



India Climate Report

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This paper is part of a series of briefing papers designed to provide an up-to-date account and analysis of India's efforts to address climate change. As the fourth in the series, this paper covers an update on trends in renewable energy prices and other domestic as well as international developments.

KPMG in India is the knowledge partner for this briefing paper

Recent developments

Dr. Harsh Vardhan took charge as the Minister for Environment, Forest and Climate Change after the demise of Mr. Anil Madhav Dave on 18th May 2017. Dr. Vardhan also holds charge of the Ministry of Science and Technology¹.

On 24th January 2017, the Union Cabinet of India approved the ratification of the second commitment period of the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC). India does not have any reduction targets under the Kyoto Protocol². Until now, only seven out of 37 countries with binding emission reduction targets have ratified the second commitment period of the Kyoto Protocol³.

On 28th December 2016, the Union Government of India gave its approval to India's ratification of the Framework Agreement of the International Solar Alliance (ISA), which was launched on 30th November 2015. The alliance brings together the solar resource rich nations for coordinated research, low cost financing and rapid deployment. While 25 countries have already signed the agreement, it would become operational once 15 countries ratify it⁴.

In October 2016, during the 28th Meeting of the Parties to the Montreal Protocol at Kigali, Rwanda, the Ministry

of Environment, Forest and Climate Change (MoEFCC), Government of India, announced that all companies in India producing hydrochlorofluorocarbon-22 (HCFC-22) refrigerant gas would have to incinerate the by-product hydrofluorocarbon-23 (HFC-23). India announced this step voluntarily without a commitment of financial support from developed countries. Globally, incineration of HFC-23 is expected to help avoid more than 444 million tCO₂e emissions⁵.

In December 2016, the Draft National Electricity Plan prepared by the Central Electricity Authority (CEA) was shared for stakeholder comments. According to studies conducted during the preparation of the plan, there is no requirement to add additional capacity of coal-based plants during 2017–22. However, for the period 2022–27, coal-based capacity addition of 44,085 MW is required, which can be met by the 50,025 MW of coal-based power plants that are already under development. Further, the share of non-fossil-based installed capacity in the country is expected to reach 46.8 per cent by 2021–22 and 56.5 per cent by 2026–27, which is well in excess of the commitment to achieve a 40 per cent share by 2030, as stated in India's Nationally Determined Contribution (NDC)⁶.

1. Press Information Bureau, May 22, 2017; <http://pib.nic.in/newsite/PrintRelease.aspx?relid=161999>
2. Press Information Bureau, January 24, 2017; <http://pib.nic.in/newsite/PrintRelease.aspx?relid=157629>

3. India to ratify Doha amendment to Kyoto Protocol, January 24, 2017; <http://www.thehindubusinessline.com/economy/policy/india-to-ratify-doha-amendment-to-kyoto-protocol/article9500144.ece>
4. Press Information Bureau, December 28, 2016; <http://pib.nic.in/newsite/PrintRelease.aspx?relid=155917>

5. Press Information Bureau, October 13, 2016; <http://pib.nic.in/newsite/PrintRelease.aspx?relid=151639>
6. Draft National Electricity Plan, CEA, December 07, 2016; http://www.cea.nic.in/reports/committee/nep/draft_nep_invitation_2016.htm

In March 2017, the Ministry of Power announced that an energy saving of 8.67 million tonnes of oil-equivalent (toe) was achieved during the first cycle of the Perform, Achieve and Trade (PAT) scheme which ran between 2012 and 2015. The scheme is a market-based mechanism to incentivise energy efficiency in industries. The realised energy saving exceeds the target of 6.886 million toe and resulted in reduced emissions of 31 million tCO₂. A total of 3.8 million Energy Savings Certificates (ESCs), each representing one toe of energy saving, have been issued to industries. The trading of these certificates is expected to start after registration of the obligated entities and shall be done on a weekly basis⁷.

The Finance Minister, during the presentation of the Union Budget for 2017–18 in February 2017, made new proposals that are likely to spur investment in measures that mitigate climate change. These included taking up the second phase of the scheme for the development of solar parks and ultra-mega solar power projects for developing an additional 20 GW capacity, supporting the Indian Railways through powering of 2,000 railway stations with solar energy and providing a concessional tax rate of 10 per cent for income arising from the

sale of carbon credits that are likely to boost investments in energy efficiency and renewable energy⁸.

In August 2016, the Ministry of New and Renewable Energy (MNRE) announced a policy for repowering of wind turbine generators of capacity 1 MW and below, to promote optimum utilisation of wind energy resources. Until 2000, most of the wind turbines installed in India were set up at the locations having high wind energy potential. However, each turbine had a capacity to generate a maximum of 500 kW, which is substantially low. The policy targets replacing ageing wind turbines with higher capacity and modern units through the provision of several incentives that are otherwise available only to new wind projects⁹.

Energy Efficiency Services Limited (EESL) has successfully increased the uptake of energy-efficient LED bulbs, fans and tube lights in the Indian market. EESL has now initiated a programme on the bulk procurement of super-efficient air conditioners (ACs) that are at least 40 per cent more efficient than ACs rated five star by the Bureau of Energy Efficiency (BEE). EESL proposes to use demand aggregation to drive down production costs. Further, it plans to offer

organisations an option to replace their old ACs with super-efficient ACs without any upfront costs, and allowing them to recover their investments through the savings in power bills¹⁰.

In March 2017, MoEFCC launched the Stage-II of the HCFC Phase-out Management Plan (HPMP-II). During his address, the late Union Minister for the MoEFCC, Shri Anil Madhav Dave, urged the refrigerant manufacturing industry to invest in R&D. Under the HPMP-II plan, India is expected to reduce the GHG emissions of 8.5 million tCO₂e annually from 2023, for which it has secured USD 44.1 million in funding from the Multilateral Fund (MLF)¹¹.

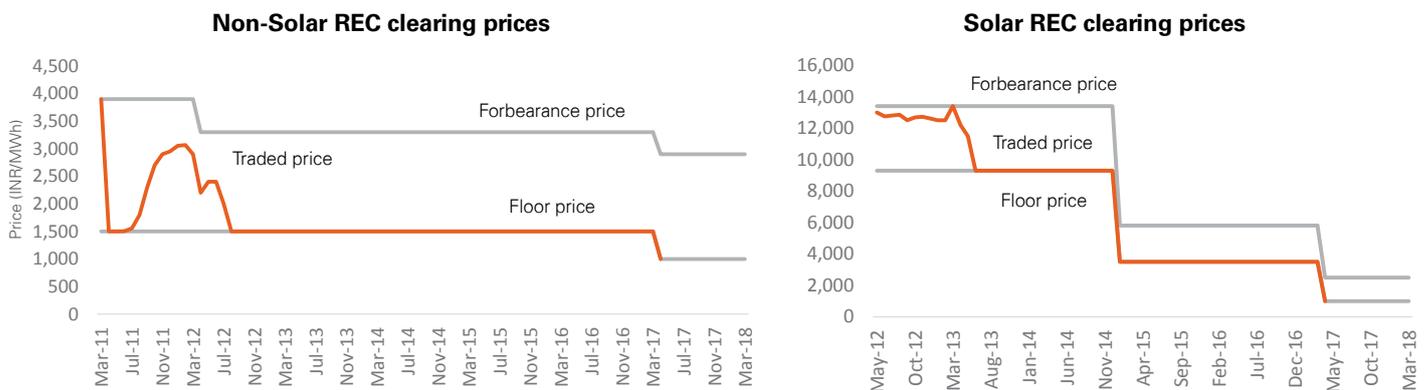
Several Indian corporates have announced the adoption of an internal carbon price that ranges from USD 10–11 per tCO₂e emitted. Among these, Arvind Limited, Dalmia Cement, Infosys, and Mahindra & Mahindra are Indian members of the global Carbon Pricing Leadership Coalition (CPLC), a voluntary partnership of governments, businesses and civil society organisations that agree on a long-term objective of applying a carbon price throughout the global economy¹².

Trends in renewable energy prices

In January 2010, the Central Electricity Regulatory Commission (CERC) notified regulations on Renewable Energy Certificates (RECs) to address the mismatch between the availability of renewable energy sources and the requirement of obligated entities

to meet their Renewable Purchase Obligations (RPOs). From time to time, the commission notifies the floor and forbearance prices for the trading of the two categories of RECs i.e., solar RECs and non-solar RECs. However, due to several factors, such as the financially

distressed nature of obligated distribution companies and lack of stringent penalty structures for non-compliance, the trading has largely taken place at the floor price with the volume of RECs traded remaining low. This trend in REC prices is shown in the graphs below:



7. Press Information Bureau, March 22, 2017; <http://pib.nic.in/newsite/PrintRelease.aspx?relid=159670>
 8. Union Budget 2017-18, Ministry of Finance; <http://indiabudget.nic.in/ub2017-18/bs/bs.pdf>
 9. Ministry of New and Renewable Energy (MNRE); <http://www.mnre.gov.in/file-manager/UserFiles/Repowering-Policy-of-the-Wind-Power-Projects.pdf>

10. Interview with Managing Director, EESL, February 28, 2017; <https://energyinfra.com/coming-soon-eesls-super-efficient-air-conditioner-that-is-40-more-efficient-than-the-best-ac-in-india/>
 11. Press Information Bureau, March 06, 2017; <http://pib.nic.in/newsite/PrintRelease.aspx?relid=158868>

12. Carbon Pricing Leadership Coalition; <https://www.carbonpricingleadership.org/leadership-coalition> and <http://wri-india.org/events/launch-wri-indias-primer-internal-carbon-pricing>

The CERC recently lowered the floor and forbearance prices significantly to INR 1,000 (USD 16.67) and INR 3,000 (USD 50) per MWh for non-solar, and INR 1,000 (USD 16.67) and INR 2,400 (USD 40) per MWh for solar RECs, respectively¹³. It is anticipated that this move will encourage the distribution companies to purchase RECs and meet their RPO obligations.

In February 2017, the then record low first-year tariff of INR 2.97 (USD 0.05) per unit was witnessed during the reverse bidding for 750 MW solar park of Rewa Ultra Mega Solar Limited, a joint venture between the Solar Energy Corporation of India Limited (SECI) and Madhya Pradesh Urja Vikas Nigam Limited (MPUVN). The terms offered complete payment protection to developers with no barriers

related to land acquisition or evacuation infrastructure, thus reducing their risks further¹⁴. Additionally, in the same month, wind tariffs dropped to a record low of INR 3.46 (USD 0.06) per unit at the auction conducted by the SECI¹⁵. More recently, an even lower tariff of INR 2.44 (USD 0.04) per unit was achieved during an auction carried out by SECI for the Bhadla Phase III Solar Park in Rajasthan¹⁶.

International negotiations and cooperation

In November 2016, the 22nd session of the Conference of the Parties (COP22) to the United Nations Framework Convention on Climate Change (UNFCCC) was held in Marrakesh, Morocco. The Parties made progress on the creation of an operational manual for the Paris Agreement called the Paris Rule Book that is targeted to be

finalised by 2018. The manual would comprise the rules and processes needed for enabling transparency of action, provision of climate finance and technology development and transfer. Seven developing countries presented updates on their climate actions, thus opening themselves to examination by their peers in accordance with the

spirit of promoting greater ambition under the Paris Agreement. Additionally, the Climate Vulnerable Forum, a group of more than 40 vulnerable nations, announced their commitment towards achieving the use of 100 per cent renewable energy between 2030 and 2050¹⁷.

Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer

Hydrofluorocarbons (HFCs) are used in a wide variety of applications, including refrigeration, air-conditioning, building insulation, fire extinguishing systems and aerosols. The use of HFCs has rapidly increased as substitutes for ozone-depleting substances and they are also generated as a by-product during the production of HCFC-22 refrigerant gas. While HFCs do not harm the ozone layer, they are powerful

greenhouse gases and contribute significantly to global warming. Phasing it out is expected to prevent the emission of up to 105 million tCO₂e, helping to avoid a rise of up to 0.5°C in the global temperature by 2100.

On 15th October 2016, the 28th Meeting of Parties to the Montreal Protocol adopted the Kigali Amendment, adding HFCs to the list of controlled substances. The

Parties are required to gradually reduce HFC use by 80–85 per cent by the late 2040s, with developed countries taking the lead. India will freeze HFC use by 2028 i.e., not use HFCs more than it would do in the baseline period of 2024–26, and gradually reduce it to 15 per cent of the baseline period by 2047. The agreed phase down schedule for countries is as follows:

	A5 parties - Group 1 (developing countries, including China)	A5 parties – Group 2 (India and other developing countries from the Middle-East)	Non-A5 parties (developed countries)
Baseline formula	Average HFC consumption for 2020-2022 + 65% of HCFC baseline	Average HFC consumption for 2024-2026 + 65% of HCFC baseline	Average HFC consumption for 2011-2013 + 15% of HCFC baseline*
Freeze	2024	2028	–
1st step	2029 – 10%	2032 – 10%	2019 – 10%
2nd step	2035 – 30%	2037 – 20%	2024 – 40%
3rd step	2040 – 50%	2042 – 30%	2029 – 70%
4th step	–	–	2034 – 80%
Plateau	2045 – 80%	2047 – 85%	2036 – 85%

* For Belarus, Russian Federation, Kazakhstan, Tajikistan, Uzbekistan, 25 per cent HCFC component of baseline and different initial two steps (1) 5 per cent reduction in 2020 and (2) 35 per cent reduction in 2025

The amendment will come into force on 1st January 2019, provided that it is ratified by at least 20 parties to the Montreal Protocol. If this condition is not met, the amendment would become effective on the ninetieth day following the date of ratification by the twentieth party.

Source: Frequently asked questions relating to the Kigali Amendment to the Montreal Protocol, Ozone Secretariat, November 3, 2016; http://ozone.unep.org/sites/ozone/files/pdfs/FAQs_Kigali-Amendment.pdf

13. CERC Petition No. 02/SM/2017 dated March 30, 2017; http://www.cercind.gov.in/2017/orders/02_SM.pdf
14. Solar tariff reaches a historic low of Rs 2.97 a unit at Rewa bidding, February 11, 2017; <http://energy.economictimes.indiatimes.com/news/renewable/solar-tariff-reaches-a-historic-low-of-rs-2-97-a-unit-at-rewa-bidding/57084519>

15. Wind power tariff falls to record low of Rs 3.46 a unit, February 24, 2017; <http://energy.economictimes.indiatimes.com/news/renewable/wind-power-tariff-falls-to-record-low-of-rs-3-46-a-unit/57323375> and all conversions assume USD 1 = INR 60

16. Press Information Bureau, May 12, 2017; <http://pib.nic.in/newsite/PrintRelease.aspx?relid=161755>
17. Nations Take Forward Global Climate Action at 2016 UN Climate Conference, UNFCCC, November 18, 2016; <http://newsroom.unfccc.int/unfccc-newsroom/nations-take-forward-global-climate-action-at-2016-un-climate-conference/>

Carbon Offsetting and Reduction Scheme for International Aviation (CORSA)

The global aviation industry currently accounts for about 2 per cent of all human-induced CO₂ emissions. However, with the projected growth in air traffic, these emissions are expected to rise by almost 300 per cent over the next three decades, unless adequate actions are taken.

The International Civil Aviation Organization (ICAO) held its 39th Triennial Assembly session between 27th September and 7th October 2016 in Montreal, Canada. One of the key resolutions adopted during this session was to establish a Global Market-Based

Measure (GMBM) scheme called CORSIA to offset CO₂ emissions from international aviation and contribute to the carbon neutral growth of the industry, from 2020 onwards. This implies that any increase in emissions by airlines above 2020 levels would require them to buy and surrender carbon credits generated through projects in other sectors.

Sixty-five parties have adopted the resolution and about 80 per cent of the emissions above 2020 levels are expected to be offset by the scheme between 2021 and 2035. The scheme

would be launched in a phased manner as follows:

- Pilot phase (2021–23) and Phase I (2024–26): This would be open for participation on a voluntary basis with the expectation that developed countries would take the lead.
- Phase II (2027–35): This would be mandatory for all parties, including India, except Small Islands Developing States (SIDS), Least Developed Countries (LDCs), landlocked developing countries and countries with small aviation activities.

Source: Memo: 39th Assembly of the International Civil Aviation Organisation, October 7, 2016, European Commission - Fact Sheet; http://europa.eu/rapid/press-release_MEMO-16-3332_en.htm



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