Met-Info

The Indian Institute of Metals
Delhi Chapter

Jawahar Dhatu Bhawan
39, Tughlakabad Institutional Area, M B Road
Near Batra Hospital, New Delhi-110062

Tel: 011-29955084

E-mail: iim.delhi@gmail.com

Visit Us: www.iim-delhi.com

CONTENTS

Know Your Members

Editor-in-Chief: S C Suri
Associate Editor: S.K. Varshney

IIM DELHI CHAPTER
EXECUTIVE COMMITTEE: 2024-25

IIM Delhi Chapter Executive Committee: 2024-25

R K Vijayavergia
Chairman

Deepak Jain
Vice Chairman

K R Krishnakumar
Hon. Secretary

R K Narang
Hon. Treasurer

M P Sharma
Hon. Jt. Secretary

Members

B D Jethra

K L Mehrotra

K K Mehrotra

Manoranjan Ram

N K Kakkar

Dr. Ramen Datta

N Vijayan

G I S Chauhan

Ram Gopal

Dr. Rahul Sharma

Anil Kumar

Prof. Nitya Nand Gosvami

Special Invitees

Prof. S Basu

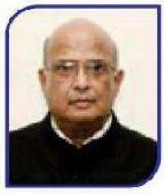
Dr. Mukesh Kumar

Shri R K Sinha

Invitees

R K Singhal

S K Varshney



B R Jain

Ashok Kumar Khatri

Executive Committee Members: Contact Details

Name / Designation	Affiliation	Contact No / E-Mail
Shri R K Vijayavergia *Chairman*	Ex. Executive Director Steel Authority of India Ltd	9650155544 rkv.sail@gmail.com
Shri Deepak Jain *Vice Chairman*	Former Dy. Director General (W) BIS	9868640986, 8368622619 deepakjain7177@gmail.com
Shri K R Krishnakumar *Hon. Secretary*	Consultant Ministry of Mines	9818277840; 01202773861 kuduvak059@gmail.com
Shri Ramesh Kumar Narang *Hon. Treasurer*	Consultant Odisha Coal & Power Ltd	9899298857 rknarang62@gmail.com
Shri M P Sharma *Hon. Jt. Secretary*	Scientific & Technical Consultant Aluminium Industries	9212202084; 9818508300 aluminiumconsultant@yahoo.com aflmps@rediffmail.com
Shri B D Jethra *Member*	Former Adviser Planning Commission	9818326878 jethra@yahoo.com
Shri K L Mehrotra *Member*	Ex CMD MOIL	9810203544;klm91048@gmail.com klmehrotra48@gmail.com
Shri K K Mehrotra *Member*	Ex CMD MECON Limited	9868112514; 01203645267 kishorekmehrotra@gmail.com
Shri Manoranjan Ram *Member*	Vice President, Head of Sales & Marketing Danieli Group	99100149989 manoranjanram@yahoo.com m.ram@danieli.com
Shri N K Kakkar *Member*	Former Vice President Somani Kuttner India Pvt. Ltd.	9871008505 nirmalkakkar@gmail.com
Dr. Ramen Datta *Member*	Consultant Steel Research & Technology Mission of India	9958084110 dattaramen@gmail.com
Shri N Vijayan *Member*	Director Technotherma India Pvt. Ltd.	9818695690 technothermaindia@gmail.com
Shri G I S Chauhan *Member*	Former ED I/c, RDCIS, SAIL	9717302437; 7048993116 gisc.delhi@gmail.com
Shri Ram Gopal *Member*	Former ED SAIL	9968605059 ramgopal.sail@gmail.com
Dr. Rahul Sharma *Member*	Director India International Zinc Association	9910299297 rsharma@zinc.org
Shri Anil Kumar *Member*	Ex Tata Steel	7763807077 kvsa2009@gmail.com
Prof. Nitya Nand Gosvami *Member*	Associate Professor Dept. of Materials Science & Engg., IIT Delhi	9958887964 ngosvami@iitd.ac.in
Prof. Suddhasatwa Basu *Special Invitee*	FIPI Chair Professor IIT Delhi	7838134181 drsbasu@gmail.com
Dr. Mukesh Kumar *Special Invitee*	Sr. Adviser JSP Group	9650080849; 9584032329 drmukeshkumar@gmail.com
Shri R K Sinha *Special Invitee*	Ex Director (Operations) Modern Steels Ltd	8968684955 rksinha555@gmail.com
Shri R K Singhal *Invitee*	Consultant Steel Research & Technology Mission of India	9910055630 rksh.singhal@gmail.com
Shri Sushil Kumar Varshney *Invitee*	Director/CEO Academy of Industrial Management Delhi	9312672831 acadim@gmail.com
Shri B R Jain *Invitee*	Sr. Adviser Engineering Council of India	9313190011 jainbinay@gmail.com
Shri Ashok Kumar Khatri *Invitee*	Director Technotherma India Pvt. Ltd.	9818695689 ashokkhatri10@gmail.com

Congratulations to YOGI JI DIGI

The Institution of Engineers (India), the largest multi-disciplinary professional body of engineers in India, instituted *IEI Industry Excellence Award* in 2008 to recognize engineering industry leaders for their innovation, excellence in engineering operations and services and their capacity to sustain excellence in a competitive manner. This award recognizes those who demonstrate the ability to maintain excellence in a highly competitive environment by setting benchmarks in governance, productivity, quality, safety, and performance standards.

The **IEI Industry Excellence Award 2024 (Gold)** was bestowed to YOGI JI DIGI in the category of *Engineering Manufacturing and Processing* for their outstanding performance with a high order of Business Excellence.

The Award was conferred to Shri Navneet Singh Gill, MD, YOGI JI DIGI at a ceremony held Kolkata on 19th December 2024.

IIM Delhi Chapter extends heartiest congratulations to YOGI JI DIGI collective on conferment of this prestigious award.

ILZDA Lead Conclave 2024 at New Delhi

An **"International Conference on Lead & Lead Batteries – Crafting a Green Future"** was organized by India Lead Zinc Development Association at New Delhi during 2 - 3 December 2024;

The event was sponsored by Luminous, Exide, Amara Raja, Livguard, Microtex, Gravita, Pondy Oxides, Nile, Waldies, Engitec, Ardee, Associated Electrochemicals, Okaya, Yogiji Diji, Surfactants, Aadishakti, MG India, MCX, Wirtz, Harsha, REIAI, SAEST, and supported by MRAI, IIM Delhi Chapter, Metalworld, Steel & Metallurgy, SSRL and Battery Directory & Year Book.

This was the fourth edition and the objective of the conference was "Crafting A Green Future", both in manufacture as well as recycling of Lead batteries.

The event began with a welcome address by Dr L Pugazhenthy, Executive Director, ILZDA followed by Special addresses by Mr Mark Stevenson of ABC & Recycle100, Ms Lisa Allen of International Lead Association and Mr Rakesh Malhotra, Founder, Livguard. Mr Rakesh Malhotra spoke about the robust Lead and Lead battery industry in India, poised for quantum jump growths in the coming years.

Guest of Honour Ms Preeti Bajaj, President, Indian Battery Manufacturers' Association (IBMA) and Managing Director, Luminous Power Technologies (P) Ltd., delivered the Inaugural Address; she highlighted the huge potential for Lead batteries in India due to expanding emerging markets namely Energy Storage and Electric Mobility.

The Inaugural Session was moderated and conducted by Mr G. Chandrashekhar, Sr. Editor & Policy Commentator.

On this occasion, **ILZDA Distinguished Services Awards** were presented to Mr Ravi Govindan, Microtex Energy Pvt Ltd. and Mr Sanjiv Nandan Sahaya, APL Metals Ltd.

On the first day (2 Dec.) technical presentations were made on Battery Technology & Markets, covering future outlook, BESS, BMS, e-rickshaws, nano materials.

The second day (3 Dec) was focussed on Recycling & Regulations, covering Circular Economy, Green Lead, Best Practices in Lead Recycling, Carbon Foot-prints, Health

Impact, Recycling in Africa, ULAB Management, Compliance, Regulations in Europe, North America etc.,

In all 27 technical presentations were made. It was strongly felt that, while the Lead and Lead battery industry will witness technology developments, market expansion, quality improvements, skill development etc, the main challenge in India is to control and minimize the informal lead recycling by streamlining an organized collection of Used Lead Batteries. This needs voluntary involvement and compliance by everyone concerned: manufacturers, recyclers, customers, regulatory bodies, citizens etc. There was also a Question & Answer session on “Battery Waste Management Rules” with Mr V P Yadav, Director, Central Pollution Control Board (CPCB). The conference was attended by 230 delegates from India and abroad.

India Faces Urgent Need to Diversify Mineral Sources

The rising demand and import dependency drive the need for secure mineral supply.

India's critical mineral dependency presents significant risks to its energy security and economic stability, warns a recent report by the Institute for Energy Economics and Financial Analysis (IEEFA). With the demand for minerals such as lithium, graphite, nickel expected to more than double by 2030, experts stress the need for India to diversify its sourcing strategy to reduce reliance on a limited set of supplier countries.

Critical mineral demand is expected to more than double by 2030, and domestic production is probably going to take up to a decade to start producing. India's current reliance on a few mineral-rich nations creates vulnerabilities.

The global reliance on a small number of mineral-rich countries, particularly for minerals such as lithium, cobalt, and rare earth elements, exposes India to supply risks due to high geopolitical tensions and trade policies. To address these vulnerabilities, IEEFA suggested a multi-step approach to diversifying mineral sourcing. An initial focus is needed on identifying the minerals most at risk. There is a need to look into 30 identified critical minerals and map it as per their import dependency and geopolitical risk exposure.

Once these minerals are mapped, the next step involves exploring new sources among "friendly nations" that hold these resources but lack the infrastructure for extraction. India could really look into these nations and regions and could develop investment partnerships along with these countries. Ghana, South Africa, and Australia can be potential partners. Additionally, India's involvement can be strengthened in international partnerships, such as the Mineral Security Partnership (MSP) and the Quad, to access diversified and secure mineral sources. Rising mineral demand also warrants that India should develop a domestic mineral resources strategy as well to avoid excess dependence on imports. This strategy would involve an exploration and production policy, designed to attract private and international investment, as well as support for technology development within India.

Source: asian-power.com

Lithium Exploration in J&K to be Stepped-up

The Ministry of Mines has asked the Geological Survey of India (GSI) to carry out "further explorations" to determine the commercial feasibility of extracting lithium in the Reasi district of Jammu and Kashmir.

Further studies on the nature of the resource have also been commissioned.

Additional areas are being explored and could be added to the existing block if enough reserves are found to make the mining activity "commercially viable".

Most of the existing reserve is in ore form. Previous attempts to auction 5.9 million tonnes of reserves in J&K — touted to be the first major lithium find in the country — have not been successful. Two auction attempts found no takers.

Lithium, called white gold, is seen as one of the key minerals required for India's shift to green energy and reduce its carbon footprint.

It finds usage in energy storage solutions, batteries (lithium ion), electric vehicles, mobile phones, among others.

NEW AREAS ADDED

New areas around the existing blocks of Salal Haimana area of Reasi district are being explored. The Ministry will come up with a "more detailed and comprehensive report" on availability of lithium and its commercial prospects, including processing needs, also will mention the estimated deposits. Reasi's lithium blocks are mostly at G3 stage (prospecting), which apparently is seen as a reason for the less than expected commercial interest during auctions.

In mining parlance, G4 stage is called reconnaissance, G3 stage prospecting, G2 mines fit for exploration, while G1 where detailed exploration can be taken up.

LITHIUM BLOCKS

"Feedback from the industry suggests that more detailed studies were required for the J&K lithium blocks. So, the GSI has been asked to carry out more exploration

activities there, add some more areas to the existing block, check the commercial viability nature of reserve and so on. Once the report comes in, and if seen to be commercially viable, the Ministry will take a call on the nature of licence — composite or otherwise — auction and other issues.

EXTRACTION METHODS

The processing and refining methods for lithium ore can vary depending on the type of the ore deposit, the characteristics of the ore, and the intended end use of the lithium compounds. Successful experimentation has been done for extraction of lithium from mineral concentrate in laboratory scale. India is completely dependent on imports for its lithium requirement.

As per consultancy firm, Care Edge Ratings, in FY24, India had a demand for 15 GWh of Li ion battery storage largely from EVs and consumer electronics. This demand is expected to reach 54 GWh by FY27 and 127 GWh by FY30.

Business Line (Mumbai) 16 Dec 2024

Copper Refining in a Cleaner Way

The world cannot reach its climate goals without copper, but producing it is carbon-intensive, polluting, and increasingly difficult. New tech could change that.

At a laboratory in Newark, New Jersey, a grey liquid swirls vigorously inside a reactor the size of a small watermelon. Here, scientists with the mining technology start-up *Still Bright* are using a rare metal, vanadium, to extract a common one, copper, from ores that are too difficult or costly for the mining industry to process today.

If the promising results *Still Bright* is seeing in beakers and bottles can be replicated at much larger scales, it could unlock vast copper resources for the energy transition.

Still Bright isn't the only company seeking to revolutionize copper production. A handful of start-ups with similar goals have announced partnerships with major mining firms and scooped up tens of millions of dollars of investment. These

companies claim their technology can help meet humanity's surging appetite for the metal, while driving down the industry's environmental footprint.

There is high demand for copper, and that's really tied to the electrification of everything.

The world cannot reach its climate goals without copper, which plays a central role in the technologies needed to decarbonize. Copper wiring is at the core of the world's electricity networks, which will have to expand enormously to bring more renewable energy online. Wind turbines, solar panels, electric vehicles, and lithium-ion batteries all rely on the mineral, too. As the market for these technologies grows, the clean energy sector's demand for the 29th element is expected to nearly triple by 2040.

At the same time, copper miners are exhausting their best-quality reserves. Copper that is economical to mine is found in rocks known as ores, and grades of the ores that miners are exploiting — the concentration of copper contained in them — have declined steadily over the past 20 years. Meanwhile, easy-to-process minerals near the surface are giving way to more challenging ones deeper down. And the current standard procedure for extracting the metal from the majority of ores results in a lot of pollution.

About 80 percent of the copper mined today comes from unweathered rocks known as primary copper sulphide ores. After being crushed and ground to a fine powder, the copper inside primary sulphide ores is concentrated using chemicals before being sent to a smelter, where it is refined at high temperatures.

The process of concentrating and smelting copper produces a toxic mineral slurry called tailings, and a cocktail of air pollutants including lead and arsenic.

In addition to air pollutants, copper smelters are energy intensive and typically require fossil fuels, driving up costs as well as carbon emissions. If the ore is too low-grade (meaning the concentration of copper is too low) companies simply can't get enough out to cover the cost of extracting it.

But globally, low-grade primary sulphide ores contain enormous amounts of copper. It is estimated that the world's top five copper miners are sitting on "billions of tons" of such ores — an amount that makes the expected 5 to 6 million ton copper supply shortfall over the next decade look puny.

It's not that the world is out of copper. "It is, though, in a form harder to extract using traditional processes.

Founded in 2021, *Ceibo* is one of several mining technology start-ups that's proposing a new, old approach to getting copper out of low-grade sulphide ores: a process known as heap leaching. Heap leaching is already used to process the weathered rocks located toward the top of most deposits, which account for about 20 percent of copper mined today. Miners process these rocks on site by crushing the rock, piling it up into a heap, and spraying it with acid, which percolates through the rock and liberates the valuable metal. The process produces significantly less pollution and carbon emissions than traditional copper smelting — but until recently, no one has figured out how to make it work efficiently for primary *sulphide ores.*

Ceibo claims it is able to recover large quantities of copper with a chemical extraction approach that involves altering critical conditions in the crushed ore, such as the pH and oxygen concentration, making it easier for the acid to get to work. *Ceibo* says its process is flexible and can accommodate the wide variety of geologic and environmental conditions a company might encounter in different parts of the world — or even different parts of the same subterranean pit. Process being developed is a whole geological platform that can be adjusted based on those changing conditions.

Ceibo hasn't revealed many details of its process, which it has mostly tested at the laboratory scale. But the firm has already secured $36 million in venture capital financing to scale up, including funding from major industry players like BHP Ventures, the investment arm of one of the world's largest copper producers. In November 2024, Ceibo began its first pilot tests with Glencore's Lomas Bayas Mining Company, based in Chile's Atacama Desert.

Source: Canary Media Daily Newsletter, 11 Dec. 2024

Secondary Aluminium

Aluminium has a dual nature when it comes to sustainability. While its lightweight properties contribute to energy efficiency in various applications, the energy-intensive process of producing aluminium from bauxite ore (primary production)

poses the need for sustainable alternatives. Aluminium obtained from recycled scrap (secondary production), also known as green aluminium, shifts the balance toward higher sustainability as the total energy required for production is reduced up to 95 percent compared with primary aluminium.

With the projected doubling of available aluminium for recycling by 2050, the metallurgical sector has a significant opportunity to move closer to a circular economy. Nevertheless, the recycling process comes with its own set of challenges. A large amount of the scrap available for recycling is post-consumer scrap, containing high levels of elemental contamination. Improved solutions are needed to maximize energy savings while minimizing costs and environmental impact. In order to comply with the reduced CO_2 requirements and reduce overall energy requirements, the ability to successfully process a wide range of post-consumer scrap must be developed for aluminium recycling. Key requirements include:

- *High dependability and uptime*
- *Jam-free design.*
- *Extremely low maintenance.*
- *High versatility.*

Aluminium de-coating is also a pivotal stage in the recycling process which enables the use of a broader range of scrap types. It consists of removing any surface layers (lacquer, paint, plastic, etc.) and other contaminants from aluminium products to obtain clean scrap, ready for melting.

Source; Recycling Today

Tata Steel Introduces Biochar in Blast Furnace

Tata Steel has pioneered the usage of biochar (biomass-based charcoal) in blast furnace in its Jamshedpur plant.

Beginning as a trial in January 2023, it has replaced approximately 30,000 tonnes of fossil fuel with biochar, to date. This approach has the potential to reduce more than 50,000 tonnes of carbon dioxide emissions annually. It also improves energy efficiency by partially replacing pulverised coal injection. The successful application in blast furnaces exceeding both 3000 m^3 and 9000 tonnes per day (tpd) production represents a significant global advancement too.

This innovative approach involves injecting pulverised biochar into blast furnaces via tuyeres, a method successfully implemented for the first time in India in blast furnaces exceeding 3000 m^3 volume. Following successful trials in one blast furnace, the process was expanded to three others at the Jamshedpur plant. Further, Tata Steel has a plan to extend this biochar usage to other steelmaking sites.

Earlier this year, Tata Steel had successfully conducted a trial of biomass usage in ferrochrome making at its ferrochrome plant in Athagarh in Odisha's Cuttack district. The plant, operating under the Ferro Alloys and Minerals Division (FAMD) of the company, had become the first in India to have performed the trial run as part of its sustainable alternative to traditional carbon sources.

On its road to becoming a carbon-neutral steel maker, Tata Steel has taken several initiatives including the use of alternative energy sources like solar in its production facilities to the use of biofuel in shipping raw materials and finished products. Tata Steel had also become the first Indian steel company to undertake a full-laden leg voyage from East Coast Australia to India, powered by a B24 biofuel blend with VLSFO (Very Low Sulphur Fuel Oil).

Tata Steel has been recognised as a Steel Sustainability Champion 2024 by *worldsteel* for the seventh consecutive year for its commitment and actions to enable sustainable development and adherence to world-class standards.

The company's Jamshedpur Plant is also India's first site to receive the Responsible Steel certification. Subsequently, the Kalinganagar and Meramandali plants have also received the certification. In India, Tata Steel now has more than 90% of its steel production from Responsible Steel certified sites.

Source: Weekly News, International Centre for Sustainable Carbon, 29 November 2024

Ethanol Production from Steelanol Facility in Belgium

LanzaTech Global, Inc. ('LanzaTech'), the carbon recycling company transforming above-ground carbon into sustainable fuels, chemicals, materials, and protein, and ArcelorMittal S.A. ('ArcelorMittal'), the world's leading integrated steel and mining company, today announced that ethanol from ArcelorMittal's Steelanol facility in

Ghent, has achieved a production milestone whereby ethanol volumes reached a level which supports shipping by barge.

LanzaTech took title to the first barge shipment earlier this month, and the ethanol is enroute to be purified and sold to LanzaTech's CarbonSmartä customers in fragrance and home care markets. This achievement progresses LanzaTech and ArcelorMittal's joint strategy to develop a thriving European supply chain for sustainable ethanol produced in the region.

ArcelorMittal's Steelanol facility is converting carbon-rich industrial emissions from its blast furnace into fuel-grade ethanol by using leading carbon recycling technology developed by LanzaTech. Ethanol production commenced in 2023, and the facility is a first-of-its-kind for the European steel industry. The produced ethanol can be sold directly into fuel markets, or further purified or converted for use in a wide array of consumer products such as apparel, personal care, and packaging.

This achievement marks the next crucial step after the successful first industrial and commercial production of ethanol. With this initiative, which converts carbon-rich gases into ethanol, and Torero, which produces biocoal from waste wood, substantial progress is made in reducing CO_2 emissions. Addressing climate challenges however requires a holistic approach, where sustainability initiatives such as energy efficiency, CCUS and electrification play key roles alongside Steelanol.

ArcelorMittal's Steelanol plant has the capacity to produce 80 million litres annually of advanced ethanol, around half of the total current demand in Belgium. It expects to reduce carbon emissions from the Gent plant by 125,000 tonnes annually, thereby advancing the EU's 2030 Climate Target Plan to reduce greenhouse gas emissions by 55% by the end of the decade

Source: ArcellorMittal Press Release 11 Dec. 2024

Hydrogen to Contribute 12% of Global Decarbonisation

There is potential for clean hydrogen to develop into a major market.

Hydrogen is seen to have a critical role in the push for decarbonisation. The recent focus on de-carbonisation and the scaling up and accelerated growth of low-carbon technologies such as renewables have sparked a new wave of interest in the properties and the supply chain scale-up of hydrogen.

Despite a slower-than-expected pace of hydrogen projects development, it is believed that clean hydrogen can develop into a major global market, with global electrolyzer capacity reaching >1100 GW by 2050 and >3200 GW by 2070, as per estimates of Goldman Sachs

Source: asian-power.com

India's Slow Non-fossil Energy Progress Puts its Climate Ambitions at Risk

At the 26th UN Climate Change Conference in Glasgow in 2021, India announced target of increasing non-fossil energy capacity nearly fivefold to 500 gigawatts (GW) by 2030.Despite multiple challenges, the Indian government maintains it is on track to achieve its 2030 non-fossil fuel capacity target.

But three years on, the likelihood of India reaching that goal is in question. Less than half of the wind, solar, hydro, bio power and nuclear projects needed to achieve this target have been installed. Its pace of renewable capacity build-up – just 18.48GW was added between April 2023 and March 2024, for instance – is slower than what is needed to meet the 2030 goal. This not only puts India's broader climate targets at risk but is also driving increased investment in polluting coal power generation, as the country's growing energy needs outstrip growth in renewables.

Ramping up green energy is key to India's Glasgow pledge of achieving net-zero emissions by 2070, which is two decades later than developed nations.

India – the world's third-largest greenhouse gas emitter – is predicted to be the world's largest energy consumer by 2050, so reducing its dependence on fossil fuels is key if the world is to imit global warming.

The country currently relies on coal to generate around 70 per cent of its electricity. Burning coal is the single largest source of carbon dioxide, the main greenhouse gas heating the planet and causing deadly air pollution.

India's renewable energy capacity crossed the 200GW mark in October 2024 and accounts for 46.3 per cent of the country's total electricity generation capacity.

In stark contrast, China hit 1,200GW of solar and wind generation capacity in August 2024, six years before its intended 2030 deadline and less than four years after the target was announced in 2020.

To hit its target, India has to add about 50GW of renewable energy capacity yearly over the next six years – far higher than the average of around 13GW it has added annually for the past five fiscal years. Even with 15GW of additional nuclear capacity expected to come online by 2030, reaching the 500GW target remains a formidable challenge

Large-scale solar and wind energy projects are being developed in remote areas, such as the deserts of Rajasthan in north-western India. The energy produced in the area has to be connected to the grid via power lines and substations, but this is not happening fast enough.

Another key reason for the slow roll-out of renewable energy projects is the challenge of acquiring large tracts of land needed for large-scale solar and wind parks.

Inadequate transmission infrastructure, land acquisition delays, poor financial health of state-run power distribution companies and insufficient battery storage are key hurdles in the growth of renewable energy in the states of Rajasthan and Gujarat, the top two leaders driving India's green energy growth.

In 2022, India fell short of its target of 175GW renewable capacity due to underwhelming progress in rooftop solar and wind energy projects. Since then, India has ramped up its coal-fired capacity to meet its growing energy demand, with the country announcing in July 2024 it would bolster its coal-powered generation capacity by at least 80GW by 2031-2032.

Solar power generation grew at its slowest pace in six years in the first half of 2024.

Total electricity generation for the year ending March 2025 is expected to grow at its fastest pace in over a decade – forecast to be mainly powered by an 8.9 per cent growth in coal-fired power output and an 8.2 per cent growth in renewable energy.

India risks achieving only around 320GW by 2030 unless it boosts battery storage and promoting distributed renewable energy. If nothing is done on these two fronts, India may miss the (500GW) target.

"Solarising" agriculture by installing small-scale but widespread solar energy plants near farms to provide renewable electricity to farmers could not just help India achieve its 500GW target by 2030 "but possibly exceed it". Agriculture accounts for 18% of India's electricity consumption, using power to irrigate fields.

Government programme to promote use of solar irrigation pumps has made little progress since its launch in 2019, with less than 1GW capacity installed.

But Rajasthan has undertaken few reforms to encourage farmers to rent out land for this purpose, to achieve around 4.4GW of solar capacity under this by early 2026 – up from zero in 2024. Maharashtra has also announced a target to install 7GW of solar power for farmers by end 2025 under a similar programme.

Missing the 500GW non-fossil fuel target could derail India's 2070 net-zero goal, as it would instead force the country to rely more on coal to meet its growing needs.

Source: The Straits Times

How Much Clean Electricity the US Steel Industry Will Need to Decarbonize

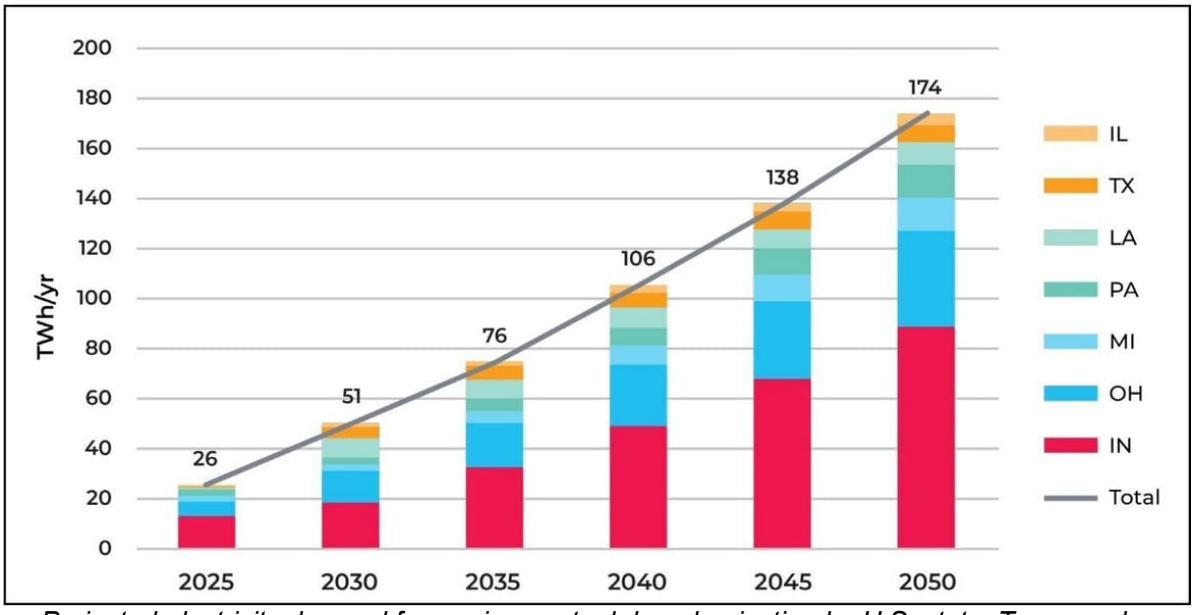
The United States is the world's fourth-largest steel producer. For US steelmakers to shift away from the polluting facilities, they'll need to use huge amounts of clean energy and adopt cutting-edge technologies.

A recent report by the Clean Energy Buyers Association (CEBA) quantifies just how much carbon-free electricity the steel industry might need to make this transition. CEBA, a group of energy customers and partners, put the number at a whopping 174 terawatt-hours per year by 2050 — ten times more than if the industry stuck to its current ways.

Demand for green steel is expected to grow worldwide as companies work to slash carbon from their supply chains. Given the global nature of the steel industry, and the trends, market demand for green steel will continue to move up.

Meeting the new demand using only renewables would entail building around 28 gigawatts of wind and solar and 53 GW of battery storage, the report said. States would also need to install long-distance transmission lines and advanced grid technologies to move that carbon-free electricity to traditional steel communities.

America's primary steel mills are concentrated in five states: Indiana, Illinois, Michigan, Ohio, and Pennsylvania. None of these locations have much available space for installing on-site electricity generation, and the states presently get only a tiny share of their power from wind, solar, or other renewables.



Projected electricity demand from primary steel decarbonization by U.S. state. Texas and Louisiana currently each have one fossil-gas-fueled ironmaking plant. (CEBA)

In its analysis, CEBA assumed that future steel production would include a mix of 3 alternative approaches: installing carbon capture and storage systems on existing furnaces; using clean hydrogen to produce iron in facilities both old and new; and deploying novel ironmaking techniques using electrochemistry. The latter two methods are also paired with powerful electric furnaces.

Steelmakers are going to need large amounts of clean H_2 to decarbonize their operations. In CEBA's analysis, a sizable share of the projected power demand in 2050 comes from using electricity to make hydrogen. But steel products made from carbon-intensive hydrogen will ultimately have higher embodied carbon emissions — and could therefore be less competitive on the global market.

Those who want to decarbonize need truly clean hydrogen.

Putting a number on green steel's electricity needs

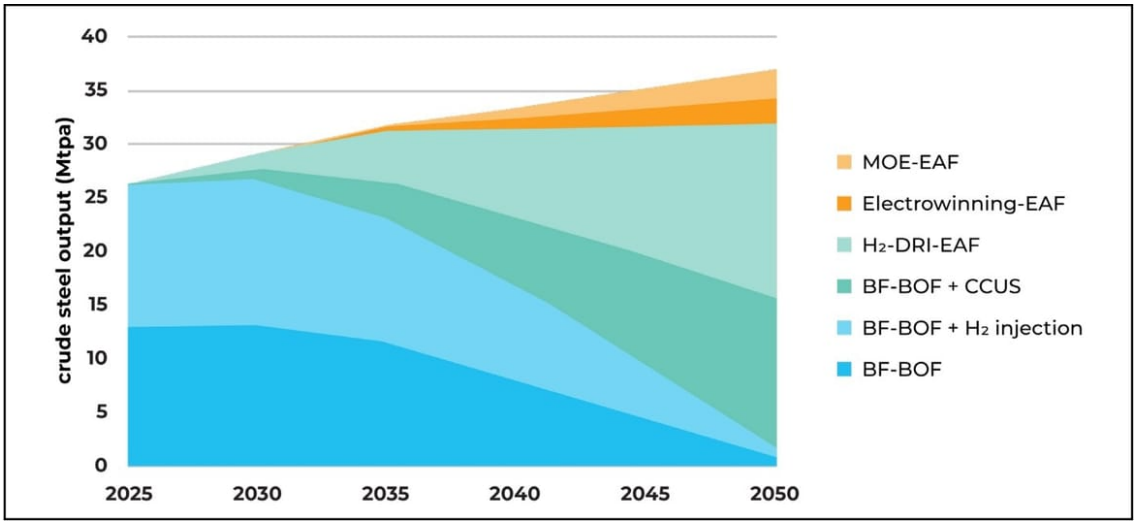
Heavy manufacturers will keep pursuing efforts to tackle emissions, to the extent that they can. Automakers, and construction firms in Europe, China, and other regions are facing mounting pressure from government regulators and customers to source materials made using lower-emissions manufacturing methods. Major corporations, including Amazon and Microsoft, are increasingly signalling their willingness to pay for cleaner and potentially costlier products. Demand will continue to increase for low-carbon steel, which means there will be rational market responses to produce low-carbon steel.

In the United States, about 70 percent of the nation's total steel supply is made by melting down recycled scrap in electric arc furnaces, of which there are more than 150 nationwide. But many companies still rely on primary steel to meet the strength and quality requirements of their finished goods.

CEBA analysts modelled the potential power requirements of two future scenarios.

In a business-as-usual world, the steel industry could need 40 percent more power, from 11 TWh per year in 2025 to 15 TWh per year in 2050, to keep up with increased demand for steel. Emissions would rise 33 percent over the same period, reaching 83 million metric tons of carbon dioxide emissions per year by mid-century — roughly the same as the annual emissions from 221 fossil gas power plants today.

Then there's the world in which U.S. steel production aligns with efforts to limit global warming to 1.5 degrees Celsius above preindustrial levels. For this, CEBA considered what it called a "plausible mix" of technologies, based on when solutions are expected to become commercially available and when existing steel mills are slated to retire.



U.S. primary steel production in a 1.5-degree-aligned scenario. Solutions in the legend are: Molten Oxide Electrolysis (MOE) with Electric Arc Furnace (EAF); Electrowinning-EAF; Hydrogen-Direct Reduced Iron-EAF; Blast Furnace (BF)-Basic Oxygen Furnace (BOF) with Carbon Capture Utilization and Storage; BF-BOF with Hydrogen Injection; BF-BOF. (CEBA).

This scenario would reduce emissions from primary steelmaking by 57 percent relative to business as usual, declining to 36 million metric tons of CO_2 emissions by 2050. That, of course, assumes the electricity comes from renewables and not today's carbon-intensive grid.

Clean hydrogen is expected to play the biggest role in primary steelmaking, accounting for potentially 44 percent of steel production in 2050. Hydrogen can be injected into blast furnaces to help reduce CO_2 emissions. However, the more effective approach involves using H_2 in the direct reduced iron (DRI) process to turn raw iron ore into molten iron.

Cleveland-Cliffs has already tested H_2 injection at its blast furnaces in Ohio and Indiana, with plans to scale up the practice. The steelmaker is also set to receive up to $500 million in federal funding to build a first-of-a-kind DRI facility in Middletown, Ohio. Initial planning work on the facility has already started. Another 37 percent of steel mills deployed carbon-capturing systems on blast furnaces by 2050. Some climate and energy groups oppose this approach, given that it prolongs the life of polluting infrastructure and doesn't deliver meaningful emissions reductions. But it's one of the industry's most readily available options. U.S. Steel is deploying a $150 million carbon capture project in Gary, Indiana, that could be completed in 2026.

Finally, about 14 percent of primary steelmaking came from electrochemical processes, which are still in early stages of development. The startup *Boston Metal* is pursuing "molten oxide electrolysis," an approach that involves using electric currents to heat iron ore to around 1,600 degrees Celsius to drive chemical reactions.

Whether the U.S. steel industry can accomplish such a dramatic shift in the next 25 years is harder than ever to predict. Manufacturers will undoubtedly need federal support to commercialize and scale alternative technologies; they'll also need a cleaner electricity grid to draw from.

US need to build enormous amounts of wind and solar,and anything that puts that at risk will be a drag on our ultimate ability to decarbonize the economy at large, and industry specifically.

Source: Clean Energy Buyers Association

Some Key Facts about the Problems Facing the European Steel Industry

- Global steel overcapacity reached 551Mt in 2023 – four times the EU's annual steel production – and continues to grow. The OECD projects an additional 157Mt of carbon-intensive capacity by 2026.
- EU steel production has plummeted by 34Mt since 2018, falling to just 126Mt in 2023. Imports now account for 27% of the EU market, further undermining domestic production.
- Nearly 100,000 steel jobs have been lost in the past 15 years, with more cuts looming.
- Capacity utilisation in the EU has sunk to an unsustainable 60%.

Source: Weekly news from Steel Times International, 4 Dec. 2024

SSAB Constructing 190-ton EAF

Swedish steelmaker SSAB is installing a new 190-ton EAF, which is set to be one of the largest installations in the world with an upper shell diameter of 9.3 metres.

The new EAF, located in Oxelösund, has its first heat scheduled for the fourth quarter of 2026 and is expected to lower total CO_2 emissions in Sweden by 3%.Powered by a 280 MVA transformer, the EAF will also utilize technology to meet the limitations imposed by the grid authority in terms of flicker, power factor, and harmonic distortion.

SSAB has also entrusted SMS group with the integration of a direct feed (DF) system from GE Vernova to be fitted in the new furnace at Oxelösund. The technology aims to ensure the new EAF operates smoothly and efficiently without disrupting the grid, thereby contributing to the reduction of CO_2 emissions.

It is claimed that this probably will be the most powerful digital electric arc furnace ever designed. The modular multilevel converter (MMC) based direct feed system, supplied by GE Vernova's Power Conversion business, is an indirect power supply built on IEGT (injection-enhanced gate transistor) technology and designed specifically for EAFs, using technology for high levels of power quality and reliability.

Powering the furnace with a fast digital control system will enable SSAB to achieve their targets in terms of power quality and efficiency. With GE Vernova's Power Conversion system the plant is expected to reduce electrical disturbances and operate more efficiently. This is a crucial step towards making steel production more sustainable and reducing carbon emissions in the industry.

Source: Weekly news from Steel Times International, 4 Dec. 2024

Clean Energy Could Create Millions of Tons of Waste in India

As the country gets more electric vehicles, solar panels and wind turbines, all aimed at reducing the country's dependency on planet-warming fossil fuels, India will need to find ways to repurpose the batteries, panels and blades at the end of their lifespans or risk creating millions of tons of waste. If the country comes up with a comprehensive strategy to recycle components, it would both reduce waste and lead to fewer imports of the critical minerals needed for clean power in the future.

Currently, many panels, batteries and other clean energy parts end up in landfills. But others are processed by unlicensed waste recyclers, and some newer businesses and organizations are coming up with ways to recycle the valuable components.

With a surge in solar, planning can minimize waste

India is the world's most populous nation and among the biggest emitters of planet-warming gases. Like the rest of the world, a major part of transitioning away from dirty fossil fuels for electricity comes in the form of solar panels.

Solar panels typically last between 20 and 30 years. Some estimates say that 100 kilotons of solar power-related waste have already been produced every year in India and this number could grow to 340 kilotons by 2030.

The issue is not very large right now, but it will become so as the installed base of solar panels becomes larger.

The country has set an ambitious target of producing 500 gigawatts of clean power by the end of this decade and is also aiming to become a global hub for manufacturing clean power components like solar cells, panels and wind turbines.

The Indian government has included solar, wind and EV components in its electronic waste regulations, and has called for producers to recycle components, but there's little clarity about how they should do that.

U.S.-based renewable energy company First Solar owns a solar manufacturing site in Chennai, India, and has already included solar panel recycling in their business model. In the future, new panels will be made from old recycled components.

Government's waste regulations show it's thinking in the right direction, but the "devil is in the details." Rules around how solar panels should be recycled, and how companies can profit from setting up recycling facilities, are needed.

Recycling can definitely be profitable for Indian solar producers. But without a clear recycling plan, the country "could become one of the largest waste generators."

Creating a national effort to recycle raw materials

India currently imports over 95% of lithium-ion batteries as well as large amounts of nickel, cobalt and other rare earth minerals that are needed for clean power and EV batteries. It is estimated that nearly 90% of those materials can be recovered to make new solar power panels, batteries and wind turbines within India.

The ability to recycle critical minerals is "a huge opportunity for India,". "Many strategies can be put in place to design products better, use them better over their lifetime, repair them before you recycle and eventually responsibly recycle."

The next step is to create a comprehensive policy for creating a circular economy — an economic model that aims to maximize the use of anything that is manufactured and create as little waste as possible.

There is tremendous potential for creating jobs in the clean energy sector if recycling is taken up more seriously – both skilled and semi-skilled. "The resource recovery industry is such a great job creator."

Source: Circular Bulletin, Edition 83, Nov. 2024 International Council for Circular Economy

A Green Steel Pathway would Turbocharge Ukraine's Post-war Recovery

A new analysis led by the University of Oxford demonstrates that Green Steel should be top of the agenda in discussions for Ukraine's post-war recovery.

The vast destruction of Ukraine's iron and steelmaking assets represents a stark opportunity to rebuild a thriving industrial sector which is independent of fossil fuels. Ukraine is well positioned to supply European green steel markets, which will provide employment throughout the value chain, and deliver returns to the economy well beyond the original investments.

Rebuilding Ukraine's ravaged steel sector - once hostilities cease - presents a golden opportunity to harness the striking economic benefits of low emissions steel production, according to researchers at the University of Oxford. In a new peer-reviewed report published today in the Journal of Cleaner Production, they demonstrate that rebuilding Ukraine's steel sector to have near zero emissions

would generate $164 billion worth of additional GVA compared to a pathway based on traditional coal-based steelmaking.

Furthermore, a robust green steel sector in Ukraine would have ripple effects across the entire economy, for instance through stronger supply chain links. For instance, replacing coal as the main heating source in steel furnaces with renewable energy would radically shift the centre of gravity of Ukraine's steel industry from eastern regions towards western and southern regions, and accelerate economic growth.

Steel is a significant component of Ukraine's economy. Before the war, Ukraine was the 14th largest global steel producer with 21.4 million tonnes of crude steel output in 2021. But its pre-war steel industry was also one of the dirtiest in the world. In 2020, the Ukrainian steel industry was responsible for emitting 48 Mt CO_2: 15% of the country's entire CO_2 emissions.

In the new study, the researchers note that Ukraine has the clear potential to develop the clean energy infrastructure needed for a full green steel transition– including a robust supply of renewable energy, and green hydrogen produced using renewable energy. Ukraine also sits on vast reserves of iron ore - the main raw material needed to make steel using virgin materials - and is well located for access to European customers.

But successfully redeveloping Ukraine's steel sector will require access to capital, clear climate policies, and strong regional trade links.

The researchers propose that new green steel mills would be situated in close proximity to westward cross-border railway crossings and southbound Black Sea ports, besides optimal solar and wind energy sources. This would significantly increase demand for land and sea transport services, re-routing them towards Western/EU markets, and also create new demand for the production of green hydrogen and green ammonia for fossil-free fuels.

According to the report, a full steel production recovery in Ukraine would require investment of $62 billion over 20 years: $45.9 billion for renewable energy infrastructure, $6.6 billion for energy storage, and $9.5 billion for iron and steelmaking furnaces. However, this investment would have wider effects: in 2021, for every $1 invested in Ukraine's basic metals industry, an additional $3.28 was generated elsewhere in the economy.

Green steel would become a sustainable growth promotion machine for Ukraine's post-war development, and would generate almost twice as much economic growth than the traditional coal-based steel. This means more income and higher living standards for all Ukrainians. The capital needed will repay itself many times over, so private investors will benefit, too!

The World Bank estimates that Ukraine's full post-war recovery and reconstruction needs will require $486 billion. Thus, by comparison, Ukraine's green steel investment needs amount to 6% of the country's total post-war reconstruction needs over the first 10-year period.

As a positive step forward, a recent commitment by domestic players (including large Ukrainian steelmakers Metinvest and ArcelorMittal) of $35bn into the medium-term green steel transition strategy until 2035 means the outstanding amount needed would be significantly lower.

Ultimately, Ukraine could provide an ideal blueprint for an urgently-needed global transition towards low-emission steel production. Globally, steelmaking produces more CO_2 than any other manufacturing and construction industry, comprising around 8% of total global emissions – 2.8 Gigatons of CO_2 per year. In comparison, international aviation transport accounts for 2.5% of global CO_2 emissions.

Source: University of Oxford https://www.ox.ac.uk › news › 2024-06-11-green-steel-...

Dr. Rakesh Kulshreshtha

Date of Birth : 8th October, 1952

Academics

A Gold Medallist in Metallurgical Engineering (BE with Honours) from MNIT, Jaipur, Dr Rakesh Kulshreshtha continued his studies in job acquiring additional qualifications in Management and Industrial Engineering and later a black belt in Six Sigma. Post retirement, he acquired his Doctorate in *Infrastructure Management* from UPES, Dehradun, on a subject related to *Urban Mass Rapid Transit System in India*.

Experience and Expertise

Dr Rakesh Kulshreshtha superannuated as Executive Director I/C Corporate Planning, Steel Authority of India Limited, with responsibilities for Business Development and Corporate Planning (short term and long-term strategic plans, acquisitions and mergers and JVs), IT and Business Excellence. He was instrumental in negotiating and concluding several strategic alliances in SAIL

After graduation, he taught metallurgical students as Associate Lecturer in MREC (now MNIT), Jaipur for six months before joining Bhilai Steel Plant. After working in Merchant Mill, he got an opportunity to work in diverse functions; Market Development (SR, Chennai), International Trade (CMO), Research & Quality Control,

Total Quality Management, Traffic & Raw Materials at Bhilai Steel Plant. He briefly headed HR function at SAIL Corporate Office.

As head of TQM/BE, he was instrumental in implementing Six Sigma, Social Quality Standard SA 8000, Internal Customer Satisfaction and knowledge Management in Bhilai Steel Plant and Integrated Systems Management and Balance Score Card in SAIL.

He served as director on five JVs of SAIL, including TRL Krosaki, where he continued as Director on Board after retirement for five years.

After superannuation, Dr Rakesh Kulshreshtha worked as independent consultant and visiting faculty in Management. Assignments included; Advisor to Chairman, SAIL, Advisor to IIDC Ltd. (a group company of IL&FS) with responsibility for Business Development in Africa, Business Strategy for Mangalore SEZ and Smart Cities. He also worked for few years on skill development project in Iron and Steel Sector under the auspices of NSDC as 'Iron & Steel Sector Expert' with Ernst & Yong. He is a trained assessor for Business Excellence Awards and have assessed Indian and Foreign companies/organisations including Abu Dhabi Award for Excellence in Government Performance 2017.

Currently he is in Addis Ababa, Ethiopia helping Ethiopian Road Authority in implementing Knowledge Management and Innovation Management as per relevant ISO standards.

A widely travelled person. Dr Rakesh Kulshreshtha enjoys travel, reading and listening to music.

Contact Details:

Mobile : +91 9871122298/8851996539

Email : rakeshkul@yahoo.com