

To Study the Pollution Data of Past Years and Predict the Values of Certain Pollutants Using the Equations Formed By Trendline

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Abstract: Exposures to the environmental pollution are fossil fuels in the last century can be thought to be responsible for the progressive change in always a major source of health risk throughout the globe and among the environmental pollution too the most hazardous pollution is the air pollution. Among air pollution the pollutants like NO_x and CO are most toxic. Our main objective behind this research is to study the concentrations of pollution at two grid points in Delhi region at an interval of 24 hours for year 2016-17 and annually from year 2009-16 and then to predict the future concentrations using the equation made from the observed data.

Key Words: - Environmental Pollution, NO_x, CO, Hazardous

I. INTRODUCTION

Environmental issues are the most common issues faced by the public of any country and among those too the air pollution is the environmental issue that have a huge weightage in contribution of the environmental issues faced by the citizens. Development of the country comes with industrialization and the comfort comes with the private vehicles but at the same time we are developing at the cost of our environment. A huge amount of toxic gases are released into atmosphere due to the burning of our fossil fuels. The one of the leading industry for the consumption of fossil fuels to give work and to release hazardous pollutants while being a friend for humans and cannot being evacuated is the automobile industry. [1]

Hazardous chemicals are liberated to the environment by a number of natural and anthropogenic activities and leads to the adverse effects on human health and the environment. Rapid increase in combustion of the atmospheric composition. Pollutants like sulphur dioxide (SO₂), carbon monoxide (CO), nitrogen oxides (NO_x), volatile organic compounds (VOCs), ozone (O₃), heavy metals, and respirable particulate matter (PM_{2.5} and PM₁₀), differ in their chemical composition, reaction properties, emission, time of disintegration and ability to diffuse in long or short distances. Air pollution comes with both acute and chronic effects on human body which affects a number of different systems and organs. Air pollution through vehicle in capital has increased rapidly from 2.30 million in 1975 (MOEF, 1997) to 4.20 million in year 2004, which got estimated 7.20 million in 2016 on the behalf of transport authority data which is obtained from Department of Transportation in 2004. According to Indian Petroleum and Natural Gas Statistics – Ministry of Petroleum and Natural Gas 2015-2016 it has been stated that the crude oil production has been decreased by 1.36% while there is the 11.57% growth in the consumption of petroleum products and there is the increase of 7.08% in import of the crude oil. [2]

The Clean Air

The Clean Air Act of 1970 appointed EPA broad authority to regulate motor vehicle pollution, and the Agency's emission control policies have become progressively more stringent since the early 1970's. EPA standards decides how much pollution automobiles may emit but automakers decide how to achieve the pollution limits. With the increase in pollution EPA is also decreasing the prescribed level of pollution emitted by the vehicles. [3]

II. LITERATURE REVIEW

The Particles which are exhausted from the engines that use diesel as their fuel are much small and most of the times are even smaller than 2.5 microns. The particles exhausted are very complex and may have carbonated core, adsorbed hydrocarbon particles and gases from the engine oil along with diesel fuel, water, some inorganic materials and adsorbed sulphates are produced by engine's inefficiency. Due to their size of few microns and complex composition, the particles which are emitted in the exhaust gas by diesel engines have raised the number of health related problems. Health experts are showing concerns in the matter that PM [Particulate Matter] produced by diesel is contributing to exasperate chronic diseases in lungs such as bronchitis, emphysema and asthma. There are evidences if humans are exposed to the diesel exhausted PM it increases the risk of cancer. In

1988, the International Agency for Research on Cancer came up with the result from their research that diesel particulates are probably much carcinogenic to human health. In 1998, Californian Air Resources Board determined the Particulate Matter emissions developed by engine operated by diesel are the one of the potential air contaminant, because of this result they came up with the first Diesel Risk Reduction Plan in the year 2000 with the target of reducing diesel PM levels minimum by 85% by 2020. In 2000, it was declared by the U.S. EPA that PM from the diesel exhaust is "likely human carcinogenic substances." A neoteric research, "Diesel and Health in America: The Lingering Threat," published by the Clean Air Task Force (CATF) in the 2005, reveals the adverse effect of diesel particulate emissions on the human health in

the U.S. This particular report stated that the factor responsible for death of more than twenty one thousand people in the U.S. per year is fine particulate pollution from diesel vehicles, with the damages connated to health from the diesel PM is estimated to be total \$139.00 billion in year 2010. The emissions of Nitrogen Oxides produced from the diesel fueled engines are also responsible for the number of problems related to health. Once in the particular atmosphere, nitrogenous oxides on reaction with other volatile organic compounds (VOCs) in the existence of sun light produced ozone gas. Ozone is highly corrosive and reactive gaseous substance that lead to many respiratory disorders. Ozone harms the children and also the elderly people. The respiratory organs can be damaged by the emission of NOx and it can also damage the lower human body resistance offered to the infections in respiratory system. As with the ozone borned from automobile emission, children as well as the senior citizens are explicitly susceptible to NOx emissions. The American Lung Association estimated that in counties which have unhealthy levels of ozone as well as particulate pollution over 55% of the U.S. population lives are shortened due to this.

Effects of major pollutants

• NITROGEN OXIDES (NOx)

Under the high pressure and temperature conditions in an engine, nitrogen and oxygen atoms present in the air react to form various nitrogen oxides, collectively known as NOx. Nitrogen oxides, like hydrocarbons, are precursors to the formation of ozone. They accord to the formation of acid rain.

• CARBON MONOXIDE

Carbon monoxide (CO) is a biproduct of incomplete combustion and occurs when carbon in the fuel is partially

oxidized rather than fully oxidized to carbon dioxide (CO). Carbon monoxide reduces the flow of oxygen in the blood stream and is particularly dangerous to persons with heart disease.

• CARBON DIOXIDE In recent years, the U.S. Environmental Protection Agency (EPA) has started to view carbon dioxide, a product of “perfect” combustion, as a pollution concern

.Carbon dioxide does not directly impair human health, but it is a “greenhouse gas” that traps the earth’s heat and contributes to the potential for global warming. Evaporative Emissions Hydrocarbon pollutants also escape into the air through fuel evaporation. With today’s efficient exhaust emission controls and today’s gasoline formulations, evaporative losses can account for a majority of the total hydrocarbon pollution from current model cars on hot days when ozone levels are highest. Evaporative emissions occur several ways: DIURNAL: Gasoline evaporation increases as the temperature rises during the day, heating the fuel tank and venting gasoline vapours. [3]

With the production of these gases the blanket is formed in the atmosphere which does not allows heat trapped to be released back and hence leading to the increase in temperature.

III. METHODOLOGY AND DATA COLLECTION

Data has been collected from the website of Central Pollution Control Board and the official website of Delhi Traffic Police. The graphs, statistics information and prediction using trendline was done using MS Excel.

Table 1

Detail	Figure
Area (Square Kms.)	1,483
Population	1,70,84,235
Vehicles	96,34,976
Road Length (Kms.)	33,198
Signalized Intersections	864
Blinkers at Intersections	418

Table 1:- Population and Number of vehicles in a particular area. [4]

Table 2

Year	No. of Vehicle
2008	3,95,435
2009	4,14,150
2010	4,86,112
2011	5,12,988
2012	5,29,712
2013	5,31,332
2014	5,74,602

Table 2:-Year wise vehicle registered in Delhi. [4]

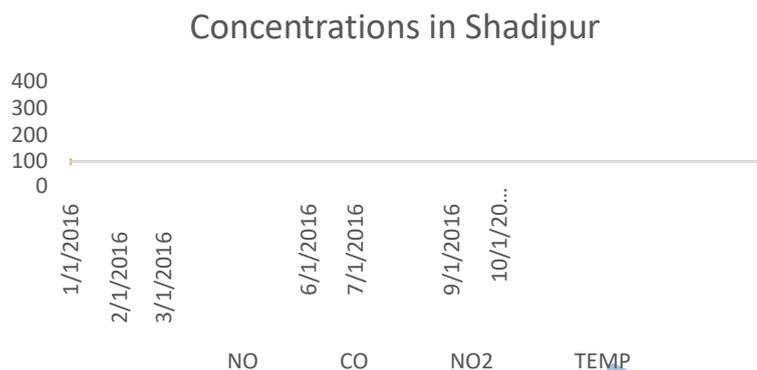


Figure 1:- Concentrations of various pollutants and temperature in Shadipur for year 2016-17

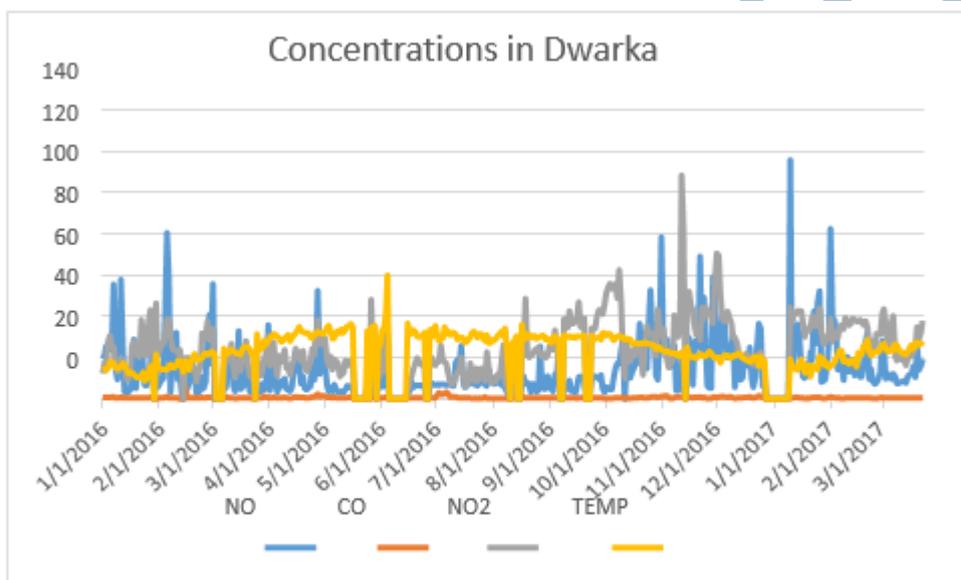


Figure 2:- Concentrations of various pollutants and temperature in Dwarka for year 2016-17.

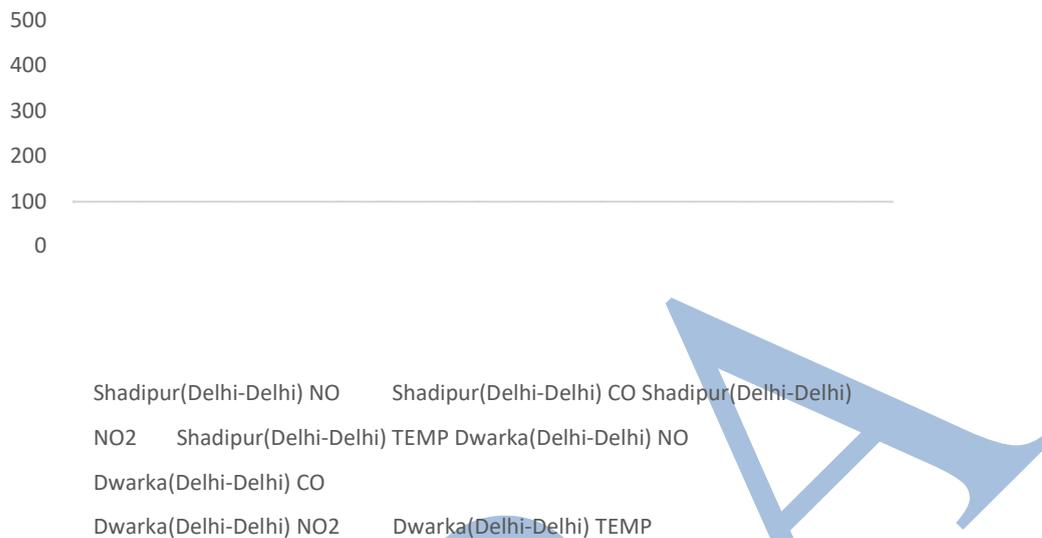


Figure 3:- Concentrations of various pollutants and temperature in Shadipur and Dwarka for year 2016-17.

Table 3:- Mean, Median, Mode, Standard Deviation and Variance for the year 2016-17.

	Shadipur(Delhi-Delhi)				Dwarka(Delhi-Delhi)			
	NO	CO	NO ₂	TEMP	NO	CO	NO ₂	TEMP
Mean	37.62301	0.998188	44.54165	25.72572	15.32305	0.698223	26.35282	24.83038
Median	17.17	0.88	36.73	26.03	10.42	0.59	23.63	25.29
Mode	10	0.9	25	30.58	7.16	0.52	23.86	17.97
Standard Deviation	48.68321	0.590372	28.54406	8.43549	13.91137	0.481793	14.57707	9.985552
Variance	2365.076	0.348539	814.7634	71.15749	193.5262	0.232124	212.491	98.41281

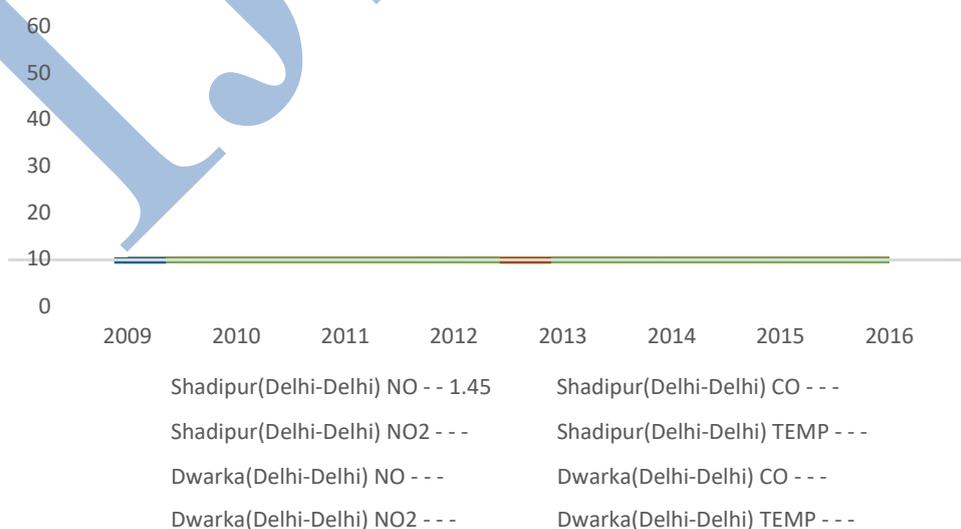


Figure 4:- Concentrations of various pollutants and temperature in Shadipur and Dwarka for year 2009-16.

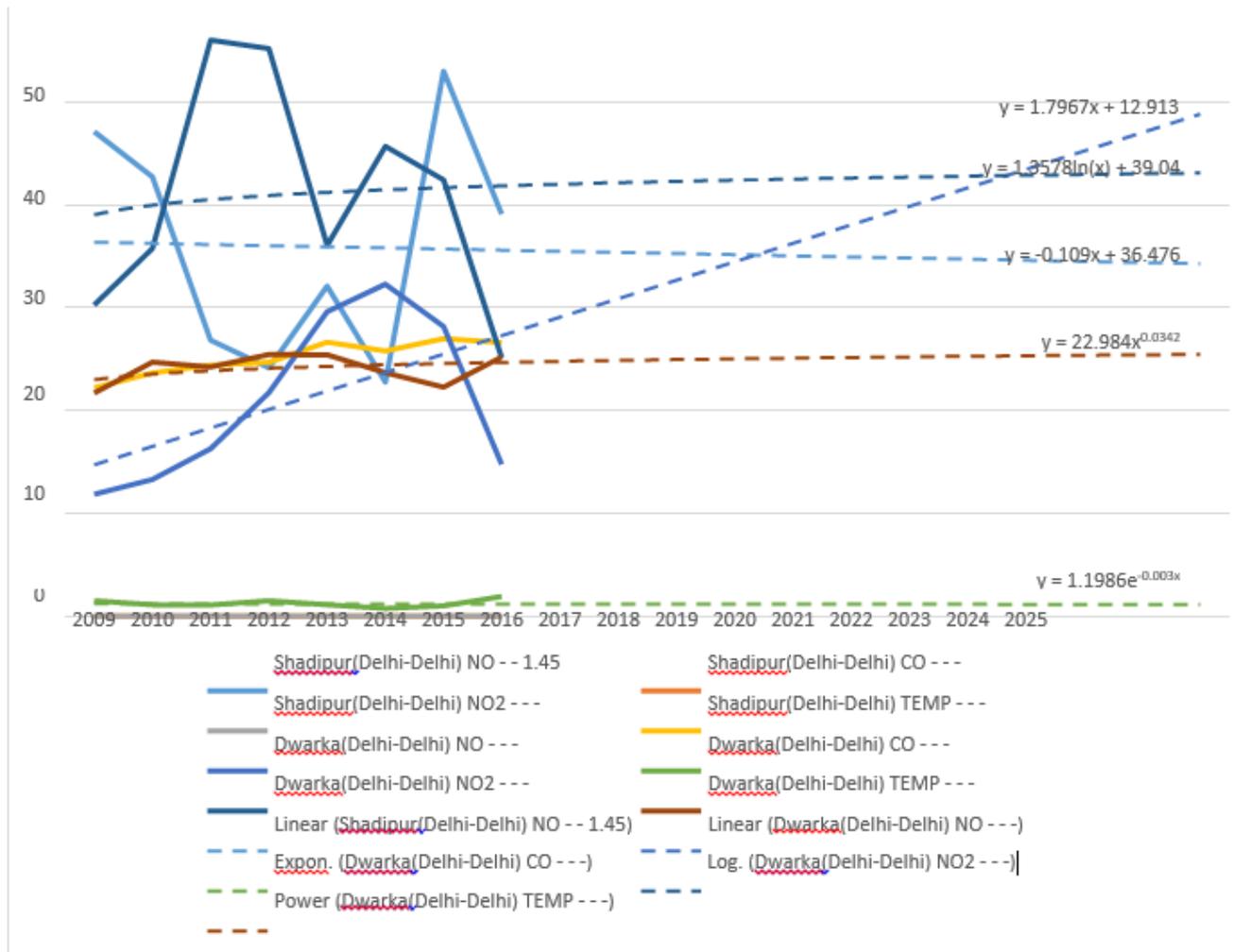


Figure 5:- Concentrations of various pollutants and temperature in Shadipur and Dwarka and predicting the future concentrations using trendline tool in Excel.

IV. CONCLUSION

With the following research work it can be concluded that the concentrations of the pollutants that are hazardous for human health is increasing day by day and if the same continues we will leave a hell which is covered with the envelope of the pollutants. The mean observed for the pollutants are very high and hence the automobile manufacturers are concentrating on how to improve the quality of exhaust gases.

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