

## **India's aluminium industry will need ~USD 29 billion CAPEX to go net-zero: CEEW**

*—Renewable energy can abate 49 per cent of emissions from the aluminium industry  
—In another hard-to-abate sector such as fertilisers, green ammonia can help industry go net carbon-negative*

**New Delhi, 30 April 2024:** The Indian aluminium industry would require an additional capital expenditure (CAPEX) of nearly INR 2.2 lakh crore (~USD 29 billion\*) to achieve net zero carbon emissions, according to an independent study by the Council on Energy, Environment and Water (CEEW) released today. Renewable energy (RE) power sources could abate 49 per cent of the total emissions from the industry. A complete transition to RE is currently not feasible as it is intermittent in nature, and a backup will always be necessary in case of grid failure. Aluminium, a widely utilised metal and one of India's fastest-growing in terms of production, is predominantly used by the power sector.

The CEEW study—which is the first-of-its-kind estimation of the cost of decarbonising this critical industry—finds that net-zero aluminium could be 61 per cent more expensive. Further, decarbonising this industry would also lead to a yearly increase of INR 26,049 crore (USD 3.5 billion) in additional operating expenditure (OPEX).

Although India's per capita aluminium consumption is low at 2.5 kg (compared to the world average of 11 kg), the industry emitted nearly 77 million tonnes of CO<sub>2</sub> (MtCO<sub>2</sub>) in 2019-20. Electricity consumption by plants accounted for 80 per cent of the total emissions, while process emissions and fuel consumption accounted for the rest. The CEEW study, funded by 'bp', provides a marginal abatement cost (MAC) curve for the Indian aluminium industry — it shows what technologies could help the industry reach net-zero emissions and at what cost.

**Hemant Mallya, Fellow, CEEW,** said, "In an effort to inform the decarbonisation of India's hard-to-abate sectors, CEEW produced four reports on what it would take for the [cement, steel, fertiliser,](#) and aluminium industries to go net zero. A clear emerging message is the requirement for large amounts of capital and scaleup from various solution providers, including the renewable power, alternative fuels, and carbon storage and utilisation sectors. Aluminium and fertiliser are key industries for India's economic growth, and significant government support will be necessary to build the necessary infrastructure, such as power grid and pipelines, to decarbonise them and meet India's climate goals."

**Sashi Mukundan, President, bp India and senior vice president, bp Group,** said, "The Indian industry's energy transition is complex and requires technology advancements and policies that will give companies across the value chain the confidence to act. bp's partnership with CEEW focuses on optimising lower carbon pathways for the hard-to-abate sectors in support of our strategy, transforming from an international oil company to an integrated energy company."

The CEEW study finds that energy efficiency in alumina refining and aluminium smelting and waste heat recovery through electrolysis off-gas can reduce emissions without increasing the cost of aluminium. However, these technologies can only abate 8 per cent of the total emissions. All the remaining carbon abatement measures, such as using RE and carbon capture, have a positive MAC, meaning that there is a net cost incurred for facilities deploying these measures.

**Deepak Yadav, Programme Lead, CEEW**, said, “Given the highly energy-intensive aluminium production process and the expected growth in demand, decarbonising the sector will have a significant impact on India’s cumulative industrial emissions. We recommend incentivising renewable energy since the majority of aluminium smelting plants are in eastern states that do not have optimal wind power potential. Further, the focus should be on building an R&D ecosystem to generate data and evidence on decarbonisation measures. Finally, the Indian government should formulate favourable policies to build a carbon capture, utilisation and storage (CCUS) ecosystem.”

Continuing its series on decarbonising hard-to-abate sectors, CEEW also launched a study on what it would take for the fertiliser industry to go net zero. India is the second-largest fertiliser producer in the world, accounting for ~20 per cent of global production. However, it is a significant source of greenhouse gas emissions (~25 MtCO<sub>2</sub> annually) due to energy-intensive production processes and extensive fossil fuel use, particularly natural gas.

Because fertiliser production does not require much electricity, the CEEW study found that switching to RE power would result in a mere 2 per cent reduction in emissions from this industry. Ammonia (urea) production accounts for ~95 per cent of the emissions in this sector, and therefore, switching from grey to green ammonia can result in a 151 per cent emissions reduction. This would result in net negative emissions for the sector. Finally, carbon management options such as carbon capture and sequestration (CCS), carbon capture and utilisation (CCU), and afforestation may also be adopted by the industry.

(\*The conversion rate has been assumed as 1 USD = INR 75)

**Read the full reports:**

[Evaluating Net-zero for the Indian Fertiliser Industry](#)

[Evaluating Net-zero for the Indian Aluminium Industry](#)

**For media queries, contact:** *Tulshe Agnihotri* – [tulshe.agnihotri@ceew.in](mailto:tulshe.agnihotri@ceew.in) | +91 9621119643 / +91 7905717812

**About CEEW**

The Council on Energy, Environment and Water (CEEW) is one of Asia’s leading not-for-profit policy research institutions and among the world’s top climate think tanks. The Council uses data, integrated analysis, and strategic outreach to explain — and change — the use, reuse, and misuse of resources. The Council addresses pressing global challenges through an integrated and internationally focused approach. It prides itself on the independence of its high-quality research, develops partnerships with public and private institutions, and engages with the wider public. CEEW has a footprint in over 20 Indian states and has repeatedly featured among the world’s best-managed and independent think tanks. Follow us on X (formerly Twitter) @CEEWIndia for the latest updates.