

A Low Cost Sensor for detecting Pollution 'Hot Spots' at locations with Limited/No Internet Access

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Air Quality in India (2016)

Urban areas in India experience very high concentration of airborne fine particulate matter (PM_{2.5}).

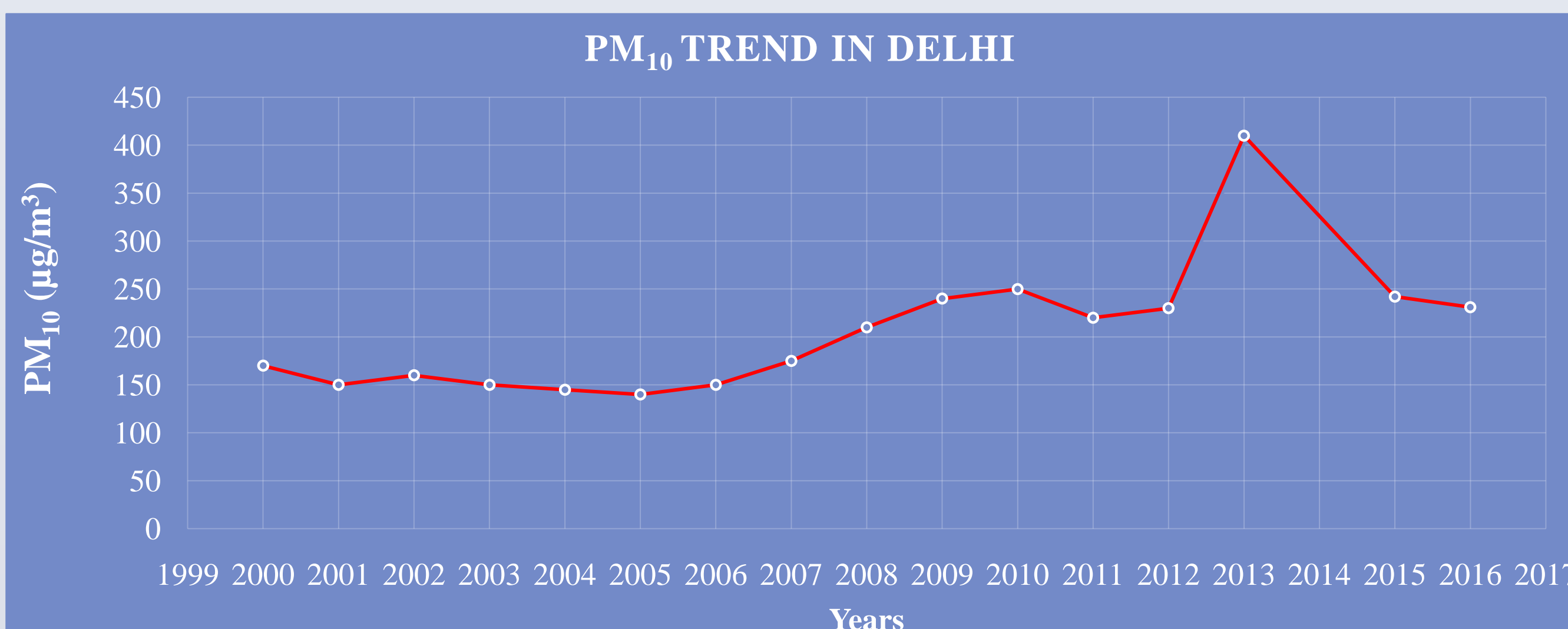
Pollutant levels that have crossed the standard limits are highlighted in "yellow".

Monitoring stations	Air Quality Parameters							
	PM ₁₀		PM _{2.5}		SO ₂		NO ₂	
	Annual Average (µg/m ³)	Standard (µg/m ³)	Annual Average (µg/m ³)	Standard (µg/m ³)	Annual Average (µg/m ³)	Standard (µg/m ³)	Annual Average (µg/m ³)	Standard (µg/m ³)
Delhi	334.18	100	130.42	60	17.05	80	68.51	80
Mumbai	82.13	100	35.85	60	7.11	80	11.14	80
Chennai	-	100	65.51	60	22.23	80	13.04	80
Kanpur	-	100	127.38	60	5.05	80	56.25	80
Hyderabad	-	100	45.89	60	13.91	80	-	80
Ahmedabad	-	100	115.23	60	57.79	80	35.84	80
Patna	-	100	125.92	60	-	80	42.15	80

Source: CPCP real-time monitoring data

Temporal trends in Particulate Matter levels in Delhi

PM₁₀ is showing general increasing trend in Delhi, this maybe attributed to the increasing number of vehicles and re-suspension of natural dust.

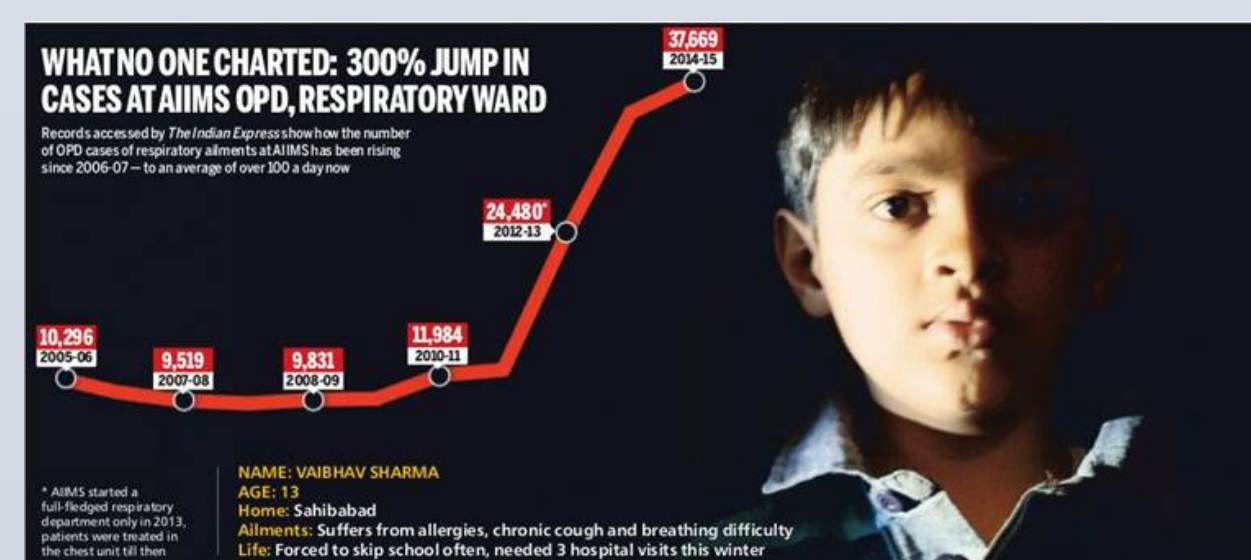


Source: NAAQ status and trend report (2012)

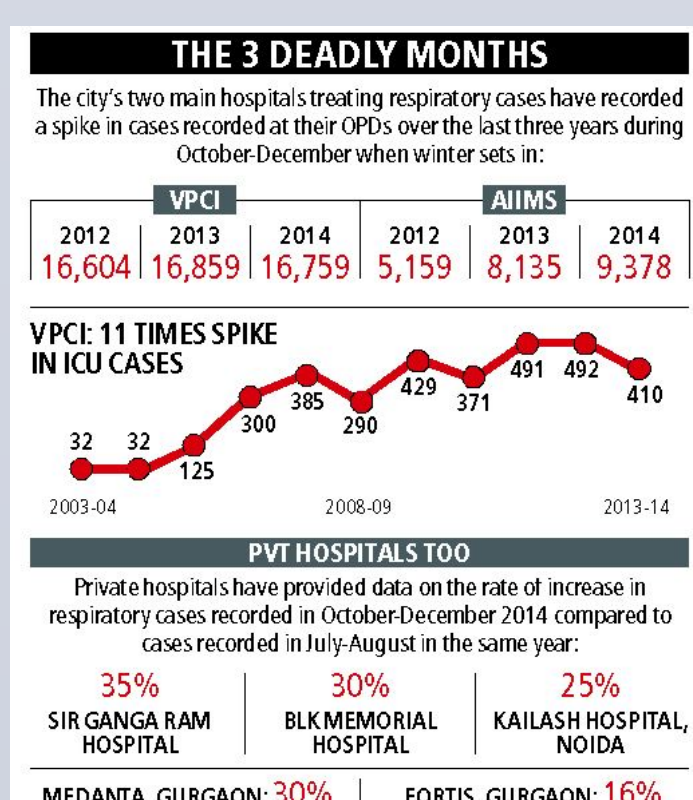
Poor Air qDeterioration in Health

Leave Delhi: Doctors are prescribing to patients with serious respiratory ailments

11-time rise in ICU cases at Patel Chest Institute; pollution not only affects lung function, it hits blood pressure levels too.



Source: Prof S K Chhabra, head of cardiorespiratory physiology, VPCI, at his office on Tuesday. He says evidence clearly shows respiratory diseases are associated with worsening air pollution. (Source: IE photo by Neeraj Priyadarshi)



Source: The Indian Express 2 April, 2015 newspaper article

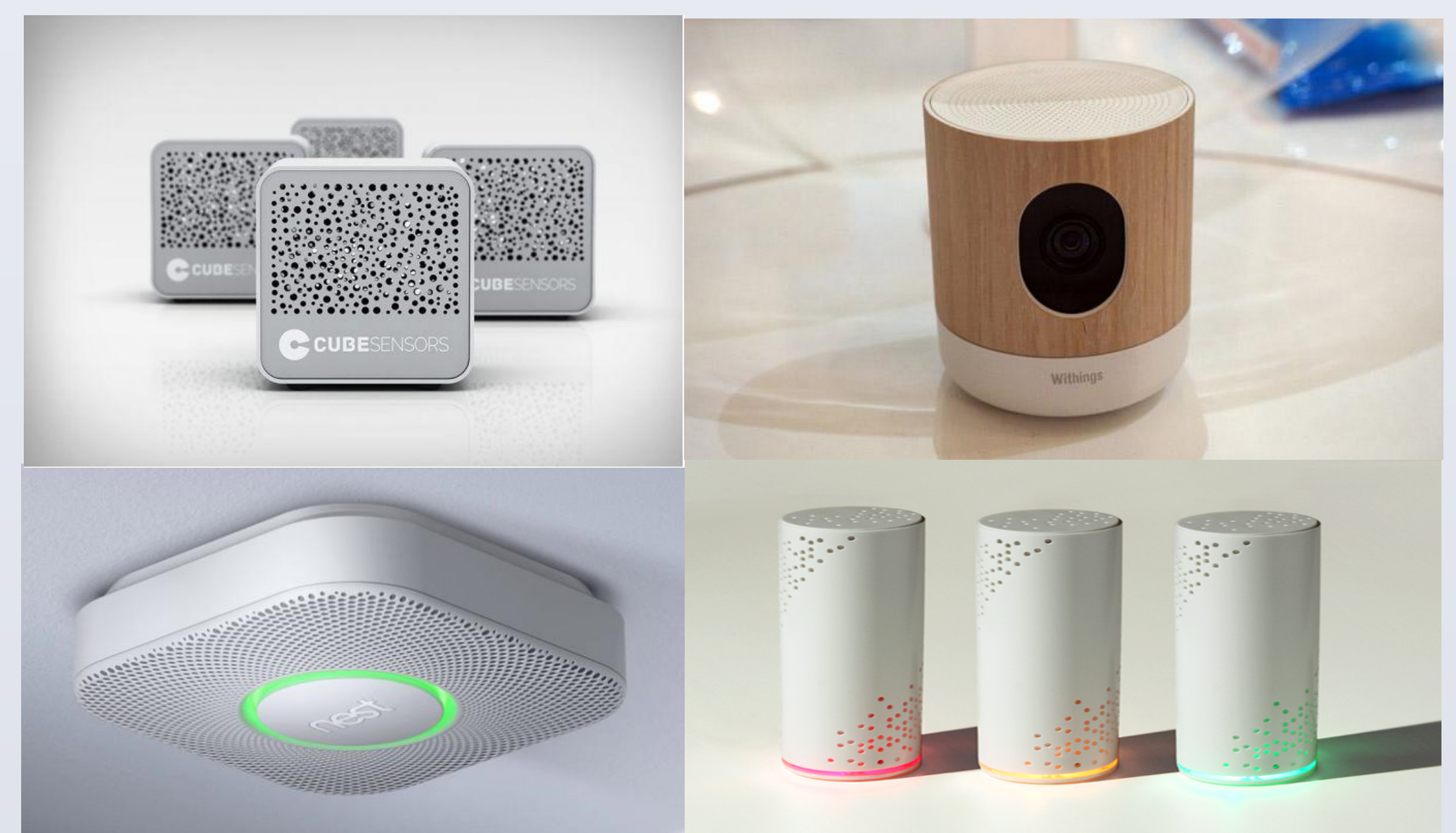
Personal Air Sensors

Objective:

- Air pollution sensors are devices that detect and monitor the presence of air pollution in the surrounding area. They can be used for both indoor and outdoor environments.
- These sensors can be built at home, or bought from certain manufactures. The objective of the personal air sensor is to warn a individual against rising pollutant level so that individual can plan his/her move accordingly to reduce the harmful effect due to high pollutant level.
- These sensors can help serve many purposes and help bring attention to environmental issues beyond the scope of the human eye.

Currently used in India:

- Indian people generally depends on data from Air Quality monitoring stations.
- People from small cities are not that much aware of personal exposure and hence didn't even bother to check Air Quality monitoring station data.
- But in urban regions many people are installing air pollution sensors in their smart homes.



Limitations:

Personal Air Sensors are of high cost and not everyone in India can afford them. That's why we came up with an idea of Portable Low Cost Sensors.

Portable Low Cost Sensors

Features:

With some modifications to current air pollution sensors handheld/portable sensors can be made with build in power supply and storage that can work even without internet access in remote areas of India.

Parts of portable air sensor:

- Air Sensor
- Storage
- Battery

A person can use portable sensor for a month, after that he can come to tweaking center. On these centers month long air quality data stored on device's storage will be uploaded to the main air quality database and storage device of the device will be emptied. Apart from this battery of the device will also be charged and fine tuning of the sensors can be done for the upcoming seasons that will help individual using the device to be warned better against high pollutant level.

Advantages:

- Low cost
- No power supply need
- No internet needed
- It will build up air quality index database which can be further used in studies and taking better controlling measures.