EPIC INDIA

ENERGY POLICY INSTITUTE
AT THE UNIVERSITY OF CHICAGO

Discover.
Impact.
Communicate.

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INDIA'S ENERGY CHALLENGE

India faces unique challenges as it seeks to rapidly expand energy access and improve living standards through economic growth. Chief among them: balancing the need for reliable, affordable energy with the need to provide cleaner air and meet its carbon emissions goals.

Experts share insights at the National Conference on Innovations in Air Pollution Regulation at the University of Chicago Center in Delhi

Access to reliable and affordable energy is critical for economic growth. Over the past two decades, India has made incredible strides in this area, for example, by connecting hundreds of millions of households to the electricity grid for the first time.

Growing demand for energy in India has largely been met by abundant, inexpensive, and highly-polluting fossil fuels. As a result, India is now the second-highest emitter of carbon emissions in the world, and annual concentrations of fine particulate pollution have increased by 60 percent between 2000 and 2016. Due to high levels of air pollution, Indians are now expected to live 4.3 years less on average than they would if they breathed cleaner air. As hundreds of millions of additional people gain access to a largely coal-powered electricity system, pollution and carbon emissions will only grow.

Foundational Research to Solve Vital Policy Challenges

EPIC-India works hand-in-hand with government and industry partners to develop and test ideas that could address India's most pressing energy and environmental challenges using cutting-edge research approaches, such as randomized control trials. Through these innovative partnerships and projects, research insights and policy lessons are "co-generated" to provide lasting change.

Scaling Solutions to Heighten Change

EPIC-India partners with the Tata Centre for Development (TCD) to scale successful policy solutions in one region and apply them to other regions throughout India. This ensures that the lessons learned through an individual pilot project are multiplied to deliver further progress.

Outreach to Deliver Real Impact

EPIC-India engages with broad cross-sections of society—from the media to other research institutes and non-governmental organizations. In providing this forum, EPIC-India ensures that the policy lessons it carves out are widely known and understood.

Training the Next Generation of Indian Energy Leaders

EPIC-India aims to ensure that ambitious Indian researchers are given opportunities to develop a diverse skillset and well-rounded understanding of the energy system through fellowship opportunities at the University of Chicago's main campus. These academic programs help India's future energy leaders think critically and comprehensively about energy issues so they can better develop solutions that work.

CONFRONTING INDIA'S ENERGY CHALLENGE

EPIC-India researchers work hand-in-hand with government and industry partners to identify innovative ideas, pilot them on the ground, and rigorously measure outcomes. This approach ensures the right questions are being answered and results can be scaled up into lasting policy changes.

AREAS OF FOCUS

Energy Access

Hundreds of millions of Indians lack access to reliable energy. EPIC-India researchers are evaluating cutting-edge approaches and technologies to expand access to reliable power.

Pollution, Climate & Human Health

With the demand for energy expected to increase, continued reliance on fossil fuels will only worsen India's air pollution problem and climate change—unless, clear regulations are in place and enforced. EPIC-India researchers are testing a variety of low-cost regulatory reforms and measures.

Data & Capacity Building

Lack of data is a significant barrier to designing and implementing effective energy and environment regulation. EPIC-India researchers are providing needed information— from expanding air quality monitoring to building the modeling tools to help India forecast its future.

Discover

EPIC-India leverages its unique government and industry partnerships to conduct applied economics research across India at a national, state and local scale with the goal of revealing important insights that can have a meaningful impact on public policy.

GUJARAT
Developing India's First Emissions Trading Scheme

PUNJAB
Direct Benefit Transfer of Agricultural Electricity Subsidy

BIHAR
Incentivizing Electricity Utility Agents to Increase Revenue Collection Performance

DELHI
Reducing Heat Stress in Low-Income Communities Through a Passive Cooling Technology

GUJARAT MAJARASHTRA
Improving Monitoring to Enhance Environmental Performance and Regulations

BIHAR
The Demand for Off-Grid Solar Power

BIHAR
Increasing Energy Access by Reducing Electricity Distribution Losses

RAJASTHAN
The Impact of Changing the Delivery of Subsidies on Farmer Welfare in Rajasthan

ODISHA MAJARASHTRA JHARKHAND
Strengthening Environmental Regulations Through Transparency

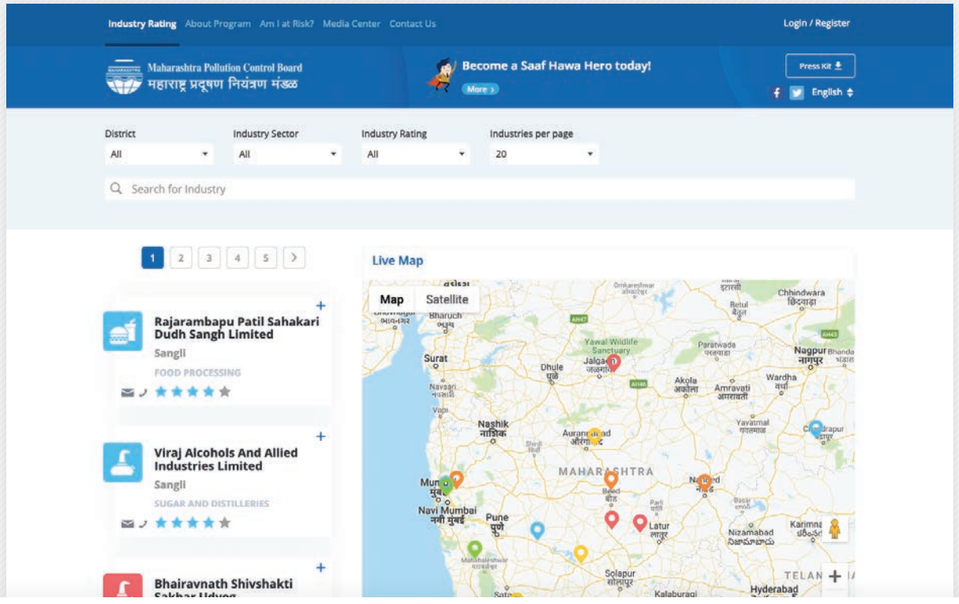
ODISHA
Improving Pollution Monitoring and Enforcement in Odisha

KARNATAKA
Incentivizing Residential Waste Segregation and Recycling Through Innovating Pricing Models

DELHI
Incentivizing Cleaner E-Waste Recycling in the Informal Sector

KARNATAKA
Encouraging Residential Electricity Conservation Using Information

DELHI
Drivers of Adoption of Air Pollution Masks in Delhi



The Maharashtra Pollution Control Board website, available at mpcb.info

ODISHA MAJARASHTRA JHARKHAND

Strengthening Environmental Regulations through Transparency

To tackle the growing danger of air pollution, the Maharashtra government launched India's first five-star rating system for industries. Under the new scheme, designed in partnership with researchers from EPIC-India, industries are rated from one to five stars based on the amount of air pollution emitted from their smoke stacks. The program has the potential to reduce pollution by making citizens more informed; giving them the information they need to call for change.

PARTNERS

State Pollution Control Boards of Maharashtra and Odisha

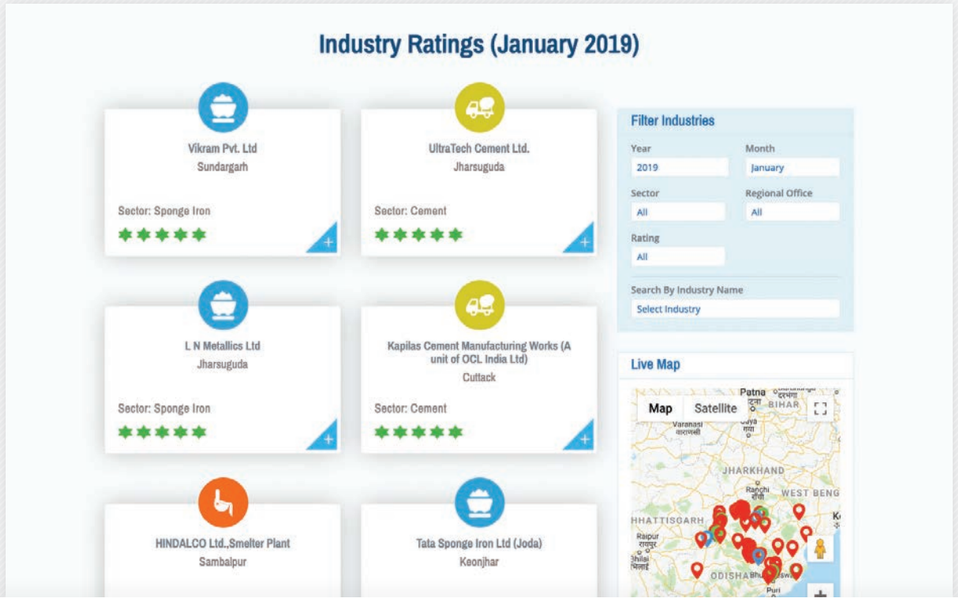
The Abdul Latif Jameel Poverty Action Lab (J-PAL)

Evidence for Policy Design (EPoD) at Harvard Kennedy School

IN THE NEWS

Study Identifies 23 Most Polluting Industries in Maharashtra

hindustantimes



The Odisha Pollution Control Board website, available at ospcb.info

Building on this work, EPIC-India partnered with the Tata Centre for Development (TCD) to help the Odisha Government launch its own five-star rating system. Building on the work in Maharashtra, the Odisha initiative is the first in India to use real-time emissions monitoring data. EPIC-India and TCD are now working to scale up this approach in additional states across India, including Jharkhand.

IMPACT

Transforming environmental regulation in India into a fully transparent and data-driven process.

IN THE NEWS

Odisha Launches Star-Rating Program For Industries To Cut Pollution

The Economic Times

GUJARAT

Developing India's First Emissions Trading Scheme

The use of command-and-control approaches to pollution regulation in India has resulted in high levels of non-compliance, caused partly by low-quality data, and partly by high costs and a lack of flexibility. Real-time, online pollution monitoring systems attempt to solve this problem, by moving away from a heavy reliance on manual inspections and monitoring, towards more efficient regulation built on sophisticated data. The real-time data generated by these systems can be used to support permit trading systems that are more efficient and flexible than command-and-control. Researchers from EPIC-India, J-PAL South Asia and EPoD-India, are working with the Gujarat Pollution Control Board to evaluate the impact of India's first emissions trading market in Surat, Gujarat. The project builds on ongoing research aiming to understand the effect of continuous emissions monitoring systems on plant abatement choices, regulatory behaviour and pollution levels. This initiative is pioneering in that it tests the use of market-based instruments for industrial pollution regulation for the first time in the history of Indian environmental regulation.

PARTNERS

Ministry of Environment and Forests

Central Pollution Control Board

Gujarat, Maharashtra, and Tamil Nadu Pollution Control Boards

The Abdul Latif Jameel Poverty Action Lab (J-PAL)

Evidence for Policy Design (EPoD) at Harvard Kennedy School

IMPACT

Drastically reduce air pollution at a low cost to both government and industry, and provide best practices for replicating this model for other types of emissions.

IN THE NEWS

Soon, Industries Could Buy And Sell PM 2.5 Emission Permits

THE TIMES OF INDIA

BIHAR

Increasing Energy Access by Reducing Electricity Distribution Losses

The power sector is widely viewed as one of the biggest constraints on India's economic growth. Almost half of power drawn from the grid is not paid for and is unmetered, unbilled or pilfered. In the state of Bihar, 45 percent of power consumed falls in this category. Working with the state-owned electricity distribution company in Bihar, EPIC-India researchers in collaboration with J-PAL South Asia are testing an innovative group collective incentive program that links the amount of electricity supplied to groups of industrial and residential consumers to their overall performance in paying for the electricity they consume. As the proportion of paid electricity increases, the hours of electricity supplied to that community also increases.

PARTNERS

North and South Bihar Power Distribution Company

The Abdul Latif Jameel Poverty Action Lab (J-PAL)

IMPACT

Identify cost-effective pathways to increasing energy access and reducing energy poverty.

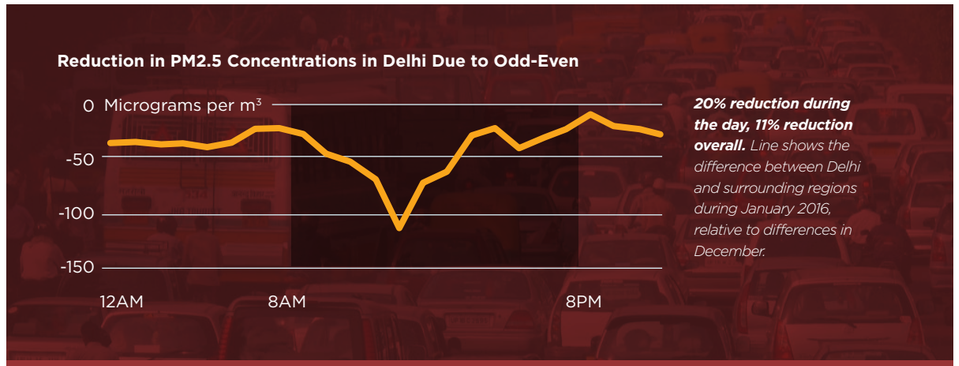
IN THE NEWS

Ending Energy Poverty: Power to the Powerless

The Economist

Impact

EPIC-India works hand-in-hand with government and industry partners to develop and test ideas that could address India's most pressing energy and environmental challenges. Through these partnerships, EPIC-India aims to turn insights gained through research from India and across the world into public policies that provide lasting benefits.

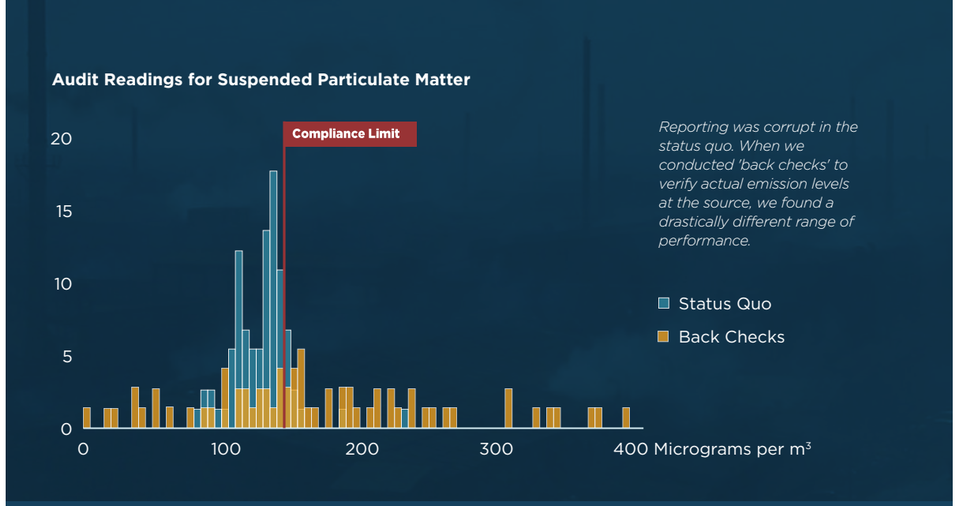


Did Odd-Even Clean Delhi's Air?

In January and April 2016, the government of Delhi piloted the 'Odd-Even' traffic rule, which mandated that only cars with odd numbered license plates could drive on odd dates, and even numbered plates on even dates. The pilot lasted for a fortnight during each round. EPIC-India researchers used data from regulatory air quality monitoring stations to estimate the program's impact and contribute to the discourse around the program with rigorous analysis. By comparing pollution measurements in Delhi and surrounding satellite cities before, during and after the program, we found that fine particle concentrations in Delhi's air were lower by 13 percent during the hours the program was in effect in the January pilot; no effect was seen at night when the program was not in force. In contrast, the program did not affect Delhi's air quality during the warmer month of April. This is possibly due to faster dispersion of pollutants in the atmosphere when temperatures are higher, effectively wiping out local differences. Taken together, this suggests that the main value of a rationing program like the Odd-Even in Delhi is as an emergency measure during winter months when car emissions play a more prominent role in affecting air quality.

13%

Reduction in particle concentrations in Delhi's air during January pilot hours.



Experiment Improves Regulation in Gujarat, Reducing Pollution

Gujarat is the most industrialized state in India and among its most heavily polluted. The Gujarat Pollution Control Board regulates more than 20,000 industrial plants using third-party audits; firms would choose and pay their auditors directly, and there was no mechanism to scrutinize the quality of auditors' reports. As a result, auditors that reported the truth were unlikely to be hired, especially by highly polluting firms that did not wish to be noticed. Neither the Gujarat environmental regulators nor the auditors themselves thought the status quo system was producing accurate information about pollution. For the regulators, this meant they were unwilling to take action based on audit reports.

The Gujarat authorities partnered with EPIC-India researchers and collaborators to answer a simple question: Does adjusting incentives to break the conflict of interest lead to more truthful auditing, and thus, less pollution?

The EPIC-India research team tested a series of reforms that gave auditors of polluting plants the incentives to tell the truth, including randomly assigning auditors to industrial plants and having their work double-checked for accuracy. The reforms led to more accurate reporting, and reduced pollution by 28 percent.

28%

Reduction in pollution following reforms implemented in partnership with EPIC.

Through a strategic outreach campaign to spread the word about the success of the tested reforms, the team wrote a policy brief sent to targeted opinion leaders and influencers, penned an op-ed that appeared in the *New York Times*, and received coverage from national and international media such as the *Wall Street Journal*. In January 2015, the pilot reforms were officially adopted by the Gujarat government. The National Clean Air Program released by the government in January 2019 also took note of the pilot and recommended that the Gujarat case study be used "for a compelling case for other states to adopt third party audit for polluting industries for enhancing implementation."

Communicate

EPIC-India translates research findings into easily-digestible content for traditional and new media sources, and provides a forum where energy and environmental challenges can be discussed. Through innovation competitions, seminars and workshops, EPIC-India reaches out to the broader community to develop and nurture new ideas.

India Parliamentarian visit UChicago 2018

Legislators Engagement Program

Political leadership is essential to successfully implementing innovative energy and environmental policies at the grass-roots level. With the help of EPIC-India's rigorous, evidence-based policy research, elected representatives can accelerate the process of addressing India's pollution challenges and shifting to a low-carbon growth trajectory while also addressing energy access challenges. To facilitate the sharing of information between researchers and policymakers, and to build capacity among Indian legislators, EPIC-India has rolled out an annual Legislators Engagement Program. This initiative has already helped research findings enter the policy discourse within India, and at the same time catalyzed new research initiatives.

Representatives from the Mahila Housing SEWA Trust accept their award

Innovation Challenges

The Innovation Challenge is a competition to identify the best local ideas to address the energy and environmental issues facing the urban cities in India. The winners of the crowd-sourcing competition receive funding to work with their local governments and University of Chicago researchers to pilot their ideas. The researchers use the pilot projects to generate evidence on which urban policy interventions work, for whom, and why. If successful, the projects could become policy solutions scaled up by the government, as well as models for other cities to follow. The Tata Centre for Development at University of Chicago and implementing partners at the University of Chicago's Energy and Environment Lab and the EPIC-India team have successfully launched two Innovation Challenges in India. The first Challenge was in Delhi in 2015-16 in partnership with the Dialogue and Development Commission of Delhi, Government of NCT of Delhi. In 2018, the Bengaluru Innovation Challenge was launched in partnership with the Urban Development Department, Government of Karnataka.

"The fact that these brilliant ideas have come from people and organizations who know the ground realities, gives me immense hope. I am very optimistic that together with experts at the University of Chicago and guidance from our Government, the winning ideas will give some long lasting environmental solutions to Bengaluru."

DR. SHRI. G. PARAMESHWARA,
DEPUTY CHIEF MINISTER, KARNATAKA

Press Coverage

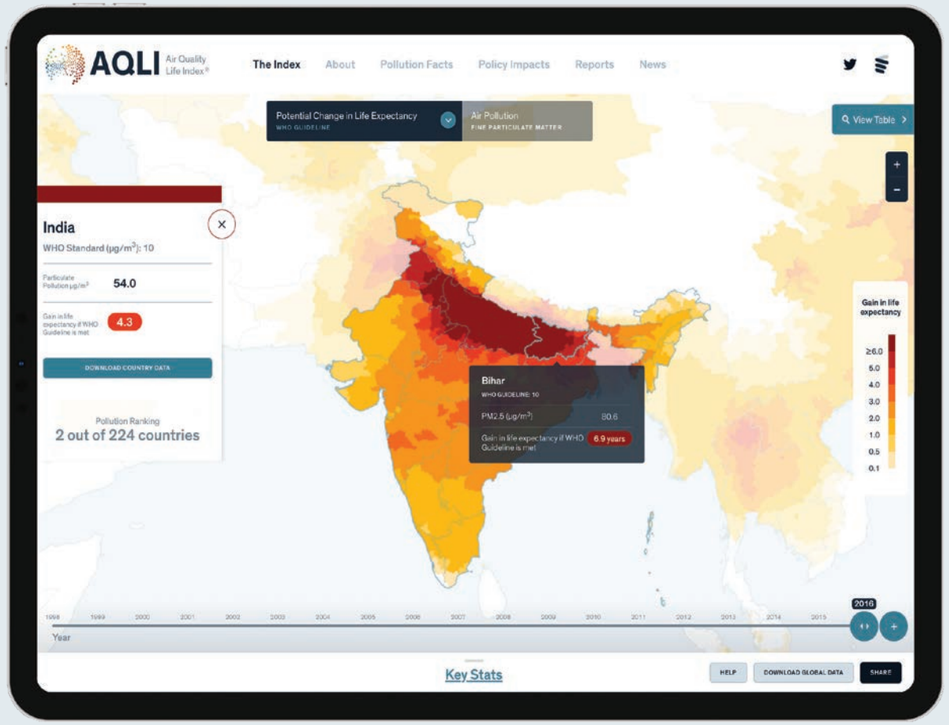
Indian MPs Visit University Of Chicago, Prepare To Tackle Energy Challenges
NDTV

Hotter Weather Threatens Productivity Of Indian Workers: Study
IndiaSpend

Air Pollution Reduces Life By 4.3 Years, Deadlier Than Smoking And Alcohol: Report
hindustantimes

Chicago Varsity To Help Karnataka Clean Bengaluru's Environment
the quint

Odisha Initiative For Partnership With Univ Of Chicago
Business Standard



PROFILE

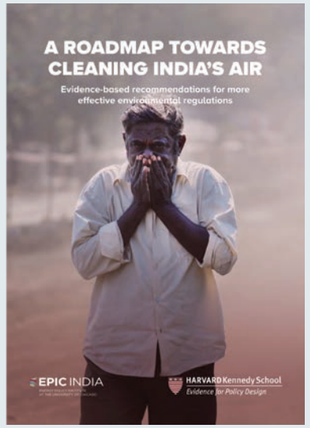
New Tool Shows Pollution's Impact in India

India is one of the most polluted countries in the world and air pollution is a major threat to health. But, a new tool developed by EPIC, the Air Quality Life Index (AQLI), reveals that if India reduced its air pollution to comply with the WHO's air quality guideline its people could live about 4 years longer on average, or more than 5.4 billion life years combined. If the country reduced pollution to comply with its own national standard, its people could live 1.8 years longer on average, or more than 2.3 billion life years combined. Some of the greatest gains would be seen in the country's largest cities, such as Delhi. *Explore the tool at AQLI.epic.uchicago.edu*

PROFILE

Researchers Provide a Roadmap to Clean Up India's Air

More than 660 million Indians live in areas that exceed the country's standard for what is considered safe exposure to fine particulate pollution (PM2.5). To help improve India's air quality, researchers from the University of Chicago and Harvard Kennedy School have laid out five key evidence-based policy recommendations in a new policy brief titled "A Roadmap Towards Cleaning India's Air."



The brief first highlights four key facts that require attention of the regulatory authorities: The enormous health benefits by improving air pollution levels; high non-compliance to industrial norms; the limited effectiveness of traditional regulatory measures that rely on equipment mandates; and bans on polluting activities.

It then lists five recommendations that include: Improving emissions monitoring by better aligning incentives of auditors; providing regulators with real-time data on polluters' emissions; applying monetary charges for excess emissions; providing the public with information about polluters; and using markets to reduce abatement costs and pollution.

> "Without good information, the state cannot manage, regulate or even monitor."
>
> **ANANT SUDARSHAN**
> **SOUTH ASIA DIRECTOR, EPIC**

LEADERSHIP

Michael Greenstone

Michael Greenstone is the Milton Friedman Distinguished Service Professor in Economics, the College and the Harris School, and director of EPIC. He previously served as the Chief Economist for President Obama's Council of Economic Advisers and on the EPA's Science Advisory Board. Greenstone also directed the Brookings Institution's Hamilton Project, which studies policies to promote economic growth, and has since joined its Advisory Council. He is an elected member of the American Academy of Arts and Sciences and former editor of the Journal of Political Economy. Before coming to Chicago, Greenstone was the 3M Professor of Environmental Economics at MIT.

Anant Sudarshan

Anant Sudarshan is the Executive Director (South Asia) for EPIC. He is also a Senior Research Associate in the Department of Economics. Prior to working at EPIC, Anant was the Giorgio Ruffolo Post-doctoral Fellow in the Sustainability Science Program at Harvard University's Kennedy School of Government. He received his PhD in Management Science and Engineering from Stanford University and he holds undergraduate and masters degrees in Mechanical Engineering from the Indian Institute of Technology (Delhi) and Stanford University respectively.

Ken Lee

Ken Lee is the Executive Director of EPIC-India. He is also a Senior Research Associate in the Department of Economics. Previously, Ken was a post-doctoral research fellow at the Center for Effective Global Action (CEGA) and the Energy Institute at Haas. He holds a PhD from the University of California, Berkeley and an MIA from the School of International and Public Affairs (SIPA) at Columbia University.

Ashirbad Snehdip Raha

Ashirbad is the Associate Director of Communications and leads the team which is responsible for simplifying institutional research to drive policy change through cross-institutional policy engagement, media interactions, social media marketing and public events. A former journalist, he has over 10 years of strategic communication and stakeholder engagement experience gained working in, and with, media, international nonprofits, humanitarian agencies and research groups in India and neighboring South Asian countries.

Vaibhav Chowdhary

Vaibhav Chowdhary is Associate Director-Operations and Strategy at EPIC-India. Prior to working at EPIC, Vaibhav was the National Energy Adviser to the Government of UK in India. He is an Electronics and Instrumentation Engineer with an MBA in Power Management from National Power Training Institute (NPTI), GoI. Vaibhav holds a post graduate diploma on "Energy Economics and Planning" from Indian Institute of Technology (IIT) Delhi and a post graduate diploma on "Energy and Sustainability" from Open University (OU), London, UK.

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