

Case Study

Delhi's First Mobile Air Monitoring Station Collects Valuable Air Pollution Data

Delhi Pollution Control Committee is responsible for the measurement and management of air quality in India's capital city.



Project
Delhi Pollution Control Committee (DPCC)

Location
Delhi, India

Date
2016

Services
AQM 65 Compact Air Quality Monitor

Measurements
PM₁, PM_{2.5}, PM₁₀, TSP, CO, SO₂, NOx, RH and Temperature

Sector
Outdoor



The customer

The Delhi Pollution Control Committee (DPCC) advises the Delhi Government on air pollution and improvement of air quality for the more than 16 million people that call this mega-city home. Amongst many activities the DPCC organizes mass awareness programmes about air pollution, collects and publishes air quality data, develops economical methods for air pollution control, and takes steps for the prevention, control and abatement of air pollution. A huge task indeed!

The problem

According to WHO, Delhi is the most polluted city in the world with air that is classified as “very unhealthy” for average PM_{2.5} levels. The high pollution levels are mainly due to motor vehicles, road dust and nearby factories. The Delhi Government has proactively tried to curb traffic and pollution with various initiatives including permitting odd/even registered vehicles on alternate days in Delhi. A pilot programme was run from 1 January 2016 for 15 days.



The challenge for the DPCC was to collect accurate air quality data in high resolution, in an economically viable manner, and from as many sites as possible during the 15-day trial. Real-time and high resolution data that is representative of the microenvironment in various city zones is crucial to evaluating the feasibility of the “Odd-Even Number Plate Car Policy.” This data is also used as a basis for educating people about making changes in lifestyle and attitude. The existing air quality network in Delhi is widely spread and has a limited number of fixed monitoring sites.

This is a common problem with municipal air networks where restrictions in site numbers, locations, size, costs, and data resolution may miss the complexity needed to assess the effectiveness of a policy change or pollution abatement strategy.

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DPCC

The solution

To meet this need Aeroqual's local representative Nevco Engineers Pvt Ltd proposed to the DPCC a mobile solution using Aeroqual's AQM 65 ambient air monitoring station installed on a van. The AQM 65 is lower cost compared to conventional technologies and its modular design means it is easily configured to measure primary air pollutants as well as meteorological parameters. Previously, the Central Pollution Control Board (CPCB) in Delhi had tested the AQM 65 station over the course of four months including a certified calibration by TÜV India. Since feedback from the CPCB was positive the DPCC accepted this proposal and provided 102 locations for Nevco to conduct real-time measurements across the city. For this study the AQM 65 was configured to continuously measure PM₁, PM_{2.5}, PM₁₀, TSP, CO, SO₂, NOx, RH and Temperature.

The AQM 65 is compact and lightweight with low power consumption so it was ideal for installation on a van with inverter and battery system. During the day the van was used to sample air quality at multiple locations for 30 minutes at a time. At night the sampling continued at fixed locations where the van parked near fire stations and the battery was charged by mains power. The small size and mobility of the van made it easy to move from site to site and park in limited spaces for monitoring. The system could operate autonomously for two days on a full battery charge.

Evaluation

The AQM 65 is the first mobile air monitoring station used to measure the impact of the new 'odd-even' car policy. For data quality assurance the AQM 65 was operated alongside one of the DPCC fixed air monitoring stations where it exhibited excellent correlation with the fixed station data. At the conclusion of the monitoring the DPCC was very pleased with the operation of the van and AQM 65 stating that "during the 15-day trial 100% data capture rate was achieved from more than 100 locations which was very satisfactory performance." This solution of using vans with compact air quality stations can be very useful for collecting large amounts of data quickly and over greater areas as was undertaken in Delhi. Internationally, mobile air monitoring for a few hours or a few days at a variety of sites is used to understand diurnal patterns and for monitoring urban and industrial areas. Now other cities in India and elsewhere are adopting mobile air monitoring solutions.

