**Arun Duggal Centre of Excellence for Research in Climate Change and Air Pollution**
**Indian Institute of Technology Delhi**
**Monthly Newsletter May 2022**

***Editorial***

Dear Readers,

India's renewable energy targets for 2030 call for a whooping four times growth of today's installed wind, solar, and hydroelectricity capacity. Coal has played a significant role in India's economic development till now and would continue to play a role for a few more years even as India prepares its road map for a gradual transition to Renewable energy from coal. Even assuming that India doesn't start building any new coal power plants going forward, it still means that in 2030, at least half of India's electricity will come from coal.

The Indian Electricity system is heavily dependent on coal, which needs to be mined and transported to distant power plants which presents inherent risks. To mitigate these risks, the Indian power system needs to diversify. Indian coal is high ash, which hurts local air quality. With prices of Solar PV and battery storage expected to continue their decline, the economics is clearly in favour of the RE and storage path not only in terms of lower electricity costs for the consumers but also in terms of increased stability and reliability for our electricity system. By entering into new coal contracts, the Discoms, in effect, would be locking consumers into expensive electricity thereby forsaking cheaper and cleaner fuel options. About 30 GW of new coal capacity would be commissioned in the next 2-3 years which can offset equivalent highly polluting and old capacity that could be immediately retired from the fleet keeping India's total installed coal capacity mostly unaltered by 2030. Retiring these old, inefficient, and end-of-life coal plants will improve air quality and help India meet her international phasedown commitments.

Wind and Sun will provide the electrons of the 21st century. The sooner we understand their enormous economic and environmental benefits and quickly embrace this change, the better. Unequivocally putting a break on new coal plant capacities would be the first step in this direction.

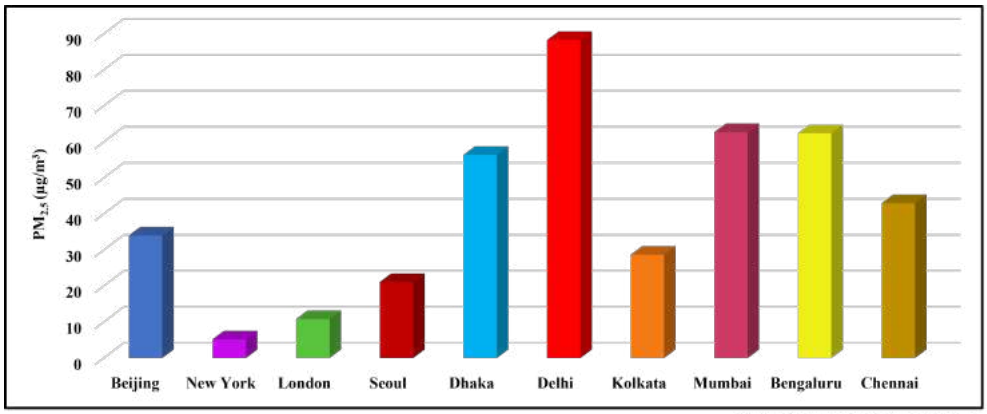
Yours sincerely,

Hemant Kaushal
Pr. Coordinator
**Arun Duggal Centre of Excellence for Research in Climate Change and Air Pollution**

# Air Quality Trends

**Indian & International Cities- April 2022**

**Delhi has the highest Air Pollution among all the major International Cities**

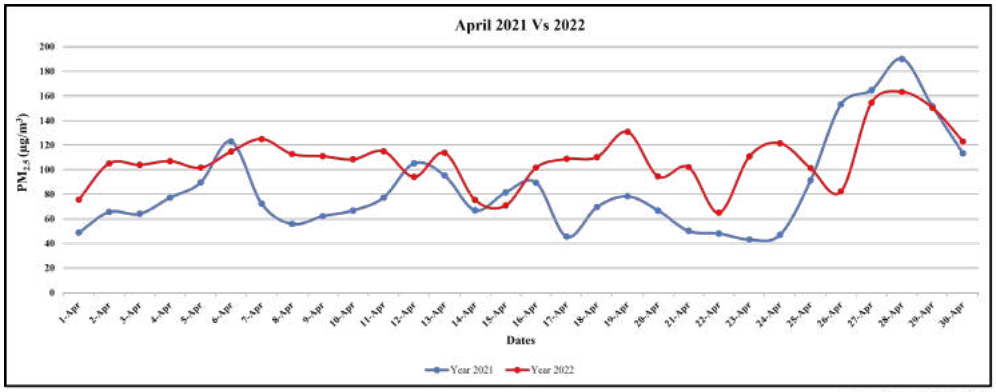



*Data Source : berkeleyearth.org*

The graph above shows the daily average $PM_{2.5}$ for the month of April 2022. Amongst the popular cities worldwide, Delhi has shown the highest concentration of $PM_{2.5}$ followed by Mumbai. Delhi, Mumbai and Bengaluru within India, rank amongst the topmost polluted cities worldwide while the other Indian cities in the graph are amongst the top 10 metropolitan cities.

**Delhi PM2.5 (24 hr. daily average) Trend**

April 2021 Vs April 2022




*Data Source : CPCB*

Air quality didn't improve much in Delhi in April 2022. The reasons attributed to this poor air quality includes no rainfall as well as high wind speed that led to localized resuspension of dust and particulate matter, apart from the anthropogenic activities. Hence, $PM_{2.5}$ has increased slightly by 23.30 $\mu g/m^3$ on an average in 2022 as compared to 2021 making air quality not better with respect to last year.

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## CERCA Expert Opinion and Research Outcomes

**Cleaner air would enhance India's annual solar energy production by 6–28 TWh**

*Sushovan Ghosh, Sagnik Dey, Dilip Ganguly, Somnath Baidya Roy and Kunal Bali*

- Generally, the loss of solar energy due to environmental factors like air pollution is not properly considered in renewable energy resource assessments.
- The study showed that India lost 29% of its utilizable global horizontal irradiance potential due to air pollution between 2001 and 2018.
- The average loss in output incurred by solar power systems with horizontal, fixed-tilt, single-axis, and dual-axis trackers due to air pollution is estimated to be 12%, 26%, 33%, and 41%, respectively, equivalent to a loss of 245–835 million USD annually.
- Further, the successful implementation of the National Clean Air Program and the complete mitigation of household emissions through the supply of cleaner fuel for domestic use and rural electrification would allow India to generate a surplus of 6–16 TWh of electricity per year from the existing installed solar power capacity in 2018.
- This translates to an economic benefit of 325–845 million USD annually, which is equivalent to the implementation costs of these social programs.

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**Association between Acute Exposure to PM2.5 Chemical Species and Mortality in Megacity Delhi, India**

*Pallavi Joshi, Sagnik Dey, Santu Ghosh, Srishti Jain, Sudhir Kumar Sharma*

- Association between acute exposure to PM2.5 chemical species and mortality is not well known in India.
- This study examined the associations between mortality and acute exposure to PM2.5 mass concentration and their 15 chemical components using data from 2013-2016 in Delhi.
- It used a semiparametric quasi-Poisson regression model adjusted for mean temperature, relative humidity and long term time trend as potential confounders.
- Among all, elderly above 65 years were the most prone to mortality effects from maximum species and risk arose more from exposures in the winters.
- This is the first evidence of association between acute exposure to PM2.5 chemical species and mortality in India.

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### Air pollution and child development in India

*Anca Balietti, Souvik Datta, Stefanija Veljanoska*

- The impact of air pollution on child growth in India was studied.
- The study relied on wind direction to capture quasi-random variation in three main criteria air pollutants.
- It was observed that an increase in the average concentration of fine particulate matter by one standard deviation is accountable for almost 5 and 2.4 percentage points of stunting and severe stunting rates, respectively.
- Also, ozone and carbon monoxide impact weight-related outcomes. Stunting has critical long-term health and economic consequences; through its impact on stunting, pollution exacerbates the height premium in earnings, with girls being more adversely affected than boys in India.

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**Climate change hits food crop yield in Kerala**

The weather variations in Kerala are impacting its food platter too, with the yield from crops falling up to 33% in the past few decades. This was revealed in a study done by the Kozhikode-based Centre for Water Resource Development and Management between 2014 and 2019. The main reasons for these are what scientists call “anthropogenic activities” that include deforestation, industrial pollution, soil erosion, and land degradation. Crop climate suitability is also changing abruptly because of climate change.

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**Air pollution is worsening reproductive health outcomes for women in India – and around the world**

Evidence is clear that air pollution is linked to higher rates of miscarriages, pregnancy complications and stillbirths, affecting women’s reproductive health. It is not just outdoor air pollution - women in the densely populated region are also disproportionately hit by high levels of poor-quality air indoors as they tend to be primarily responsible for cooking, and firewood continues to be widely used as a source of cooking fuel, emerging studies show.

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### The world can halve greenhouse gas emissions by 2030, but only if it acts now: UN panel report

The UN report, third instalment of the Sixth Assessment Report cycle of the Intergovernmental Panel on Climate Change focuses on the mitigation of climate change by laying out how the world can remain within that window of opportunity. The report notes that limiting warming to around 1.5 degrees Celsius by the year 2100 requires global greenhouse gas emissions to peak before 2025 at the latest and be reduced by 43% by 2030. This means that climate action should start now, and the next few years are more critical than ever.

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### India plans own uniform carbon trading market

India, the largest exporter of carbon credits, proposes to have its own uniform carbon market in one year as a large finance avenue for energy transition projects and emission reduction. An analysis by Deloitte Economics Institute showed the country could gain $11 trillion over 50 years by limiting rising global temperatures and realizing its potential to 'export decarbonization' to the world. Under the present Perform, Trade and Achieve scheme, Energy Saving Certificates (ESCerts) are traded. Similarly, renewable energy certificates (RECs) are traded to let entities meet renewable purchase obligations.

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### Billions of people still breathe unhealthy air: new WHO data

Almost the entire global population (99%) breathes air that exceeds WHO air quality limits, and threatens their health. A record number of over 6000 cities in 117 countries are now monitoring air quality, but the people living in them are still breathing unhealthy levels of fine particulate matter and nitrogen dioxide, with people in low and middle-income countries suffering the highest exposures. Released on World Health Day, with the theme Our planet, our health, the 2022 update of the World Health Organization's air quality database introduces, for the first time, ground measurements of annual mean concentrations of nitrogen dioxide ($NO_2$), a common urban pollutant and precursor of particulate matter and ozone.

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### Climate change: World is set to face 1.5 disasters a day by 2030, says UN

The United Nations (UN) has warned that the world is set to face 1.5 disasters a day - 560 a year - by 2030, as humans put themselves on a "spiral of self-destruction" by heating up the climate and ignoring risk, pushing millions more people into poverty. This was published by the UN Office for Disaster Risk Reduction (UNDRR), which published the Global Assessment Report 2022.It discussed how frequent and intense disasters have killed or affected more people in the last five years than in the previous five-year period, and could push an additional 100 million people into poverty by 2030.

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