Data sheet on summer ozone in Delhi - 2015

The Centre for Science and Environment has analysed the emerging problem of ozone pollution in Delhi between April and May, 2015. This study has tracked the daily realtime data on ozone from the monitoring stations of the Delhi Pollution Control Committee (DPCC) located in RK Puram, Mandir Marg, Civil Lines and Punjabi Bagh. Continuous data for IGI airport was not available. Interestingly, the IGI monitor stopped working when ozone 1-hour average values crossed 200µg/m3 in April, 2015.

In addition to this CSE has carried out its own independent monitoring in two critical areas – at Lodhi Estate in Lutyen's Delhi and at All India Institute of Medical Sciences, a sensitive area, where official monitoring does not happen. The state of the art ozone monitor was deployed to carry out this monitoring. CSE has used 2B Technologies Ozone Monitor (Model 205) for the ozone monitoring.

It may be noted that ozone is a highly reactive and variable gas as its generation depends on temperature and sunshine. Volatile hydrocarbons and other gases from vehicles and other combustion sources react photochemically in the air to create ozone. Nitrogen oxide, that largely comes from vehicles especially diesel vehicles, is to a great extent responsible for catalyzing the reaction. Ozone is therefore not emitted directly but is caused as a reaction of nitrogen oxides and various other volatile organic compounds in the presence of sunlight. Therefore ozone builds up during the day when sun shines and temperatures are high.

This summer ozone levels have been highly variable due to erratic weather conditions that included intermittent rains and strong winds. Despite these, ozone levels have increased manifold across the city.

Ozone is a dangerous gas as it can harm even if exceeds standards and hits poor levels for short duration. This is the reason standards for ozone are set for 1-hour and 8-hour duration. The national ambient safe standard for ozone is 100 µg/m3 for 8-hour average and 180 µg/m3 for 1 hour average.

The key highlights of the analysis of the official data and the CSE monitoring are as follow:

Key highlights of CSE's ozone monitoring in sensitive areas and in Lutyen's Delhi

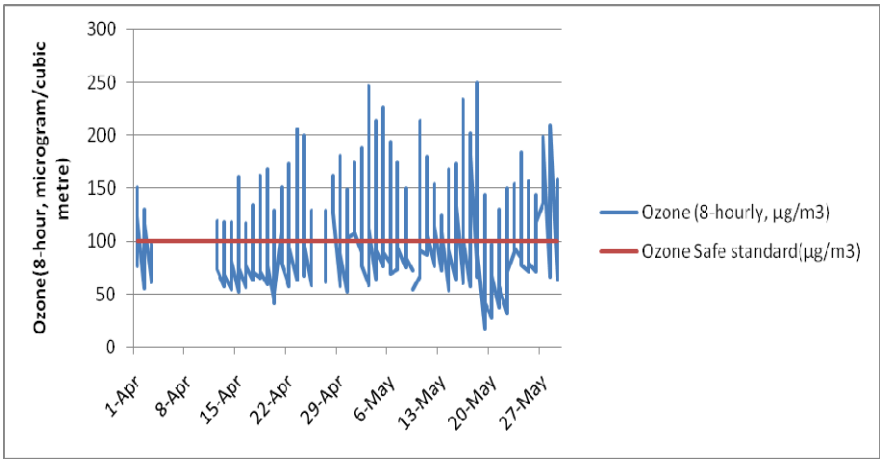
CSE has carried out rapid ozone monitoring in two key locations that DPCC does not monitor. These areas include Lodhi Estate in Lutyen's Delhi and All Indian Institute of Medical Sciences, which is a sensitive area. Three days of monitoring were carried out in each location during the second and third week of May respectively. The focus of this monitoring was to track the hourly peaks during the day when ozone build up is very rapid.

- At Lodhi Estate the hourly ozone levels had peaked to close to three times the standards largely around 12:00 and 13:00 pm. This shows how the seemingly cleaner environment of the rich and the powerful are vulnerable to toxic pollution.
- At AIIMS the hourly peaks around late morning and noon have been very high – 2.5 times the standards. This is the time the ailing patients visit the hospital the most. The ailing with predisposed disease conditions are more vulnerable to ozone pollution.
- Even when there has been intermittent rain that brought down the temperature and blocked the sun so reduced the ozone levels, the levels would bounce back very quickly after the rains were over.

2. Analysis of data from Delhi Pollution Control Monitoring stations

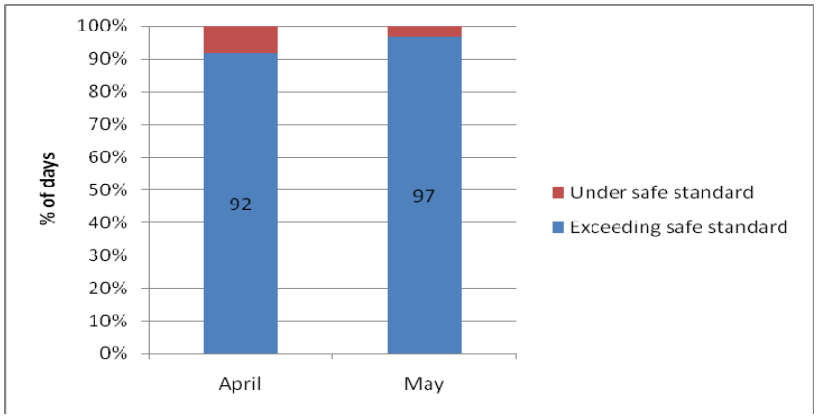
Civil Lines: Residential area

Graph 1: Frequency of days violating the standards (8 hour average standards) (April and May, 2015)



Source: Computation done by CSE based on data from DPCC

Graph2: High percentage of days violating standards (April and May, 2015)



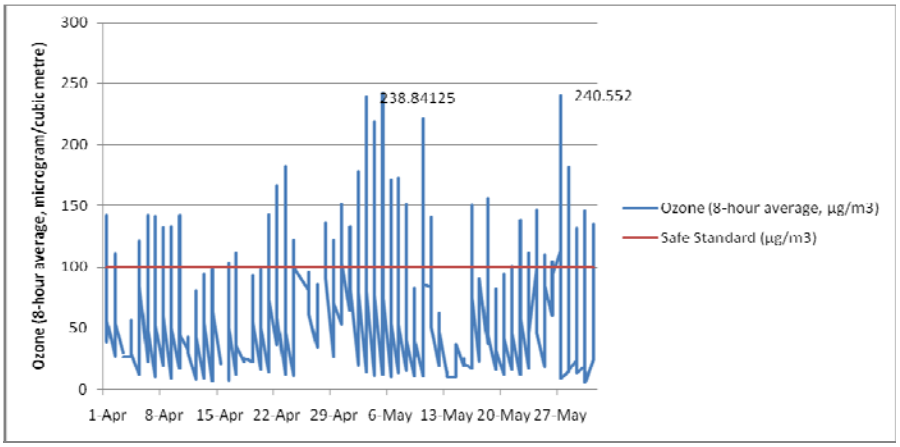
Source: Computation done by CSE based on data from DPCC

- Civil lines has fared the worst in terms of number of days exceeding the safe standard for ozone.
- The peaks rose to as high as 250 microgram/cubic metre. However, the frequency of days exceeding 100 microgram/ cubic metre was 92% in April and as high as 97% in May.
- It is to be noted that 3 days in May were not reporting ozone values for civil lines which leaves the possibility that 100% days were exceeding safe standard in May
- As per the AQI classification, the poorly polluted days rose to 41% in May compared to 22.7% in April, almost twice the number. Furthermore, the percentage of days classified as

worse than poor rose to 27.58, as against 4.5% in April. This is a clear indication that even natural weather phenomenon like rains and cool winds do not manage to control our ozone pollution.

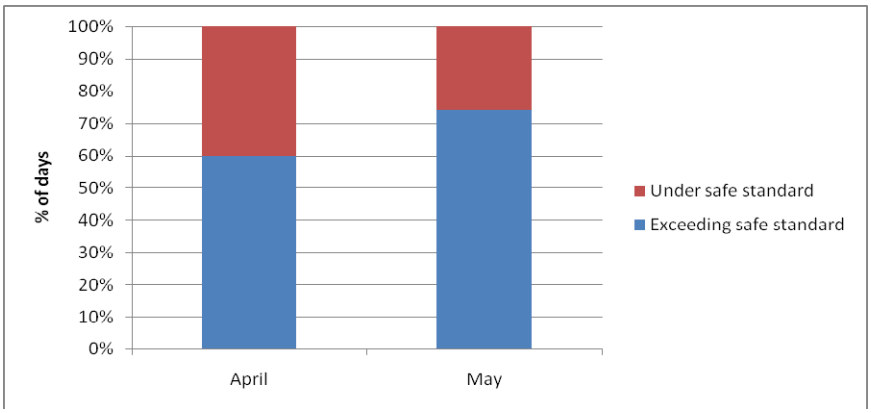
R K Puram: Residential area

Graph 3: Frequency of days violating the standards (8 hour average standards) (April and May, 2015)



Source: Computation done by CSE based on data from DPCC

Graph 4: High percentage of days violating standards (April and May, 2015)

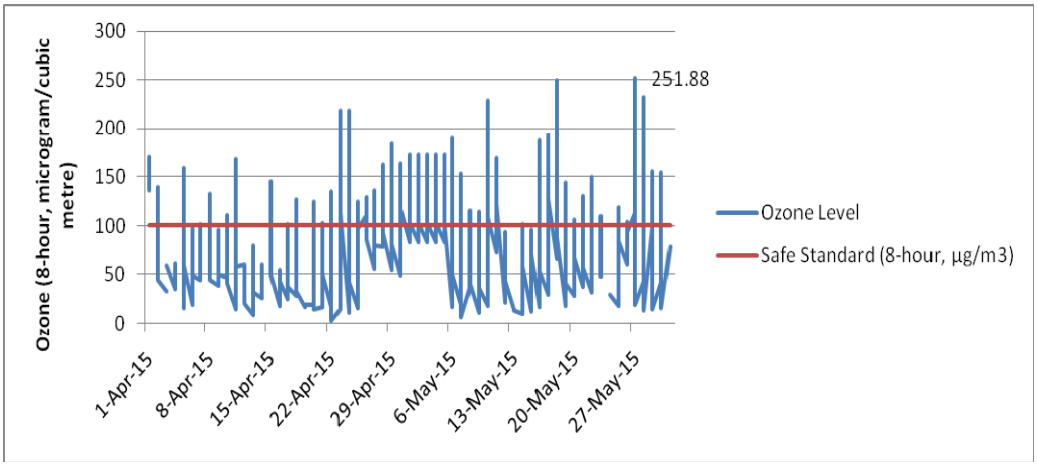


Source: Computation done by CSE based on data from DPCC

- The peaks have reached 240 microgram/cubic metre, almost 2.5 times higher than the safe standard of 100 microgram/cubic metre
- The percentage of days under the safe standard have gone down from 40% in April to 25% in May
- On classifying this data according to the air quality index, 55% of days in April were moderately polluted with 3.5% days poor. However, the poorly polluted days rose to 13% in May along with an additional 16% days being worse than the official poor category. Yet, there was no news by the government.

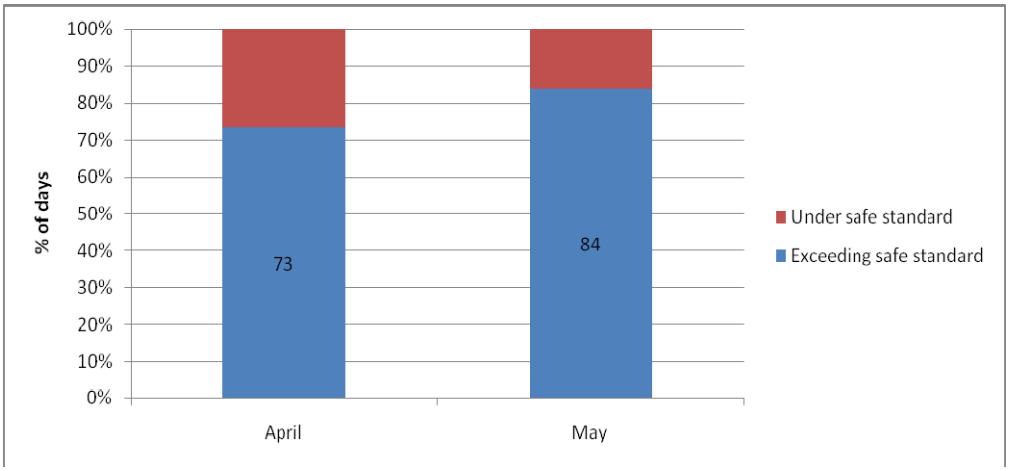
Punjabi Bagh

Graph 5: Frequency of days violating the standards (8 hour average standards) (April and May, 2015)



Source: Computation done by CSE based on data from DPCC

Graph 6: High percentage of days violating standards (April and May, 2015)



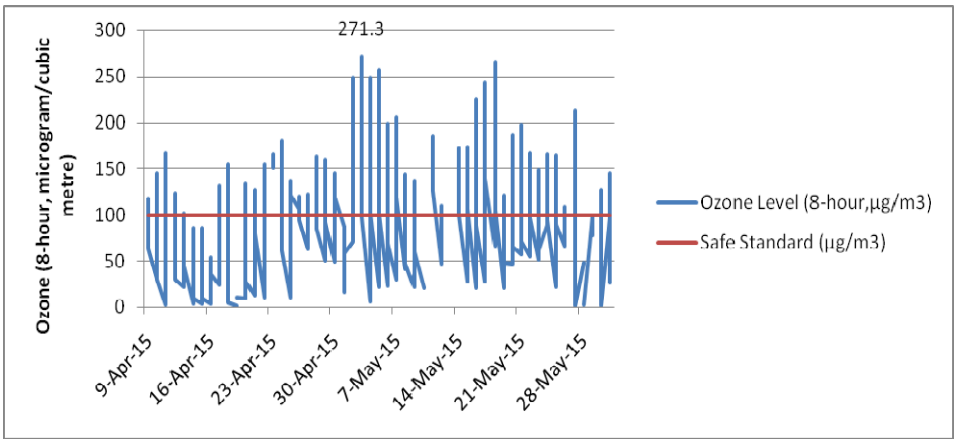
Source: Computation done by CSE based on data from DPCC

- In Punjabi Bagh, the percentage of days exceeding safe standard was 73% in April which quickly shot up to 84% in May. The number of days under safe standard was extremely low for these months

- On applying the air quality index, percentage of moderately polluted days in April (56.67%) was more than that seen in May (43.33%). But this came at the price of increased number of days with poor air quality (30%) and worse than poor air quality (13.33%) in May.

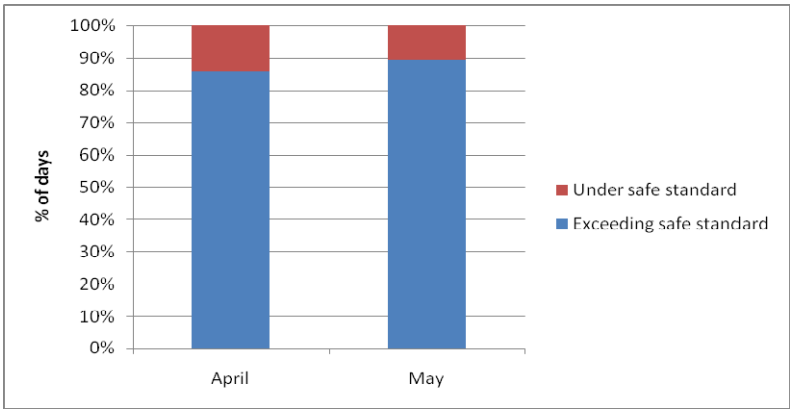
Mandir Marg: Residential area

Graph 7: Frequency of days violating the standards (8 hour average standards) (April and May, 2015)



Source: Computation done by CSE based on data from DPCC

Graph 8: High percentage of days violating standards (April and May, 2015)



Source: Computation done by CSE based on data from DPCC

- In Mandir Marg, ozone values have peaked the maximum to three times the standards for 8-hours
- The 8-hour peaks for Mandir marg have been the highest, 271 microgram/cubic metre
- Mandir Marg also had 85% of days exceeding safe standard in April followed by 89% in May

- Moderately polluted days declined dramatically from 77.27% in April to 36.67% in May. The days with poor air quality and worse as per the AQI increased to close to quarter in May compared to 4.54% in April. It may be noted that April had larger number of rainy days.