

Management Discussion & Analysis





Economic Review

World Economic Review

Economic recovery was impacted in 2021 with re-emergence of COVID-19 related pandemic in different parts of the world in varying magnitudes. Vaccination programmes were rapid and effective in most advanced economies while in many emerging market and developing economies vaccination pace were sluggish. The direct impact on world economy is expected to continue but in lower magnitude.

Global growth is projected to slow from an estimated 6.1% in 2021 to 3.6% in 2022 and 2023 mainly attributable to the Russia-Ukraine conflict, continued COVID-19 flare-ups, frequent and wider ranging lockdowns in China including in key manufacturing hubs, diminished fiscal support, and lingering supply bottlenecks. These events have resulted in worldwide inflationary pressure and disruptions in supply chain. Higher, broader, and more persistent price pressures have also led to a tightening of monetary policy in many countries. Overall risks to economic prospects have risen sharply and policy trade-offs have become ever more challenging.

Global growth is expected to decline to 3.3% over the medium term, beyond 2023 due to sustained inflationary pressure driven by the conflict-induced energy & commodity price increases and broadening price pressures. Gradual resolution of supply-demand imbalances and a modest pickup in labour supply is slowly expected to ease price inflation, though uncertainty prevails. Further escalation in conflict, may deteriorate global supply-demand balances, and further increases in commodity prices. Central banks have started with the first round of interest rate hike and are expected to remain aggressive throughout 2022.

Source: World Economic Outlook April 2022, IMF

Indian Economic Overview

India is expected to remain one of the fastest-growing major economies in the world. Pegged at USD 3.1 trillion in 2022, based on the current price in dollar terms, India is chasing a target of becoming a USD 5 trillion economy by 2025, as the government pushes ahead with various economic reforms to drive manufacturing capacity and domestic consumption. The global supply chain vacuum caused by geo-political changes work in India's favour and expected to add impetus to economic growth trajectory as India becomes a key natural choice for sourcing.

According to the first advanced estimates by the National Statistics Office (NSO), in FY22, GDP growth rate is projected at 9.2% on the back of strong projected performance of major sectors including services, agriculture, manufacturing, mining, construction and energy. In FY21, Indian economy had contracted by 7.3% due to pandemic-related disruptions. The Indian economy, along with other global economies, suffered many tribulations since the start of the pandemic. However, the economic rebound has been sharp post the second wave, and the GDP crossed the pre-pandemic levels in the second quarter of FY22.

With digital transformation becoming a critical strategic priority for enterprises, almost every sector of India's digital economy is witnessing a multi-fold growth trajectory. India is poised to become the hub for all manufacturing activities for global requirements led by the Government's strong vision of making India self-reliant. The focus on infrastructure development augurs well, leading to stronger demand for Indian products and attracting investment in the country. Recent policy reforms including the reduction in corporate tax rates, focus on reducing regulatory burden, reducing the logistics cost by augmenting logistics infrastructure and the proposed National Logistics Policy, the consolidation of labour laws, will all help build India's manufacturing sector and the economy at large. The measures are also expected to help attract FDI as global corporations are looking at diversifying their supply chains. This in turn will lead to job creation and boost exports in the manufacturing sector.

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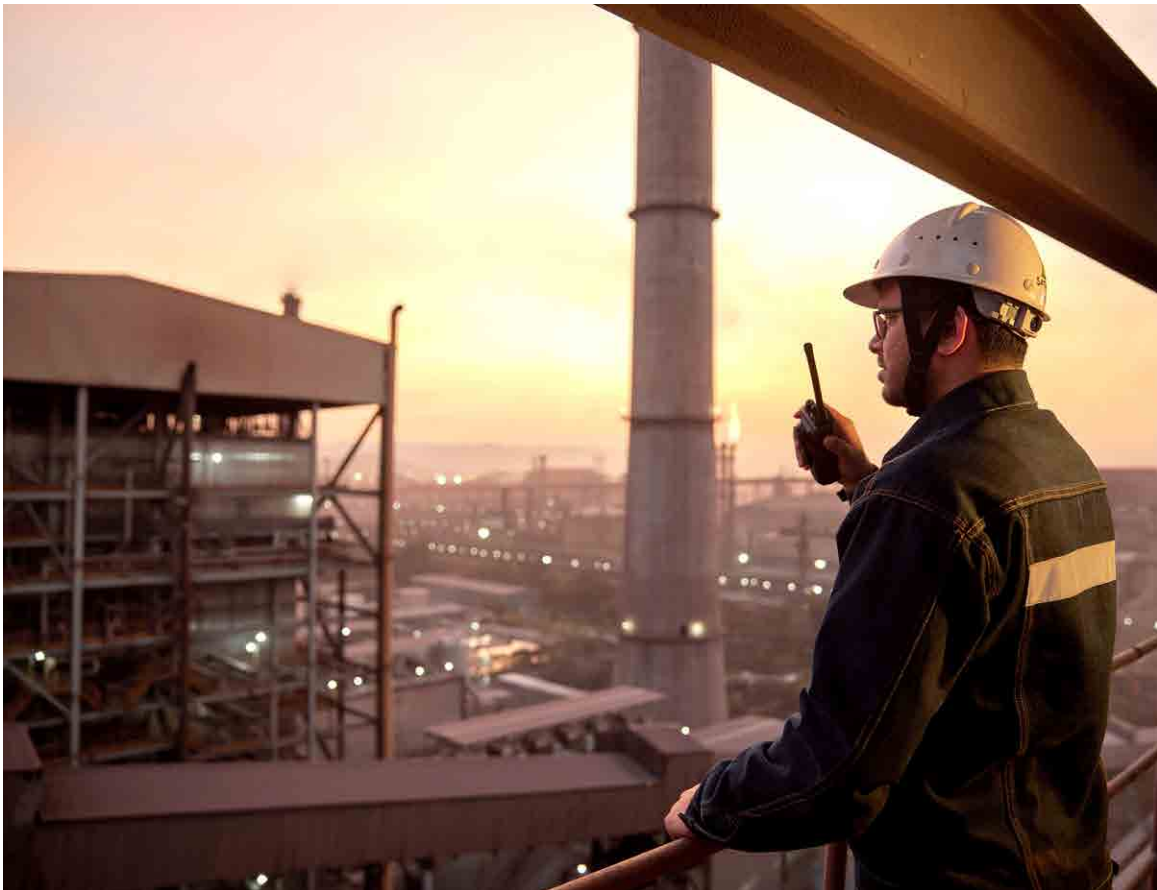
India is on the path to a sustained economic recovery led by the vigorous countrywide vaccination drive which helped to reduce the severity of the third wave with minimal disruptions to mobility and economic activity. The Government's policy to improve logistics infrastructure, incentives to facilitate industrial production, asset monetisation, taxation, telecom and banking sectors, and measures to improve farmers' income will support the country's accelerated recovery in future. The Union Budget 2022 further aided economic growth prospects with strong focus on boosting government capex and revive private sector investments. Also PLI schemes were extended with additional fund allocation to support large scale manufacturing in India. According to the Reserve Bank of India, the GDP growth for FY23 is projected at 7.2%. Uncertainties stemming from volatile geopolitical situation, surge in international energy and commodity prices, supply-side disruptions, tightening of global financial conditions and weak external demand pose risks to these assumptions.

Source: NSO, RBI

Industry Review

Climate Change – Biggest risk looming

According to the 2022 Global Risks Report, climate crisis continues to be the most severe long-term threat facing humanity, even as the world enters the third year of the COVID-19 pandemic. The lethal Hurricane Ida in the United States, devastating floods in Europe and China, and hunger-inducing drought in East Africa and various other climate change-fuelled disasters cost over billions of dollars in 2021, in addition to severe human suffering. The risks to humans and nature are bigger than scientists had envisaged - even at current 1.1 degree of global warming - and will surge much higher beyond 1.5 degree of warming. Governments and businesses must take prompt action to drive innovative, determined and inclusive transition that protects economies and people. Over the next decade the most severe risks looming on humans and nature include climate action failure, extreme weather due to climate change and biodiversity losses.





The 2015 Paris Agreement established a global goal on adaptation to strengthen resilience and reduce vulnerability to climate change effects, through stronger infrastructure, early warning of disasters and crops that can tolerate extremes. But efforts on the ground lag far behind accelerating climate stresses and weather shocks. Environmentalists are urging global leaders to come together and adopt a coordinated multi-stakeholder response to ensure the transition to net-zero economies.

(Source: Global Risks Report 2022, January 2022, World Economic Forum)

Climate Change Conference COP26

The UN Climate Change Conference COP26 in Glasgow witnessed governments announcing various emission reduction targets. This was done by emphasising shorter-term targets, such as halving emissions by 2030 and to achieve net-zero by 2050. The onus is on governments to submit more ambitious climate plans and take immediate, tangible and effective action to meet climate targets.

As per the 2015 Paris Agreement, all 190+ signatories were given five years to chalk out their strategies, officially called Nationally Determined Contributions (NDC). These strategies were aimed at reducing greenhouse gas emissions and achieving the common goal of keeping global temperatures either 1.5 degree or 2.0 degree above pre-industrial era temperatures.

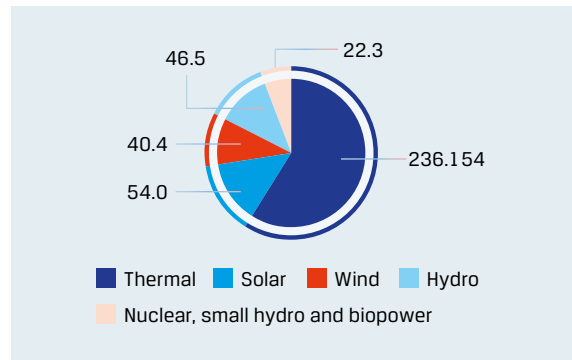
The NDCs act as monitoring mechanisms for the progress of each country. Every five years, these countries are expected to present more ambitious climate goals. Consequently, COP26 was the most important climate meeting since Paris, since the countries had to present their new NDCs. The final declaration from COP26 urged nations to increase their objectives to cut down emissions over the rest of the decade. It also contained an explicit reference to coal, and finally defined the so-called Paris Agreement Rule Book. The Paris Agreement made these countries pledge to a text recognising the urgency to fight climate change and mitigate its consequences. COP26 took it to the next level by defining a concrete action plan to execute the promises.

India's Climate Pledges

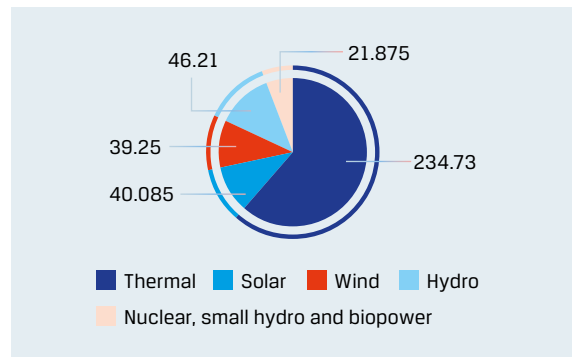
India is moving towards becoming the fastest growing green economy of the world. The coming decade is set to witness a profound transformation in the Indian power system with respect to demand growth, energy mix and market operations.

In 2015, India announced one of the most ambitious renewable targets globally to reach 175 GW by 2022, including 100 GW solar, 60 GW wind and the rest from biomass and small hydro. India is well on track to achieve its goals: As on 31st March, 2022, India's renewable capacity stood at 110 GW and at 157 GW (including large hydropower capacity).

Total installed capacity: 399.5 GW (as on 31st March, 2022)



Total installed capacity: 382.2 GW (as on 31st March, 2021)



Source: Ministry of Power, Central Electricity Authority (CEA)

At the COP26 summit held at Glasgow in November 2021, India committed to an ambitious five-part "Panchamrit" pledge. These included goals:

- to reach 500 GW of non-fossil electricity capacity by 2030
- to generate half of all energy requirements from renewables by 2030
- to reduce emissions by 1 billion tonnes from now to 2030; and
- to reduce emissions intensity of GDP by 45% by 2030
- to reach net-zero emissions by 2070

Furthermore, India has embarked on a notable initiative of conversion from the incandescent light bulb to LED light, saving 80 million tonnes of carbon emission. The country has also taken significant efforts to promote biofuels being a leading agri-producer. Foodgrains waste and sugarcane are converted into ethanol, with the ethanol blending programme making rapid strides from 1% to being 9-10% in 2022. The target is to take the blending to 20% by 2024, to reduce dependence on import of crude oil and make petrol vehicle more sustainable and support efforts towards net-zero by 2070. The government is providing all incentives to the power sector to ensure sustainable production through one or another scheme such as UDAY Scheme, PM KUSUM, Solar Rooftop Programme and others.

(Source: MNRE, Government of India - Press Information Bureau (pib.gov.in))

Global Energy Outlook

To achieve global net-zero, every sector of the energy economy needs to eliminate emissions completely by the mid of this century. According to Bloomberg NEF's New Energy Outlook 2021, energy emissions increased 0.9% every year between 2015-2020. If the current trend of emissions continue, by 2028 the earth's temperature will rise above 1.5 degrees and by

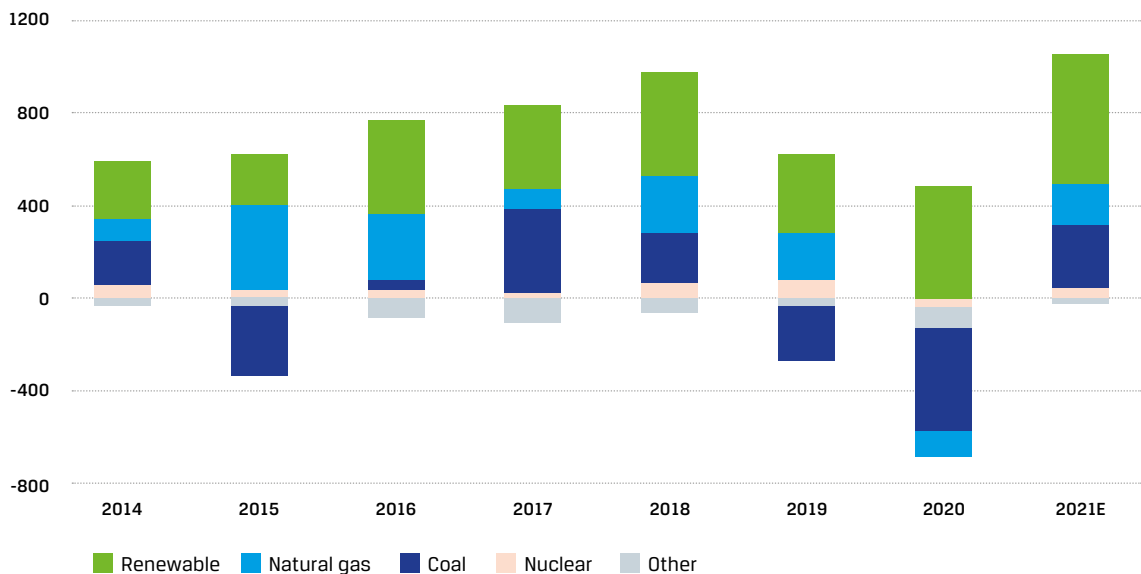
2044 it will increase by 2 degrees. This emphasises the impending need for immediate, concrete policy action to accelerate decarbonisation.

Large investments in energy infrastructure are needed for energy transition, with capital flowing away from fossil fuels and towards clean power and other climate solutions. The required investment in energy supply and infrastructure is estimated at USD 92-173 trillion over the next three decades. The annual investment will thus need to more than double from around USD 1.7 trillion per year today to USD 3.1-5.8 trillion per year on an average over the next three decades.

According to UNFCCC's NDC Synthesis Report dated October 2021, if all NDCs are implemented, the total global greenhouse gas emissions in 2030 would range from 50.8 gigatonnes to 56.9 gigatonnes of CO2 equivalent, resulting in emission levels that are around 59% higher than 1990 levels, 13.7% higher than 2010 levels and 5% higher than 2019 levels. To limit the rise in global mean temperature to 1.5 degrees, emissions need to be reduced by around 45% from 2010 level by 2030, with the aim of reaching net-zero emissions by 2050.

Change in global electricity generation, 2014-2021

TWh



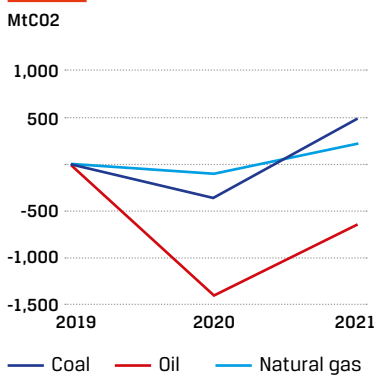
Source: IEA, World Energy Outlook 2021



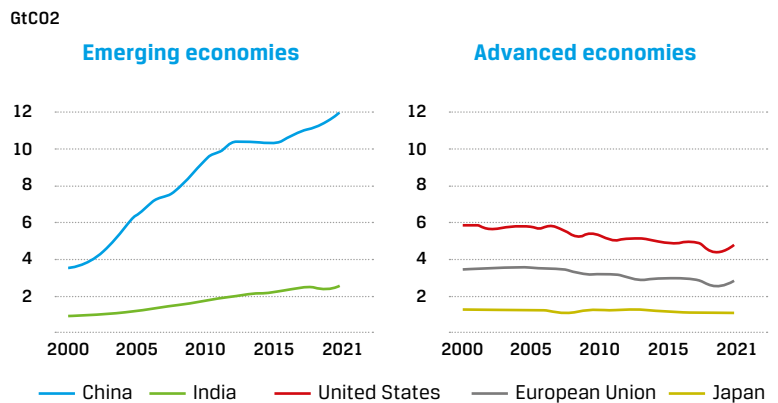
Taking into account the rebound in global industrial output, overall coal demand worldwide is expected to have grown by 6% in 2021 as per Coal 2021 report by IEA. Similarly, demand for oil is also expected to grow 6% globally. Global gas demand is expected to grow by 3.2% in 2021. The burning of fossil fuel surged faster than expected in 2021, as opposed to the rapid cuts needed to tackle global heating.

The Global Carbon Project (GCP) projects that fossil emissions in 2021 will reach 36.4 billion tonnes of CO₂ (GtCO₂), only 0.8% below their pre-pandemic high of 36.7 GtCO₂ in 2019. To reach CO₂ emissions by 2050, global CO₂ emissions need to be cut by about 1.4 billion tonnes each year on an average.

Change in CO₂ emissions by fossil fuel, relative to 2019 levels, 2019-2021



CO₂ emissions in selected emerging and advanced economies, 2000-2021

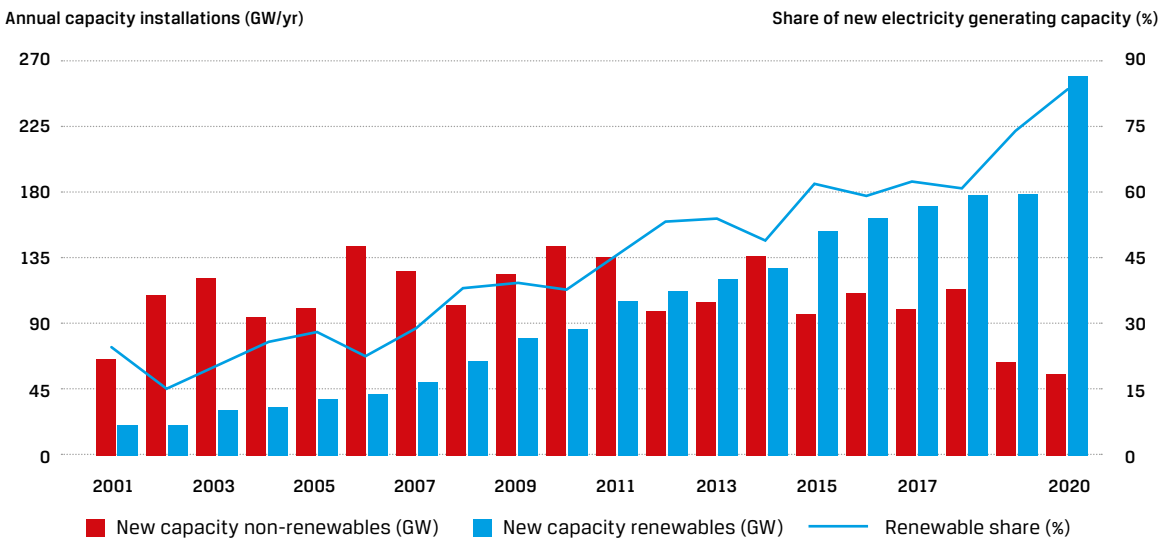


Source: Global Energy Review: CO₂ Emissions in 2021, IEA

An energy transition grounded in renewable sources and technologies that increases efficiency and conservation is likely to play an imminent role in limiting global warming. As per the International Renewable Energy Agency (IRENA), fossil fuel use will have to decline by more than 75% by 2050. For the past seven years, more renewable power was added to the grid annually than fossil fuels and nuclear combined.

Today, renewable power technologies have emerged as the cheapest sources of electricity in several markets. A record level of 260 gigawatts (GW) of renewables-based generation capacity was added globally in 2020, more than 4x the capacity added from other sources. The installed generation capacity of renewable power will need to expand from over 2,800 GW in 2020 to over 27,700 GW in 2050, a ten-fold increase. In annual terms, this requires more than 840 GW of new renewable capacity additions every year.

Share of new electricity capacity, 2001-2020



Based on IRENA's renewable energy statistics.

Note: GW = gigawatt

Innovative solutions in technology, policy and markets are being implemented for a decarbonised future. Significant progress has been made in several aspects including electric mobility, battery storage, digital technologies and artificial intelligence. Greater attention is being given to the need for sustainable exploitation and management of rare earths and other minerals, and investment in the circular economy. New and smart grids, ranging from mini to super grids, strengthened further by facilitative policies and markets are a few steps in the right direction to cope with the variability of renewables. Solutions in transport, buildings and industry are worked on through direct uses of renewables – including bioenergy – and green hydrogen.

Global annual renewable energy investments increased almost 5 times between 2005 and 2020, with solar and wind technologies recently accounting for about

90% annually. The pandemic-related slowdown had minimum impact on renewables new capacity addition. Renewables usage grew by 3% in 2020, largely due to an increase in electricity generation from solar PV and wind. Generation from solar PV and wind is set to grow by 17% in 2021, up from 16% in 2020. Hydro and biomass generation should also accelerate, with total generation from renewables growing by 8.3% in 2021, faster than 7% increase witnessed in 2020. The share of renewables in total electricity generation will reach almost 30% due to the sharp addition in these two years, up from less than 27% in 2019.

(Source: New Energy Outlook 2021, November 2021, Bloomberg NEF; NDC Synthesis Report update, November 2021, UNFCCC; World Energy Outlook 2021, December 2021, IEA; Global Energy Review 2021, April 2021, IEA; Global Carbon Budget 2021, November 2021, Global Carbon Project; World Energy Transitions Outlook, June 2021, IRENA; 2021 Q4 and Annual Battery Storage, Smart Grid and Efficiency Funding and M&A, January 2022, Mercom Capital)

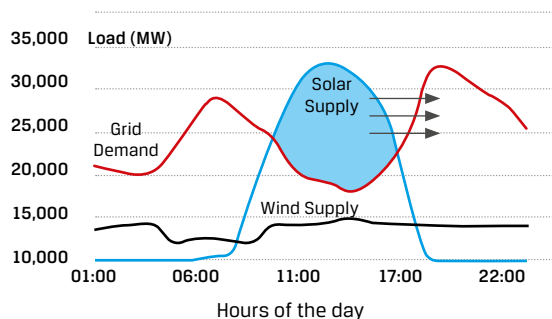


India's Clean Energy Transition

India is moving towards becoming the fastest growing green economy of the world. The coming decade is set to witness a profound transformation in the Indian power system with respect to demand growth, energy mix and market operations. Moreover, the government has strong intentions to pursue strong energy efficiency standards, including LED lighting, efficient cooling and building standards.

The government plans to increase the country's non-fossil fuel generating capacity to 500 GW by 2030 and is committed to achieve energy autonomy and to provide clean, affordable, reliable and sustainable power for all. With increased installed capacity from renewable energy sources, it is estimated that the frequency of ramping requirement will increase with maximum positive ramping requirement of 400 MW/min. This ramping requirement can only be achieved if all generating stations exploit their inherent ramping capability and are flexible to operate. Hydro and gas-based generation can efficiently and effectively provide balancing and ramping requirements of the grid in view of high renewable energy sources integration. Also, as large amounts of intermittent solar and wind energy sources are integrated onto the grid, deployment of battery storage resources can enable balancing of variability of generation. Inexpensive, mass-produced batteries will also enable cost-effective decarbonisation. Batteries enable storage of cheap, carbon-neutral solar and wind generation, contributing to the safe, reliable operation of power systems with very high share of renewables. In tandem, Hydro Pumped Storage projects, that act like water batteries, will help provide grid stabilisation and longer power storage capabilities.

Time-shift benefits of energy storage



This figure displays the benefit of energy storage of saving excess energy for later use.

Source: <https://www.renewableenergyworld.com/articles/2011/11/solar-intermittency-how>

Source: *Battery Storage: The Answer To Renewable Energy Intermittency* | Awaken

Furthermore, Hydrogen is gaining importance as a critical element in the energy transition to decarbonise harder-to-abate sectors. Hydrogen could account for up to 12% of global energy use by 2050, leading to a rise in new energy superpowers. It is likely to influence the geography of energy trade, further regionalising energy relations.

India has unveiled the first phase of its New Green Hydrogen Policy under the National Hydrogen Mission, to use renewable electricity to split water to make hydrogen, which can be used as fuel in several industries including refineries, steel plants and automotive fuel. India plans to manufacture 5 million tonnes of green hydrogen per year by 2030. Apart from being industrial feedstock for production of steel, ammonia, methanol and fertilisers, green hydrogen is set to play a big role in clean mobility and electricity production and storage. The green hydrogen industry will require the building of a domestic hydrogen production value chain. The most important part of this value chain is electrolyzers, forming 45% of the system cost, for which costs have come down across the globe, led by US, China and Nordic-based electrolyser manufacturers. There is a significant interest from foreign private entities in manufacturing electrolyzers in India. Domestically produced, cheaper electrolyzers combined with ultra-low cost renewables along with clear policy support will help realise India's green hydrogen potential. According to a report by The Energy and Resources Institute, in 2020, India's hydrogen demand stood at 6 million tonnes (MT) per year. It is estimated that by 2030, the hydrogen costs will reduce by 50%. The demand for hydrogen is expected to increase 5-fold to 28 MT by 2050 where 80% of the demand is expected to be green in nature.

(Source: *Geopolitics of the Energy Transformation: The Hydrogen Factor*, January 2022, IRENA; *The potential role of hydrogen in India*, December 2020, The Energy and Resources Institute; *Optimal energy mix in power generation on medium and long term basis*, January 2018, Ministry of Power, GOI)

The installed generation capacity of renewable power globally will need to expand from over 2,800 GW in 2020 to over 27,700 GW in 2050, a ten-fold increase. In annual terms, this requires more than 840 GW of new renewable capacity additions every year.

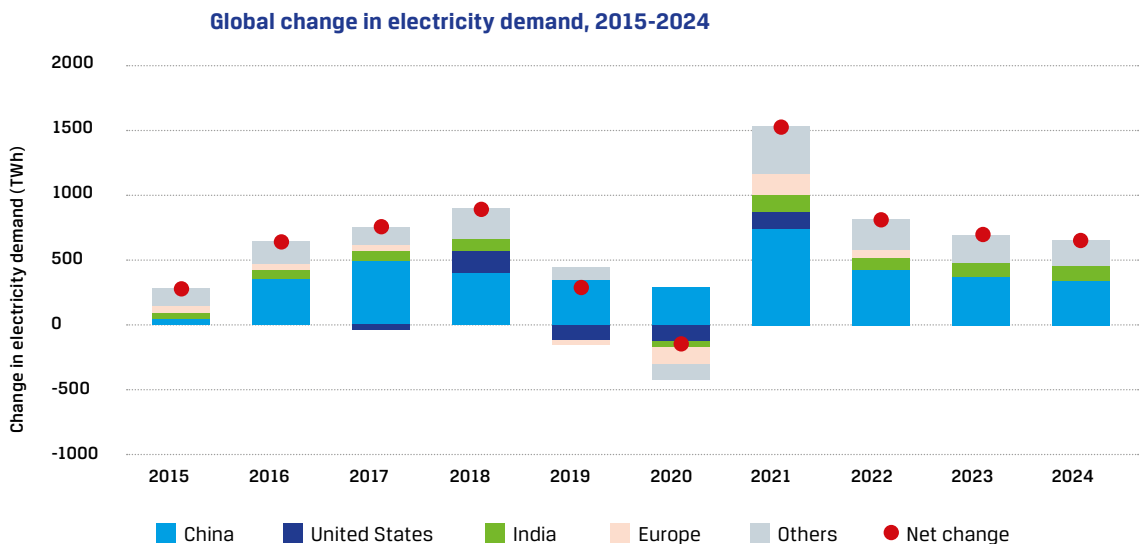


Indian Power Sector

Power Demand & Generation

India has the fourth-largest electricity market in the world, after China, the United States and the European Union. It is the world's third-largest energy consuming country, led by population growth, urbanisation, industrialisation, commercialisation and growing air-conditioning units. Increase in electricity demand was led by improved standards of living and gains in electrification access. India has gradually shifted from a country with a shortage of energy to a state close to an energy surplus.

Global demand growth is concentrated in emerging and developing Asia



Source: IEA – Electricity Market Report, January 2022



According to the International Energy Agency (IEA), power demand in India is likely to grow at an annual rate of 6.5% between 2022 and 2024, above pre-pandemic levels, backed by rising consumption from residential and industrial segments. Per-capita electricity demand in India is still below (approximately one-third) the global average. This is despite having low electricity tariff, and therefore, quality of service improvements is expected to drive consumption. Continued promotion of schemes like 'Make in India' will increase power demand in the industrial sector by promoting local manufacturing. Faster Adoption and Manufacturing of Electric Vehicles in India (FAME) will increase EV adoption in the country through an increase in EVs and charging infrastructure throughout the country.

Led by pandemic-related disruption in economic activity, FY21 witnessed a 1.2% decline in power consumption. India's power demand, a barometer of economic activity and progress, witnessed a historic pace of growth of 7.9% in FY22, owing to a multitude of factors boosting industrial and residential load as well as a low base. Going forward, the demand recovery is expected to be led by a pick-up in growth in the industrial segment.

Demand in BUs	FY22	FY21	YoY %
North	418	396	5.4%
West	426	388	9.8%
South	351	327	7.3%
East	163	148	10.6%
North-East	17	17	0.3%
All-India	1,376	1,276	7.9%

India's power sector is one of the most diversified in the world with sources of power generation ranging from conventional sources such as coal, lignite, natural gas, oil, hydro and nuclear power to viable non-conventional sources such as wind, solar, and agricultural and domestic waste.

Generation in BUs	FY22	FY21	YoY %
Thermal	1,115	1,033	8.00%
Hydro	152	150	0.90%
Renewables (RE)	169	147	15.10%
<i>Wind</i>	69	60	14.10%
<i>Solar</i>	73	60	20.50%
<i>Others (RE)</i>	27	27	0.00%
Others (Nucler + Import)	55	52	5.30%
All India	1,490	1,380	7.80%

As on 31st March, 2022, the total installed power generation capacity was ~400 GW. Of this, ~60% was through fossil fuels like coal, lignite, gas and diesel. According to the 19th Electric Power Survey (EPS) report issued by the Central Electricity Bureau, by the end of 2026-2027, India's power generation capacity is expected to increase to 619 GW, including traditional energy and renewable energy. (Source: Electricity Market Report, January 2022, IEA)

Thermal Energy: Coal

As of March 2022, India had a net thermal installed capacity of 236 GW, of which majority of the thermal power is obtained from coal. In FY22, the installed thermal capacity increased by net 1.4 GW or 0.6% YoY to 236.1 GW. With the increasing demand for energy from industrial and commercial sectors, and pressure of meeting climate change obligations, India is making a big push towards green energy. While this push is vital in making the country's energy-mix sustainable, the challenge of weaning India off its coal dependency remains a strong impediment. Power utilities are importing coal to bridge the shortfall in the availability of domestic coal as well as to meet the requirement of coal for power generation in the power plants designed on imported coal. Due to inadequate availability of domestic coal, the utilities were advised to import coal for blending. Under the guidance of Ministry of Coal, Coal India Limited (CIL) has taken the initiative for substitution of imported with domestic coal since 2016 with customised strategy as per suitability of each power station. Imported coal has been substituted with domestic coal for many power plants throughout the country.

Renewable Energy

1. Hydro

Due to the intermittent availability of solar and wind to produce power, hydro-power assumes greater importance to provide stability to the electric grid. Apart from reducing carbon emissions and being cheaper, hydropower energy enables to take electricity to new remote locations, helps increase security over energy generation and reduce impact of geopolitical issues. Hydropower is highly relevant for grid integration of renewable energy and for balancing infirmities.

As of March 2022, India had a total hydro installed generation capacity of 46.7 GW, up 1.1% YoY, which amounts to ~12% of the total installed capacity, making it the second-largest supply source. The government has set a target of 70 GW hydro power generation capacity by 2030.

2. Solar

As of March 2022, India has a total solar installed generation capacity of 54 GW, up by 38% YoY, amounting to ~13% of total installed capacity. In FY21, the installed solar capacity increased by 15.8% to 40.1 GW. According to data from the Central Electricity Authority, the highest ever solar installations were recorded in any fiscal year and 13.9 GW of solar capacity was added in FY22, as compared to 5.5 GW installed in FY21. New solar capacity addition in FY22 made up for 80% of all power capacity installed during the year. Rajasthan, Karnataka and Andhra Pradesh were the top three states for large-scale solar installations.

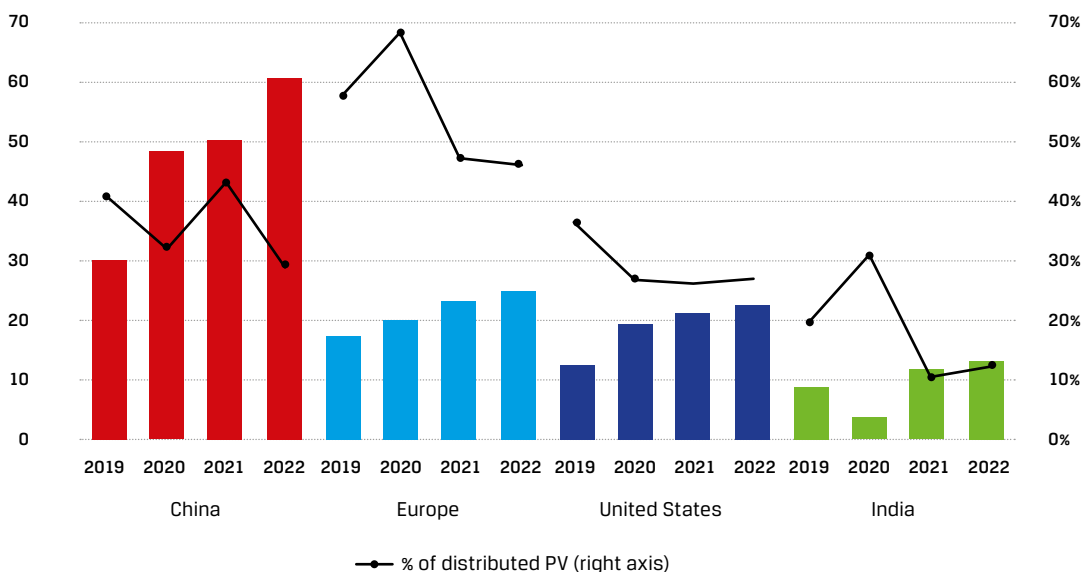
India has launched multi-pronged programmes to achieve solar energy as a part of the renewable energy targets set for combating climate change.

The Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM) Scheme aims to provide energy and water security, de-dieselise the farm sector and generate additional income for farmers by producing solar power and aims to add 30.8 GW of solar capacity with the central financial support of over ₹ 34 billion. For large scale grid-connected solar power projects, 'Development of Solar Parks and Ultra Mega Solar Power Projects' is under implementation with a target capacity of 40 GW capacity by March 2024.

Roof Top Solar Programme Phase-II for accelerated solar rooftop systems, with a target of 40 GW installed capacity by December 2022, is also under implementation. The scheme provides financial assistance for up to 4 GW of solar rooftop capacity to the residential sector.

A scheme for setting up 12 GW Grid-Connected Solar PV Power Projects by government entities is implemented. Viability Gap funding support is provided under this scheme. Under this scheme, the government has sanctioned around 8.2 GW of projects.

Annual solar PV capacity additions by country, 2019-2022



Source: Renewable Energy Market Update-Outlook for 2021 and 2022, May 2021, IEA



3. Wind

India's wind energy sector is led by indigenous wind power industry and has shown consistent progress. With over three decades of experience in trapping power through a grid-connected wind energy structure, it continues to occupy a major proportion of the share in India's clean energy-based grid-connected power generation combination. Between 2010 and 2020, wind generation witnessed 11% CAGR and the total installed capacity grew ~9% CAGR.

India has the fourth-largest wind installed capacity in the world with total installed capacity of 40.4 GW (as in March 2022), up by 1.1 GW YoY. Wind installed capacity generated around 68.610 Billion Units (BU) during FY 2021-22. In FY 2020-21, the installed wind capacity increased by 4.1% to 38.8 GW. The government has also shared its vision for longer-term renewable energy targets of 500 GW by 2030, including 140 GW of wind.

India is expected to become a hub for wind export with wind energy becoming an important bridge towards India's clean energy transition story. The government under the new suggested wind park/ wind-solar hybrid park expansion scheme has suggested the possibility of assigning land for wind park growth to tackle delays in the distribution of land and grid.

4. Storage: Hydro Pumped Storage (PSH)

Deployment of renewable energy in the electricity sector has led to the growing need to modernise the electricity grid, including the increased implementation of battery storage. Variable generation increases the need for flexible generation and operating reserves, which can be met by energy storage to some extent. Currently, solar/wind-plus-storage is not competitive with coal. However, with growing environmental restrictions on coal and constant reduction in battery costs due to innovation and technological advancement, renewable energy is expected to gain an advantage.

PSH plants are highly useful options for the integration of renewable energy power with the power system. PSH plants are storage systems based on hydropower operations between two or more reservoirs (upper and lower) with an elevation difference. India has 120 GW of potential

PSH capabilities of which only ~4.8 GW have been commissioned. In addition, three plants with a capacity of 2.7 GW are under construction. Additional capacities of 16.5 GW are under various stages of implementation.

5. Storage: Battery Energy Storage System (BESS)

Battery storage is expected to become an integral part of the Indian power system in the coming decade. According to the Central Electricity Authority (CEA), India's storage requirement by 2030 is forecasted at 41 GW. Battery storage is expected to assume broader role in energy markets, moving from niche uses such as grid balancing to broader ones such as replacing conventional power generators for reliability, providing power-quality services, and supporting renewables integration.

According to a study by Wartsila and KPMG, India's power system would not require any new coal-fired power plants by 2030. India would need 38 GW of four-hour battery storage and 9 GW of thermal balancing power project for cost-efficient and reliable integration of 450 GW of renewables. The power could use internal combustion engines (ICE) and solar/wind plus battery storage to meet any flexibility requirements. Over 35 GW of wind and solar capacities would need to be added annually up to 2030. Higher supply side flexibility reduces the cost of power in the system by enabling full despatch of low cost generators and ensuring grid resilience.

(Source: Electricity market design for efficient procurement of ancillary services in India to address changing system needs, November 2021, Wartsila and KPMG)

India has 120 GW of potential Hydro Pumped Storage capabilities of which only ~4.8 GW have been commissioned



Company Overview

JSW Energy (the Company), one of India's leading private sector power companies, is the energy arm of India's leading conglomerate, the JSW Group which has revenues of USD 22 billion. From managing operations, allocating capital judiciously, enhancing social and economic benefits, minimising environmental impacts and employing cutting-edge innovation, JSW Energy has grown steadily and strongly through the years. Today, we stand at the forefront of Energy Transition in the country.

In 2000, having started commercial operations with our first 2x130 MW thermal power plant at Vijayanagar, Karnataka, the Company has come a long way. Today, the Company's presence extends across several Indian states. This diversity in geographic locations, fuel sources and power off-take arrangements, helps us de-risk our business.

Our Company has a generation portfolio of 7 GW (of which 2.4 GW is under construction) with a combination of thermal power, hydel power, wind power and solar power. In FY22, we announced our plans to re-organise our company into green (renewable) business and grey (thermal) business. This streamlining of the renewable portfolio and the setting up of a holding structure will enable us to potentially unlock and enhance the shareholders' value going forward. Within the power sector, we have set high benchmarks led by our transparent way of operating, abiding to stringent corporate governance norms, and having a clear vision. Our strong financial acumen, clarity in business decisions and proactive debt management has helped us build one of the strongest balance sheets in the capital-intensive Indian Power sector. We had maintained a healthy balance sheet while pursuing value accretive growth.

Our superior project execution skills enable us to set up projects in the least possible cost and fastest turnaround time. Our robust business model is a



testimony to our relentless focus on operational efficiencies and adoption of global best practices. Leveraging our unique strengths, we are well on track to achieve 20 GW capacity by 2030, with incremental growth coming entirely from renewables. Continuing on our differentiated business strategy path, we are also looking forward to foraying in New Energy Platforms of green hydrogen and its derivatives, energy storage and energy products & services which we believe will redefine the future of the energy industry.

Investing in Renewables for High Growth

Being at the forefront of energy transition in the Indian power landscape with high sustainability standards, JSW Energy has set a roadmap of achieving renewables-led growth to 20 GW by 2030 wherein our renewables portfolio contribution will stand at 85%. The current share of renewables in our portfolio is 55%. Following this renewable path, we are reorganising our business into grey (thermal) and green (renewable) businesses. This reorganisation will help us to build and streamline the renewable portfolio and set up a holding structure for efficient fund-raising and potentially unlocking value for shareholders in future.

Our commitment to becoming a net-zero company

At JSW Energy, we are committed to set science-based targets to keep global warming to 1.5°C under SBTi thereby reaching net-zero by 2050. By reducing our carbon emissions by more than 50%, we are committed to being carbon neutral by 2050. We have chalked out a scientific plan with 17 focus areas and 2030 targets starting 2020 as base year. Our approach includes increasing share of renewable energy for deep decarbonisation, ensuring process efficiency improvements and replacing condenser tubes with graphene coatings. In keeping with the aggressive targets by most of the countries in the world for Climate Change, JSW Energy is all set to lead from the front. It is our constant endeavour to implement cleaner strategies, and invest in energy growth platforms to provide significant business growth.



Business Segments

Power Generation

We have a total installed power generation capacity of 4.6 GW and an under-construction 2.4 GW portfolio, totalling to 7 GW (Renewable: 55%, Thermal: 45%)

Installed Capacity: (Renewable: 30%, Thermal: 70%)

3,158 MW 1,391 MW

Thermal

Hydro

10 MW

Solar

Under-construction Capacity: (100% Renewable)

240 MW 1,993 MW

Hydro

Wind

225 MW

Solar

Power Transmission

Stable electricity supply is made possible through an efficient power transmission system. Jaigad Power Transco Limited (JPTL) is a 74:26 joint venture between the Company and Maharashtra State Electricity Transmission Company Limited. Under JTPL, we have two operational 400 kV transmission lines.

Power Trading

In 2006, we incorporated JSW Power Trading Company Limited (JSWPTC) so as to become a full-spectrum power company. It has successfully emerged into one of the leading power trading companies in the country. Central Electricity Regulatory Commission has issued a licence to JSWPTC to trade in power across India. It is a member of Indian Energy Exchange (IEX) and Power Exchange of India Limited (PXIL).

Our robust business model is a testimony to our relentless focus on operational efficiencies and adoption of global best practices. Leveraging our unique strengths, we are well on track to achieve 20 GW entirely renewable capacity addition by 2030.

Operational Review

The Company's net generation in FY22 stood at 20,787 MUs vis-à-vis 19,990 MUs in FY21. It generated a total income of ₹8,736 crore in FY22 as compared to ₹7,160 crore in FY21. The deemed PLF was 62% for FY22 as against 60% for FY21.

Thermal Power Plants

Vijayanagar

PLF: The plant comprises two Strategic Business Units (SBUs) – SBU 1 and SBU 2. In FY22, the plant achieved an average actual PLF of 45% as against 32% in FY21.

Total Gross Power Generated: 3,386 million units

Net Power Generated: 3,115 million units

Power Sales: Long-term sales to JSW Steel Limited, JSW Cement Limited, JSW Paints limited, JSW Severfield Structures Ltd, EPSILON Carbon Private Limited under power purchase agreements (PPA), and short-term/merchant sales to distribution companies and through power exchanges in India

Key Strengths of the Plant:

- It is located in the southern region of India, which has traditionally seen a higher demand for power
- It is an operationally strong plant leading to high fuel efficiency, lower O&M cost and higher PLF efficiency
- Provision to blend up to 50% of domestic coal with imported coal increases operational flexibility

Ratnagiri

PLF: In FY22, the plant operated at an average deemed PLF of 73% as against 69% in FY21

Total Gross Power Generated: 6,025 million units

Net Power Generated: 5,514 million units

Power Sales: Long-term sales to Group captive consumers, Maharashtra State Electricity Distribution Company Limited (MSEDCL) and other third-party industrial consumers under PPA. Short-term/merchant sales to distribution companies and through power exchanges in India

Key Strengths of the Plant

- It is located near the Jaigad port, which helps in coal transportation cost savings
- As nearly 65% of the capacity has been tied up with Group Captive consumers, the recovery of its fixed cost is ensured along with ROE to that extent
- Provision to blend up to 50% of domestic coal with imported coal increases operational flexibility

Barmer

PLF: In FY22, the plant achieved an average deemed PLF of 81% as against 82% achieved in FY21

Total Gross Power Generated: 7,177 million units

Net Power Generated: 6,515 million units

Power Sales: To Rajasthan DISCOMs

Key Strengths of the Plant:

- The plant has assured availability of fuel (lignite) which is sourced from pit-head captive lignite mines under a Fuel Supply Agreement
- It has a long-term PPA with Rajasthan DISCOMs for full capacity, ensuring full recovery of the fuel cost and fixed cost, including ROE

Hydro Power Plants

Baspa-II

PLF: The plant achieved an average PLF of 50.24% for FY22 as against 49.89% in FY21

Total net power generated: 1,306 million units

Power sales: To Himachal Pradesh State Electricity Board (HPSEB)

Key Strengths of the Plant:

The plant has 100% capacity tied up under long-term PPA with HPSEB, ensuring full recovery of fixed cost

Karcham Wangtoo

PLF: The plant achieved an average PLF of 46.91% for FY22 as against 49.79% in FY21

Total net power generated: 4,214 million units

Power sales: Uttar Pradesh, Rajasthan, Haryana, and Punjab DISCOMs through long-term PPA with PTC India Limited

Key strengths of the plant:

The plant has 96% capacity tied up under long-term PPA with PTC India Limited, which in turn has PSA with various discoms ensuring full recovery of fixed cost, including ROE under the Central Electricity Regulatory Commission (CERC) regulations



Kutehr Hydroelectric Project

JSW Energy (Kutehr) Limited, is a wholly-owned subsidiary of JSW Neo Energy Ltd (JSWNEL), set up for the purpose of implementing the 240 MW Kutehr Hydroelectric Project (3x80 MW Kutehr HEP) located in the upper reaches of Ravi Basin in district Chamba of Himachal Pradesh. The project progress is in full swing and PPA for the entire 240 MW with Haryana Power Purchase Centre for purchase of power on behalf of Uttar Haryana Bijli Vitran Nigam and Dakshin Haryana Bijli Vitran Nigam has been signed for a period of 35 years on 5th March, 2022. The project is expected to be commissioned in September 2024.

Hydro Pumped Storage Project

JSWEL has also secured tie-ups for 5 GW Hydro Pumped Storage projects with various states.

Solar Power Plants

225 MW Solar Plant in Karnataka; Signed 25-year PPA with JSW Steel

Status: Commenced operations in April 2022

Wind power

600 MW Wind Plant in Karnataka; Signed 25-year PPA with JSW Steel

Status: Under construction

Expected commissioning progressively from: Q1 FY24

1260 MW Wind Plant in Tamil Nadu; SECI IX (810 MW) + SECI X (450 MW); Signed 25-year PPA with SECI

Status: Under construction

Expected commissioning progressively from: Q2 FY23

95 MW Wind Plant in Maharashtra; Signed 25-year PPA with JSW Steel

Status: Under construction

Expected commissioning progressively from: Q1 FY24

38 MW Wind Plant in Tamil Nadu; Signed 25-year PPA with JSW Steel

Status: Under construction

Expected commissioning progressively from: Q1 FY24

Financial review including financial ratios

Standalone financial performance

Revenue from operations

(₹ Crore)

Parameters	FY21	FY22	% change
Sale of Power	2,280.12	2,624.72	15%
Interest Income on Assets under Finance lease	68.83	48.58	-29%
Sale of Goods	-	26.11	100%
Sale of Services	534.78	934.88	75%
Other Operating Revenue	13.80	8.45	-39%
Total	2,897.53	3,642.74	26%

In FY22, the sale of power increased 15% from ₹2,280.12 crore to ₹2,624.72 crore, primarily due to the fact that during the year under review, there were higher merchant and long-term sales. Revenue from the sale of services increased 75% to ₹934.88 crore from ₹534.78 crore in FY21, due to additional job work arrangements tied up and higher mining income.

Other income

(₹ Crore)

Parameters	FY21	FY22	% change
Interest Income	30.43	148.47	388%
Dividend Income from Long-term Investments	14.01	45.52	225%
Net Gain on Sale of Investments	11.82	9.82	-17%
Other Non-operating Income	6.15	24.45	298%
Total	62.41	228.26	266%

Other income increased in the current fiscal, primarily due to late payment surcharge received and increase in dividend income.

Cost of fuel

(₹ Crore)

Parameters	FY21	FY22	% change
Cost of Fuel	1,778.14	2,041.09	15%

The increase in fuel cost is primarily on account of increase in international fuel prices.

Expenses

(₹ Crore)

Parameters	FY21	FY22	% change
Employee Benefit Expense	112.32	124.10	10%
Finance Costs	210.10	127.00	-40%
Depreciation and Amortisation Expense	358.07	327.69	-8%
Other Expenses	193.57	406.93	110%

The Company has been able to reduce finance costs due to reduction in borrowings and borrowing costs. Further, other expenses have increased primarily due to loss allowance for impairment of assets and loans and higher mining expenses.

EBITDA and Profit after Tax (PAT)

(₹ Crore)

Parameters	FY21	FY22	% change
EBITDA	875.91	1,272.77	45%
Profit/(Loss) after tax	186.18	569.82	206%

The EBITDA increased to ₹1,272.77 crore in FY22 from ₹875.91 crore in the previous year primarily on account of higher contribution for merchant, long-term sales and higher other income. Consequently, the Company's standalone PAT increased to ₹569.82 crore in FY22 vis-à-vis a PAT of ₹186.18 crore in FY21.



Ratios

Parameters	FY21	FY22	% change	Reasons
Debtors Turnover (number of days)	66	42	-36%	Decrease was primarily on account of increase in turnover.
Inventory Turnover (number of days)	79	88	11%	Increase was due to increase in average inventory.
Interest Coverage Ratio	5.17	13.76	166%	Increase was primarily due to lower interest expense (mainly repayment of borrowings) and higher earnings.
Current Ratio	0.80	2.92	264%	Increase was primarily on account of increase in current assets (mainly increase in inventories, trade receivables, loans and other financial assets).
Debt Equity Ratio	0.14	0.09	-36%	Lower ratio due to repayment/prepayments of borrowings.
Operating Profit Margin (%)	17.87	25.94	45%	Increase is mainly due to higher earnings.
Net Profit Margin (%)	6.29	14.72	134%	

Consolidated Financial Performance

The Company's total Income increased by 22% to ₹8,736 crore from ₹7,160 crore in the previous year. The Company earned an EBITDA of ₹4,138 crore as compared to ₹3,144 crore, up 32%. EBITDA after adjusting for the impact of Karcham Wangtoo tariff order is ₹3,542 crore as compared to ₹3,070 crore in FY21, a growth of 15%. The Company continues to deliver strong EBITDA on the back of stable cashflows from long-term portfolio, superior O&M practices, and gains from buoyancy in the short term / merchant markets.

Consolidated Profit stood at an all-time high of ₹1,729 crore as compared to ₹795 crore in the previous year. PAT after adjusting for the impact of Karcham Wangtoo tariff order is ₹1,180 crore in FY22, a growth of 48%. Total Comprehensive Income for the year stood at ₹3,306 crore as compared to ₹3,023 crore in the previous year. The Consolidated Net Worth and Consolidated Net Debt as on 31st March, 2022, were ₹17,415 crore and ₹6,963 crore, respectively, resulting in a Net Debt to Equity ratio of 0.40 times.

Income & Expense (Consolidated)

Parameters	(₹ Crore)		
	FY21	FY22	% change
Revenue from Operations	6,922.20	8,167.15	18%
Other Income	237.45	568.69	139%
Fuel Cost	3,283.04	3,493.95	6%
Purchase of Stock-in-trade	-	80.21	100%
Employee Benefits Expense	236.63	264.15	12%
Finance Costs	895.65	776.91	-13%
Depreciation and Amortisation Expense	1,166.94	1,131.05	-3%
Other Expenses	495.95	759.84	53%

Risk Management and Mitigation

JSW Energy Limited follows the globally recognised 'COSO' framework of Enterprise Risk Management. Enterprise Risk Management brings together the understanding of the potential upside and downside of all those factors which can affect the organisation with an objective to add maximum sustainable value to all the activities of the organisation and to various stakeholders.

EBITDA and Profit after Tax (PAT)

Parameters	(₹ Crore)		
	FY21	FY22	% change
EBITDA	3,144.03	4,137.69	32%
Profit for the year	795.48	1,728.62	117%
Other Comprehensive Income	2,227.29	1,576.99	-29%
Total Comprehensive Income	3,022.77	3,305.61	9%

The Company recognises that the emerging and identified risks need to be managed and mitigated to:

- Protect its shareholders and other stakeholder's interest,
- Achieve its business objective, and
- Enable sustainable growth.

Pursuant to the requirement of Regulation 21 of the Securities and Exchange Board of India (Listing Obligations and Disclosure Requirements) Regulations, 2015 and Companies Act, 2013, the Company has a risk management framework in place. It has constituted



a committee of Directors, the Risk Management Committee to oversee Enterprise Risk Management framework to ensure:

- Execution of decided strategies with focus on action, and
- Monitoring risks arising out of unintended consequences of decisions or actions related to performance, operations, compliance, incidents, processes, systems and the same are managed appropriately

The Risk management process and structure is given below:

- **Department Heads at Plants:** Identification, assessment, response and tracking of risks is done by the Risk Owners (Department Heads) at respective locations
- **Plant Heads:** Risks identified by the Risk Owners at the plant level is reviewed by the respective Plant Head. Plant-level integration across the Plants is done to ensure consistency in risk identification and benchmarking

- **Senior Management at Corporate:** Risks at all the plants, contingency planning and organisational risks requiring review of macro environment, policies, processes are discussed at the corporate level
- **Board of Directors:** Oversee the Risk strategy and Risk Management framework, reviews the key risks and mitigation plans
- All these activities are coordinated by the Chief Risk Officer



Business Continuity Plan





The Company has a Business Continuity Policy duly approved by the Board. The same can be viewed at www.jsw.in/investors/energy/jsw-energy-corporate-governance-policies. All the major generation plants have formulated Business Continuity Plans (BCP). The main objective of BCP is to maintain business continuity during / post disruptive incidents with an aim to minimise impact on:

- Human life and other living beings
- Environment and related eco systems
- Economic losses
- All stakeholders (such as investors, employees, local communities)



The Company has been conducting awareness and training sessions and mock drills across the Plants on BCP.

Type of Risk / Opportunity	Risk Movement	Impact	Risk Response Strategies
Coronavirus pandemic		<p>Global & domestic economic revival remained under stress due to continued threat of Coronavirus pandemic.</p> <p>The risk to human lives continued due to mutating nature of virus.</p>	<p>The Company continues taking precautionary & proactive measures to control the spread of coronavirus amongst its workforce at workplaces. Various measures such as: -</p> <ul style="list-style-type: none"> • Strict adherence to guidelines issued by various Government authorities, • Compulsory wearing of masks & following COVID-19 appropriate behaviour at Plants & offices, • Compulsory testing of staff returning from outstation travel, • Work from Home facility, • Setting up quarantine centres across all Plant locations. <p>All of the above has helped the Company to manage the pandemic risk.</p> <p>Vaccination remains the key to combat the COVID-19 pandemic. The Company arranged for Vaccination drives across all its Plant locations and offices for employees in collaboration with local hospitals.</p> <p>As on 31st March, 2022, almost entire staff, including associates; are fully vaccinated.</p>
Demand fluctuations - Offtake risk		Demand-supply dynamics impacting power demand & tariff rates	<ul style="list-style-type: none"> • Commissioning of capacity expansion in Dolvi plant of JSW Steel Ltd has increased the power off-take through captive route • The Company focusses on enhancing the sale through long-term PPAs with regulated tariffs and fixed tariffs • The aim is on ensuring an optimum mix of medium, short and long-term arrangements
Portfolio diversification	Harnessing opportunity	<p>Globally, Thermal plants are facing challenges like -</p> <ul style="list-style-type: none"> • Competition from Renewable Energy (RE) (Growing RE PPAs, Government thrust) • Higher coal prices • Rising O & M cost • Low exchange rates • Stringent emission norms requiring higher capital expenditure for emission control 	<ul style="list-style-type: none"> • The Company is expanding its footprints in the Renewable Energy (RE) segment • The Company has secured renewable energy projects from Solar Energy Corporation of India (SECI) of 1260 MW • Further, the Company has tied up for solar and wind Group captive power projects for JSW Steel Ltd of 958 MW • By adding these RE capacities, the Renewable energy portfolio mix would increase from current 30% to 55%

Type of Risk / Opportunity	Risk Movement	Impact	Risk Response Strategies
Raw material availability & cost		<p>During the year, the availability and cost of required grade of coal was impacted by: -</p> <ol style="list-style-type: none"> 1) Overall low coal production globally owing to COVID-19 restrictions. 2) Increased coal demand from European Thermal plants to replace costly gas-based energy. 3) Higher demand from China after banning the Australian coal. 4) Lesser coal output from Indonesian mines due to heavy rains. <p>Prices surged significantly.</p>	<ul style="list-style-type: none"> • The Company has a dynamic coal sourcing policy through diversified sources of supply • Ability to blend various grades of coal gives operational flexibility. <p>The Company continues to manage this risk through -</p> <ul style="list-style-type: none"> • Broadening sourcing options - different geographies, multiple vendors • Prudent hedging strategies to mitigate the foreign exchange fluctuations risk • Various contract options like long-term contracts and monthly / quarterly / spot contracts for cost effectiveness
Regulatory changes	New Risk	<p>Ministry of Environment and Forests (MOEF) notified regulations for 100% utilisation of ash and legacy ash in an eco-friendly and time-bound manner.</p> <p>Any non-compliance would attract financial penalty.</p>	<ul style="list-style-type: none"> • The Company's Plants have been disposing most of their fly ash to cement and brick manufacturers • The legacy ash is being used / would be used in highway expansion projects, land filling during Group companies' expansions; which are permissible eco-friendly ways defined in the MoEF notification • The legacy ash would fully be put to use much before the defined timeframe
Recovery of dues from DISCOMs		<p>Due to poor financial health, payments from the Discoms against our power supply are delayed. This impacts the working capital cash flow.</p>	<ul style="list-style-type: none"> • Regular follow-up for the overdue payments. • The Company has availed bill discounting facility from banks for Discom bills. The interest cost would be borne by the Discoms.
Cyber security		<p>During the COVID-19 pandemic, employees Working From Home (WFH) have been accessing Company's data remotely posing greater cyber security risk.</p> <p>Cyber security risk could result in substantial reputation and financial loss arising from:</p> <ol style="list-style-type: none"> 1. Theft of corporate information. 2. Theft of financial information (e.g. Financial results, bank details etc.) 3. Ransomware – cyber extortion. 4. Disruption to business. 	<ul style="list-style-type: none"> • Secure Virtual Private Network (VPN) enablement for home users • Alternate Disaster Recovery secure VPN created for resiliency • Google advanced phishing and malware protection features • Periodic critical security updates of Operating System (OS) for all the remote endpoints • Information security awareness campaigns • Controlling System vulnerability through - <ul style="list-style-type: none"> • Vulnerability Assessment and Penetration testing for all public facing assets • Implementation of Firewall hardening Rule Sets • Deployment of Firewall remediation tool and improvements done in identified areas
Financial risk		<p>Foreign exchange rate fluctuations and changes in interest rates.</p>	<ul style="list-style-type: none"> • Prudent hedging strategies • Appropriate mix of financing – floating & fixed rate



HR Management

Human capital is one of the key pillars of strategic business growth furthering Organisational Objectives of growth, agility and increased productivity. During the year, while HR initiatives from previous years continued to motivate the employees, we undertook several new HR initiatives as well to drive business efficiency. We continued to focus on our key initiative CARE which is based on four critical elements of Communication, Agility, Responsibility and Elevation. CARE enables us to create a superior employee experience and make the Company an engaging workplace which in turn drives business objectives with ease.

The CARE Model of JSW Energy

A well-communicated employee who is Agile, becomes Responsible and is Elevated. This is the principle of the CARE model which is designed to create superior employee engagement.

- **Communication:** Engagement with employees at various levels is established through a multi-level communication structure, encompassing multiple channels. This structure not only enabled us in employee engagement but also led to grievance redressal mechanisms. Knowledge management enables to plough back organisational learning in solving business problems.

- **Agile:** A 3-tier analytics training programme enables creation of analytical problem-solving facilitators and experts. This encourages greater employee engagement through our improved capability building practices.
- **Responsible:** Several problem-solving practices have been designed to create engagement within the organisation. The Company strives to cascade the policies to the last level of employees with the help of problem-solving experts. Other activities like the Kaizen culture and the QC activities were also introduced in the shop-floor.
- **Elevated:** Helps to evaluate and reward all good improvements in the organisation. Multi-level R&R system for Kaizens and Improvement Projects-J2/J3 projects were instituted to engage contributing employees.

Employee Safety

At JSW Energy, mandatory compliance of all stakeholders with "10 JSW Critical Safety Rules" allows covering critical safety practices to achieve reduction in injuries and illnesses. Employees are encouraged to anticipate, address and mitigate any hazards at the workplace if deemed to be unsafe.

TQM

We, at JSW Energy, embarked on Total Quality Management "TQM" as a part of our sustainable journey. TQM has been embedded in our business culture and acts as an important tool to help us achieve our objectives and further the culture of "Better Every day". The integrated TQM framework is used as the guiding principle to drive TQM practices in the Company. TQM orientation in the Company has led to various recognitions for the Company at different forums. TQM techniques are regularly deployed in operations and maintenance processes for achieving consistent quality and efficient performance.

JSW Energy Limited focusses mainly on utilising the digitisation tools in its TQM journey to accelerate, penetrate and expand its reach to everyone. The Company has also successfully launched Digital TQM Dashboard to monitor systems and to strengthen the continuous improvement culture. As part of TQM Digitisation journey, BIOS has been incorporated in Qlik scene for better monitoring of KPIs. At department level, there is a daily management board which is displayed in each and every control room for monitoring the deviation in KPIs and it helps us take the corrective action in timely manner.

Further, our operational KPIs are compared with internal and external benchmarks to achieve higher production, better productivity and yields. We continuously undertake cross-functional improvement programmes under Total Quality Management (TQM) for operational efficiency, cost management, waste reduction, energy efficiency, etc.

During the pandemic-impacted year, we revisited the various aspects of fixed costs to ensure reduced expenditure and maintain healthy cash flows. Also, with increased production capacities, the emphasis has been on simplifying and synergising operations across sites for optimal utilisation of resources to reduce costs. Total Quality Management (TQM) remained a key focus in the organisation during the pandemic to mitigate the business risks during uncertain industry environment and to drive the organisation towards its growth path.

In addition to these, the journey towards TQM as a way of working has been initiated through the deployment of quality circles for SGA (Small Group Activity), DM (Daily Management) practices. Quality Circle teams participated in CCQC, NCQC and ICQCC and won numerous awards and accolades for the Company.

S. No.	Chapter	Number of Medals
1	CCQC-2021	23
2	NCQC-2021	19
3	ICQCC-2021	18

The Company is on-track in its TQM journey. A total of 25+ J2 projects, 400+ Kaizens and 50+ Quality Circle projects were implemented in the organisation. These initiatives resulted in cost optimisation and ensured positive cash flows from operations.

CSR

Inclusive social and economic growth is an integral part of our belief system with equal opportunities to communities at large. JSW Foundation, the social development arm of the JSW Group carries out social development activities for the Company, through continuous and purposeful engagement with the local communities. We aim to create a value-based and empowered society to provide the right opportunities to communities for holistic and inclusive development. We work for different social issues like hunger and poverty eradication, tackling malnutrition, promoting social development, addressing social inequalities by empowering the vulnerable sections of the society, various environmental issues, preservation of national heritage and promotion of sports training. All this work is carried out with the support from the Foundation.

CSR Framework

Our CSR interventions are well supported, planned and executed by the JSW Foundation. The Board has constituted a CSR Committee which approves and administers all the initiatives. According to the Company's CSR policy, the Committee periodically reviews progress at different levels, as the Company recognises the importance of synergy and interdependence at various levels throughout the organisation. To foster sustainable growth of both community and individuals, we adopt several intervention strategies.

The strategies adopted in this regard are as follows:

- The villages in the immediate vicinity of the plant locations, are defined as Direct Influence Zone (DIZ) and given utmost priority. Every plant is free to define their own DIZ as per the policy along with the provision for expansion for scope as per the scale of operations. Also, the scope for certain programmes is allowed to be expanded to Indirect Influence Zone (IIZ) which covers areas beyond the geographical purview of DIZ



- Several quantitative and qualitative methods are used to carry out need assessment and based on specific measurable impacts, programs are thus designed. Implementation is then ensured either through the Foundation directly or in partnership with the government and civil society groups at various levels
- In each sector, interventions are designed to cover social mobilisation, advocacy at various levels, and/or appropriate policy changes

For details of the CSR initiatives undertaken by the Company during FY22, please also refer to:

- Annexure B to the Board's Report for the Annual Report on the CSR activities, starting on Page 237
- Our Sustainability Report's Chapter on Social Development starting on Page 72-81
- Our Business Responsibility and Sustainability Report starting on Page 162

Internal Control

In keeping with the size and nature of its business and complexity of its operations, we have designed a strong system of internal control, which includes following significant features:

- Preparation of annual budgets and its regular monitoring
- Deployment of integrated ERP system to effectively control transaction processing and ensuring integrity of accounting system
- Well documented authorisation matrix, policies, procedures and guidelines covering all important operations of the company
- Deployment of compliance tool to ensure compliance with laws, regulations and standards
- Ensuring reliability of financial information by testing of internal financial controls over reporting by internal auditors and statutory auditors
- Adequate insurance of company's assets / resources to protect against any loss
- A comprehensive Information Security Policy and continuous updating of IT systems
- Oversight by the Board-appointed Audit Committee which comprises of Independent Directors who are experts in their field

All audit plans are reviewed by the Audit Committee at periodic intervals to ensure adequacy of internal controls. It reviews significant audit findings and ensures audit recommendations are effectively implemented.

Internal Audit

JSW Energy has an inhouse Internal Audit function that inculcates best global standards and practices of international majors into its operations. The Company has a strong Internal Audit Department that reports to the Audit Committee comprising of Independent Directors who are experts in their respective fields. The Company successfully integrated the COSO framework with its audit process to enhance the quality of its financial reporting compatible with business ethics, effective controls and governance. The Company extensively practices delegation of authority across its team, which creates effective checks and balances within the system to identify and correct all possible gaps. The Internal Audit team has access to all information in the organisation facilitated by the ERP implementation across the organisation.

The Internal Audit Department prepares risk-based audit plans whereby the frequency of audit is decided based on the risk ratings of the respective areas/ functions. The audit plan is approved by the Audit Committee and executed by the Internal Audit team. It is reviewed periodically to include areas that have assumed significance in line with emerging industry trends and growth of the Company. In addition, the Audit Committee also places reliance on internal customer feedback and other external events for the inclusion of additional areas into the audit plan besides regularly reviewing significant Internal Audit findings.

Internal Financial Control

As per Section 134(5)(e) of the Companies Act 2013, the Directors have overall responsibility for ensuring that the Company has implemented a robust system and framework of Internal Financial Controls. The Company had already developed and implemented a framework for ensuring Internal Controls over Financial Reporting. This framework includes entity-level policies, processes controls, IT General Controls and Standard Operating Procedures (SOP).

The entity-level policies include anti-fraud policies (such as code of conduct, conflict of interest, confidentiality and whistleblower policy) and other policies (such as organisation structure, insider trading policy, HR policy, IT security policy, treasury policy and business continuity and disaster recovery plan). The Company has also prepared a risk control matrix for each of its processes such as procure to pay, order to cash, hire to retire, treasury, fixed assets, inventory and manufacturing operations. These Internal Controls are reviewed by the Internal and Statutory Auditors every year.