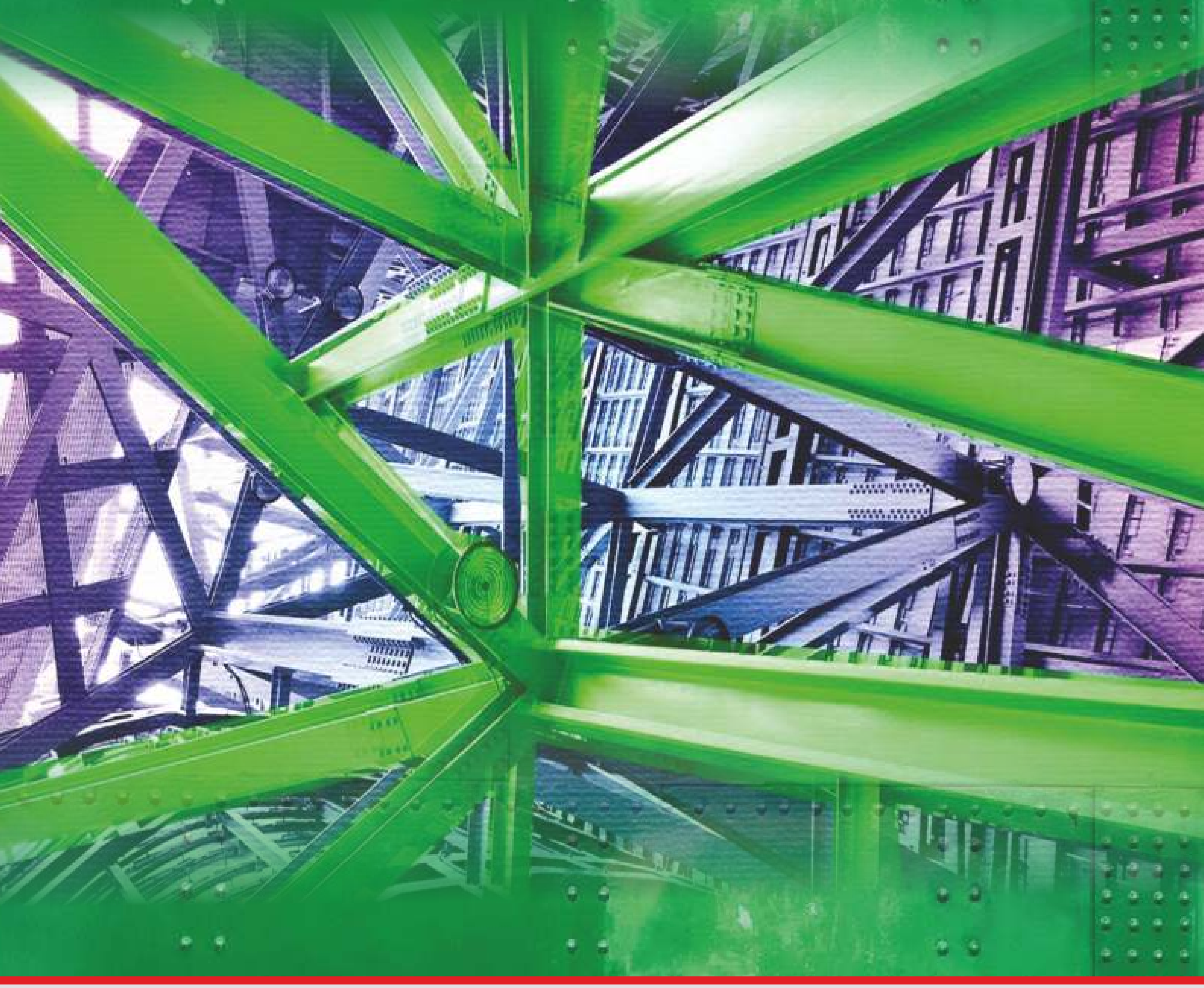
Steel SCENARIO

A JOURNAL ON FERROUS AND ALLIED SECTORS

June 2022

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Is the Indian Steel Industry ready for meeting the 2050 Net Zero Target?

Sakuntala, Editor & Publisher

Steel production is among the world's most polluting industries, accounting for as much as 9% of direct emissions from fossil fuels. Yet steel is also essential to every aspect of modern life. It's a crucial component for technologies of the future that will help tackle climate change, from electric vehicles to wind turbines, as well as being the bedrock of all existing infrastructure and manufacturing processes.

The future of steel therefore finds itself centre stage in the climate change debate, and this has also had implications for other substantial industries.Steel emissions must be halved by 2050 and continue to decline thereafter to meet global energy and climate goals, according to the International Energy Agency's "Iron and Steel Technology Roadmap". Is it currently the only viable way to obtain high-quality iron at the scale required to produce enough steel?

Breakthrough technologies have been developed with the aim of eliminating emissions from steel production by using hydrogen instead of fossil fuels. The real roadblock for green steel is simply the availability of low-carbon hydrogen. Scaling up this technology will require massive amounts of green or blue hydrogen. If the world wants to meet its commitments to decarbonise, a solution for steel must be found. The technologies required are in the process of being proven, but there is still a large leap required to make them commercially viable, especially in the absence of cheap, fossil free power.

A further headwind comes in the form of cost. Even the developers of the new technologies accept that higher prices for carbon emissions and coking coal will be needed to make hydrogen steel commercially viable. The market for green steel does not yet command a premium, mirroring the experience to date in other metals such as aluminium, where a green product does not command significant premium pricing.

India will be in a paradoxical situation where we will have to industrialise on our path towards reducing emissions. This is an unusual situation, unlike other countries where crude steel production has peaked and they have provided net zero targets. Transitional strategies to control emissions that will be adopted by the market in the 2030s and early 2040s include increased usage of ferrous scrap, high-grade iron ore, and direct-reduced pellets to reduce coke rates. Another way to promote decarbonisation would be through pursuing large-scale research and development, pilots and trials, and demo plants on carbon capture, storage, and use as well as grey/green hydrogen production and use for production or iron. Any modernisation, expansion of existing plants or even setting up of new plants on conventional technologies must be planned based on minimum carbon emission considerations with necessary provisions for carbon capture and storage.

"Any modernisation, expansion of existing plants or even setting up of new plants on conventional technologies must be planned based on minimum carbon emission considerations with necessary provisions for carbon capture and storage."

India's steel and concrete industry is actively preparing itself for an imminent transformation. Several large players in the industry have taken up medium-to-long-term voluntary decarbonization targets and are looking to domestic and international capital markets to raise green financing. These are significant developments since direct investments by large corporations would be key in deployment of LCS (low carbon solutions) at scale in the long-term. In the near-term however, investments are likely to focus only on mature and available LCS unless supported through innovative financing mechanisms that lower the cost of adoption of LCS. The transition to a cleaner fuel will be difficult for sectors like iron and steel, and they won't be able to meet a 2050 decarbonization target. It is crucial for policy-makers to work together with industry and financial institutions to chart out feasible pathways for long-term decarbonization; formulate and implement clear policy measures; and mobilise technology-specific financing support.

S. Chanda

Sakuntala Chanda

OBITUARY

Dr. V. Krishnamurthy

Former Chairman of public sector undertakings such as
Bharat Heavy Electricals Limited (BHEL),
Steel Authority of India Limited (SAIL) and Maruti Udyog (now Maruti Suzuki),
passed away on 28th June 2022 at the age of 97 years in Chennai.

Born in Karuveli in Tiruvarur district in Tamil Nadu, Dr. Krishnamurthy started his career as a technician on the airfields during World War II. He has held positions as the Chairman of IIM Ahmedabad, Bangalore; IIT Delhi and the Xavier Institute of Management, Bhubaneswar, and Chancellor of the Central University of Tamil Nadu and Indian Maritime University. He is widely regarded as the 'Father of Public Sector Undertakings' and a mentor to prominent figures in business.

V. Krishnamurthy was the Chairman of SAIL from 1985 to 1990.

He served as Secretary of Industries for the Government of India, Member of the Planning Commission, and many other Prime Minister's Committees. He was conferred Padma Shri, Padma Bhushan and Padma Vibhushan for his services.

Achieving carbon-neutrality by 2050

Steel industry facing challenges boldly

Global warming. Climate change. Environment protection. Decarbonisation. These are no longer hollow buzzwords in opinion pieces or rhetorical spins pronounced at global summits. Widespread on-ground activation of 'green' and 'greening' goals set by nations across the world – following collective awareness and realisation about the rapid pollution/degeneration of natural resources, some irreplaceable, leading to the Paris Agreement of 2015 – have started influencing the working of economies and industrial sectors and effecting transformations.

The iron & steel industry, too, has not remained untouched. It is energetically pursuing adoption of 'green' technologies and business processes, since its very survival depends on the continued long-term availability of earth materials like iron ore, coal and other minerals along with other natural elements like water and oxygen that are used in humongous quantities to make steel. Besides, the industry has long since been identified as a frontline offender with regard to environmental degradation due to its largescale emissions/waste generation in solid, liquid as well as gaseous forms, and steep energy usage. Thus, even though decarbonisation will be a tough job – given the high capital- and energy-intensiveness of the sector – reduction in CO_2 emissions through adoption of clean technologies and processes has now become a major goal of the industry, notwithstanding the impact on profitability due to the considerable investment that companies will have to make initially for it.

However, there is no one-solution-suits-all formula. According to Worldsteel's policy paper outlining the steel industry's challenges and opportunities with respect to reducing CO_2 emissions in line with the aims of the Paris Agreement, released last year, “the steel industry is committed to continuing to reduce the footprint from its operations and the use of its products. There is no single solution to drastically reducing CO_2 emissions from our industry and we believe that individual countries are best placed to assess and implement policy and technical strategies to suit their particular circumstances”. However, as Worldsteel pointed out, the main elements of the industry's response, applicable to steel producers everywhere, are:

- Reducing our own impact
- Efficiency and the circular economy
- Developing advanced steel products to enable societal transformations

Technology providers to the iron & steel sector in several countries and economies have already started to provide options that can help decarbonisation in an integrated manner, including both upstream and downstream operations. Among the leading examples of these developments are Europe and China.

A majority of the decarbonisation options involve modification of the conventional highly carbon-intensive production routes of making steel – like the widely used Blast Furnace-Basic Oxygen Furnace (BF-BOF) steel-making process – into low-carbon utilisation operations. Some of these are aimed at optimising the traditional BF route, while others involve the installation of retrofitting plants with CCUS (carbon capture, utilisation and storage) technologies. These options would, however, be unable to achieve the envisaged target of the Paris Agreement – to be carbon neutral by the year 2050 – due to their limited ability to fulfil required CO_2 reduction levels.

The last – and most viable option for achieving carbon neutrality – is to abandon the BF-BOF route altogether and switch to the EAF (Electric Arc Furnace) route that utilises scrap steel, sometimes combined with the eco-friendly DRI (Direct Reduced Iron) technology fuelled by natural gas or hydrogen. However, for this option to become cost-effective and sustainable in the long run, the supply of cheap, renewable energy would be a pre-condition. For this, a gradual but rapid fuel sourcing shift – from coal-based to natural gas- to hydrogen-based – in the ensuing 30 years is a must. It would be in the interest of the steel companies to encourage climate-friendly hydrogen production at competitive rates so that they can implement the DRI-based route of steel making.

For the iron & steel industry to become totally carbon neutral, therefore, three preconditions would have to be met – extensive availability of cheap green power, hydrogen, and/or CCS/CCUS infrastructure.

The European panorama

In the European Union (EU) countries, reduction of greenhouse gases (GHG) emissions has been afforded a priority during the last three years. For timely delivery of targeted objectives, the European Commission has been regularly updating policy instruments, taking transitional progresses/setbacks into consideration. A target of 55% reduction in GHG emissions by 2030 (compared to 1990 levels) has been set and the scope of the Emissions Trading System implemented by the EU as a key tool to reduce GHG emissions from the power, iron & steel and manufacturing sectors has been expanded.

Further, a Carbon Border Adjustment Mechanism has been put into place to enable non-EU countries to make their production processes more eco-friendly and align them to European standards for a level playing field and smoother trading relations, besides plugging carbon leakages in the system. This initiative also supports industry's efforts to achieve carbon neutrality via establishment of sources for assured and adequate supply of low-carbon energy at competitive prices. This is particularly relevant for the iron & steel industry which is still weighing the feasibility/viability of the various decarbonisation options available in the market.

EU's Hydrogen Strategy is another supportive policy for the iron & steel industry which stands to gain immensely from it if the progressive DRI technology option that relies heavily on consistent supply of hydrogen becomes the more popular choice. The strategy has put forward a scalable target of producing up to 10 million tonnes of renewable or 'green' hydrogen by 2030. If demand for hydrogen from energy-intensive industries like power and other sectors like transport, etc., grows along expected lines, the strategy would well become a strong foundation for provision of industrial hydrogen on a large scale during the next 20 years, i.e. by 2050.

According to the study 'Moving Towards Zero-Emission Steel' commissioned by the European Parliament's committee on Industry, Research & Energy, recycling of steel has emerged as yet another cornerstone for decarbonising of the iron & steel sector in the EU. The Circular Economy Action Plan (CEAP) put into effect in the EU last year, outlines, as the moniker suggests, a roadmap for bump-less transition of the industry towards a circular economy, through progressively higher production of sustainable items in an endless value chain. While “empowering consumers and ensuring there is less waste”, the strategy targets sectors that use most resources and where the potential for circularity is high, such as electronics and information & communication technologies, batteries and vehicles, packaging, plastics, textiles, construction and buildings, food, water and nutrients.

The study goes on to say that certain policy measures of the CEAP on emissions could be pertinent to the EU steel industry, especially the Sustainable Product Initiative, dealing with the “extension of product scope and of requirements regarding the eco-design of products, introduction of a Digital Product Passport, economic and reputational incentives for circular products and support for circular business models”. These include mandatory green public procurement criteria, requirements for recycled material content in products, and restrictions on export of waste, among other pointers.

In the EU countries, the carbon-intensive BF-BOF route of steel making is more prevalent (60%), making decarbonisation a major focus area, requiring attention and investment. Most of the GHG emissions happen during the iron reduction process in the BF. But a clear trend is now emerging in favour of the EAF process, which is more amenable to decarbonisation since the only emissions are those arising from melting scrap; powering of the furnace by electricity does not produce emissions as in BFs that use carbon to produce basic iron from melted ore.

However, abandoning the BF-BOF route totally and switching to the EAF route entails massive investments and temporary production losses for large producers. Hence, many such producers are making stop-gap arrangements like retrofitting or adding CCUS facilities or shifting partially to EAF/DRI operations to meet required decarbonisation targets set.

There are many low-carbon and/or carbon neutral steelmaking technologies available in the market today, almost equally divided between options that optimise the BF-BOF process and those that aid transition from the BF/BOF process to the EAF/DRI ones. Some are discussed below:

Recycling: According to the study mentioned above, recycling a tonne of steel can save 1.5 tonnes of CO_2, 1.4 tonnes of iron ore, 740 kgs of coal and 120 kgs of limestone compared to primary steel produced in a traditional BF.

Near net shape casting: This amalgamates various technologies with the aim of shortening the steel making process chain – mainly eliminating the hot rolling process which generates about 20% of the process emissions – and thereby also generating higher productivity along with energy savings. The Castrip® process used for producing flat-rolled steel sheets of very thin gauges is one such technology.

Top gas recycling: As its nomenclature indicates, the TGR process involves capture and reuse of the reducing agents in BF top gas with the help of small modifications made to the existing BF. High-purity CO_2

can be recovered by this method from the top gas for underground storage and/or use. The remaining reducing agents like carbon monoxide and hydrogen are then recovered for reuse. The demand for coke is less in this process and so are associated emissions from the coking plant.

Smelting reduction process (HIsarna process): This process eliminates the pre-processing of iron ore into sinter as in the conventional BF production route. Here iron ore (even mixed with 50% scrap) is directly reduced to pig iron in a reactor. This helps to reduce CO_2 emissions by up to 85%. Since the CO_2 exhaust from this process is relatively clean, it is suitable for CCS application as well as for capture and storage.

Carbon Capture, Storage & Use: The biggest advantage of CCSU technologies is that the equipment necessary for the purpose can be retrofitted to existing assets, without disrupting the running BF-BOF process. Use of CCSU technologies can reduce emissions by around 70%.

The EU has been supporting development of carbon capture technology based on the Sorption Enhanced Water Gas Shift process that combines CO_2 adsorption and water-gas shift reaction, resulting in overall gain in energy efficiency. The technology reportedly has the potential to decrease CO_2 emissions globally by 2.1 Gt/year based on current emission levels.

A steel mill in Ghent, Belgium is using a technology developed by LanzaTech, which enables the gases produced during the chemical reactions associated with steel production to be fermented by microbes that secrete ethanol. This process has been named Steelanol.

However, all these low-carbon technologies work, or are associated, with the conventional BF-BOF route of steel making. Worldwide, it is increasingly being accepted that steel production through the alternate EAF/DRI/scrap route is way more beneficial in terms of environmental considerations than the conventional process. The EAF process is considered cleaner because it is run on electricity, which is produced using less energy. In recent times, even this electricity is being produced through renewable energy sources such as solar power plants, windmills, etc., that have very low or negligible carbon emissions. EAF technology is readily available in the market. The only hindrance in its widespread use is the non-availability of quality steel scrap for consistent supply as input material on a regular basis. The scrap market profile globally varies significantly based on location and the level of organisation that in commands in different countries.

Direct reduced iron (DRI): For primary steel production in the conventional process, iron ore is smelted using reducing agents like coke in a blast furnace. Using natural gas as a reductant in place of coke can ensure around 66% reduction in gaseous emissions compared to the BF route. If instead of iron ore, scrap metal is processed with natural gas, the carbon benefits are larger. Moreover, cost of using natural gas as a fuel is very low compared to coke. This has provided a competitive edge to big steel producers using the EAF-DRI route in countries and regions with abundant supply of natural gas such as the Middle East and North America.

Steel makers across the world, however, are awaiting the setting up of large, industry-scale hydrogen plants that will enable widespread use of H2 as a fuel and reducing agent in place of natural gas. Use of H2 in DRI plants will near-totally eliminate CO_2 emissions from the iron making process. The primary iron obtained from DRI process, either singly or mixed with steel scrap, can easily be further smelted into crude steel in an EAF using hydrogen which, if produced from renewable sources, makes the entire process carbon-neutral. For the time being, however, cost of procuring hydrogen for industrial purposes remains high due to limited availability.

China is going chop-chop...

Nearly two years ago China announced its intention of achieving carbon neutrality by 2060. Being the leader in the global steel-scape, China stands to gain immensely if its steel industry implements decarbonisation efforts in an earnest and time-conscious manner.

Producing and consuming more than half of the world's steel, about 17% of the country's carbon emissions come from this sector itself. Not surprisingly, the steel industry has given a thrust on decarbonisation efforts to achieve carbon neutrality during the targeted period. Leading Chinese steel producers like Baowu and HBIS groups have also preponed the target for achieving carbon neutrality to 2050 on their own.

Market studies, research and technology development for decarbonisation are all taking place in a planned manner in the country. Analysts believe that primary steel making will make way for secondary steel processes using hydrogen, and use of fossil fuels and raw materials will take a backseat. Treatment of emissions using CCSU equipment will become a popular option of enterprises that use the conventional BF-BOF line of production.

However, the challenges are many. The foremost is: What will China do with its abundant and cheap coal resources? Will it be able to consume all of it by 2030 (as proposed for peak carbonisation before tapering off)? Nearly 90% of China's steel producers use the carbon-intensive BF-BOF route, much higher than the global average of 73%, vis-à-vis the EAF route. Hence, even the scale of CCSU to come is going to be voluminous, along with related investments. The third challenge facing the Chinese steel sector is that the majority of its production facilities are young. Consequently, rapid transition to a carbon neutral status would entail a higher stranded asset cost.

Faced with global criticism for the high emission levels of its steel plants, the Chinese government has come down heavily upon polluting units in recent times, even shutting down the operations of many such offenders that saw around 140 million tonnes of steel falling off the market in 2017. As a result, average energy consumption has almost halved, and emission levels of many processes have achieved international benchmark standards. Following the announcement of the national target, many leading Chinese steel companies have started laying the groundwork for adoption of decarbonisation technologies. Baowu, HBIS, Jiuquan Iron & Steel, Jianlong Steel and others have initiated collaboration efforts with suppliers of processes using hydrogen and DRI.

To top it all, the existing market scenario already offers the China steel sector many tailwinds to comfortably achieve its targets. Steel stocks are high and supply of scrap is increasing, paving the way for development of secondary steel. Moreover, the industry is entering a stage of declining demand with the pace of infrastructure creation slowing down due to industrialisation and urbanisation are close to achieving maturity levels. All that the steel industry needs to do is to expand quality scrap output and utilisation, set up more secondary steel-making capacity and lessen overall average carbon intensity of steel production.

Due to its central command and socialist outlook, China has always demonstrated the capability to handle change quite ably and to develop and scale up new technology. With the national zero-carbon target firmly in place, China's agile steel industry will be able to become the leader in production of green steel too, feel analysts.

What is being seen as an optimistic outcome of the zero-carbon transition is that demand for steel in certain sectors is expected to rise. Infrastructure demand arising from widespread electrification of processes and for production, storage and delivery of clean energy will definitely be required to be met. Demand for construction steels will also continue as new urban centres are created, and old structures are renovated and/or pulled down and rebuilt; new transport routes are established; and new commercial/ industrial centres are born. Associated steel demand for automobiles and other consumer durables is also expected to rise. In the long run, with more and more advancements made in manufacturing technologies – such as for manufacturing intelligent and high-performance equipment – demand for special application steels is expected to rise in the machinery sector. The renewable energy sector – and, resultantly, the transmission equipment industry – are also expected to grow in leaps and bounds in China's run-up to carbon-neutral status.

Studies suggest that given China's aim to transition to mainstream secondary steel production based on scrap, its production and recycling avenues will rise exponentially. Steel stocks have been accumulating in China over the years, and while quality of scrap generated from these may not be of high value due to obsoletion and degeneration, the possibility of recycling it offers is huge. The China Metallurgical Industry Planning & Research Institute has estimated that China's social scrap resource production will reach 340 million tonnes in 2025 and 400 million tonnes in 2030, including a marginal volume of imports. The ready availability of scrap will also provide cost advantages.

All this will ultimately result in EAF capacities rising from the existing 10% to around 60% by 2060, it is believed. While new forms of EAF such as Quantum EAF, ECOARC EAF, and CISDI-Green EAF have already emerged in China, "selection of EAF technologies in future will focus more on the optimisation and integration of continuous feeding, preheating of scrap, high efficiency and energy savings, environmental protection, waste heat recovery, and intelligent steelmaking", says a study.

In addition, informs the study, "EAF enterprises will have inherent advantages by building intelligent mills. In the future, the focus of intelligent development will be the combination of advanced monitoring measures and the overall optimisation control. This will involve a greater focus on technologies such as smelting process quality analysis and cost optimisation and control, in order to realise the control and optimisation of the whole process."

Moreover, the recycling system of scrap steel in China is continuously growing in scale and improving to more standardised levels as the exercise to rein in excess capacity in the steel industry continues. Hearteningly, the grey market for scrap steel is now slowly but surely turning into an organised sector. Favourable government policies are also encouraging the development of a standardised domestic scrap recycling industry.

Besides the decarbonisation technologies being tried and tested in the Western hemisphere such as HIsarna, CCSU, DRI, etc., China is also looking at **Hydrogen plasma smelting reduction** (HPSR) technology, which is under development for implementation in VoestAlpine's SuSteel project. Jianlong Steel in China has plans to transition gradually from coal-based smelting reduction to HPSR, which is far from being technology read at the moment. Some Chinese steel makers may also opt for use of electricity to reduce iron through the **Direct electrolysis** method, that is considered to be technically feasible and would be economically viable in the long term.

Economics of decarbonising steel

Until largescale industrial production of both green hydrogen and electricity from renewable sources becomes a reality, any measure to decarbonise the iron & steel making processes would push up expenditure of steel companies by at least 30%. It is estimated that economies of scale would sharply bring down the cost of hydrogen and green electricity in the long run. This would make the hydrogen-DRI route of production the most cost-competitive for the steel industry and carbon neutrality could well be achieved.

However, for this dream to become a reality, large investments for development of production, storage and transportation of renewable energy are required. Further, wide availability of quality steel scrap to ensure full circularity of the system is a pre-condition.

Currently, zero-carbon steel has a steep cost premium over conventional fossil fuel-based steel. This is due to high cost of hydrogen at present. Whereas cost of crude steel from the BF-BOF route would be ~$400/ton, the same from a hydrogen-DRI route would be 80% higher with 1 kg of hydrogen priced at ~$6. The CCS route would also pose a 40% cost premium with price of electric power for industrial use at ~$80/MWh. However, as more efficient and cost-effective technologies are gradually adopted over the next 30-35 years and economies of scale come into play, the competitiveness of zero-carbon steel is likely to be vastly improved.

Capital costs, including that of CCS equipment and electrolysers, are also estimated to gradually fall by over 30% during the next 30 years. As renewable power capacity grows, electricity too will become cheap, leading to cost of green hydrogen to fall sharply. Many countries, including Germany and the US, aim to bring the cost of hydrogen down to $2/kg by 2030 and $1/kg by 2050. If this becomes a reality and most steel producers opt for the hydrogen-based DRI route for production, carbon neutrality could well become possible for the industry by 2050.

(With inputs from the studies 'Moving Towards Zero-Emission Steel' and 'Pursuing Zero-Carbon Steel in China')

Danieli receives new SuperGrinder plant order from JSW

Danieli Centro Maskin has received an order for a new SuperGrinder plant from JSW to be installed at the latter's Dolvi plant in Maharashtra, India. This project will represent one of the most important technology milestones for slab conditioning, reconfirming Danieli Centro Maskin's solid technology and market leadership.

The new benchmark slab-inspection and -grinding plant will process a wide array of ultra-low, low- and medium-carbon grades and alloy steel grades, with an average of 2mm removal depth. The new SuperGrinder plant will start operations by the summer of 2023.

Structured in two phases, the project will start with the supply of a first grinding unit equipped with the latest-generation 710-kW power oil-lubricated spindle that will initially ensure an output of approximately 800,000 tpy. With the installation of the second grinding unit (phase II), the SuperGrinder plant will reach an overall output of 1.3 Mtpy.

Featuring a U-circuit plant layout, a newly designed edge-grinding unit with double-grinding cart configuration will serve the two grinders. The plant will feature exclusive Danieli Automation TWS platform, along with the E-Cube, Hi-Grind and CastGrind technologies for processing hot slabs up to 800°C.

The new JSW plant also will feature the latest-generation IntelliGrind surface-defect inspection system, which makes use of combined high-definition image acquisition and laser sectioning, with functions for automatic detection and classification.

'We are a certified Green Steel producer and are constantly exploring new green initiatives'

Mr. Ashish Beriwala
Director, SRMB Steel

Mr. Ashish Beriwala, Director, SRMB Steel, spoke to Steel Scenario on how the company's various initiatives have turned challenges into opportunities

Steel Scenario: The pandemic left its mark during the last two years and now raw material prices are soaring high. What has been the biggest challenge for SRMB, and how is the company handling these hurdles?

Ashish Beriwala: The pandemic has been a challenge for the industry as a whole. At SRMB we had taken the pandemic as an opportunity to revisit our systems and processes, upgrade manpower skills, and fine-tune our medium- and long-term vision.

The volatility in raw material prices and the resultant high steel prices have again come as a challenge for the industry. It has led to increased working capital outlay and pressure on industry ROI. We are equally concerned about the negative impact of high steel prices on the consumer industries.

SS: Do you think there is some kind of lacuna in the policies of the Government to extend adequate protection and support to secondary steel producers in the country?

AB: First of all, I would like to revisit the term 'secondary steel' manufacturers / sector. The said term was coined by the Joint Plant Committee under the Ministry of Steel to represent small to medium-sized steel players for statistical purposes. However, the Steel Ministry has done away with such terminology.

I would like to say that there is definitely huge scope for policy reconsideration for bringing small and medium-sized (SME) steel players at least on a level playing field with large manufacturers. SME manufacturers are currently discriminated against vis-à-vis large manufacturers due to prevailing policy defects in terms of approvals / eligibility for supply in Central and state government projects. This discrimination is all the more alarming as all companies are manufacturing the same quality of steels mandated under common BIS codes. Further, a few legacy large manufacturers have been allocated captive mines, whereas new steel players have to either bid at high committed prices to acquire captive mines or buy the same from commercial miners at high prices.

This leads to the SME manufacturers playing on a totally non-level field, wherein on one side their raw material costs are higher than large-sized players and on the other they are at a disadvantage when it comes to supply of steel to government projects which may fetch a better price premium for finished products.

SS: How is your company managing the supply of raw materials? Do you think a proper supply of quality scrap in eastern India will be of immense help to the IF or AF producers in this region?

AB: We are continuing to maintain long-term healthy relations with our raw material suppliers. The raw materials are purchased both under spot buying and long-term supply basis as per our planning and requirements.

Scrap is globally acknowledged as one the most cost- and energy-efficient sources of steel manufacturing. Input of scrap in charge mix with proper in-process refining is a preferred process for quality steel manufacturing. Therefore, it would definitely be helpful to industry raw material needs.

SS: What has been the biggest strength of SRMB in marketing their products and what size of the market do you hold in the country?

AB: In my opinion, some of our brand and product strengths are:

- **Quality of steel** – superior to prevailing Indian and international standards;

• **Value for money pricing** resulting in cost economy for our institutional and retail customers;

• **Robust channel sales network** in more than 10 states and expanding pan India thus ensuring local availability;

• **History of pioneering innovations and firsts** in both product and services which has helped us carve a separate niche in the market; and

• **Strong IP, HR, Engineering & IT resources** to provide excellent pre- and post-sales support to our customers.

Currently we are one of the biggest brands and TMT bar manufacturers based out of eastern India.

SS: Carbon emission and reduction of carbon footprint are common terms used in the production line and is the need of the hour. How is SRMB planning to work on this through technology upgradation?

AB: Green initiatives which result in reduction of carbon emission are at the core of our company philosophy. We have recently been awarded **Green Steel certification** by CII. Due to our successful initiatives we have been certified ISO:14001 since more than one and half decades. We have recently installed 1.9 MWp capacity solar power unit at our plant which is equivalent to carbon neutralisation equal to approximately 85,000 trees. We are in the process of further augmenting this capacity by another 1-1.5 MWp. Further, we are constantly on the lookout with our consultants and industry partners to explore new green initiatives.

SS: Where do you see SRMB in the next five years, and what steps are you taking to reach that goal?

AB: We have recently concluded two phased expansions of SMS capacity with an investment of Rs. 250 crore. We plan to more than double our finished steel manufacturing capacity from the current 0.5 million tonnes with end-to-end backward and forward integration. We are also working towards strengthening our brand presence and channel network by venturing into new product lines complementary to our target customer segment.

Tata Steel takes on board 18 more transgenders in its Shared Services Division

Tata Steel has further expanded its transgender base with Shared Services Division by on-boarding a new batch from the LGBTQIA+ community. 18 transgenders from pan India were on-boarded.

In December 2021, in a landmark initiative, Tata Steel's West Bokaro Division on-boarded 14 transgender people as heavy earth moving machinery operators at its mines to start the ambitious journey. So far, a total 97 transgenders have been employed at different locations, including Kalinganagar, West Bokaro and Jamshedpur.

This step of on-boarding the LGBTQIA+ community not only aims to break the glass ceiling, but also targets mainstreaming of transgenders in society. Tata Steel's Diversity & Inclusion (D&I) initiative aims at curating a workplace where everyone is respected, every voice is heard, and people can bring their authentic selves to work.

The recent on-boarding event at Tata Steel's Centre for Excellence in Jamshedpur witnessed the presence of senior executives of Tata Steel such as Ms. Atrayee Sanyal, VP, HR Management, and Mr. Probal Ghosh, VP, Shared Services, along with Mr Sanjeev Kumar Choudhary, President, Tata Workers' Union, besides other senior union members.

Ms. Sanyal said on the occasion: “I am glad to welcome new members into the Tata Steel family. Tata Steel will continue with its efforts to drive LGBTQIA+ inclusion and build a benchmark workplace for all. This journey of HR excellence has been extremely rewarding and motivates us to explore new horizons on diversity and inclusion.”

In his address Mr. Ghosh said, “This is an endeavour to make a more diverse and inclusive workplace. The initiative will set an important milestone. As an equal-opportunity employer, Tata Steel respects uniqueness of individuals and is putting its best foot forward to shape the workspace of tomorrow.”

D&I has been a part of Tata Steel's ethos since long. The company has taken several pathbreaking initiatives for the benefit of the LGBTQIA+ community, including providing menstrual leaves, equal benefits for LGBTQIA+ partners, gender-neutral parental leaves, and support for gender confirmation.

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DANIELI THE COMPETITIVE GREEN STEEL

Primetals Technologies launches new task force to lead transition to green steel

Dr. Alexander Fleischanderl is the newly appointed Head of Green Steel

In April, Primetals Technologies appointed Dr. Alexander Fleischanderl as the head of its new task force Green Steel. The main goal of the task force is to position the company as the frontrunner in green steel production solutions.

While holding the position of market leader in environmental innovations for the metals industry, Primetals Technologies has now moved into another gear. The main target is to gather and refine all the information and expertise within the company – and to then communicate it. Another important aim of the new task force is to support the implementation of Primetals Technologies initiatives within the areas of green steel and energy transition.

Decarbonisation is an essential part of green steel. However, there is much more to this field. A reduction in emissions, lower water consumption, greater energy efficiency, and improved circularity and yield – these are all examples of green steel activities. Primetals Technologies possesses both high engineering competence and proven solutions in all the above-mentioned fields – and more. The portfolio covers the entire iron and steel production chain: upstream, downstream, metallurgical services, and electrics and automation.

Therefore, Fleischanderl and his team play a key role that extends across the whole company. The Green Steel organisation consists of a team of hand-picked leading experts from all major locations of Primetals Technologies. The team will work together to lead and push the efforts on green steel, while actively developing synergies within Primetals Technologies as well as within the larger Mitsubishi Heavy Industries Group, which Primetals Technologies is part of. "I strongly believe that this effort will become a game-changer," says Fleischanderl.

While climate change is today's number one environmental challenge, both governmental benefits and environmental regulations are being implemented in many countries. Therefore, producing green steel is becoming more and more important for steel producers across the globe.

In the coming decades, it will be essential for the steel industry to make use of green steel solutions – mainly to lower CO_2 emissions, but also for the sake of meeting stricter environmental regulations, and for financial reasons. "In about ten years it might be quite hard to get a good price for non-green steel. Those who do not invest in green steel today will experience challenges in the future; once that ship has sailed, companies left behind will not be competitive going forward," says Fleischanderl.

The steel industry is waking up to the need for a transition to green steel. Several global companies are making efforts to present their lower carbon steel segments – and sell the products at a premium price.

Primetals Technologies' green steel portfolio focuses upon the following four solutions:

• **Hydrogen** economy that enables shifting from fossil fuels to hydrogen. In Primetals Technologies' portfolio, the foremost example of a hydrogen solution is direct reduction technology. There are solutions for processing iron ore of any quality using hydrogen as the main reducing agent.

• **Electric steelmaking** through EAFs and related technologies are carbon neutral when steel producers are using a renewable energy source.

• **Carbon capture and utilization.** Mitsubishi Heavy Industries Group possesses leading solutions related to carbon capture. Primetals Technologies is working on realising the first reference project in the steel industry. Another key technology in which Primetals Technologies is a shareholder is LanzaTech's unique fermentation solution that converts captured CO2 into e-fuel or other intermediate products for the chemical industry.

• **Endless casting and rolling.** Arvedi ESP is changing the way steel is produced. By linking processes, steel producers relying on this technology no longer need to cool down and reheat their slabs. The result is a significantly reduced carbon footprint paired with an increase in yield and lower energy consumption.

BSE - The Preferred Hedging Platform in a Volatile Steel Market

By Shri Sameer Patil – Chief Business Officer, BSE

Background:

In India, the approximate price of hot rolled coils (HRC) are at around US$ 900 a tonne in May, versus US$1,000 – US$ 1,010 per tonne in April. Similarly, steel rebar prices in India are down to US$ 916 per tonne in May, as against US$ 970 in April; while in Vietnam - India's largest Export Market, it is down to US$715 per tonne in May versus US$ 850 / tonne in April. In Japan, it is down to US$ 794 / tonne (US$ 800 / tonne). In India, mills have also revised prices for a second time in May.

According to trade sources, steel consumption in Europe is expected to decline 2–4 percent in 2022 due to negative impact of rising inflation. Ukraine will see a 10 percent slump during the year; and could turn a steel importer as it comes out of the war. A major look out would also be the Chinese stimulus package offered to pull up economic conditions there.

The BSE platform for Managing Risk

As the price of steel is a major component of total cost in many infra-projects, physical market participants were made aware to manage the volatility in steel prices via the BSE hedging platform. As seen, the geopolitical uncertainties have made steel and its raw material prices extremely volatile posing challenges to the entire value chain participants. For instance, the annualized volatility of domestic steel spot prices was 23.52% in the last year. Similarly, the global annualized volatility (LME Steel) is 25.16% over the last three years.

The BSE SUFI Steel Billets contracts

The BSE SUFI Steel Futures contract created jointly with India's leading steel trader association - Steel Users Federation of India (SUFI), has achieved remarkable success to bring various stakeholders of steel industry on a common platform. It has worked with an aim to achieve the objective of the Government enhancing per capita consumption of steel by supporting 'Make in India' and 'Invest India'.

The total turnover so far on the BSE platform is Rs. 724 crores, with average open interest of 240 MT. So far, a total of 370 MT has been delivered on the exchange platform so far.

The SUFI Steel billets futures contract offers market participants an additional avenue to all stakeholders' effective risk hedging instruments using the latest technology and risk management framework. The underlying prices are as of Raipur, where the delivery center is based. The trading and delivery unit are 10 MT. The tick size is Rs. 10, which gives traders enough movement for bid and offer prices.

In Conclusion

The appeal of BSE's product portfolio and liquidity continues to attract new users. By trading Steel futures contract at BSE, users can enjoy benefits such as market transparency, increasing liquidity and the security of knowing every Steel futures contract is cleared through Indian Clearing Corporation Ltd (ICCL).

The various stakeholders such as producers, processors, exporters, importers etc. can use various risk management techniques and strategies to mitigate adverse price fluctuations. Steel prices can be very volatile, so investors looking to hedge on short-term bottlenecks in supply might see steel as an attractive investment.

STEEL MARKET PRICE (thousand tonnes)

June 2022

								PIG IRON	PIG IRON
CITY	INGOT	BILLETS	TMT 12MM	WIRE	SCRAP	COIL/CR/HR	SPONGE IRON	Foundry Grade	Steel Grade
ALANG	48500				40000				
AHMEDABAD	48000	49000			38700	69500/61500			
BHIWARI	49800				36900				
BHAVNAGAR	46800	48800	56500		40000				
BATALA								52000	49000
DELHI			56900		43300	67300/58500			
DURGAPUR	48700	49300	52300	5.5mm-54200/12G HB-56200	41000		34800		
GOA	48600		56700						
GAZIABAD	50000	51200	56300		44500	72000/63000			
INDORE MELTING					40300				
INDORE	49000	49400	55500		39700				
JALANDHAR								51800	49500
JALNA SUPER		49500			39300				
JALNA MELTING					40000				
JAIPUR	49700	49800			40500		37000		
JAMMU	52500				40500				
KANPUR	49500		59500		38700				
KOLKATA	49400	50000	49700		41500	67000/57100			
LUDHIANA	51500	51800			43100	69500/58600		51800	49000
MANDI GOBINDGARH	51500	51500	58000				37800		
MUMBAI	48700	49000	54100		38500	69000			
MUZAFRNAGAR	50200	50600	55400		44800				
RAIGARH	48000	49100	53000				33500		
RAIPUR	48800	49500	53200	5.5mm-54600/12G HB-57100	43800		35100		
ROURKELA	47500	48200					33500		

Source: Metal Market

Industry Scenario

VOL 01 / M11

Growing renewable energy need for India

As the world strives to limit the global average temperature rise to 1.5 degrees Celsius, with over 100 countries making net-zero pledges at the recently concluded COP26 UN Climate Change Conference in Glasgow, the spotlight has shifted to the energy sector, which accounts for more than 70% of global greenhouse gas (GHG) emissions. To counter that, renewable energy is set to rise to the occasion, holding the key that aims to keep global warming in check. Attention in the renewable energy sector is expected to be centred around advanced photovoltaic (PV), advanced robotics, artificial intelligence, big data, distributed energy storage systems, grid integration, blockchain, green hydrogen, bioenergy, hydropower, and wind energy.

Solar energy will continue to be the preferred choice. PV is expected to witness more floatovoltaic and agrivoltaic projects. There will be increased attention to more environmentally friendly thin-film cells and the usage of materials like perovskite for better energy conversion. Advanced robotics will be used to help improve production and process efficiency.

The Government of India has set a target of installing **175 GW of renewable energy capacity by 2022**, which includes 100 GW from solar, 60 GW from wind, 10 GW from bio-power and 5 GW from small hydro-power. Renewable energy now forms a quarter of India's total installed power capacity – 110 gigawatts as of March 2022 – and accounts for 13% of the country's electricity generation. Many Indian renewable energy developers have successfully raised debt capital through green bonds at competitive rates in the international market. These companies have also managed to tap significant international institutional capital. India's energy demands are increasing with both growing GDP and population growth, and the said demands have come from all aspects of the economy – industrial, commercial, agricultural, and residential. The key area for demand side management will be to monitor energy intensity. With growing energy intensity, investments have to be multiplied or added to (at least). The $189 billion requirement includes $57 billion in equity, and $132 billion in debt for our country overall, as per the report of Niti Ayog.

With growing energy needs and now with the world expecting a major electronic automobile boom, India, too, should stand out to achieve her 2022 mission. India has an estimated potential capacity of 720 GW in solar alone, 102 GW in wind power capacity, 25 GW in biomass, and 20 GW in small hydropower. However, the estimated potential capacity is not equivalent to power supply, but the two are positively correlated, as a rise in potential capacity implies a commensurate rise in supply. Therefore, amplifying investments in renewables is imperative to attain India's potential growth. Over and above this, many ministerial debates and policies have been framed around this sector, which is eyeing massive investments.

The Government of India has announced plans to implement a US $238 million National Mission on advanced ultra-supercritical technologies for cleaner coal utilisation. Indian Railways is making increased efforts through sustained energy efficient measures and maximum use of clean fuel to cut down emission levels by 33% by 2030.Besides the various government initiatives to increase use of clean energy sources, the Ministry of New and Renewable Energy (MNRE) has set an ambitious target to set up renewable energy capacities to the tune of 227 GW by 2022, of which about 114 GW is planned for solar, 67 GW for wind, and others for hydro and bio, among others. The Indian government intends to build a "green city" in each state, powered by renewable energy.

Investments have been invited from both foreign and domestic institutional investors, but they are facing significant barriers to investment in renewable energy. These barriers to investments by both domestic and foreign institutional investors are (in priority order): off-taker risk, lack of transmission evacuation infrastructure, currency risk; regulatory risks; and a mismatch in return expectations.

A gradual reduction in the cross-subsidy burden on the sector and improvement in operational and commercial efficiency would help improve the financial condition of the Indian power sector. Transition management has no longer proven to be the most difficult task and has effectively and efficiently tried to balance the commercial goals and social obligations the sector faces. This has balanced commercial prudence at one end and the social acceptability of the reform at the other.While looming market uncertainties increase challenges, the new focus on energy security is also triggering an unprecedented policy momentum towards accelerating energy efficiency and renewables. Ultimately, the forecast of renewable markets for 2023 and beyond will depend on whether new and stronger policies will be introduced and implemented in the next six months.

India needs to deregulate T&D infra

By Ritwik Mukherjee

The covid pandemic massively impacted India's renewable energy (RE) sector. The only ray of hope in the gloomy scenario during the slowdown came from the existence of a strong pipeline of orders awaiting execution.

A pertinent question at that point was – would India be able to evolve a policy initiative that would help, in the long-term, deregulation of the distribution and transmission infrastructure, allowing the PPP model to operate the grid and injecting competition in the industry? Another critical question was – would the overall outlook towards investing in alternative energy or the sustainability space improve? It appears that the sun has started shining quite brightly now on the RE sector in India. But more of that later.

Power mix vs Energy mIx

Sector analysts feel that the power mix – alternatively known as power generation mix that Planet Energies describes as "the breakdown of energy sources used specifically to generate electricity" – will always be dominated by thermal power, till India adds significant nuclear power generating facilities. However, RE, especially solar energy, would be vital in meeting the energy mix. In fact, inclusion of solar energy will tilt the mix more towards RE.

Energy mix and power mix are not the same. According to Planet Energies, each country uses the types of energy available to it, in differing proportions, to meet its energy needs. This is energy mix. "While the figures vary significantly from one country to another, fossil fuels dominate the energy mix at the global level, accounting for over 80% of the total," it says.

Significantly, peak power demand nationally reached an all-time high of over 200 GW on July 7, 2021. It surpassed the previous all-time high of 197.06 GW. Thermal power satisfied 67% of the load when demand was at its peak. In comparison, RE sources accounted for 16% of the supply. Hydropower met 14% of the demand, and the remaining was met through gas and nuclear power generation units.

Even though India is blessed with huge sources of hydro energy, hydro projects are difficult to execute from many different perspectives, and so, a significant contribution cannot come from hydro in either the power or the energy mix. In the next 5-10 years, we are likely to see the emergence of new technologies in energy generation. These will definitely be from RE sources. Thus, a greater percentage of RE is on the cards in both power and energy mix scenarios.

In light of the current trends – including a shift in eastern India's solar market from policy-driven incentive-based projects to parity-driven projects – tremendous potential exists for investors, developers and equipment suppliers to experience success in ventures relating to the solar sector. Solar energy is fast approaching grid parity and emerging as a cost-competitive solution. In light of reducing solar costs, increasing grid tariffs, increased customer awareness, strong policy support, and on-ground net metering implementation across all East and North-East (NE) Indian states, solar proves to be a massive market opportunity for investors, developers and manufacturers alike.

This is true especially of West Bengal, in particular. The degree of urbanisation in the state is rapidly growing at the rate of 3.92%, and energy demand will grow proportionately, feel observers. Projected peak demand in the state, which stood at somewhere between 8,937 MW and 10,871 MW in 2021, is expected to increase to about 14,730 MW by 2031. Demand of domestic consumers grew 19% in the recent past, mainly during the lockdowns in 2020-22, and with rapid growth in commercial activities with lifting of movement restrictions, it is expected that the same kind of demand growth for electricity will be seen in the industrial and commercial sectors as well.

Bengal is also the gateway to the NE states. Growth of the renewable energy industry in Bengal will automatically invite interest from investors to tap the NE market. Bengal already has several solar energy companies – SunShell Power, Kenbrook Solar, ONergy, AlienSolar, Loom, Vikram Solar, Evergreen Solar, Bengal Sun Solar Energy, Sova Solar and Bharat Solar are considered to be the top 10 among local companies. Besides there are many MNCs like Siemens and GE with their global expertise. This places the state in the unique position of being a potential supplier of investors for the NE states.

Thus, Bengal has the ability to successfully unleash the growth of rooftop solar – which is the most popular neo-energy source in India – in East and North-East India. The potential of spill-over benefits through transfer of technology, skills, business models and experience also exists for the hitherto neglected NE states, which are now receiving some on-ground developmental attention due to external factors.

Solar leads the race

With more and more producers entering the solar energy sector, and the number of installations across the country increasing, the market is becoming very competitive. As a direct consequence, solar companies have been offering very attractive tariffs from the consumer's point of view. From the investor's point of view, however, this is a price war, where many are burning their money. Of late, the landed cost of cells and other solar energy equipment has been rising, and a correction in tariffs is bound to happen in the near future. Even after a correction, however, solar energy would still remain one of cheapest among all energy sources.

Solar energy is also likely to reach grid parity sooner than anticipated and become competitive vis-à-vis conventional energy sources, in light of increasing coal prices, decreasing module prices, technological innovations, and increasing installations. According to an India Ratings & Research report, solar power is likely to become cheaper than or equivalent to conventional thermal energy prices.

The Indian solar sector has achieved a significant maturity in the last 10 years. However, as an independent energy source, it has serious policy dependency. In the utility level and open access level, the Indian solar sector is highly regulated and since the grid belongs to distribution companies, the sector keeps witnessing policy paralysis or delay in policy execution. Dependence on the grid and net metering have enabled regulators to especially prey on rooftop solar energy providers.

To overcome these issues, a couple of policy changes need to be made. On the one hand, we need to deregulate the distribution and transmission infrastructure and allow the PPP model to operate the grid. In this arrangement there will be many power generators and many grid operators, enabling consumers to have the option of buying the cheapest power available to them. On the other, distribution companies have to be made to play on a level field. This will make all of them extremely competitive and each has to find ways and means to increase its appeal to consumers.

Rooftop solar faces regulatory clouds

However, the rooftop solar sub-sector is observing hindrances to expected growth levels due to a significant policy aberration. Rooftop solar installations can sustain only when net metering arrangements are allowed. [Solar energy exported to the grid from a grid-connected rooftop solar energy system is deducted (unit: kilowatt-hours) from the energy imported from the grid by the establishment where the rooftop unit is installed to arrive at the net exim energy.] The recent policy change by the Centre imposing a cap at 500 kWp or connected load, whichever is lower, has brought considerable uncertainty in potential rooftop investment opportunities.

Following the Centre's lead (and possibly influenced by providers of conventional power) many state regulators are also capping solar energy at a level of 10 kWp or 5 kWp with net metering arrangement and allowing gross metering for more than 10 kWp or 5 kWp systems. For instance, WBERC has capped the net metering arrangement for solar energy up to 5 kWp after June 30, 2021.

This policy is impacting the industry deeply since benefits accruing to a user of solar energy have been minimised, and demand for installations has lessened. So much so that many small-scale solar rooftop companies are now on the verge of downing shutters. This state of affairs has, naturally, created doubts in the minds of small and mid-sized solar companies as well. There are about 30-odd solar companies operating in the state and most of them feel that if the current situation persists, the industry cannot sustain in the long run.

Observers and industry analysts feel that regulators must allow the captive use of solar energy and net metering of at least 1000 kWp to save this sector, which has created significant employment and investor interest. All states need to take a reasonable stand on net metering to bolster the waning market of rooftop solar. It should be kept in mind that this sector does not require any subsidy as generation of power from solar energy via rooftop installations is extremely cost-effective and offers consumers an access to economical options.

This sector offers better value to consumers if allowed to operate in a free market. If the regulators can see the industry scenario from the consumers' perspective, then it is possible to find a solution where all the sectors can co-exist. Established general power companies should realise that rooftop solar energy would not be able to contribute more than 2% to the grid in the next five years, even if all the states allow net metering arrangements for 1000 kWp, as it was before. So where is the competition from solar rooftop, and why the regulatory throttle upon a fledgling industry that is yet to find its feet?

Now for the good news...

There has been some good news, though, coming in amidst all the gloom. Just before World Environment Day on June 5, reports stated that between January and

March of calendar year (CY) 2022, India added 456 MW of rooftop solar capacity, a 13% increase compared to the 402 MW installed in October-December 2021. In a year-on-year comparison, installations were up 34%. This assumes significance particularly in the wake of the fact that the mercury has been soaring through the summer, pushing up power demand. It is estimated that 1.9 billion units, or 6% of the total demand, will be the overall shortage, making it the worst electricity shortage in over six years.

The unusual rise in atmospheric temperature was not the only cause of the sky-high power demand. Disturbance in coal supplies from Russia and Ukraine pushed up coal prices globally from $60 per tonne to $203 per tonne during the first half of the year. This has impacted the import of coal that could have otherwise filled the domestic supply shortfall that arose due to rise in demand.

If the latest research report by the global renewable energy consulting firm Mercom is anything to go by, in Q1 of CY 2022, rooftop solar accounted for 15% of total solar installations. India's cumulative rooftop solar capacity was approximately 7.6 gigawatts (GW) at the end of Q1 2022. During the quarter, 47% of installations were in the industrial segment, followed by 29%, 22%, and 2% in commercial, residential, and government segments, respectively. Mind you that in Q1 2022, about 71% of rooftop solar installations were under the capital expenditure (capex) model, while the operating expenditure/renewable energy service company (opex/resco) model contributed to 29% of total installations.

What is more interesting and significant is that most of the states have been empanelling vendors and commissioning the allocated capacities under MNRE's Phase II Rooftop Solar Programme, driving capex installations. Empanelment tenders were floated by Gujarat, Karnataka, Telangana, Madhya Pradesh, Odisha, Himachal Pradesh, Jharkhand, Nagaland and West Bengal for proposed installations of around 1.2 GW rooftop solar capacity. The top 10 states accounted for nearly 73% of cumulative rooftop solar installations at the end of Q1 2022, during which tender activity increased by 269% compared to Q4 2021 and 214% y-o-y. This investor interest comes despite overall project margins having reduced in the wake of the rise in component prices, the imposition of BCD and the hike in GST.

It may have been another great quarter for the rooftop solar market, but a word of caution could do well at this stage. One has to keep in mind that the future growth of the industry is dependent on system costs. If the prices continue to grow and project economics deteriorate, demand is bound to contract in the short term. The fact remains that the average cost of a rooftop solar system increased 6% in Q1 CY2022 compared to Q4 CY2021. The increase in average rooftop system cost was up 17% during the period y-o-y.

But for the time being, it's sunny-side up, for sure.

Home and the world

Interestingly, Germany has been leading innovations in manufacturing within the solar sector and has become a global leader in the sector with companies like Siemens, Bosch, SMA, Kaco, etc., leading the way. Indians have a high preference for German technology and innovation in certain areas – an example is SMA and Kaco having 25% of the inverter market share in India. German engineering is sought-after and to ensure its accessibility to the Asian market, companies there must consider setting up manufacturing or assembling units in India for controllers, inverters and other critical components.

The most pertinent question, at this point, would therefore be: Is India and the world going greener by the day? Well, it would not be a wrong notion to believe this, at least going by available facts and figures.

Q1 of CY2022 has turned out to be a very good time for the battery storage, smart grid and energy efficiency sectors. Globally, total corporate funding (including venture capital funding, public market, and debt financing) in the battery storage sector came to $12.9 billion in 26 deals compared to $4 billion in 27 deals in Q4 2021. Funding was up significantly y-o-y compared to $4.7 billion in 18 deals in Q1 2021. In Q1 2022, $1.6 billion was raised in VC funding by battery storage, smart grid and energy efficiency companies, a 21% increase compared to the $1.3 billion raised in Q1 2021.

Quite in line with global trends, in India also, this period has turned out to be good for the RE sector. Consider these examples:

• Husk Power Systems, a distributed utility company that provides mini-grids to rural communities and businesses entirely from renewable energy sources, secured ₹310 million (nearly $4.2 million) in debt financing from the Indian Renewable Energy Development Agency (IREDA). The company will use the loan to finance 140 micro-grids in Uttar Pradesh and Bihar.

• Exide Industries, a manufacturer of lead-acid batteries, invested ₹200 million (close to $2.68 million) in its lithium battery joint venture, Exide Leclanche Energy, with Swiss energy storage solutions company Leclanche.

• Taqanal Energy, developer of the cloud-connected smart modular battery energy storage, raised ₹9.5 crore (nearly $1.3 million) in a pre-series round from JITO Angel Network along with KITVEN, Lets Venture, and Wellingdon Advisors.

Similarly, Offgrid Energy, a developer of rechargeable zinc-carbon batteries, raised undisclosed funds from energy solutions giant Shell, venture capitalists Ankur Capital, and APVC to take its flagship product, rechargeable zinc-based battery ZincGel, to the market.

And not just in terms of VC funding, but in M&A (mergers & acquisitions) deals, too, there has been eyebrow-raising activity in India. Reliance New Energy, a wholly-owned subsidiary of Reliance Industries, substantially acquired all assets of Lithium Werks, a provider of cobalt-free lithium iron phosphate batteries, for $61 million, including funding for future growth.

Mercom Capital Group, llc, a global research and consulting firm focused on cleantech, in its recent report also indicated that in Q1 CY2022, announced debt and public market financing for battery storage technologies were higher, with $11.7 billion in five deals compared to $2.4 billion in six deals in Q4 2021 and $3.7 billion in four deals in Q1 2021. Seventy-six VC investors participated in battery storage funding this quarter. The top five VC-funded battery storage companies in this quarter were:

- Hydrostor, which raised $250 million from Goldman Sachs Asset Management;
- Sunfire raised $215 million from Copenhagen Infrastructure Energy Transition Fund I and Blue Earth Capital;
- Factorial Energy raised $200 million from Mercedes-Benz (DAI) and Stellantis;
- Viridi Parente raised $95 million from Thomas Golisano, Ashtead Group/Sunbelt Rentals, and National Grid Partners; and
- Our Next Energy (ONE) raised $65 million from BMW iVentures, Coatue Management, Breakthrough Energy Ventures, Assembly Ventures, Flex, and Volta Energy Technologies.

Sustainable investments

Concluding this piece with a discussion about the outlook towards investment in the sustainability space would round off the issue holistically. Increasing consumer demand for socially responsible brand behaviour, government policies and the massive growth of cleantech and green initiatives are together encouraging and pushing sustainable investment ventures in the country quite significantly. Mind you, the current state of affairs with regard to sustainable investments in India is still nothing to write home about. While investments in sustainability account for one-third of assets under management (AuM) in the US and 36% of AuM globally, the Indian sustainable investment space only makes up 10-15% of AuM by private equity (PE) and venture capital (VC) firms currently.

However, growth in this space is quickly gaining momentum, thanks to the above-mentioned factors. Significantly, sustainable investments by Indian PE and VC firms are projected to grow to $125 billion by 2026, at a five-year CAGR of 46%. By then, it is also estimated that sustainable investments would make up 40% of AuM by Indian PE and VC firms, which is above the current US standard.

When it comes to India, the sectors attracting the most sustainable investments include renewable energy, agritech, e-mobility and waste management. E-mobility especially has been of interest to PEs and VCs, with investments into the sector doubling between the period 2019-22. Within the next five years alone, the electric vehicle market in India is projected to attract investments worth Rs. 94,000 crore. One therefore has reasons to be optimistic about the prospects of sustainable investments in the country.

Companies across sectors have started to realise that to follow ESG (environmental, social and governance) practices is not expensive; it requires diligence, hard work, and in the long run is very rewarding for the company, employee and investor. And as a result, companies across all sectors are now moving towards strengthening their sustainability parameters. The consideration for sustainable practices within businesses when making investments is also rising. Stakeholders are becoming more cautious of the outcomes of their investments, preferring to invest in companies with greater sustainability interests.

Various recent studies suggest that investors, on their part, have increasingly begun to recognise that just financial metrics are not enough. The focus is shifting towards investing into businesses that provide not only good returns but also sustainable returns.

While these are certainly very positive and encouraging facts, one has to keep in mind that India's progress on this front could have been much greater. There are more issues than one which have been and still are plaguing India's sustainable investments such as lack of quality data, measurement criteria, a traditional mindset, a limited record of sustainable funds, and a lack of awareness. The talent pool with knowledge in the areas of ESG/sustainability is limited, and it is not growing at the same rate as the demand for support for long-term investment.

To strengthen ESG practices and reduce the reluctance towards sustainable investing in the country, our corridors of power must make the right moves. The start should be made with a significant regulatory push and guidance asking for disclosures that must be supplied in a timely manner.

Race for Mytrah Energy assets

JSW Group signs exclusivity pact; deal valued at $1.6-1.7 billion

In yet another instance of a big-bang deal brewing in the Indian clean energy segment, Sajjan Jindal-led JSW Group has signed an exclusivity agreement with Hyderabad-based Mytrah Energy to buy the latter's wind and solar assets, according to a report by *Moneycontrol.*

The news agency quoted several sources who, while wishing to remain anonymous, confirmed the development. However, the agency's mails and phone calls "could not elicit an immediate response from" either Mytrah Energy or JSW Energy.

"There was a lot of interest from both global and strategic players as well as funds for this transaction as it's a portfolio of sufficient size and scale and there aren't many such assets up for grabs in the market. Mytrah Energy has signed an exclusivity pact with JSW Group which wants to purchase the entire portfolio," one person was quoted to have told *Moneycontrol.* JSW Group had edged ahead of other suitors and the enterprise value of the deal was likely to be between $1.6 billion and $1.7 billion, another source told the agency, who added that JSW Energy, the likely acquiring entity, was keen to bolster its green energy footprint.

A third person also confirmed that JSW Group was the frontrunner to acquire Mytrah Energy's assets, said *Moneycontrol*, which had also reported on the early stages of the deal post its launch on July 5, 2021. The report had added that investment bank Barclays was handling the sale process.

According to another report by Mint, Singapore-based energy major Sembcorp and Miami, USA-headquartered Enfinity Global had also been shortlisted for the final round of the sale process for Mytrah Energy's assets.

The *Moneycontrol* report says Mytrah Energy, which had toyed with the idea of a US special purpose acquisition company (SPAC) listing earlier, owes more than Rs 2,000 crore in mezzanine debt (a form of financing that is part debt and part equity) to the likes of Piramal Group and APG Asset Management.

In March 2022, in a big boost for the renewable energy sector, the Andhra Pradesh High Court reinforced the sanctity of power purchase agreements (PPAs) struck between wind and solar independent power producers and state discoms. The verdict gave a liquidity boost to local players like Mytrah Energy.

According to the *Moneycontrol* report dated July 5, 2021, Mytrah Energy's assets are spread across 17 wind farms and 21 ground-monitored solar farms in nine states – Punjab, Rajasthan, Gujarat, Madhya Pradesh, Maharashtra, Karnataka, Telangana, Andhra Pradesh and Tamil Nadu. It sells power mainly to state grids through 13 to 25-year PPAs. In addition, its 100.5 MW project in Tamil Nadu sells power directly to industrial consumers on short-term agreements. The firm's website claims it has the largest wind data bank in India, being the only independent power producer having a pan-India presence of over 240 wind masts.

Indian clean energy sector: Red-hot for M&A

The domestic renewable energy segment has been buzzing with M&A activity for the past two years. "It's a very active and fragmented sector and players want to exit or recycle capital. It has also caught the global fancy of ESG (environmental, social and governance) over the last 12 months," said an industry executive on condition of anonymity.

In April, Tata Power announced that a consortium consisting of Blackrock and Mubadala would pump in Rs 4,000 crore in the former's renewable energy arm.

The year 2021 saw the acquisition of Softbank Energy by the Adani Group for a record $3.5 billion. Earlier in the year, French energy major Total struck a $2.5-billion deal with the Adani Group via a combination of JV and stake-buy with Adani Green Energy. In February 2021, top domestic player ReNew Power and RMG Acquisition Corporation II announced the execution of a definitive agreement for a business combination that would result in ReNew becoming a publicly listed company on the NASDAQ.

According to the official announcement by ReNew Power, the pro forma consolidated and fully diluted enterprise value of the transaction was approximately $8 billion. This was a landmark transaction as it represented the first major overseas listing of an Indian company via the SPAC route, which has gained immense popularity over the last year on Wall Street.

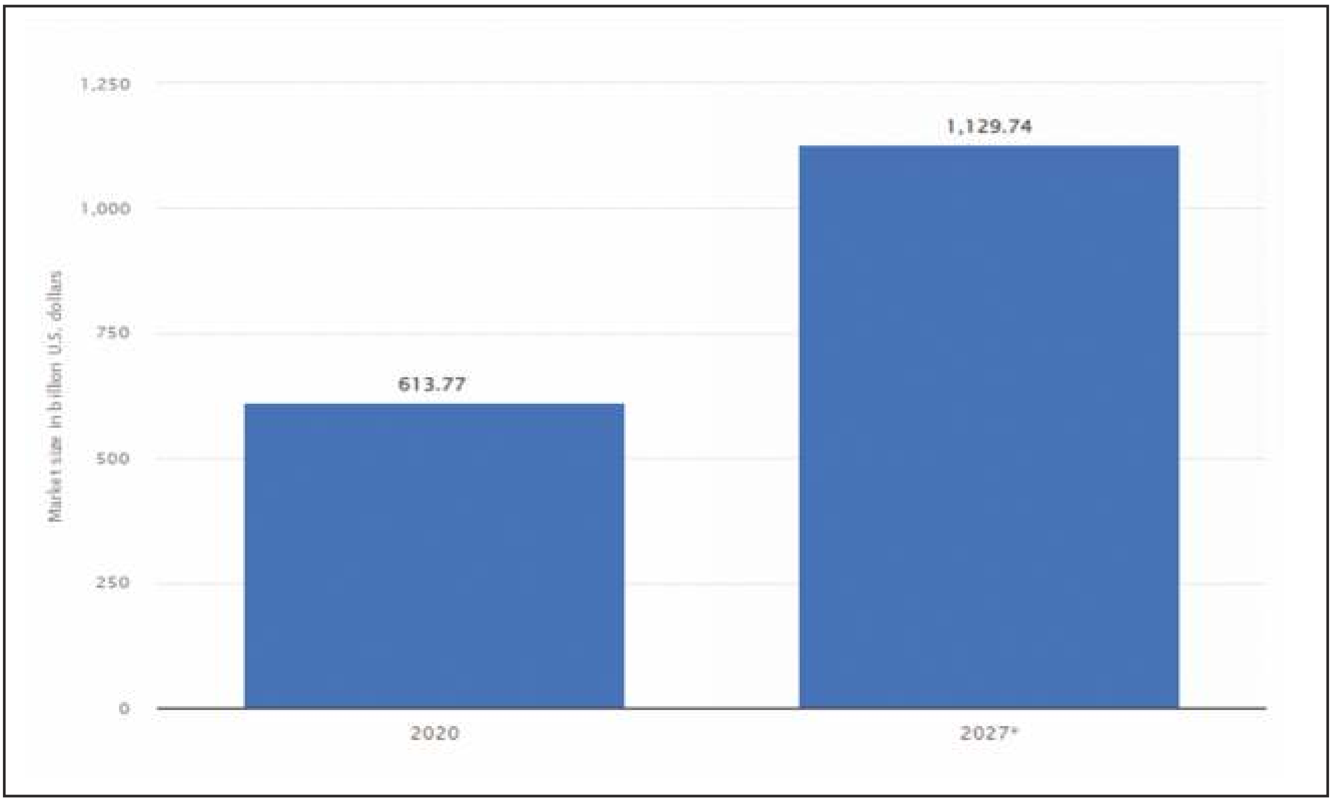
Actis Llp's purchase of 500MW of solar projects in India from Finland's state-controlled power utility Fortum Oyj for around €280 million is another example of deal activity in the sector. Reports have also indicated that Morgan Stanley's majority stake in Continuum Wind Energy is up for grabs as well after the likes of US firm SunEdison Inc and Norway's Statkraft had earlier expressed interest in the asset.

The Indian government has set an ambitious renewable energy target to achieve 175 GW by 2022 and 450GW by 2030 as part of its climate commitments.

(Courtesy: Moneycontrol)

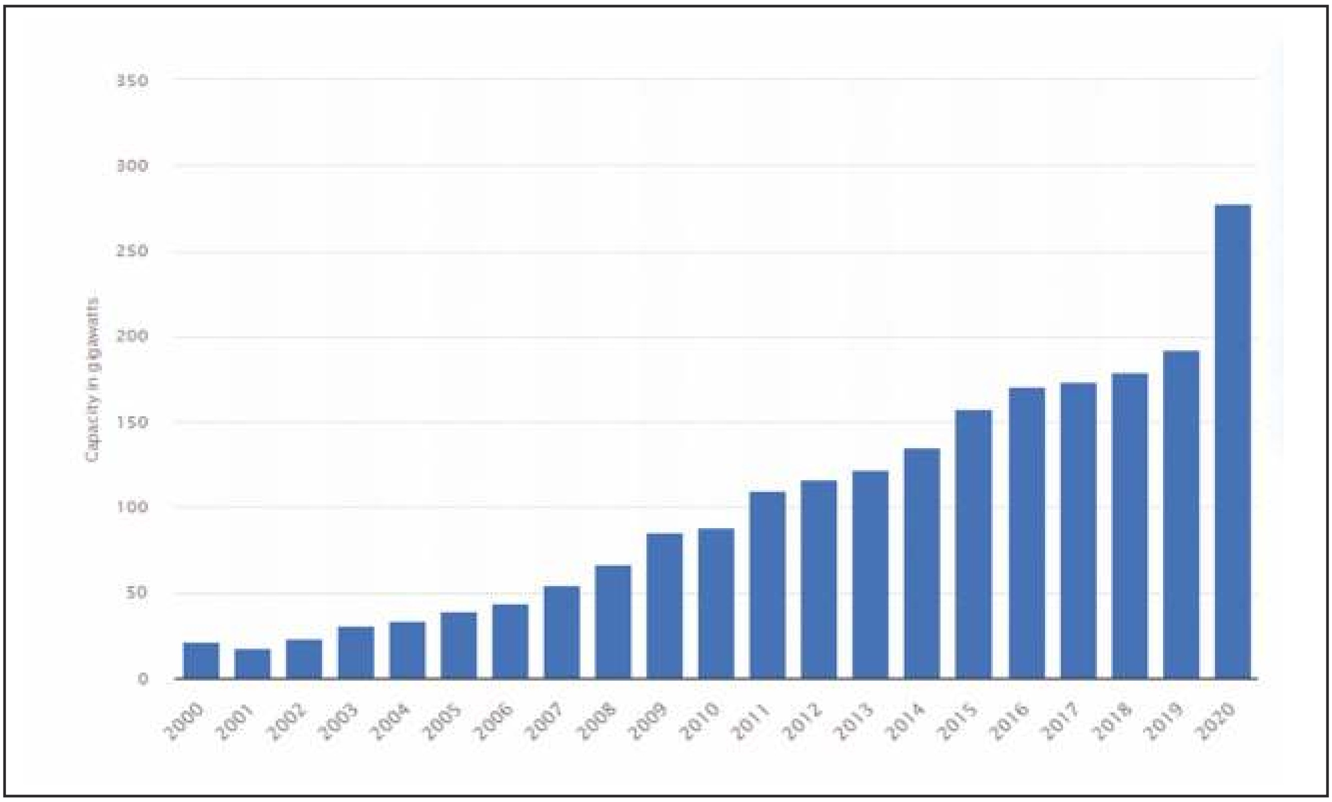
Renewable energy market size worldwide in 2020, with a forecast for 2027

(in billion U.S. dollars)



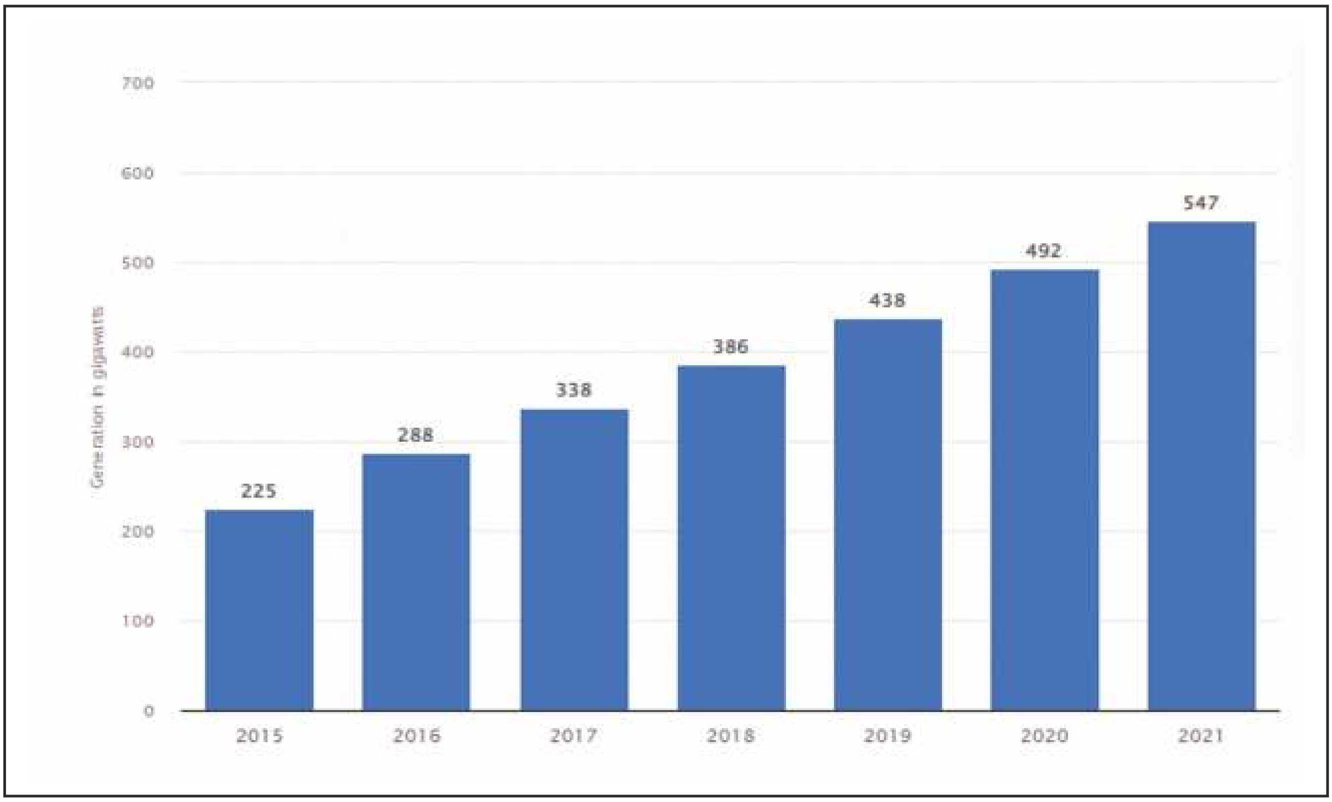
Net capacity additional of renewable energy worldwide from 2000 to 2020

(in gigawatts)



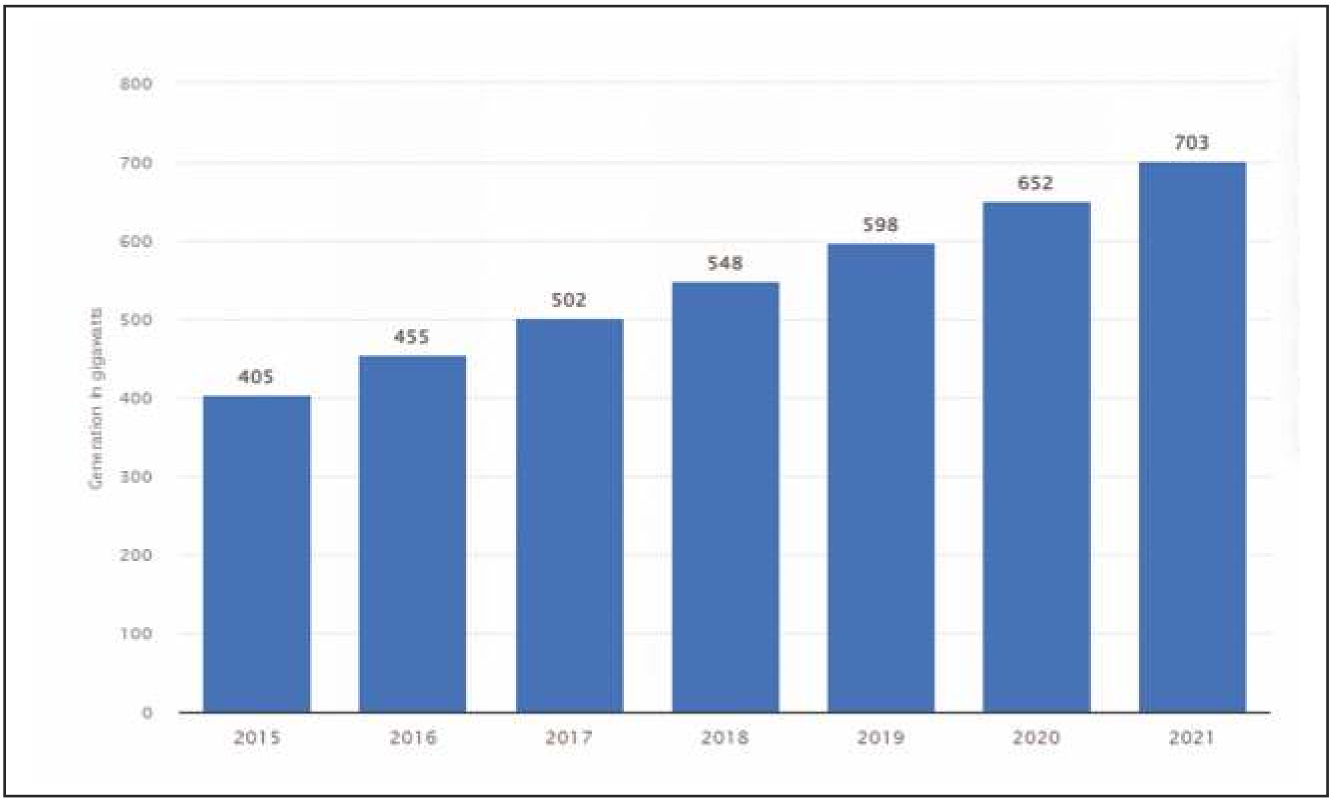
Projected generation of solar PV power worldwide between 2015 and 2021

(in gigawatts)

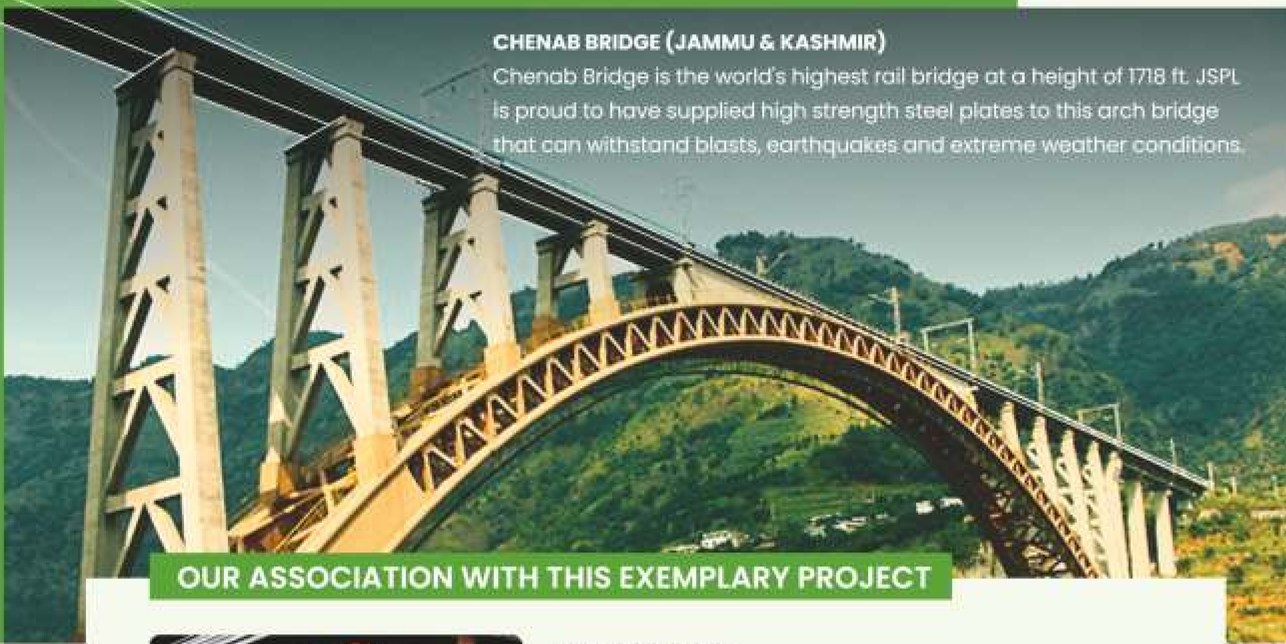


Projected generation of onshore wind power worldwide between 2015 and 2021

(in gigawatts)



TOUGHEST TERRAINS
DESERVE THE TOUGHEST PLATES



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