



# Centre of Excellence for Research on Clean Air

(Academic Think Tank and Research Centre at IIT Delhi)



## ANNUAL REPORT 2020

### CERCA, IIT DELHI

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## MESSAGE FROM OUR FOUNDER

India, like other countries in the world has been battered by the Covid-19 pandemic. However, Covid-19 is not the only threat to the respiratory health of people in our country. So is the severe air pollution, that reached severe levels for days in New Delhi. Toxic exhaust fumes from road vehicles, industries, and the stubble burning in neighboring states have all had their share in contributing to the city appalling levels of air pollution. Also, poor air quality is an important risk factor for both acute and chronic respiratory and cardiovascular diseases and is most likely a contributing factor to the health burden caused by COVID-19. However, during these times of global COVID-19 pandemic, we have also witnessed a significant, albeit short-term reduction of air pollution, especially nitrogen oxides, a pollutant very much linked to traffic and vehicular movement, which emerged as one of the most affected activities during the several rounds of lockdowns imposed in cities across the world. Automobile emissions are major source of air pollution and contribute to Climate Change which is the long-term threat to the world.



EVs are the future for clean environment. Electric Vehicles avoid any emissions and are the solution to automobile emissions and resultant air pollution problem. In 2019, in China 1 Million EVs were sold, in Europe 560,000 and in the US 320,000, mostly Tesla. In India which has the worst air pollution problem, only 2000 EVs were sold as they are just not affordable as compared to IC (Diesel and Petrol) engines. Solution for India is to retrofit existing IC cars with electric motor, batteries, etc which can be done at much lower cost than new EV.

“Electric Beetle” is an interesting name. It is a 70-year-old Volkswagen Beetle which has been converted to an EV with top speed of 50 KMH and range which can be 100 KMs. This demonstrates in a nice, photogenic way that retrofitting is the way to go in India. At present regulations require that a car use commercial (Taxi, Rental car, etc) can only be used for 5 years and other cars for a maximum of 15 years largely due air pollution concerns for older cars. The Electric Beetle proves that so long a car is road worthy and electric, there should be no age limit. Through retrofitting, millions of older, but road worthy IC engine cars can be converted to EVs and reduce the air pollution burden. The policy for reducing air pollution has to be based on “Polluter Pays” and subsidies clean vehicles. Economic incentives and disincentives do work to bring in the desired change. Therefore, there should be a high and increasing Road Tax on IC vehicles and a Pollution Cess on petrol and diesel which should increase every year. This Road Tax and Pollution Cess should escrowed in a Green Fund which can only be used to subsidize EVs new or retrofitted. Thus, without any funds outlay from the Government, just by change in the vehicle life policy and tax on IC engine vehicles and petrol/diesel, and subsidies for EVs the air pollution can be significantly reduced.

The Goal should be reducing air pollution by 25% by 2030 by converting 90% of the vehicle population to EVs new or retrofitted. Another 25% reduction in pollution levels can be achieved by reducing emissions from power plants, industries, stopping agriculture waste burning; improved construction practices, and reduces household wood burning. Then, by 2030, we will have blue skies in Delhi/NCR and other parts of India.

CERCA continually strives to find out solutions to mitigate air pollution and have been undertaking various studies on stubble burning especially mapping farm fires through satellite imagery. Another initiative undertaken by

CERCA was mapping of emissions from point sources such as power stations and Brick kiln clusters around Delhi.

CERCA delivered very good performance during the year as we made steady progress in terms of the number of projects undertaken on clean air issues including feedback to government stakeholders, conducting webinar series of air quality workshops/conferences sensitizing various stakeholders like state Pollution Control Boards, industry partners, scientific community and common citizens. As part of CERCA public outreach policy, we have been reaching out to a wide section of our society through a monthly newsletter providing latest inputs on research on health effects of air pollution, actionable information on air quality data to the Government, Industry and to the Citizens at large for appropriate policy formulation, emerging clean air technologies including new measures/innovative initiatives from across the world to combat air pollution including thought leadership.

We are extremely happy to share with you our Annual Report for Calendar year 2020.

Stay safe and healthy!

**Arun Duggal**

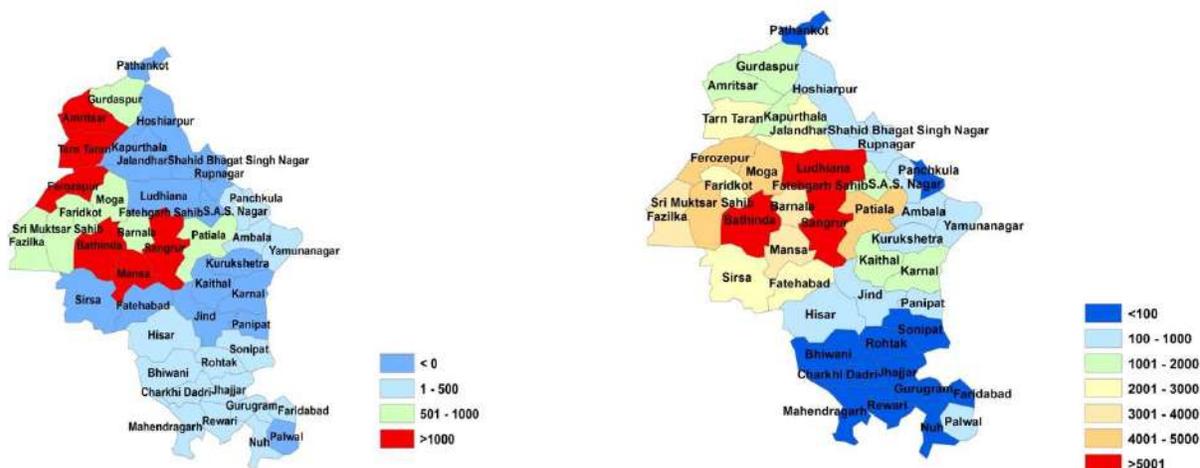
# 1. RESEARCH PROJECTS

## 1.1 Monitoring Air Pollution impacting Delhi NCR using a Hybrid Approach

(Investigator – Prof. Sagnik Dey, Centre for Atmospheric Science, Coordinator, CERCA, IITD)

**Objectives:** 1. Estimation of contribution of various neighboring states and trans-boundary transport to Delhi air pollution 2. Identifying the changes in open burning patterns, pollutions at large point sources (e.g., TPPs)/source clusters (e.g., brick kilns) 3. Feedback for policymakers to judge the effectiveness of the mitigation measures implemented to curb pollution due to these three major sources.

**Progress:** In this project, the first and second objectives has been completed, i.e., Identifying the changes in open burning patterns, pollution at large point sources (Thermal Power plants (TPPs), and Brick Kilns). The project team has studied the change in the number of fire counts in Punjab and Haryana districts during the year 2020. The key results indicated large increase in crop-residue burning cases in Punjab. Punjab has recorded around 74590 incidents of crop-residue burning this season (22 September to 30 November), which is the highest in the last four years (44004 cases in 2019, 56463 cases in 2018 and 56539 cases in 2017). One potential reason could be anger over farm bills. Sangrur, Bhatinda, Ferozepur, Moga and Patiala are the top 5 districts in Punjab in 2020. Whereas improvements were seen in Haryana by recording 5862 farm fires between September 22 to November 30, lower than 6227 cases in 2019, 9120 cases in 2018 and 11344 cases in 2017. Fatehabad, Kaithal, Karnal, Sirsa and Jind are the top 5 districts in Haryana which has recorded highest Fire count in 2020.



**Figure:** (Left) Climatology (2012-2020) and (right) anomaly (in 2020) of fire counts at districts of Punjab and Haryana.

## 1.2 Assessment and prediction of the air-quality using dynamically downscaled high-resolution data from numerical models

(Investigator - Prof. Vimlesh Pant, Centre for Atmospheric Sciences IITD)

**Objectives:** 1. Air-quality maps at a spatial resolution of about 1 km using numerical models and observational data. 2. Prediction of air-quality a week in advance over a desired state or region, e.g., Delhi-NCR using machine learning.

**Progress:** The Team has collected data on electricity generation, fuel type, and total fuel consumption for different power plants nearby Delhi-NCR. This data collected from various reports from NTPC, Ministry of Power, Central Power Research Institute, Coal India Limited, Central Electricity Regulatory Commission, datasheets of power plants, etc. Further plant characteristics and emissions analysis carried out for the coal/oil fuel types used at thermal power plants for years after 2012 for power plants NTPC Dadri (Coal), NTPC Dadri (Gas), NTPC Faridabad, PTPS Panipat, DCRTTP Y. Nagar, and RGTPP Hisar. Data tables are prepared for power plant emissions against their generation capacity and fuel consumption for different years. The WRF-Chem model experiments (3 km resolution) carried out for the first week of November 2017 with thermal power plant emissions in Delhi-NCR. Model results for PM<sub>2.5</sub> and SO<sub>2</sub> concentrations and their 3-hourly horizontal spread with surface winds are analyzed. It helps to understand the impact of power plant emissions on the population residing in nearby locations.

## 1.3 Select Study of Air Pollution Reduction Programs around the World:

### Governance and Implementation Issues

(Investigator - Prof. Nimesh B. Bolia, Department of Mechanical Engineering, IITD)

This project has been completed and a detailed study report is available at the following link:

<https://cerca.iitd.ac.in/uploads/Research/1576054426cerca-pollution-reduction-web-upload.pdf>

## 1.4 Public Awareness generation on Indoor Air Quality for Priority Buildings in NCT of Delhi

(CERCA in partnership with SIE)

**Objective:** Main aim of this project is to generate mass awareness on indoor air quality in public places (schools, colleges, hospitals, shopping malls, metro, and residential complexes) of Delhi NCR for in urban India.

**Progress:** A base line survey of indoor air quality was carried out for various buildings in Delhi NCR such as schools, colleges, hospitals, restaurants, cinema halls, offices to find out the level of indoor air pollution in these premises in partnership with Society of Indoor air (SIE). Further, we have planned to

develop indoor air quality guidelines in partnership with SIE, and an event was organized to release the results of the survey on February 19<sup>th</sup>, 2021.

This project has been completed and a detailed study report is available at the following link:

<https://cerca.iitd.ac.in/uploads/Reports/1615873639FINAL%20REPORT-MACQUID%202020.pdf>

## **1.5 Pilot deployment of Particular Matter (PM) sensors in Delhi buses**

(Investigator - Prof. Riju Rekha Sen, Dept. of Computer Engg. IITD)

**Objective:** To use vehicle fleets that travel across the city and instrument them with sensors. This will scale up the spatial coverage of the sensors. In addition to measuring Particulate Matter (PM), the vehicle-mounted instruments should have other sensors, computation, and communication facilities, so that policy questions become more tractable. The proposed instrument should have - PM sensor (low cost, but accurately calibrated against more expensive E-BAM sensors).

**Progress:** The Team has designed and built the necessary instrument, the instrument is being made much more robust against high temperature, vibration etc. The data analysis software stack is in final stages, so that time series analysis, correlation of PM with traffic and other data, Spatio-temporal interpolation based on bus data for all areas of Delhi can be done. As the pilot deployment work has been done as a part of this project, further work of Installation of sensors is in progress.

## 2. IRD STUDENT START-UP PROJECTS

### 2.1 Modelling of Research logistics network for consumed EVBs

(Faculty supervisor - Prof. Nomesh Bolia, Dept. of Mechanical Engg., Co-coordinator CERCA IITD)

**Objective:** To make a reverse supply chain model for used Electric Vehicle Batteries to help the electric vehicle industry to set firm foot in India. In the second part of this project, an attempt would be made to design and launch a mobile application that would aid the consumer and the company to undertake the exchange.

**Progress:** The projects team has worked on forecasting of used batteries returns from electric vehicles, predict the life of an electric vehicle battery in India, Geospatial mapping of expected “used battery” generation in Delhi, application development.

### 2.2 Study of E-rickshaw Operations & Development of Charging and Parking

#### Infrastructure for E-rickshaws

(Faculty supervisor - Prof. Nezamuddin, Dept. of Civil Engg. IITD)

**Objective:** I) Analysing the supply characteristics of the e-rickshaw network, II) Analysing the operational characteristics of e-rickshaw service, and III) Identifying the optimal locations for setting up physical infrastructure for e-rickshaws and designing the optimal capacity of the charging stations.

**Progress:** The project's primary goal was to conduct a field survey of e-rickshaws and analyse the data. Unfortunately, due to the COVID situation, the team cannot perform a field survey of e-rickshaw routes and operations. Therefore, the objectives will be achieved by collecting data with smartphone applications, repetitive observations, and a questionnaire survey's limited application. In the case of objective (III), optimal locations will be determined using a facility location-based model, and optimal charging station capacities will be determined by queueing theory-based simulation.

### 3. POLICY-DRIVEN RESEARCH PROJECTS

#### 3.1 NASA Citizen Science Project Phase II

(Collaborators: Dr. Prakash Doraiswamy (RTI), Dr. Pawan Gupta (NASA), Prof Sagnik Dey (IITD) and Dr. Kartik Ganesan (CEEW))

**Objective:** This project aims to explore the use of low-cost sensors to measure air pollution through citizen's engagement. Adequate ground-based measurements of air quality do not exist in most of the country. In the first phase, the purple air sensors are tested in California and North Carolina, USA. In the second phase, the sensors are being deployed in India. The broad objectives of the project are:

1. To test the Purple Air sensors in the Indian condition
2. To explore the feasibility of these sensors in expanding the ground-based measurements
3. To engage citizens in hosting these sensors and enhance awareness
4. To evaluate satellite-based PM<sub>2.5</sub> estimates in data-scarce regions (e.g. small cities, rural areas, background area)

Before deployment, the sensors are calibrated against the CERCA BAM once in the winter season. Another round of calibration will be carried out in the summer season before deployment. The sensors will be deployed in several clusters covering urban-rural transect in the Indo-Gangetic Basin. Altogether, six clusters, one each in Punjab-Haryana, Delhi NCR, central UP, eastern UP, Bihar-Jharkhand and West Bengal, are chosen. In the first phase, the sensors will be deployed in Delhi NCR. All data will be made available to the public through the purple air website from the day of deployment.

**Progress:** Sensor Deployment work is in progress and air quality data of installed sites is available at the following link:

<https://www.purpleair.com/map?opt=1/mAQI/a10/cC0&select=48929#10.08/28.4779/77.2103/14.2>

#### 3.2 Developing Air Quality Management model for the Indo Gangetic Plains

(Co-sponsored by World Bank, Collaborators: Prof. Sagnik Dey, Centre for Atmospheric Sciences, CERCA IITD, World Bank, IIASA)

**Objective:** To establish an Air Quality Management modelling network among states of Indo Gangetic Plain to support cost-effective AQM in the overall IGP region. The main elements of AQM modelling for the IGP would include methods and protocols monitoring, AQ monitoring, Emission inventory, Source apportionment, Health impacts, cost-effectiveness and AQM planning. AQMod to be hosted at CERCA IIT Delhi and would be responsible for coordinating the AQMod between the states/UT through a license agreement. A strategic Advisory Board with members from MOEFFCC, CPCB, NKN

Coordinator, NITI Aayog, other ministries, experts, etc. would oversee the operations of the Modelling network.

**Progress:** The project team has started collecting data of air pollution contributing sources of IGP states.

### **3.3 Delhi Research implementation and innovation (DRIIV) project funded by PSA Government of India**

(Theme- Air Pollution, Coordinator - Sagnik Dey, CERCA coordinator, IITD along with other 11 institutions)

**Objective:** The whole idea is to orient the existing efforts towards 'Aatmanirbhar Bharat' concept - stronger academia-industry partnership, scaling up products from prototype to marketable, involvement of start-ups, infrastructure development, etc. so that as a community, we take leap towards self-reliance. The whole purpose of this next phase is to solve the problem and scope of new scientific research is bare minimum. The seed fund proposal focuses on the implementation of a clean air action plan.

**Progress:** The project has been started in collaboration with 11 partner institutes and will have several components such as - point sources; awareness at educational Institutions; crop burning solution (crop diversification); real-time source apportionment.

## 4. EVENTS

### 4.1 MoS HRD Shri Sanjay Dhotre inaugurates exhibition on clean air technologies at IIT Delhi

Union Minister of State for Human Resource Development Shri Sanjay Dhotre inaugurated the exhibition on clean air technologies organized by Centre of Excellence for Research in Clean Air (CERCA) at Indian Institute of Technology Delhi on 25th February 2020. The exhibition showcased clean air technologies developed by IIT Bombay, IIT Ropar, IIT (ISM) Dhanbad and IIT Delhi. IIT Delhi showcased the work it had carried out in clean air through start-ups incubated at IIT Delhi namely Aerogram and Kriya Labs.

For more details on prototypes visit:

<https://owncloud.iitd.ac.in/nextcloud/index.php/s/3rijdZmYKSzsjb>



### 4.2 Visit of Swedish Delegation at IIT Delhi

A delegation of 12 journalists from Sweden Television Network visited IIT Delhi on 4th March 2020. The main purpose of this visit was to expose the media delegation to the current air pollution research activities at CERCA IIT Delhi. The media delegation interacted with various faculties from the different departments of IITD, who briefed them about the research work(s) being done to curb the air pollution issue in the country. The Delegation also visited Aerogram and Kriya Labs.



### 4.3 International Day of Clean Air for Blue Skies

We have organized a Webinar on "Clean Air Goals for India" on 7 September 2020 on "International Day of Clean Air for Blue Skies". This Webinar's objective was to deliberate on the air pollution goals and policy perspectives for India through Technical sessions on Air Quality Measurement, Science and Mitigation Plans. This Webinar brings together various Domain Experts from the Government, Think



Tanks, Academia, and Private sector and covered a range of topics such as Real-time PM Speciation and Gas Measurements, Source contribution to PM<sub>2.5</sub> pollution and solutions, Open Data Resources for Energy, Emissions, & Air Pollution Analysis in India, Looking beyond PM in India, Air-pollution climate interaction and co-benefit opportunities, Pursuing a clean air agenda during the COVID crisis, Citizen science, Roadblocks to clean air action plan implementation, Integrating health outcomes to policy.

#### 4.4 Webinar on Source Apportionment and Emission Inventories Studies in Non-Attainable Cities in India

We have organized a webinar on “SA and EI studies in non-attainment cities in India: Bridging the gap between Researchers and Regulators” on 26th November 2020. This half-day workshop aims to bring together various Domain Experts from the Government, Think Tanks, Academia, and Private sector to deliberate on the source apportionment studies carried out in different non-attainment cities in India. The focus of this workshop is to bridge the gap between the researchers and regulators for a better understanding of the way forward to formulate on-ground implementable strategies in these cities.



#### 4.5 Electric Mobility Initiative

Retrofitting an old vintage Beetle car into EV, On November 16, 2020 we have launched our maiden initiative on electric mobility with the retrofitting of a Classic Beetle car into an electric vehicle. The program at IIT, Delhi was attended by several members and Office bearers of the Heritage Motoring Club of India. Mr. Arun Duggal, Founder of CERCA, a former IIT Delhi Alum and Life Member of the Heritage Motoring Club of India in his message said Centre of Excellence for Research on Clean Air has been established at IIT Delhi to promote research and actions to reduce Air pollution. The Electric Beetle is a symbolic action to demonstrate that we can take actions to eliminate air pollution in Delhi/NCR and in India by use of technology and innovation.

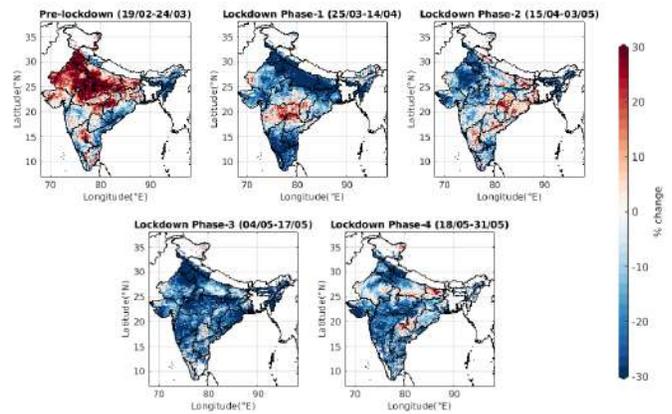


## 5. RESEARCH ACTIVITIES (Government-Academia-Industry Partnership)

### 5.1 Satellite based Air Quality analysis during Lockdown

Reduction on PM<sub>2.5</sub> during COVID19 lockdown in India by Prof. Sagnik Dey

Using our satellite-based national PM<sub>2.5</sub> database ([www.saans.co.in](http://www.saans.co.in)), we examined the changes in ambient PM<sub>2.5</sub> during the four phases of lockdown from the pre-lockdown period (Feb 19-Mar 24, 2020) with respect to the similar changes in the last five years. PM<sub>2.5</sub> (averaged over the entire mainland India) decreased by 35.8% from 86.9  $\mu\text{g m}^{-3}$  in the five weeks preceding the lockdown (February 19-March 24, 2020) to 55.7  $\mu\text{g m}^{-3}$  during the lockdown with a considerable regional heterogeneity as compared to a 19.5% decrease observed during the same period (81.2 to 65.3  $\mu\text{g m}^{-3}$ ) in the last five years; thereby suggesting an additional 16.3% improvement due to the lockdown. However, we observe that the initial improvement in air quality during the first phase of lockdown could not be sustained in the subsequent phases and the emission reduction from the major anthropogenic outdoor activities (larger impact in urban areas than the rural background) was not enough to sustain the PM<sub>2.5</sub> exposures below the national standards.



### 5.2 Beta Attenuation Monitoring (BAM) at IIT Delhi

An air quality measuring equipment for continuous monitoring of ambient air quality has been installed at IIT Campus. This will enable further research on air quality as well as for calibrating other air quality monitoring equipment. CERCA is constantly collecting data from BAM and it is also displaying Live PM<sub>2.5</sub> data on IIT Delhi Digital Notice Board and on the website.

For live data, visit: <https://home.iitd.ac.in/> or <https://cerca.iitd.ac.in/>



### **5.3 MoU signed with West Bengal Pollution Control Board (WBPCB)**

A Memorandum of understanding has been signed in February by WBPCB and CERCA for undertaking source apportionment studies, preparing emission inventory, and carrying capacity for three cities in west Bengal namely Durgapur, Asansol and Raniganj. A Meeting in this regard was held on March 16,2020 with Principal Secretary (Environment), WB & Chairman West Bengal Pollution Control Board on finalization of project. The West Bengal Pollution Control Board (WBPCB) is also planning to install remote sensors across the state to detect stubble burning which is a major cause of air pollution and working with IIT Delhi on this project. Two scientists from the board will be trained by IIT Delhi to work on the project. The sensors will help in tracking any incident of stubble burning across the state.

### **5.4 MoA with Bihar State Pollution Control Board (BSPCB)**

The Bihar State Pollution Control Board has signed a 'Memorandum of Agreement' (MoA) with IIT Delhi on 8th August 2020 for setting up of geographical information system (GIS) based platform for air quality management in the state. Prof. Sagnik Dey, from Centre for Atmospheric Sciences and Coordinator CERCA IITD, will be leading this project with his counterpart Mr. S.N Jayaswal of Bihar State Pollution Control Board, Patna. This project will help in identifying sources and transport of PM 2.5 at a "very high resolution" and help the board to identify "effective mitigation measures". It will also help to determine the local hot spot of particulate matter PM 2.5 in the non-attainment cities in Bihar, namely Patna, Gaya, and Muzaffarpur. These maps will help in developing a strategy to minimize exposure with the help of modelling and survey. Further, using satellite data, the study will identify the districts and villages where open burning is prevalent.

### **5.5 Climate Change and action**

We are glad to announce that CERCA has expanded its scope of activities to undertake research projects on Climate change and more specifically:

- To undertake research projects on impacts of climate change including identification of mitigation options that reduce the risk of longer-term climate change including promotion of international research and collaboration.
- Build capacity for climate assessment through training, education, and workforce development.

Our broad objective is to promote scientific research for developing strategies to understand root causes and implications of anthropogenic climate change and to build resilience to severe climate change impacts on the society through appropriate policy changes.

## 6. OUTREACH ACTIVITIES

### 6.1 CERCA Monthly Newsletter

To get public outreach, we have been reaching out to a wide section of our society through a weekly newsletter since 2018 providing the latest inputs on research on health effects of air pollution, actionable information on air quality data to the Government, Industry and to the Citizens at large for appropriate policy formulation, emerging clean air technologies including new measures/innovative initiatives from across the world to combat air pollution including thought leadership. We endeavour to involve more and more people across our communities in this significant initiative, thereby enhancing public understanding and participation in promoting Clean Air initiatives at the grass-root level. In line with this, we have now decided to change the frequency of this newsletter from weekly to monthly. Also, we are planning to design a separate newsletter specially for school students. This would allow us to include more impactful and qualitative information on clean air and climate change area.

You can access newsletters on our website: <https://cerca.iitd.ac.in/>

### 6.2 CERCA opinion paper series

We have started a CERCA opinion paper series as a part of our CERCA monthly newsletter in which we include opinion/discussion papers relevant to clean air and climate change research from our faculties/research scholars, local, regional and national level air quality analysis and findings, latest national and international research on emerging clean air technologies including thought leadership and policy discussion.

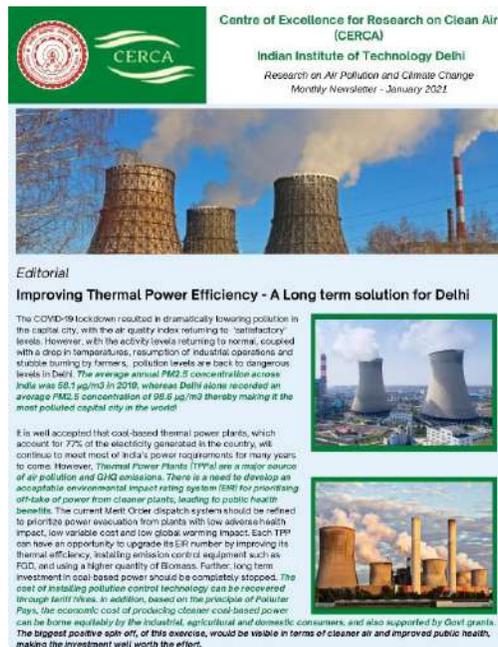
Read Here: <https://cerca.iitd.ac.in/category/past>

### 6.3 Media Coverage and Social Media Presence

We are active on social media via LinkedIn and Twitter. You can follow us for the latest updates on air quality, news highlights, and centre activities.

You can also share your feedback and other relevant information on:

- <https://www.linkedin.com/company/centre-of-excellence-for-research-on-clean-air/>
- [https://twitter.com/CERCA\\_IITD](https://twitter.com/CERCA_IITD)





**Hindustan Times**

Home / Cities / Delhi News / 'Good' air days over as AQI starts to spike?

**DELHI NEWS**

**'Good' air days over as AQI starts to spike?**

This year, clean air days could be all but over with forecasts showing heavy showers, which help wash away pollutants, are unlikely in the coming days and with the lifting of the 68-day lockdown to curb the spread of Covid-19, the scientists added.



**IIT-Delhi, Bihar State Pollution Control Board sign MoU**

Arunkumar Lal | TNN | Updated: Aug 9, 2020, 12:02 IST

PATNA: The Bihar State Pollution Control Board (BSPCB) has signed a memorandum of understanding with the IIT-Delhi to set up a geographical information system-based platform for air quality management.

Track the pollution level in your city

An air quality monitoring station at Eco Park in Patna

**Bengal Will Become First State to Use Real-time Satellite Data for Air Quality Management**

NEW DELHI | Bengal will become the first state in India to use real-time satellite data for air quality management. A memorandum of understanding (MoU) has been signed between the Central Pollution Control Board (CPCB) and the West Bengal Pollution Control Board (WBPCB) to set up a real-time satellite-based air quality monitoring system in Kolkata.

**IIT Delhi Research Centre Launches 'Electric Beetle'**

Founder of CERCA, Mr. Arun Duggal, said that the Electric Beetle is a "symbolic action" to demonstrate that air pollution in Delhi and NCR can be eliminated by using "technology and innovation".

The Electric Beetle is a small, yellow, electric car that is designed to be a "symbolic action" to demonstrate that air pollution in Delhi and NCR can be eliminated by using "technology and innovation".

**IIT-Delhi's classic solution to check air pollution**

Mohammad Iqbal | TNN | Updated: Nov 18, 2020, 09:22 IST

NEW DELHI: Want to get your car converted into an electric vehicle? IIT Delhi's Centre for Research on Clean Air (CERCA) is ready to help. The IIT think tank on Monday launched an initiative to retrofit a vintage car of 1948 model into an electric vehicle.

A yellow Beetle car is shown, which is being converted into an electric vehicle by IIT Delhi's CERCA.

**Clean air can help minimise risks of Covid infections as the economy opens up**

Air quality has improved, but not enough. Data from the Central Pollution Control Board monitors across the country show a dramatic improvement in air quality during the lockdown period.

**IITs Showcase Clean Air Technologies At IIT Delhi Exhibition**

The exhibition showcased clean air technologies developed by Bombay, Ropar, Dhanbad and Delhi IITs.

The exhibition showcased clean air technologies developed by IIT Bombay, IIT Ropar, IIT Dhanbad and IIT Delhi. IIT Delhi showcased the work it had carried out in the area of clean air technologies.

**How bad is indoor air? IIT Delhi to study 10 public spaces**

People spend at least 60% of their time indoors, increasing exposure to particles and risk of respiratory illness.

By Vatsala Shrivastava | Hindustan Times, New Delhi | PUBLISHED ON NOV 10, 2019 01:31 PM IST

Potential threat of high indoor pollution levels is mainly owing to poor ventilation and lighting, high ambient air pollution, among others. (Representational image) (Unsplash)