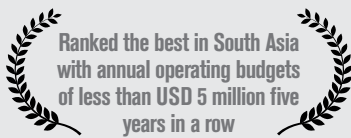




**DIGGING  
DEEP TO  
YEAR IN REVIEW  
2016-2017  
(Sep - Aug)**

**AIM  
HIGH**

The Council on Energy, Environment and Water (CEEW) is one of South Asia's leading not-for-profit policy research institutions. It uses data, integrated analysis, and strategic outreach to explain – and change – the use, reuse, and misuse of resources.



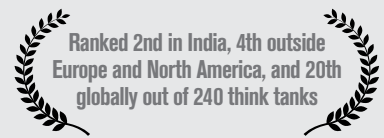
**Ranked the best in South Asia  
with annual operating budgets  
of less than USD 5 million five  
years in a row**

Global Go To Think Tank Index 2017



**Among top 100 out of  
6846 think tanks in eight  
categories**

Global Go To Think Tank Index 2017



**Ranked 2nd in India, 4th outside  
Europe and North America, and 20th  
globally out of 240 think tanks**

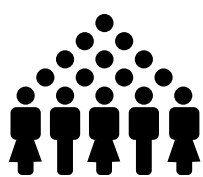
ICCG Climate Think Tank's  
standardised rankings 2016

# The Council

## TEAM



# at a Glance

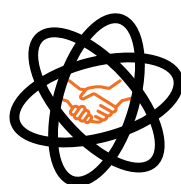


## OUR PEOPLE

---

Young. Professional.  
Interdisciplinary.  
Dreamers.

A 40-strong team and  
counting.



## OUR VALUES

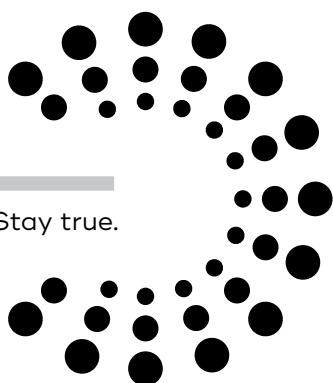
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- **Integrated**  
Be it of disciplines, cultures, teams, or points of view – synergies and respect drive our research, outreach and behaviour.
- **International**  
Focus on understanding global challenges and implications for India's development. All research outputs internationally relevant.
- **Independent**  
Funding and findings are mutually exclusive. Non-partisan. Editorial independence is sacred.

## OUR AIM

---

Fight ignorance. Stay true.  
Raise the bar.



## THE NON-NEGOTIABLES

- Zero tolerance for sexual harassment at the workplace.
- A functional Internal Complaints Committee (ICC). A seven-member strong ICC chaired by a senior female researcher.
- All research goes through multiple internal reviews. All reports and working papers go through at least two external peer reviews before publication.
- No private consultancies. All published research is available in the public domain.

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# Dig Deep to Aim High

**From the Chairperson  
and the CEO**



Every institution goes through periods of growth and periods of consolidation. After supporting the historic Paris Agreement on climate change in 2015, CEEW went into consolidation mode in 2016-17. We deepened capacity in our research areas, continued to support international negotiations, and launched new institution-wide initiatives.

In this Year-in-Review, we showcase how we apply The Council's Arc of Learning, our trajectory from research to convening and communicating to action and contemplation in whatever we undertake. You will learn about how we applied our extensive primary data to support field interventions for energy access. Or how our strategic and timely financial analysis on solar and wind tariffs changed policy thinking on how to scale renewable energy. We continued to strengthen our database on industrial emissions, to build the foundations for our work on industrial sustainability and competitiveness. We began work on extensive modelling-based analysis of India's low-carbon pathways, a mammoth exercise that will show results in the coming months. We downscaled our assessment of global climate risks to understand how India's growing cities would be vulnerable to rising temperatures and energy-water stresses. We also analysed trends in electricity tariffs and the power sector situation in many states to develop our hypotheses and theory of change for state-level reforms.

As each research programme evolved, we pushed for some big wins. A high point was the Kigali Amendment to the Montreal Protocol. Having pioneered business engagement and extensive analytics on hydrofluorocarbons (HFCs), it was our privilege to support the successful and historic conclusion of many years of negotiations to phase down HFCs. Equally, we worked tirelessly through 2016-17 to support the foundational period of the International Solar Alliance (ISA). Brick-by-brick, we developed strategic roadmaps, reached out to many countries, communicated the ISA's aims to a wider audience, and contributed to its work programmes.

On 5 June 2017, World Environment Day, CEEW launched the Women in Sustainability (WiS) initiative, in collaboration with the United Nations. WiS is a network of individuals and institutions to promote greater participation, inclusiveness, and visibility of women at all levels of the public policy workforce. We want to lean in for those women who lean in for the planet.

In recognition of our efforts, for the fifth year in a row, CEEW has been ranked as South Asia's Top Think Tank (14th globally) with an annual operating budget of less than USD 5 million.

As you peruse through this report, we hope you will find signs of an institution that values its people – our biggest, strongest, and only asset. CEEW is a platform from which we hope young minds can push hard at finding solutions, not just describe problems. This takes time, perseverance and a hunger for change. We are aiming high, but for that we have to continue to dig deep.

**JAMSHYD N. GODREJ**

Chairperson, CEEW; Chairman, Godrej and Boyce Manufacturing Company Pvt. Ltd.

**ARUNABHA GHOSH**

Chief Executive Officer, CEEW

# Strategic



Ms Patricia Espinosa, Executive Secretary, UNFCCC, with senior researchers from CEEW.



Shri Suresh Prabhu, Hon'ble Union Minister for Commerce and Industry, and Civil Aviation, at the CEEW-UNDP conference on 'Decarbonising the Indian Railways'.



Mr Montek Singh Ahluwalia, Trustee, CEEW, and former Deputy Chairman, Planning Commission, at CEEW's book discussion on 'Energizing India'.



Ms Christine Lins, Executive Secretary, REN21, at the CEEW-Shakti 'Renewable Energy Dialogue'.



Ambassador Shyam Saran, former Foreign Secretary, at CEEW's book discussion on 'Energizing India'.



# Outreach



Shri Piyush Goyal, Hon'ble Union Minister for Railways and Coal, at the CEEW-UNDP conference on 'Decarbonising the Indian Railways'.



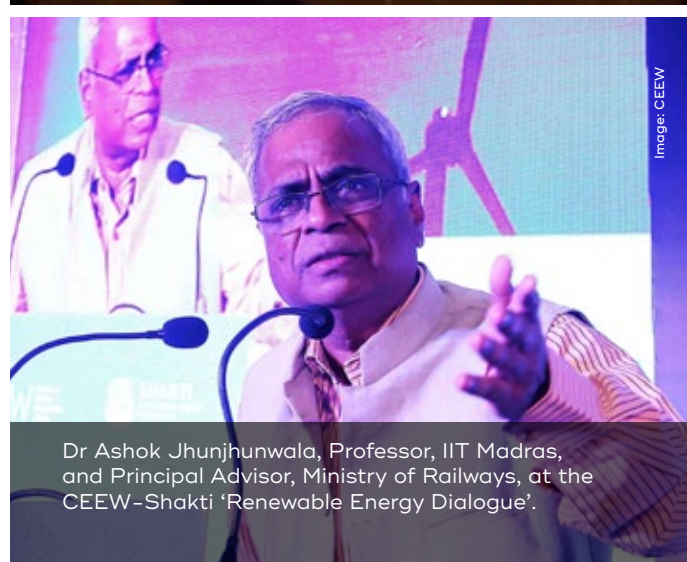
Dr Arunabha Ghosh presenting at the 'Green Growth Summit V' held in Brussels.



Ms Beth Urbanas, Deputy Assistant Secretary for Asia and the Americas at the Office of International Affairs, U.S. Department of Energy, at CEEW's roundtable discussion on 'India - U.S. Energy Partnership'.



Mr Jamshyd N. Godrej, Chairperson, CEEW and Managing Director, Godrej & Boyce; and Mr Suman Bery, Former Chief Economist, Shell International at the 'Energizing India' book discussion organised by Asia Society.



Dr Ashok Jhunjhunwala, Professor, IIT Madras, and Principal Advisor, Ministry of Railways, at the CEEW-Shakti 'Renewable Energy Dialogue'.

# From Research

## THE COUNCIL'S ARC OF LEARNING

The Arc is a path of inquiry and initiative that serves as a guiding light for team CEEW.



### IDENTIFY

Healthy scepticism to define the research question. Whose problem can we understand, whose problem can we solve, and who could help us do that?



### CONCEPTUALISE

Build an interdisciplinary team, design robust research methodology, choose partners, and differentiate clients from funders.



### UNDERSTAND

Research through data collection, objectivity in method, and evidence-based analysis.



### CONVENE

Present findings to and exchange ideas with our network of scholars, industry experts and civil society representatives, within and outside India.



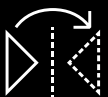
### COMMUNICATE

Core messages (based on facts) to inform policymakers, political leaders and the wider public.



### SUPPORT

Policy processes and pilot interventions for innovative solutions to complex policy challenges.



### REFLECT

On our research and actions, measure key metrics, and learn from our failures.

# to Action

We conduct and publish pioneering research across seven key domains.

## 7 FOCUS AREAS



**Energy Access**



**Renewables**



**Power Sector**



**Industrial Sustainability and Competitiveness**



**Low-Carbon Pathways**



**Risks and Adaptation**



**Technology, Finance, and Trade**



# Energy Access

Lack of access to energy is a barrier for households, communities, and enterprises in reaching their desired potential. The Energy Access team envisions removing this barrier by using evidence-based research of on-ground realities to inform policies and businesses. The team does this through the collection and analysis of primary data, evaluation of policies and programmes, design of interventions, and development of collaborative platforms that enable equitable access to modern energy for human development.



© Image: CEEW

*Abhishek Jain (R), Senior Programme Lead, CEEW, at the roundtable discussion on 'India - U.S. Energy Partnership - New Horizons', New Delhi, 25 April 2017. On his left is Hari Natarajan, former CEO of CLEAN.*

# SUSTAINABILITY OF SOLAR-BASED IRRIGATION IN INDIA

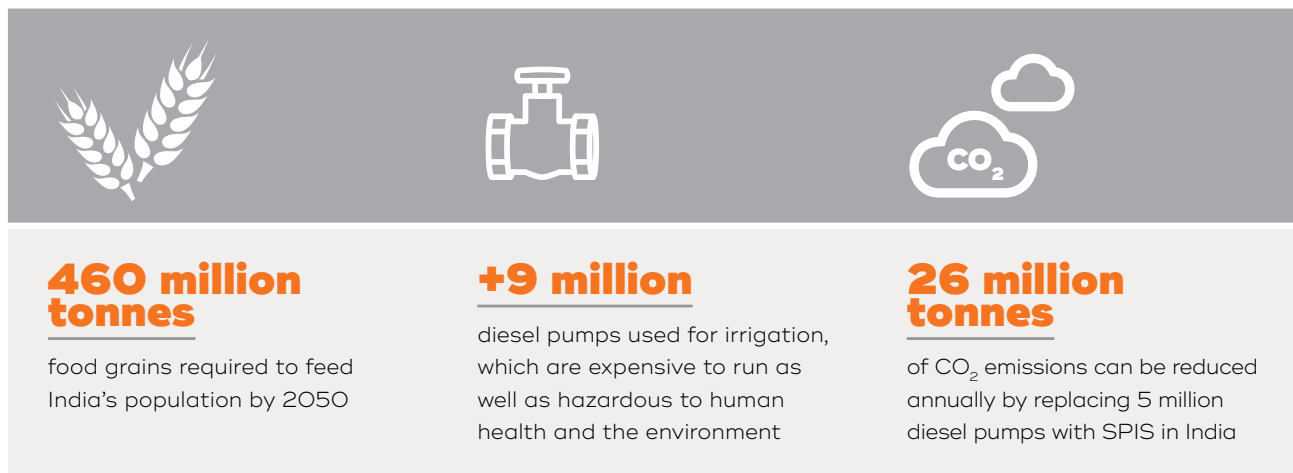
## Key Determinants, Challenges and Solutions

Ensuring access to reliable and affordable irrigation to small and marginal farmers has several economic, environmental, and social benefits. The working paper identified eighteen key determinants of sustainable solar-powered irrigation systems (SPIS) and suggested pertinent strategies to scale them up. This study opened new research avenues for the Energy Access team and also provided valuable inputs to policymakers, SPIS manufacturers and suppliers, and other researchers.



**Working Paper**  
December 2016

**Download**  
<https://goo.gl/HB7XPs>



Source: CEEW Analysis

## FEASIBILITY TOOL FOR SOLAR IRRIGATION

The Council developed an innovative map-based web tool that helps identify the most conducive geographical regions, at the district level, for sustainable deployment of solar pumps in India. The tool also indicated the social, economic, and environmental parameters to be considered during solar pump deployment in a particular district. We presented this tool to senior officials at the Ministry of New and Renewable Energy (MNRE) and the Ministry of Agriculture and Farmers' Welfare, solar pump deployers, financiers, and other experts.



© Image: Pixabay

# MEASURING ENERGY ACCESS IN INDIA

## Insights from Applying a Multi-tier Framework in Cooking Energy and Household Electricity

The briefing paper reported on the largest energy access survey ever conducted in India, by the Council, covering a representative sample of the rural poor across six states with interviews in 8,566 households. It used a multi-tier framework to measure access to household electricity and clean cooking energy, across a spectrum of tiers and a range of attributes. It was co-authored by the Council on Energy, Environment and Water, Columbia University, and Practical Action UK.

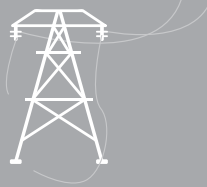


**Briefing Paper**  
February 2017

**Download**  
<https://goo.gl/1WS9sG>



Images from the six states where CEEW conducted the ACCESS survey.



**78%**

households still rely entirely on biomass for cooking

**66% households**

prioritise household electrification over electrification for community spaces, enterprises, and street lighting

**47%**

was the household electrification rate in Bihar in 2014-15

**50% households**

receive less than twelve hours of power a day

Source: CEEW Analysis

## INNEWS | Towards a Kerosene-free India

The op-ed authored by Abhishek Jain in *The Hindu* urged policymakers and experts to look beyond kerosene to provide cooking and lighting solutions to poor households, while ensuring affordability, reliability, and universal availability of alternatives such as LPG.



**Abhishek Jain**  
Senior Programme Lead



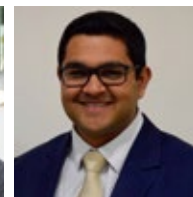
**Sasmita Patnaik**  
Programme Lead



**Sanchit Waray**  
Programme Associate



**Tauseef Shahidi**  
Research Analyst



**Saurabh Tripathi**  
Research Analyst

Special thanks to Sarah Ashraf, Praanjali Agarwal, Sara Dethier, Anne Raymond, and Aditya Ramji for their contributions to research on Energy Access.



# Renewables

The Renewables team supports India's – and the world's – clean energy transition. It does so through timely, research-based interventions based on extensive policy, regulatory, and market analyses. The team also assesses, through surveys, India's renewable energy jobs potential and skills requirement, the risks facing renewable energy investments, and designs strategic financial mechanisms to address the identified risks.



© Image: CEEW

*Kanika Chawla (R), Senior Programme Lead, CEEW, with Ms Christine Lins, Executive Secretary, REN21, at the CEEW-Shakti Renewable Energy Dialogue, 21 June 2017.*



# GREENING INDIA'S WORKFORCE

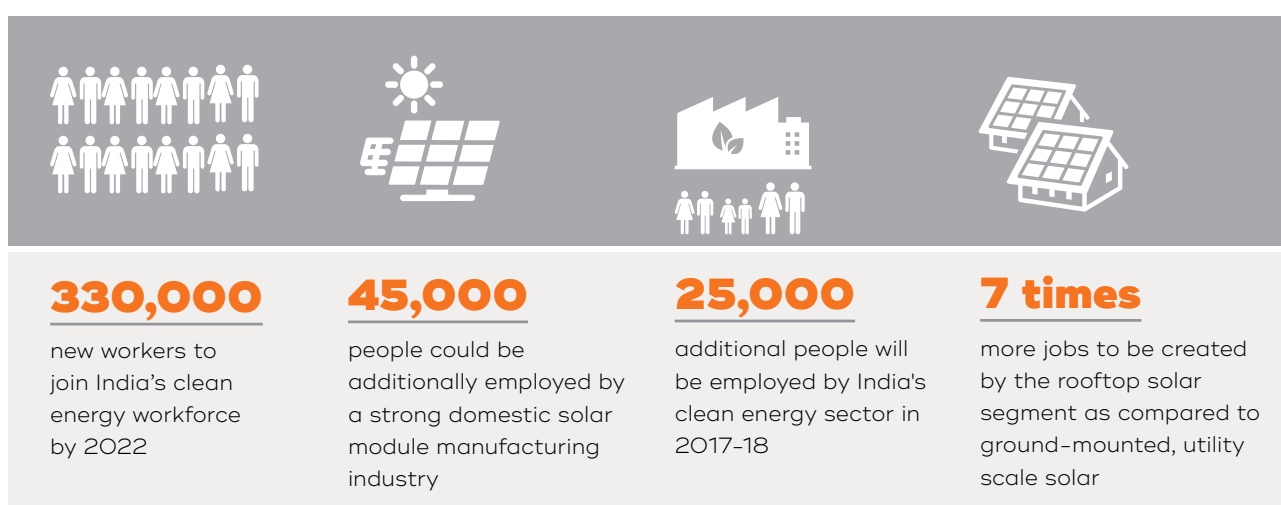
## Gearing up for Expansion of Solar and Wind Power in India

For the past three years, CEEW and the Natural Resources Defense Council (NRDC) have annually surveyed India's solar and wind project developers, and now manufacturers, to collect accurate, market-based information on jobs created, workforce employed, and the skills required to achieve India's renewable energy goals. In their latest study 'Greening India's Workforce', CEEW and NRDC find that one million job opportunities will be created if India were to achieve its ambitious solar and wind energy targets of 160 GW by 2022.



**Report**  
June 2017

**Download**  
<https://goo.gl/gHCti5>



Source: CEEW Analysis



“CEEW and NRDC’s report captures a new dimension in accurately assessing manpower requirements in the solar and wind domain. The report builds on earlier studies on the subject, considering national objectives to meet INDC commitments. It makes the path of Skill Council for Green Jobs more clear and visible in terms of capturing the opportunity of employability in solar and wind domain.”

**Dr Praveen Saxena**

CEO, Skill Council for Green Jobs

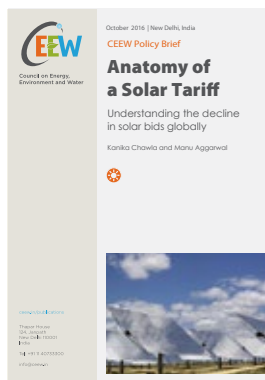
### CONVENING A HIGH-LEVEL STAKEHOLDER WORKING GROUP ON RE POLICY AND FINANCE

Since October 2016, CEEW and the Shakti Sustainable Energy Foundation have been convening a High-Level Working Group on Renewable Energy Policy and Finance. This multi-stakeholder group with CXO level representatives from finance regulatory bodies, banks, solar manufacturers, think tanks, and civil society convenes every two months to discuss sector-wide issues, and makes recommendations to policy makers. So far, five meetings of the Working Group have been convened and their specific recommendations on finance, regulatory, and technology aspects of renewable energy have been shared with senior representatives of the Ministry of New and Renewable Energy, and the Ministry of Power.

## ANATOMY OF A SOLAR TARIFF

### Understanding the Decline in Solar Bids Globally

The policy brief studied the composition of solar tariffs across the world to identify the individual cost components of global solar tariffs, and compared them with India's tariff figure. The findings were shared with the government, media, financial institutions, and the industry during the RE Dialogue.



**Policy Brief**  
October 2016

**Download**  
<https://goo.gl/N7mthZ>



### Deconstructing India's Record Low Solar Bid

**66%** of the INR 2.44/kWh tariff is the cost of finance

**INR 35 million/MW** total capital cost of the Bhadla solar park vs INR 53 million/MW in Telangana in May 2016

**INR 17 million/MW** total capital cost comprises panels/modules. Realised cost could be as low as INR 13 million/MW

**14%** expected return on equity. Investors accepting lower returns as solar PV market matures rapidly

Source: CEEW Analysis

Anjali Viswamohanam, Programme Associate, CEEW, presenting on 'Scaling Renewable Energy Finance in India', at a CEEW-NRDC discussion in New Delhi on 17 May 2017.

### SUPPORTING THE INTERNATIONAL SOLAR ALLIANCE (ISA)



"CEEW has been a trusted resource partner for the advances made by the International Solar Alliance. Their independent analysis on renewable energy jobs and skills, and the risks plaguing the flow of investment into renewable energy in India is extremely valuable for the sector and for ISA's mission."

**Shri Upendra Tripathy**, Interim Director General, International Solar Alliance

# FIRST CEEW-SHAKTI RENEWABLE ENERGY DIALOGUE



On this summer solstice, 21 June 2017, CEEW in collaboration with the Shakti Sustainable Energy Foundation, International Solar Alliance, and REN21, hosted the first Renewable Energy Dialogue in New Delhi. The Dialogue highlighted the growing role of renewable energy in the global energy mix and the growing role of India in further advancing renewable energy deployment.



(T) Dr Paolo Frankl, Head, Renewable Energy Division, International Energy Agency; (R) Neeraj Kuldeep, Programme Associate, CEEW; (L) Manu Aggarwal Programme Associate, CEEW, at the CEEW-Shakti 'Renewable Energy Dialogue.'



## CEEW'S RENEWABLES TEAM



**Kanika Chawla**  
Senior Programme Lead



**Manu Aggarwal**  
Programme Associate



**Arjun Dutt**  
Programme Associate



**Neeraj Kuldeep**  
Programme Associate



**Anjali Viswamohan**  
Programme Associate

Special thanks to Shipra Arora, Nandita Badami, Upendra Dwivedi, Priyanka Kachru, Kanika Kharbanda, Florentine Oberman, and Selna Saji for their contributions to research on Renewables.



# Power Sector

The Power Sector team seeks to put the consumer at the centre of India's electricity system. They do this through analyses of accountability measures of distribution companies, of power procurement policies they adopt, and their financial constraints. The team also supports ongoing regulatory and institutional reforms in the sector.



*Karthik Ganesan, Research Fellow, CEEW (C), Netra Walawalkar, Director - India Markets, CES (L), and Pramod Deo, former CERC Chairman (R) at the roundtable held in Mumbai to disseminate findings from CEEW's retail tariffs study, August 2017.*



© Images: CEEW

*Multi-stakeholder discussions at the roundtable held in Mumbai to disseminate findings from CEEW's retail tariffs study, August 2017.*



**70%**

of a DISCOM's annual expenses consist of power procurement costs



**6%**

estimated rise in electricity tariffs (CAGR) for commercial customers in Bengaluru



**5%**

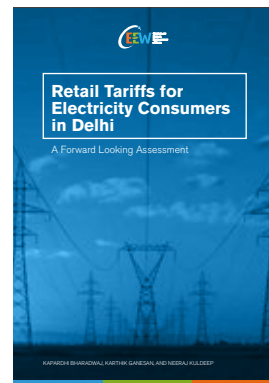
estimated rise in electricity tariffs (CAGR) for industrial customers in Delhi and Bengaluru

Source: CEEW Analysis

## RETAIL TARIFFS FOR ELECTRICITY CONSUMERS OF DELHI

### A Forward Looking Assessment

The Council undertook a first-of-its-kind assessment of retail tariffs for electricity consumers in Delhi, Bengaluru, and Maharashtra. These studies examined factors contributing to variation in tariffs for different consumer groups across the states. A workshop to disseminate preliminary findings was held in August 2017, in Mumbai.



**Report**  
March 2017

**Download**  
<https://goo.gl/tGc3Ut>

### INNEWS | Improving Efficiency in the Power Surplus Era



The op-ed published by Karthik Ganesan and Kapardhi Bharadwaj argued that a comprehensive evaluation of power procurement efficiencies, externalities and sharing of benefits with those who lose out, is key to India's energy transition. The article further highlighted that there were significant gains to be had from rationalising procurement just from the coal-based generation assets.



**CEEW'S  
POWER  
SECTOR  
TEAM**



**Karthik Ganesan**  
Research Fellow



**Kapardhi Bharadwaj**  
Programme Associate



**Kanika Balani**  
Research Analyst

Special thanks to Anandasundaraman. S, Prabhat Kumar Gupta, Medha Kapoor, and Kurinji L.S. for their contributions to research on the Power Sector.



# Industrial Sustainability and Competitiveness

The Industrial Sustainability and Competitiveness team aims to accelerate energy and resource efficiency practices within India's manufacturing sector to support the country's low-carbon growth aspirations. The focus is on improving energy and emission statistics around industries, addressing information gaps and associated challenges, informing national and state policies to meet global climate commitments, and building strategies around resource security for future-ready manufacturing.

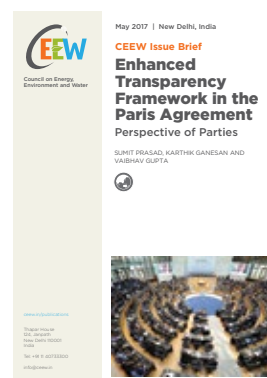


Vaibhav Gupta, Senior Programme Lead, CEEW, at an interactive stakeholder consultation workshop on the GHG Platform India (Energy and Industries), Bengaluru, 24 Jan 2017.

## ENHANCED TRANSPARENCY FRAMEWORK IN THE PARIS AGREEMENT

### Perspective of Parties

The issue brief is a collation of the perspectives of different parties to the Paris Agreement on strengthening the transparency regime for climate change action. In the lead up to COP23, the paper enabled India and like-minded parties to contemplate their positions on the various provisions of transparency under Article 13, collectively referred to as the modalities, procedures & guidelines (MPG) of transparency.



Issue Brief  
May 2017

Download  
<https://goo.gl/dL7bnL>



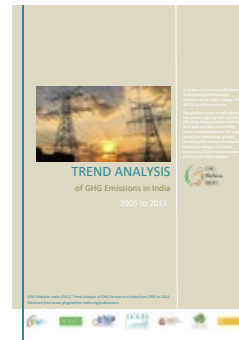
CEEW is one of the founding partners of the GHG Platform India, a collective civil society initiative that takes up independent estimation and analysis of India's Greenhouse Gas (GHG) emissions across key sectors such as energy, industry, agriculture, livestock, forestry, land-use, and land-use change and waste. CEEW leads the work on manufacturing sector emissions as part of the GHG Platform India.

## AN ANALYSIS OF THE TRENDS OF GHG EMISSIONS IN INDIA

### At the Subnational Level (2005 to 2013)

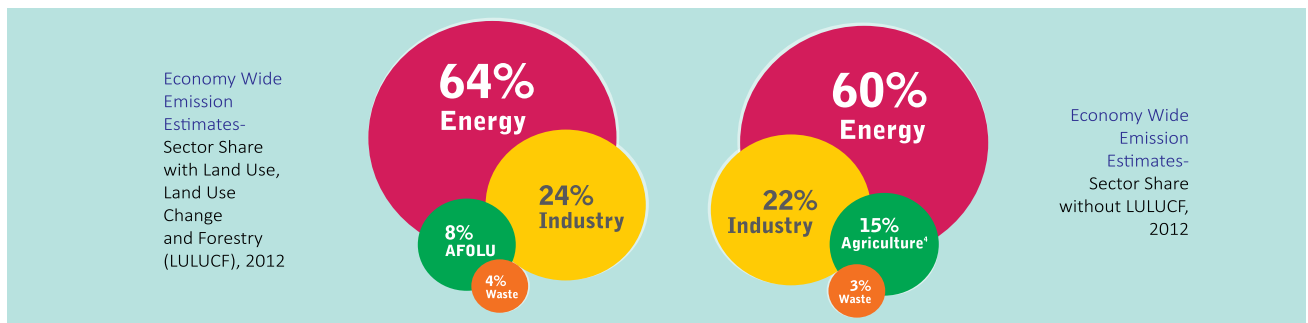
The study analysed trends in GHG emissions estimated by the GHG Platform from 2007-2012.

Data from the study supported the reporting efforts of the Indian government to the UNFCCC under the Paris Agreement. The Ministry of Environment, Forests and Climate Change (MoEFCC) has invited The Council for an independent review of the official GHG inventory estimates.



**Report**  
November 2016

**Download**  
<https://goo.gl/bzPdwE>



Source: GHG Platform India Analysis

### INNEWS | Electric Vehicles and Critical Minerals

The op-ed by Tirtha Biswas and Neeraj Kuldeep highlighted the importance of critical minerals such as cobalt, graphite, lithium, and phosphate to produce lithium-ion batteries for use in electric vehicles.



### CEEW'S INDUSTRIAL SUSTAINABILITY AND COMPETITIVENESS TEAM



**Vaibhav Gupta**  
Senior Programme Lead



**Karthik Ganesan**  
Research Fellow



**Tirtha Biswas**  
Programme Associate



**Sachin Sharma**  
Programme Associate



**Sumit Prasad**  
Research Analyst

Special thanks to Priyanka Basu, Keshav Rai Goud, Kritika Gulati, Bala Navneeth, and Swapna Merlin Stephen for their contributions to research on Industrial Sustainability and Competitiveness.



# Low-Carbon Pathways

The Low-Carbon Pathways team seeks to support policy makers and the research community with robust quantitative and qualitative analysis for improved understanding of low-carbon transition pathways within the context of the sustainable development goals (SDGs) and national priorities. The team has strong capabilities in integrated assessment modelling, examining cross-sectoral synergies and trade-offs (energy-water-food-climate nexus, SDGs, political economy of transition), and in sector-specific analyses (transport, agriculture, etc.).



*Vaibhav Chaturvedi, Research Fellow, CEEW, addressing the CEEW-EDF roundtable on carbon markets, 10 July 2017.*

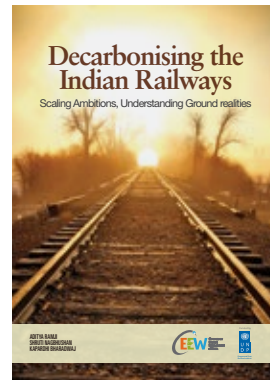


# DECARBONISING THE INDIAN RAILWAYS

Scaling Ambitions, Understanding Ground Realities



In April 2017, Minister Piyush Goyal and Minister Suresh Prabhu released CEEW's study 'Decarbonising the Indian Railways: Scaling Ambitions, Understanding Ground Realities'. The study, funded by UNDP, identified the potential of using renewables to supply electricity to the railways as well as the policy and regulatory challenges developers face while supporting the Railways' renewable energy ambitions.



**Policy Brief**  
April 2017

Download  
<https://goo.gl/eyZ9Et>

<p><b>25%</b></p>	<p><b>5 GW</b></p>	<p><b>3.6 bn (USD)</b></p>	<p><b>60 MW</b></p>
<p>of Indian Railways' electricity power needs could come from renewables by 2025</p>	<p>solar target could be achieved by the Railways by 2025</p>	<p>investments required to achieve the 5 GW solar target</p>	<p>of solar &amp; wind power plants have already been installed covering 270 stations &amp; 120 administrative buildings &amp; hospitals</p>

Source: CEEW Analysis

## PATHWAYS TO ACHIEVE INDIA'S NATIONALLY DETERMINED CONTRIBUTIONS (NDCS)

Research is underway to understand India's long-term electricity, energy, and emission pathways to inform India's progress towards the SDGs, NDCs, and mid-century pathways.



**Policy Brief**  
October 2016

**CAN INDIA'S DEVELOPMENTAL FLIGHT TAKE OFF?**

**What the ICAO Global Market Based Scheme Means for India**

The policy brief studied, with an India perspective, the ICAO's proposed global market-based measures (GMBM) to offset international civil aviation emissions. It reviewed the GMBM proposal in relation to the Paris Agreement (under the UNFCCC) commitments and also highlighted key features in alternative proposals that other countries have tabled to identify specific inputs that might be important to safeguard India's strategic interests.

Download  
<https://goo.gl/eyZ9Et>

**CARBON MARKETS: PROSPECTS AND POTENTIAL FOR INDIA**

In July 2017, CEEW and the Environmental Defense Fund (EDF) convened a roundtable to understand key design principles for carbon markets and discuss lessons learnt from across the world. Dr Nathaniel Keohane, Vice President, EDF, delivered a keynote presentation.



L to R: Arunabha Ghosh, CEO, CEEW; Nat Keohane, Senior Vice President, Environmental Defense Fund; Purnamita Dasgupta, Chair Professor and Head, Environmental and Resource Economics Unit, Institute of Economic Growth; Sandhya Srinivasan, Climate Change Specialist, World Bank; Kirit Parikh, Emeritus Professor and Founder Director, Integrated Research and Action for Development (IRADe); Vaibhav Chaturvedi, Research Fellow, CEEW; Richie Ahuja, Regional Director Asia, Environmental Defense Fund.



**CEEW'S  
LOW-CARBON  
PATHWAYS  
TEAM**



**Dr Vaibhav Chaturvedi**  
Research Fellow



**Poonam Nagarkoti**  
Research Analyst

Special thanks to Sakshi Chamola, Arihant Jain, Shruti Nagbhusan, Anjali Ramakrishnan, and Mohit Sharma for their contributions to research on Low-Carbon Pathways.

## LECTURE

# Can Asia Change the Climate?



Dr Arunabha Ghosh's public lecture 'Can Asia Change the Climate? : Risks, Responses and Leadership for Climate Action' was hosted by the Society for Policy Studies in association with the India Habitat Centre as part of the 'Changing Asia Series'.

“Climate and energy-related institutions need new designs and collaborative platforms. Climate economics will deliver the greatest benefits if we forego foolhardy attempts to capture niche market shares in favour of developing supply chains for climate friendly goods and services – and create new prosperity and jobs as a result. Climate ethics requires new voices on new issues, from explaining energy transitions, to governing geoengineering, to calling for a more open, inclusive and transparent climate regime.”

**Dr Arunabha Ghosh**  
CEO, CEEW

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https://goo.gl/8NX6Bx](https://goo.gl/8NX6Bx)

## BOOK DISCUSSION

# Energizing India: Towards a Resilient and Equitable Energy System

‘Energizing India’ explores opportunities and challenges in designing and implementing a robust but flexible set of strategies for India’s energy future. These include meeting India’s primary energy needs; making the energy system more resilient to price and technology shocks; and being more successful in meeting the basic energy needs of all citizens in an age of uncertainty.



L to R: Karthik Ganesan, Research Fellow and co-author, CEEW; Dr Arunabha Ghosh, CEO, CEEW and co-author; Dr Ritu Mathur, Professor, Department of Energy and Environment, TERI University and co-author; Mr Ashok Bhattacharya, Former Editor, Business Standard; Mr Suman Bery, former Chief Economist, Shell International, and co-author of ‘Energizing India’; Ambassador Shyam Saran, former Foreign Secretary, and Mr Vikram Mehta, Chairman Brookings India and Senior Fellow, Brookings Institution, at the ‘Energizing India: Towards a Resilient and Equitable Energy System’ book discussion, India International Centre, 9 August 2017.



# Risks and Adaptation

The Risks and Adaptation team examines both local and global environmental risks in order to develop strategies to mitigate them. The team analyses the impact of climate risks on health, agriculture and urban infrastructure, the links between clean energy and water, other human development priorities, and designs effective responses to air and water pollution related problems.



© Image: CEEW

L to R: Sanjeev Jain, Chief Engineer, Chhattisgarh Renewable Energy Development Agency (CREDA); Dr Hem Dholakia, Senior Research Associate, CEEW; Aditya Ramji, then Programme Lead, CEEW; and Sunil Mani, Research Analyst, CEEW.

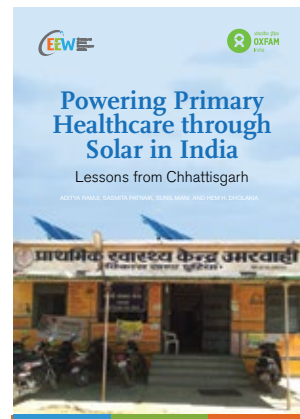
# POWERING PRIMARY HEALTHCARE THROUGH SOLAR IN INDIA

## Lessons from Chhattisgarh



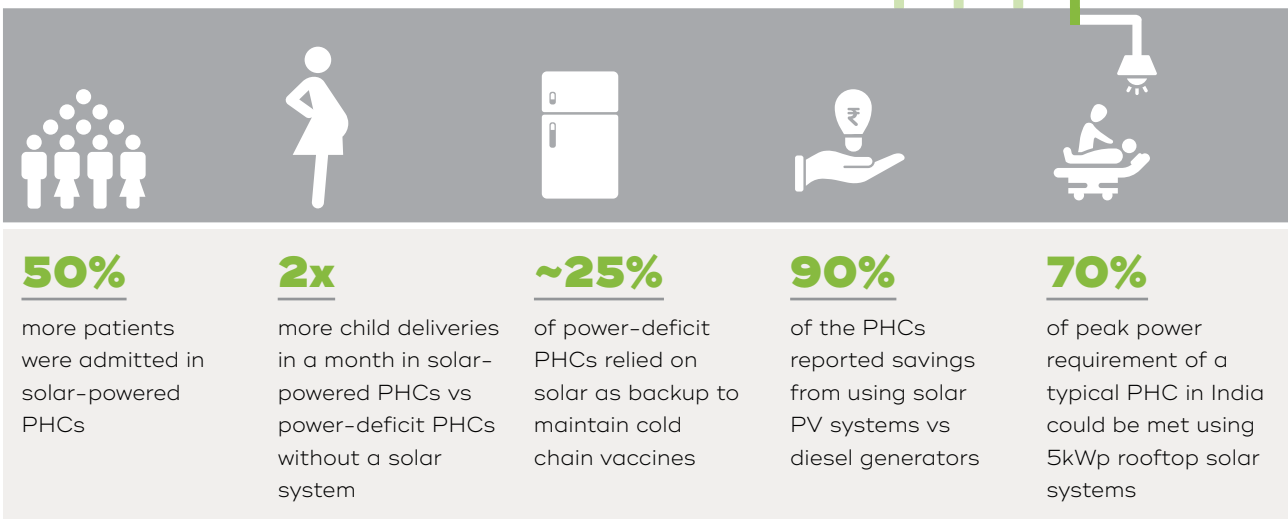
Field survey in progress at primary healthcare centres, Chhattisgarh.

CEEW's first-of-its-kind independent study, funded by Oxfam India, evaluated the role of electricity access on health outcomes in rural Chhattisgarh. The study established a strong correlation between sustainable development goals, focusing on good health and well-being (Goal 3), and on affordable and clean energy (Goal 7). The study was based on an evaluation of 147 primary healthcare centres (PHCs), including 83 having solar photovoltaic (PV) systems, across 15 districts in Chhattisgarh.



**Report**  
August 2017

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<https://goo.gl/MJRv1a>



Source: CEEW Analysis



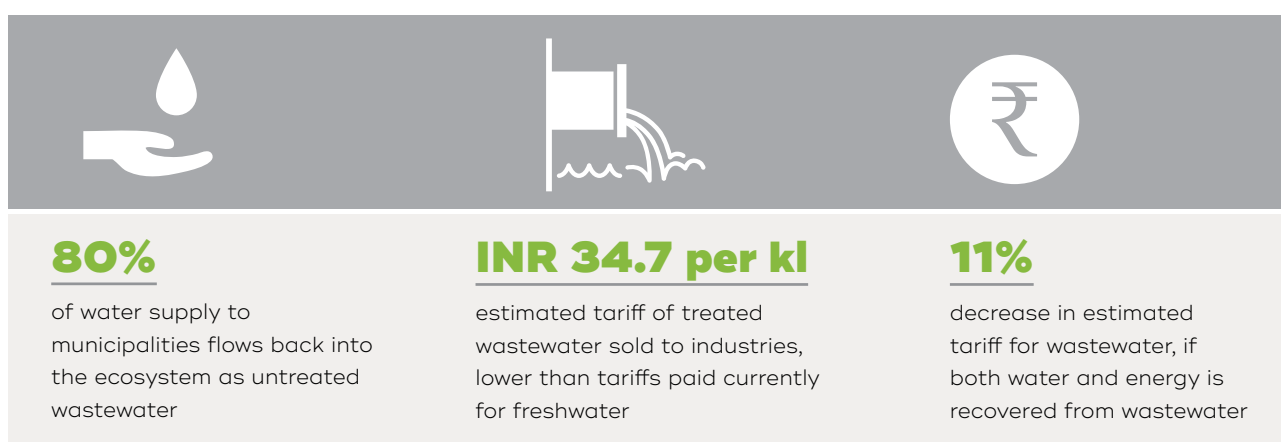
# CIRCULAR ECONOMY PATHWAYS FOR MANAGING MUNICIPAL WASTEWATER EFFICIENTLY

The study 'Circular Economy Pathways for Municipal Wastewater Management in India: A Practitioner's Guide', published in collaboration with the 2030 Water Resources Group, explored the more efficient 'use, treat, reuse' approach of circular economy against the 'make, use, dispose' practice of the linear economy. The study highlighted possibilities of recovering growth-propelling resources such as water, energy, and fertilisers from treated sewage.



**Report**  
October 2016

**Download**  
<https://goo.gl/N1hFm5>



Source: CEEW Analysis

## BUILDING CLIMATE RESILIENT CITIES

For India to build climate resilience plans, its states need to assess risks comprehensively. But few such risks assessments have been carried out for urban areas in India. To address this gap, The Council mapped the major climate risks to infrastructure for four smart cities - Amaravati, Indore, Bhopal, and Jabalpur.

The research was conducted jointly by the Council on Energy, Environment and Water, the University of East Anglia, and Mott MacDonald.



### CEEW'S RISKS AND ADAPTATION TEAM



**Dr Hem Himanshu Dholakia**  
Senior Research Associate



**Ishita Jalan**  
Research Analyst



**Sunil Mani**  
Research Analyst



**Kangkanika Neog**  
Research Analyst

Special thanks to Ravi Prakash and Sanya Prakash for their contributions to research Risks and Adaptation.



# Technology, Finance, and Trade

The Technology, Finance, and Trade team focuses on enabling the global economic architecture to support sustainable development. The team examines the governance of emerging technologies, supports technological partnerships between India and other countries, analyses barriers and incentives for desired technology futures, and designs climate-friendly mechanisms for international trade and commerce.



Arunabha Ghosh, CEO, CEEW, with Beth Urbanas, Deputy Assistant Secretary for Asia and the Americas at the Office of International Affairs in the US Department of Energy (DOE) at the roundtable discussion 'India - U.S. Energy Partnerships - New Horizons', New Delhi, 25 April 2017.



# SUPPORTING THE GLOBAL HFC PHASE-DOWN

The Council has been pioneering India-specific research on hydrofluorocarbons (HFCs) and allied subjects. After the 2016 Kigali Amendment, The Council has helped steer the discussion on how India would achieve the HFC transition, especially in conjunction with the ongoing HCFC transition.




## ASSESSING GOOD SERVICE PRACTICES IN INDIA'S AIR-CONDITIONER SERVICING SECTOR

### Key Findings from a Survey of Service Technicians

The brief analysed good servicing practices in the residential, mobile, and commercial air-conditioning sectors to help reduce HFC consumption. Globally, the servicing sector uses as much as 40 per cent of refrigerants during servicing. This could be greatly reduced by good service practices, use of tools, and regular servicing of equipment.



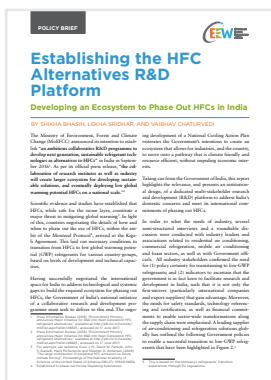
Policy Brief  
July 2017



# 36%

of AC technicians have received training in ac servicing

Source: CEEW analysis from a survey of 642 respondents split across locations and servicing sectors



Policy Brief  
July 2017

## ESTABLISHING THE HFC ALTERNATIVES R&D PLATFORM

### Developing an Ecosystem to Phase Out HFCs in India

The brief highlighted the relevance, and presented an institutional design, of a dedicated multi-stakeholder research and development (R&D) platform to address India's domestic concerns and meet its international commitments of phasing out HFCs.

## OPEN-ENDED WORKING GROUP MEETING TO THE MONTREAL PROTOCOL

In July 2017, Shikha Bhasin and Lekha Sridhar, led discussions on priorities for HFC phase-down in India at a CEEW organised side-event at the 39th session of the ‘Open-Ended Working Group of the Parties to the Montreal Protocol’ at Bangkok, Thailand.



## SCIENCE AND GOVERNANCE OF SOLAR RADIATION MANAGEMENT (SRM) GEOENGINEERING

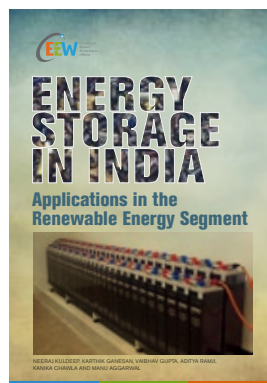


L to R: Vaibhav Chaturvedi, Research Fellow, CEEW; Nandakumar Janardhanan, Assistant Professor, Energy Studies, School of International Studies, JNU-Delhi; Rodel D Lasco, Scientific Director, Oscar M Lopez Center; Chen Ying, Senior Research Fellow, Chinese Academy of Social Science; Shinichiro Asayama, Researcher, National Institute for Environmental Studies.

## ENERGY STORAGE IN INDIA

### Applications in the Renewable Energy Sector

The report studied the emerging landscape of energy storage technologies and their applications in the renewable energy segment. The report also captured various challenges faced in the implementation of advanced battery technologies in Indian climatic conditions.



**Report**  
November 2016

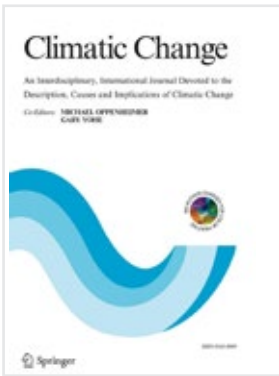
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<https://goo.gl/sFsZoH>

CEEW, jointly with the Solar Radiation Management Research Governance Initiative (SRMGI), convened a workshop bringing together researchers from India and abroad to explore the latest evidence and arguments around geoengineering, its socio-political implications, and the nature of research being undertaken internationally, with a focus on Asia. Discussions focused on governance arrangements needed to ensure that any SRM research that proceeds is safe, transparent, and moves ahead with appropriate approval and oversight.

“Today almost the entire world is against geoengineering, especially large-scale geoengineering such as SRM which will block off a part of the sunlight. But the way things are going, do not be surprised if, 10 years from now, this possibility is considered very seriously.”

**Dr Arunabha Ghosh**  
CEO, CEEW

# THE ASIA-PACIFIC'S ROLE IN THE EMERGING SOLAR GEOENGINEERING DEBATE



**Paper**  
July 2017

Download  
<https://goo.gl/3Nb7bC>

The paper, co-authored by Dr Arunabha Ghosh, discussed the significance and challenges of international collaboration on climate engineering research with a focus on the Asia-Pacific region. The paper highlighted that local researchers in the region could help make progress towards better understanding of impacts of solar radiation management. These activities could be guided by an ad hoc Asia-Pacific working group on climate engineering and a voluntary expert network.

# TECHNO-ECONOMIC ASSESSMENT OF BIOMASS PELLETS FOR POWER GENERATION IN INDIA

The study, published in collaboration with IIASA, made a preliminary assessment of the techno-economic feasibility of biomass pellets – produced from biomass surplus available from agriculture and forestry/wasteland – for electricity generation in India.



**Working Paper**  
October 2016

Download  
<https://goo.gl/jbLLRp>

## INNEWS | Changing the Course of the Planet



The op-ed published by Dr Arunabha Ghosh and Dr Vaibhav Chaturvedi highlighted India's leadership and contribution to the success of the Kigali Amendment in Rwanda. It was written days after The Council convened a crucial meeting on the 'Implications of different baselines and freeze years for an operational strategy and sector-wise HFC phase down in India' in Kigali, Rwanda, during the HFC negotiations.



**CEEW'S  
TEAM FOR  
TECHNOLOGY,  
FINANCE, AND  
TRADE**



**Dr Arunabha Ghosh**



**Dr Vaibhav Chaturvedi**  
Research Fellow



**Shikha Bhasin**  
Programme Lead



**Abhinav Soman**  
Programme Associate

Special thanks to Lekha Sridhar for her contribution to research on Technology, Finance, and Trade.

# Women in



© Image: CEEW

CEEW with the United Nations in India launched the Women in Sustainability (WiS) initiative, on the World Environment Day, 5 June 2017.



"CEEW is committed to promoting gender diversity in sustainability. As part of WiS, We will work on practical steps that institutions, colleagues, and women themselves can take to increase participation and encourage career growth for women in this sector."

**Dr Arunabha Ghosh**  
CEO, CEEW

# Sustainability

## ENABLING WOMEN'S PARTICIPATION AND LEADERSHIP IN PUBLIC POLICY



If half of the graduates of sustainability courses are women, why are they missing in public policy?



**36%** OF EMPLOYEES ARE WOMEN



**33%** OF SENIOR MANAGEMENT ARE WOMEN



**21%** OF THE BOARD OF TRUSTEES ARE WOMEN

*Source: CEEW Analysis 2017. Data based on analysis of 15 energy and climate think-tanks*

Women in Sustainability (WiS) is a network of individuals and institutions who believe in, and want to promote greater participation, inclusiveness, and visibility of women at all levels of the sustainability public policy workforce. Its endeavour is to recognise and take affirmative action to counter the challenges that restrict women from taking on bigger roles in their career and, consequently, greater participation in this sector. This initiative aims to be a network of individuals and institutions committed to increasing participation and encouraging career growth for women across various segments of the public policy sector.



“There is abundant research and practical evidence that women can assist in building stronger, more resilient and environmentally-friendly communities that are better able to resist climatic impacts and seize opportunities for a transition to a greener, cleaner world.  
**I welcome CEEW’s Women in Sustainability initiative** and look forward to it flourishing in the years to come.”

**Patricia Espinosa**  
 Executive Secretary, UNFCCC

## SUPPORT FOR **WiS**



“I have recently co-founded GWNET, a global network aimed to empower women working in sustainable energy in both developed and emerging/developing countries... GWNET looks forward to collaborating closely with CEEW’s new initiative to advance women in sustainability, thereby

promoting gender equality and facilitating the reaching of the Sustainable Development Goals.”

**Christine Lins**  
 Executive Secretary, REN21,  
 Founding Member of GWNET



“More women should be at the table in the developmental sector, when the policies made will directly and indirectly affect

women. The network is an important effort in amplifying the voice of women in sustainability.”

**Yuri Afanasiev**  
 UN Resident Coordinator in India



“In the energy and sustainability space there still exists a gendered divide on who studies the gender angle of the process of transformation towards sustainability... While gender is an important aspect of sustainability, it should not be

restricted to being explored by women researchers alone.”

**Dr Tejal Kanitkar**  
 Chairperson, Centre for Climate Change and Sustainability Studies, TISS



“Women are often affected by the failure to balance personal and professional lives. My support goes out to this initiative because if we, as people who understand this failing,

do not start talking about it and think of ways to act on it, who will?”

**Kangkanika Neog**  
 Research Analyst, CEEW

## SPREADING THE WORD



© Image: CEEW

L to R: Prerna Singh Bindra, Conservationist and Author; Kanika Chawla, Senior Programme Lead, CEEW; Ajaita Shah, Founder & CEO, Frontier Markets; Surabhi Rajagopal, Principal Analyst, SELCO Foundation.

## INNEWS



### Supporting Women Who Support The Environment

Kanika Chawla and Lekha Sridhar  
*Business World, June 2017*

### Her Career Matters

Lekha Sridhar and Kanika Chawla  
*The Hindu, June 2017*

## INTERNAL COMPLAINTS COMMITTEE AT CEEW

In line with our zero-tolerance policy against sexual harassment at the workplace, CEEW has an Internal Complaints Committee (ICC).

Members to the ICC were nominated in compliance with the provisions that require at least one member to have worked with an NGO / legal domain with an emphasis on gender rights. Our ICC also has at least 50 per cent women members.

The Council has an internal policy against sexual harassment which is shared per due process with all new recruits - interns as well as employees. A compulsory training for all members on the provisions of 'The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013,' as well on the CEEW Zero Tolerance Policy, was conducted on 20 January 2017.

During the period in review, no complaints were received by the ICC.



Urmī Goswami from *The Economic Times* at the WiS panel discussion.

# The Council @ COP22

Marrakech

At the Conference of Parties held in Marrakech (COP22), CEEW researchers presented analysis and data on emissions, low-carbon pathways, risks and adaptation, energy access, renewable energy, and emerging technologies at twelve public sessions and forums.

## SUSTAINABLE TRANSPORTATION NETWORK: ACHIEVING INDIA'S NDCS

At this session, co-hosted with the Ministry of Railways, Government of India, The Council's Aditya Ramji presented on India's energy strategy for its railway and aviation sectors. He highlighted the potential to reduce GHG emissions significantly by substituting petroleum with alternatives, and by pursuing a policy of railway electrification through renewable sources of energy.



## SCALING RENEWABLE ENERGY: SUPPLY CHAINS, JOBS, TRADE, FINANCE, AND THE INTERNATIONAL SOLAR ALLIANCE (ISA)

At this session, co-hosted with the International Centre for Trade and Sustainable Development (ICTSD), The Council's Kanika Chawla presented our research on enhancing investments, jobs and skills in the renewable energy sector, and showcased ISA as the ideal platform to promote investments in solar energy globally.

### OTHER SPEAKING ENGAGEMENTS

**Climate Change and Health in Indian Cities: Modelling the Impacts of Heat and Air Pollution and Potential Co-Benefits from Mitigation and Adaptation**

Organised by the Ministry of Health, Government of India, and TIFAC

**Conference on Climate and Health Care: The Role and Strategy of the Health Sector in Achieving Global Climate Goals**

Organised by Health Care Without Harm

**Best Practices with Fossil Fuel Subsidy Reform**

Organised by New Nordic Climate Solutions

**High-Level Forum of South-South Cooperation on Climate Change: Multi-stakeholder Participation and Partnerships for the Global South**

Organised by China, Morocco, and the United Nations

**G20 Policy Options towards Pricing Carbon**

Organised by BDI, Germanwatch, and Mercator CC

**The Measurement, Reporting, and Verification (MRV) Revolution**

Organised by Vasudha Foundation

**PAT: A Success Story and Future Trajectory**

Organised by Ministry of Power, Government of India

**Towards Implementation: EU and India Climate Activities One Year after Paris**

Organised by Adelphi and DG CLIMA

**Enhancing Renewable Energy Capacity: Financing Renewables in India**

Organised by the Ministry of New and Renewable Energy, Government of India

**Meeting the 2°C Challenge: Nexus of Innovation and Clean Energy**

Organised by the United Nations





# The Council @ Kigali

## SUPPORTING THE KIGALI AMENDMENT

The Council began pioneering India-specific research on estimating India's long-term HFC emissions at a time when existing global and regional estimates were often interpolated to estimate India-centric numbers.

Vaibhav Chaturvedi and Lekha Sridhar from CEEW convened a crucial meeting on the 'Implications of different baselines and freeze years for an operational strategy and sector-wise HFC phase down in India' in Kigali, Rwanda, during the HFC negotiations. They also provided strategic and analytical inputs to the Government of India delegation throughout the negotiations.



## ROUNDTABLE DISCUSSION ON PHASING DOWN HFCs IN INDIA



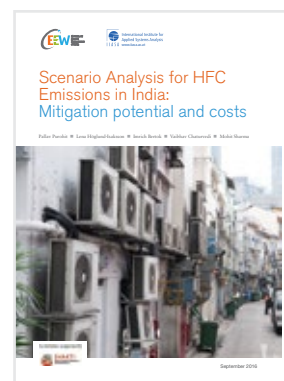
L to R: Mr M K Singh, Joint Secretary, MoEFCC, GoI; and Mr RR Rashmi, Special Secretary, MoEFCC, GoI at the roundtable.

Leading up to the meeting of parties for the Montreal Protocol at Kigali in October 2016, the Ministry of Environment, Forest and Climate Change (MoEFCC) together with CEEW and Natural Resource Defense Council (NRDC) convened a roundtable discussion on 26 September 2016 in New Delhi to engage stakeholders from across industry groups, and international experts. The experts discussed challenges in phasing down high-GWP HFCs specifically in the context of the Indian economy, its growth, and challenges for specific sectors.

Late Shri Anil Madhav Dave, India's then Minister (Independent Charge) for the Ministry of Environment, Forest and Climate Change, was briefed on India's position as well as key insights and recommendations from The Council's research during the discussion.

## SCENARIO ANALYSIS FOR HFC EMISSIONS IN INDIA: MITIGATION POTENTIAL AND COSTS

The research estimated the economy-wide cost of reducing potential HFC emissions, and analysed scenarios of different HFC freeze dates and their implications on mitigation costs as well as climate change mitigation ambitions. It provided policy recommendations to focus on R&D to promote refrigerants with low global warming potential (GWP), roll out better energy efficiency processes for air-conditioners, and so on.



**Report**  
September 2016

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# Our Partners

Together with our partners in India and across the globe, we aim to achieve the highest standards of research in finding solutions to sustainability issues – and implement those solutions to make a difference to the world.

- 2030 Water Resources Group (WRG)
- Adaptation Watch Group
- Administrative Staff College of India (ASCI)
- Alliance for an Energy Efficient Economy (AEEE)
- American University, USA
- Ananta Aspen Centre
- Asia Society Policy Institute
- Asian Development Bank (ADB)
- Asian Infrastructure Investment Bank (AIIB)
- Australian Centre for International Agricultural Research (ACIAR)\*
- Basque Centre for Climate Change (BC3), Spain
- Bihar Agriculture Management & Extension Training Institute (BAMETI)
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- British High Commission, New Delhi
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- Centre for European Policy Studies, Belgium
- Centre for International Governance Innovation (CIGI), Canada
- Centre for Study of Science, Technology and Policy (CSTEP)
- Clean Energy Access Network (CLEAN)
- Climate and Development Knowledge Network (CDKN)
- Climate Policy Institute (CPI)
- Climate Technology Centre & Network (CTCN)
- CNA Corporation, USA
- Columbia University
- Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia\*
- Confederation of Indian Industry (CII)
- Delegation of the European Union in India
- Department for International Development, (DFID) UK
- Department of Science and Technology (DST)\*, Government of India (GoI)
- Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)\*
- Embassy of France in India
- Embassy of the United States in India
- Environmental Defense Fund (EDF), USA
- Energy Policy Institute at the University of Chicago (EPIC) – India

We acknowledge with many thanks the valuable contributions of Mr Deepak Parekh who served as CEEW's Trustee from 2013-2017.

- European Business and Technology Centre (EBTC)
- ExxonMobil\*
- Farms and Farmers (FnF)
- Foreign & Commonwealth Office (FCO), UK
- Forum for the Future\*
- French Alternative Energies and Atomic Energy Commission (CEA)
- German Development Institute (DIE)
- Godrej Prima
- Good Energies Foundation\*
- Harvard University Center for the Environment
- High Commission of the Republic of Fiji, New Delhi
- Hindustan Unilever Foundation
- ICLEI South Asia
- IFFCO Foundation
- India Energy Storage Alliance (IESA)
- Indian Council of Medical Research (ICMR)\*
- Indian Institute of Management Ahmedabad (IIMA)
- Indian Institute of Public Health - Gandhinagar (IIPHG)
- Indian Institute of Technology Bombay (IIT Bombay)
- Indian Institute of Technology Gandhinagar (IIT Gn)
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- Indian Lead Zinc Development Association (ILZDA)
- Indian Renewable Energy Development Agency Limited (IREDA)
- Indian Renewable Energy Federation (IREF)
- Initiative for Sustainable Energy Policy (ISEP)
- Institute for Advanced Sustainability Studies, Germany
- Institute for Defence Studies and Analyses (IDSA)
- Institute for Governance and Sustainable Development (IGSD)
- Institute for Science, Innovation and Society (INSIS), Oxford
- Institute for Social and Economic Research and Policy (ISERP), Columbia University
- Integrated Action and Research for Development (IRADE)
- International Centre for Trade and Sustainable Development (ICTSD), Switzerland
- International Energy Agency (IEA)
- International Finance Corporation (IFC)
- International Growth Centre (IGC)
- International Institute for Sustainable Development (IISD), Switzerland
- International Institute of Applied Systems Analysis (IIASA), Austria
- International Maize and Wheat Improvement Center (CIMMYT)
- International Renewable Energy Agency (IRENA)
- International Solar Alliance (ISA)
- Joint Global Change Research Institute, USA
- Lee Kuan Yew School of Public Policy, National University of Singapore
- MacArthur Foundation, USA\*
- Ministry of Civil Aviation, Government of India (GoI)
- Ministry of Environment, Forest and Climate Change (MoEFCC),\* GoI
- Ministry of External Affairs (MEA), GoI
- Ministry of Foreign Affairs and International Development, France
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- Ministry of New and Renewable Energy (MNRE), GoI
- Ministry of Petroleum and Natural Gas (MoPNG), GoI
- Ministry of Power (MoP), GoI
- Ministry of Railways (MoR), GoI
- Ministry of Water Resources, River Development and Ganga Rejuvenation, GoI
- Mott Macdonald, UK
- Natural Resources Defense Council (NRDC), USA\*
- Neer Foundation
- New York University School of Law
- NITI Aayog,\* GoI
- Norwegian Environment Agency (NEA)
- Norwegian Ministry of Foreign Affairs\*
- Observer Research Foundation (ORF)
- Oxfam International\*
- Ozone Cell, MoEFCC, GoI
- Pacific Northwest National Laboratory (PNNL), USA
- Pierre Mendès-France University, France
- Planning Commission, GoI
- Prayas (Energy Group)
- Public Health Foundation of India (PHFI)
- Pure Earth (formerly known as the Blacksmith Institute)
- Renewable Energy Policy Network for the 21st Century (REN21)
- Ricardo AEA, UK
- Royal Norwegian Embassy, New Delhi
- Royal Society, UK
- SELCO Foundation
- Shakti Sustainable Energy Foundation\*
- Shell International
- SINTEF, Norway
- Skill Council for Green Jobs (SCCJ)
- Skolkovo Foundation, Russia
- Skoll Global Threats Fund
- Solar Radiation Management Governance Initiative (SRMGI)
- Stockholm Environment Institute (SEI)
- Sustainable India Finance Facility (SIFF)
- Technology Information, Forecasting and Assessment Council (TIFAC), GoI
- Terrawatt Initiative, France
- The Ashden India Renewable Energy Collective (AIREC)
- The Climate Group (TCG)
- The Currency Exchange Fund (TCX)
- The Energy and Resources Institute (TERI)
- The International Growth Centre (IGC)
- The Nand and Jeet Khemka Foundation
- The Nature Conservancy\*
- The William and Flora Hewlett Foundation\*
- Tsinghua University, China
- Tyndall Centre on Climate Change, UK
- United Nations Development Programme (UNDP)
- United Nations Educational, Scientific and Cultural Organization (UNESCO)
- United Nations Environment Programme (UNEP)
- United Nations Foundation
- United Nations Foundation: Global Alliance for Clean Cookstoves\*
- United Nations Framework Convention on Climate Change (UNFCCC)
- United Nations India
- United States Agency for International Development (USAID)
- University of East Anglia, UK
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- Vasudha Foundation
- Veolia Water India
- Vijnana Bharati
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- World Resources Institute (WRI) India

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# The Council's Publications

Sep 2016 - Aug 2017

## BOOKS/REPORTS

- Aditya Ramji, Sasmita Patnaik, Sunil Mani, and Hem H. Dholakia (2017) 'Powering Healthcare through Solar in India: Lessons from Chhattisgarh', August
- Neeraj Kuldeep, Kanika Chawla, Arunabha Ghosh, Anjali Jaiswal, Nehmat Kaur, Sameer Kwatra, Karan Chouksey (2017) 'Greening India's Workforce: Gearing Up for Expansion of Solar and Wind Power in India', CEEW-NRDC Report, June
- Kapardhi Bharadwaj, Karthik Ganesan, and Neeraj Kuldeep (2017) 'Retail Tariffs for Electricity Consumers in Delhi: A Forward Looking Assessment', March
- Neeraj Kuldeep, Karthik Ganesan, Vaibhav Gupta, Aditya Ramji, Kanika Chawla, and Manu Aggarwal (2016), 'Energy Storage in India: Applications in the Renewable Energy Segment', November
- Aditya Ramji, Rana Pujari, Shubhashis Dey, Vikas Gaba, Ajit Nafde, Varun Anand (2016) 'Energy Policy Roadmap for the Indian Railways: Energy Efficiency and Renewable Energy Interventions', November
- Rudresh Kumar Sugam, Abhishek Jain, and Kangkanika Neog (2016) 'Circular Economy Pathways for Municipal Wastewater Management in India: A Practitioner's Guide,' October
- Ben Grobot, Adarsh Varma, Ashish Kulkarni, Robert Stewart, Shaun Brace, Tom Buckland, B Sengupta, Bhargav Krishna, Hem H. Dholakia (2016). 'A review of the process for setting industry specific emissions standards in India' September

## JOURNAL PAPERS/BOOK CHAPTERS/OTHER PAPERS

- Vaibhav Gupta, Sumit Prasad, Karthik Ganesan (2017) 'Domestic Measurement, Reporting, and Verification Framework for India's Climate Actions', India's Biennial Update Report. MOEFCC, New Delhi.
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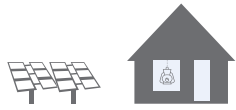
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# Tracing The Council's

## Key Milestones and Achievements



**AUG 2017**

Released a first-of-its-kind independent evaluation on the role of electricity access on health outcomes in rural Chhattisgarh



**JUN 2017**

Hosted the first CEEW-Shakti Renewable Energy Dialogue



**JUN 2017**

Launched Women in Sustainability on World Environment Day



**MAY 2017**

Published paper on Enhanced Transparency Framework in the Paris Agreement



**OCT 2014**

Submitted reports on Environmental Clearances, Power Reforms, Solar, and Swachh Bharat to the PMO



**JUL 2015**

Published major multi-country report on Climate Change: A Risk Assessment



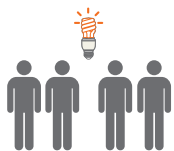
**SEP 2015**

Minister of Power, Coal and New & Renewable Energy released ACCESS report, based on India's largest energy access survey



**DEC 2015**

Showcased climate leadership during COP21 climate negotiations in Paris



**JUL 2014**

Co-Founded Clean Energy Access Network (CLEAN)



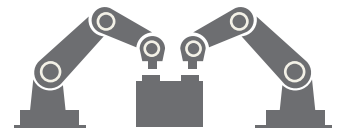
**JUN 2014**

Organised Climate Geoengineering Governance conference with University of Oxford



**MAR 2014**

Hosted Dr Ernest Moniz, US Energy Secretary, for a dialogue on Scaling Decentralised Clean Energy in India



**NOV 2013**

Submitted Report on Strategic Industries to the National Security Advisory Board



**JAN 2010**

Idea for a think-tank to integrate energy, water and environment conceived



**AUG 2010**

CEEW starts operations in a single empty room in Gurgaon



**OCT 2010**

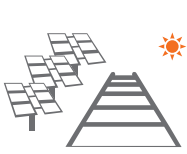
Conceptualised and enabled the Maharashtra-Guangdong Partnership on Sustainability



**JUL 2011**

Facilitated the \$125 million India-US Joint Clean Energy R&D Center

# Seven-Year Journey



**APR 2017**

Railways Minister and Power Minister released policy brief on Decarbonising the Indian Railways



**MAR 2017**

Released the first of three reports on retail tariffs for electricity consumers in Delhi, Bengaluru and Mumbai



**JAN 2017**

Featured in multiple categories of the 'Global Go To Think Tank Index' for the fourth year running



**OCT 2016**

Organised a meeting on the implications of the HFC phase-down at Kigali, Rwanda



**MAR 2016**

Railways Minister released the book 'Energizing India: Towards a Resilient and Equitable Energy System'



**JUN 2016**

Ranked 2nd in India, 20th globally amongst leading climate think-tanks by ICCG



**JUL 2016**

Published first-of-its-kind assessment of minerals critical to boost Indian manufacturing



**JUL 2016**

Jointly launched GHG Platform-India, an independent web portal estimating GHG emissions



**NOV 2013**

Published report on Urban Water and Sanitation in India



**JUN 2013**

Ranked number 1 climate think-tank in India, 15th globally, by International Centre for Climate Governance (ICCG)



**MAR 2013**

CEO Dr Arunabha Ghosh nominated Young Global Leader by World Economic Forum



**SEP 2012**

Published study on minor irrigation reform for the Indian state of Bihar



**SEP 2011**

Published a 584-page National Water Resources Framework Study for India's 12th Five-Year Plan



**DEC 2011**

Submitted first ever report on India and Global Governance to the National Security Adviser at the PM's Office



**MAY 2012**

Published the first assessment of India's 22 gigawatt National Solar Mission



**AUG 2012**

National Security Adviser of India delivered keynote lecture at CEEW's second anniversary





# Opinion

**INNEWS** Glimpses of Op-eds by CEEW Researchers



## For a breath of fresh air

We have to stop sacrificing the science of pollution control at the altar of populist policies



HEM H. DHOLAKIA



## DON'T TAX CLEAN ENERGY

GST Council's confusion on solar power casts doubt on its commitment to renewables

KANIKA CHAWLA

## Here's looking at you, India

As US withdraws from the Paris pact, it's time the world recognised the real climate leaders

ARUNABHA GHOSH



## Can Asia Change The Climate?

On climate politics there is not one but three Asias, we need many Asian voices



## THE KIGALI BREAKTHROUGH

Indian intervention ensured a balance between climate concerns and economic needs

VAIBHAV CHATURVEDI AND LEKHA SRIDHAR

THE KIGALI Amendment to the Montreal Protocol, agreed to by 197 countries, is a milestone agreement. It will avoid global warming by up to 0.5°C by phasing out hydrofluorocarbons (HFCs), a category of greenhouse gases with extremely high global warming potential (GWP). The amendment is the product of seven years of negotiations. Four amendment proposals were submitted — the North American, European, and small island states' proposals for developing countries advocated an early baseline (2011-13)

rive at a better understanding of the implications of the different amendment proposals for the country. Apart from China, India is the only other developing country to have HFC producing capacity. India also has large and growing air-conditioning, refrigeration and automobile manufacturing sectors, which would face technical and financial challenges due to the HFC phase-downs. The issue of economy-wide costs was highlighted by the Indian negotiators during a trilateral meeting in Vienna in July 2016.

The Indian economy's high expected growth rate and consequently, refrigerant consumption, means that the three major HFC-consuming sectors (mobile, residential and commercial air-conditioning) will have to transition within eight to 10 years of the freeze. If 2021 had been the freeze year, a transition to low GWP alternatives by 2031 may have been difficult given the current lack of availability of patent-free and low-cost options in many sectors. The HFC negotiators emphasised from a G-



nical capacity precludes SPCBs from setting more stringent emissions standards, and manpower shortages prevent enforcing existing standards. An independent evaluation of the CPCB in 2010 found that it would need to fill 308 posts immediately to meet its targets. This has implications for controlling pollution from industrial clusters in and around Delhi, such as Faridabad and Ghaziabad. Upskilling of existing staff knowledge and coordination between the CPCB and SPCBs are essential, without which they will remain toothless watchdogs. This perspective has received less attention in the discourse on pollution control.

### Power of technology

Third, leverage technology for innovative solutions. It is well understood that trans-boundary sources contribute 20-30 per cent to Delhi's pollution. Whereas seasonal crop burning in Punjab and Haryana makes headlines, little is made of pollution from industrial clusters in Faridabad and Ghaziabad. Yet, we have barely considered developing the business models by which farmers can secure revenue from waste-to-energy projects or providing pollu-

reduce health risk on in New Delhi. st studies stop ment analysis.

## Good & Bad of Goods & Services Tax for Solar Energy

In the short-run, study suggests a 10 per cent increase in solar tariff as a result of increased project capital cost by about INR 4.5 million per MW but in the long run, GST will eradicate presence of inverted duty tax structure in the value chain of solar cells, modules and panels manufacturing and the introduction of Input TaxCredit will eliminate cascading effect of existing tax structure, write **Anjali Viswamohanam** and **Neeraj Kuldeep**.



Solar tariffs in India touched a record low of INR 3.3 per kWh last month in the recently awarded 750 MW Rewa Ultra Mega Solar Park in Madhya Pradesh. This

is a significant decline from the lowest solar tariff prior to this, of INR 4.34 per kWh for a 420 MW project in Rajasthan. Amidst this favourable direction for the sector uncertainty over multiple Goods and Service Tax (GST) rates and their applicability on different solar Photovoltaic (PV) system components has raised concerns. The likely increase in project capital cost and solar tariff as a result of the GST on major works, especially for renewable projects which are currently in the construction or tendering phase. Uncertainties over the continuation of existing tax benefits for grid connected solar projects, adds to the concerns of developers and investors alike. Under the existing tax regime, solar PV system components in India are largely exempt from import duties and indirect taxes levied by the central and state governments on the manufacturing and supply of goods.

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**India to gain huge RTKs from international aviation: CEEW**

New Delhi, Oct 8 (UNI) India is expected to have 10 billion Revenue Tonne Kilometres (RTKs) from international aviation by 2020, which is expected to touch 20 billion RTKs in the short to medium term.

**Energy storage market for off-grid renewable energy in India to touch Rs 16,500 crore by 2022: CEEW**

"Rooftop solar will itself account for 80 per cent of the total energy storage market for off-grid renewables and will be worth INR 130 billion (USD 2 billion) in 2022," CEEW said.

Analysis Date | ETEnergyWorld | May 16, 2017, 14:30:15T

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**The Guardian**

**Malcolm Turnbull talks up coal in Delhi, despite India's aim to stop imports**

Glut in Indian coal market, plans to phase out imports and lower than forecast energy demands cast doubt on future for exports from proposed Adani mine



The Indian prime minister, Narendra Modi, shakes hands with Malcolm Turnbull before their meeting at Hyderabad house in New Delhi. Photograph: Harish Tyagi/PTA

Malcolm Turnbull is adamant that Australian coal will play "a very big role" in powering India's future despite a glut in the local market and clear signals from Delhi that it aims to eliminate imports of the fossil fuel as soon as possible.

The prime minister touched down in New Delhi on Monday for his first official visit to the south Asian giant. Selling Australia as an attractive destination for Indian students and reviving negotiations over a free-trade agreement are high on the agenda as the government vies for a slice of the world's fastest growing major economy.

**THE ECONOMIC TIMES**

**Green Energy may Renew Job Hopes & Create 3L Jobs in 5 Yrs**

**Kaavya Chandrasekaran**  
@timesgroup.com

New Delhi: India's rapidly growing renewable energy sector will generate a significant number of new jobs apart from giving the country cleaner environment, a new study has forecast. Around 800,000 such jobs in this sector will be created in the next five years, according to a study done by Council on Energy, Environment and Water (CEEW) and Natural Resources Defense Council (NRDC). The eventual job potential of the sector, according to the study, is 34,600 in wind power, 58,500 in ground-mounted

panels too. But if they are serious about rooftop, proper contracts and sound legal framework will need to be put in place. Otherwise, it could lead to NPAs, as a result of which, people will lose jobs," said Sunil Jain, CEO, Hero Future Energies. There is currently a sizeable skill shortage in the sector. The ministry of new and renewable energy has set up the Skill Council for Green Jobs to address the problem. The study said solar module manufacturing currently employs close to 2,900 people and that it could employ an additional 45,000 people if demand is met domestically. At present, barely 10% of solar modules used to India

**BusinessLine**  
THE HINDU  
EXPANSION DRIVE: AGL will take its gas-to-liquids boom and open up its India head office here

**'Railways can raise Green Bonds to fund renewable power projects'**

decarbonisation extremely important for Railways: Prabhu

and have Railway employees operate the plant. He also pushed for further open access for the sector. As per a study released by the CEEW, Indian Railways would draw up to 25 per cent of its electric power needs from renewables and achieve the target of 5 GW of solar by 2022.

Investment requirement: For this, the Railways would need an investment of 5.5 billion to meet the 5 GW target. A potential

come from Railways and will largely benefit the domestic industry. Today, we are supplying power at reduced rate of 60-70 per cent than what it was three years back even at peak demand. However, Sunil Jain, CEO & MD, Hero Future Energies, said investing on the use of indigenous technology would push up the prices.

Amalendu Chak, CEO, CEEW, said: "An AGL fund, in partnership with the Ministry of New and Renewable Energy and the Min

**Forbes**

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**Tulsi Tanti Gets A Second Wind**  
Megha Bahree, Managing National Technology FULL BIO  
Operations expanded to Forbes Distribution as their own.

In 2007 Tulsi Tanti, the founder of Suzlon Energy, was the tenth-richest person in the country, with a \$10 billion fortune. Back then Suzlon was the world's most valuable wind-turbine maker, and Tanti, who had just won a hotly contested bid to acquire German rival Repower for \$2 billion, was out to conquer the world.

The winds of fortune have shifted in Suzlon's favor. The Modi-led government's target for renewable energy--both wind and solar--is 175GW by 2022. Tanti has latched on to what he calls a "hybrid model" under which he will build combined wind and solar-power projects.

**दैनिक जागरण**  
सही मायने में भारत है अगुआ

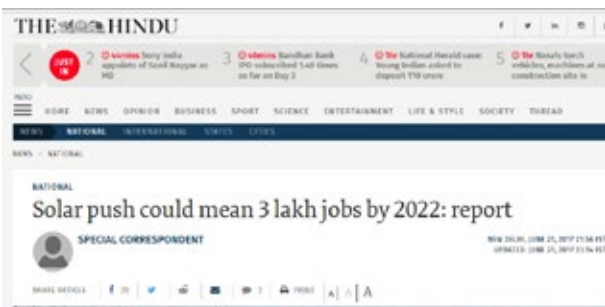
दिल्ली काठकोटि पर पर्यावरण रक्षक दल का विरोध भी बढ़ती चली है। दुकानदारों के लिए दल का विरोध भी बढ़ती चली है। दुकानदारों के लिए दल का विरोध भी बढ़ती चली है।



Arunabha Ghosh, CEO, CEEW, discussing China and India's role as climate change leaders on CGTN America



Kanika Chawla, Senior Programme Lead, CEEW, discussing India's solar tariffs as a panelist on CNBC TV 18



**Indian Railways to source 25% of power needs from renewables by 2025**  
 Indian railways has the potential to generate 5 GW of solar power by 2025, that will meet a quarter of its power demand.  
 Updated: Apr 06 2017 17:41 IST  
 Malavika Vyawahare



## Dr Arunabha Ghosh with David Letterman on *National Geographic Channel's 'Years of Living Dangerously'*



David Letterman with Dr Arunabha Ghosh during the shooting of 'Years of Living Dangerously' at Huda City Centre Metro Station, Gurugram.



Dr Arunabha Ghosh featured with renowned US talk show host and broadcaster, David Letterman, on the first episode of Season 2 of the 'Years of Living Dangerously', the award-winning *National Geographic* documentary series. Dr Ghosh explained India's energy transition, renewable energy ambitions, and developmental challenges to Mr Letterman during a day-long trip to multiple locations in New Delhi and Gurugram.



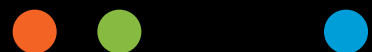
At locations in Delhi and NCR.

## **The seat at the table**

You see me enter the building, and  
You (sub) consciously choose to ignore.  
You notice me walk into the room, and  
You smile, 'cause you're courteous.  
You watch me sit at the table  
You're then forced to say, "Hello."  
You hear me when I speak out of turn  
You shift your attention from your cellphone.  
You listen when I disagree with you  
You begin to twitch, you start to squirm.  
You speak in a louder tone, but  
Your words cannot my logic drown.  
You shout out your opposition, and  
You gang up, trying to wear me down.  
You comment on my dress, my hair, my character.  
You record all my flaws you've found.  
At the end, you accuse me of being ambitious.  
By then, my friend, I've already won.

**Arunabha Ghosh**

*On the launch of the Women in Sustainability initiative at The Council*



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