid operation powered by solar panels, eliminating electricity costs and ensuring sustainable, continuous operation even during power outages.

The system operates independently of the electrical grid, providing reliable air purification 24/7 with zero ongoing energy costs—a critical advantage for families in all economic situations.

ESP8266 @ Blynk: Smart Monitoring for Peace of Mind



Connected Air Quality

Our system integrates the ESP8266 microcontroller with the Blynk IoT platform, enabling real-time remote monitoring and data tracking via Wi-Fi connectivity.

01

Real-Time Monitoring

Track air quality metrics and system performance from anywhere

02

Historical Data

Analyze trends and patterns in your home's air quality over time

03

Remote Control

Adjust settings and receive alerts directly on your smartphone

The "Voice" of Maintenance

Maintaining filter efficiency is critical for protecting your family's health. Our system includes an integrated speaker that uses digital audio alerts to notify parents when the cotton filter needs replacement.



Audio Alerts

Clear voice notifications when "cotton is bad" and requires replacement



Timely Reminders

Proactive maintenance scheduling ensures continuous protection



Long-Term Efficiency

Consistent performance through proper filter management

This intelligent maintenance system ensures that families never compromise on air quality due to forgotten filter changes, maintaining optimal protection for children's developing respiratory systems.



Actions Taken & Evidence

Prototype Development

Built multiple iterations to optimize the dual-mesh filtration system and cooling efficiency

1

ESP8266 Programming

Developed custom firmware for IoT connectivity and smart monitoring capabilities

3

2

Airflow Testing

Conducted rigorous testing to measure air displacement rates and filtration effectiveness

4

Field Validation

Real-world testing in homes to validate performance and user experience

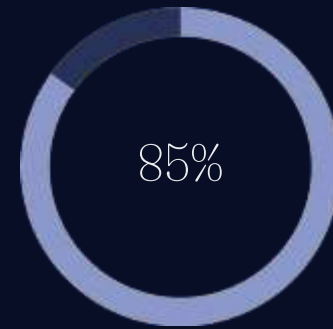
Our investigation journey involved hands-on prototyping, extensive testing, and iterative refinement. We documented airflow patterns, measured filtration efficiency, and fine-tuned the IoT integration to create a system that truly meets the needs of Delhi families.

📄 Documentation including photos, videos, and test data available for review

Impact & Results: Protecting the Next Generation

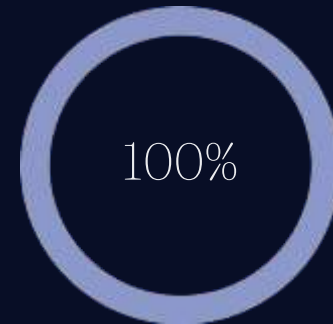
Measurable Benefits

Our solar-powered IoT air purifier delivers tangible improvements for families with infants and young children, addressing both immediate health concerns and long-term sustainability.



Indoor PM2.5 Reduction

Significant decrease in harmful particulate matter



Solar-Powered

Zero electricity costs for continuous operation



Protection

Continuous air purification and cooling

Real Impact & Transformative Outcomes

This innovative solution extends beyond simple air purification, creating a ripple effect of positive change for vulnerable families:

Enhanced Health for the Youngest: By significantly reducing indoor PM2.5, our system directly contributes to fewer respiratory infections, reduced incidence of asthma, and improved lung development in infants and young children. Cleaner air during critical developmental stages can lead to long-term cognitive benefits and healthier childhoods.

Profound Family Peace of Mind: Parents gain invaluable emotional and psychological reassurance. Real-time monitoring provides transparent data, allowing families to see and trust the clean air their children are breathing. This knowledge alleviates anxiety and fosters a sense of security.

Sustainable Economic Advantages: The solar-powered design eliminates ongoing electricity costs, offering substantial long-term savings for households. Furthermore, by reducing pollution-related illnesses, families can anticipate lower medical expenses and fewer lost workdays, freeing up vital resources for other needs.

Meaningful Environmental Contribution: Operating entirely on solar energy, the system helps reduce household carbon footprints, contributing to broader efforts to combat air pollution and climate change in Delhi. It offers sustainable cooling without burdening the city's energy infrastructure.

Promoting Social Equity: Designed to be accessible and affordable, this technology bridges the gap for low-income families who are often disproportionately affected by poor air quality. It ensures that advanced air purification is not a luxury, but a fundamental right, fostering greater health equity across communities.

Future Scalability: A Cleaner, Healthier India

Our vision extends beyond individual homes to community-wide impact. We're developing plans for mass production and distribution to make clean air accessible to every family in Delhi.



Mass Production

Scale manufacturing to reduce costs and increase accessibility across all economic segments



Community Distribution

Partner with local organizations and government programs to reach families most in need



Regional Expansion

Adapt the solution for other polluted cities across India and South Asia

Every child deserves to breathe clean air. Together, we can make this a reality for Delhi and beyond.

