

Environmental Stewardship



One of the greatest challenges the planet will face in the near future is to produce sufficient decarbonised energy to support the economic growth where operating excellence and technology innovation are the key factors for winning this challenge. We, at JSW Energy, are committed to shape a cleaner energy for fuelling future growth. The technological solutions to achieve this are available and are being developed. This decade will witness disruptions in technology of generation, storage and use of energy. JSW Energy is prepared to address and lead this challenge of energy transition.



Prabodha Acharya
Chief Sustainability Officer

JSW Energy is committed towards empowering the nation while preserving the environment. Hence, it believes in the importance of addressing key global environmental issues like climate change, water management, emission reductions, and bio-diversity

conservation, among others. As a responsible business player, we have endorsed our commitment to manage and mitigate the environmental concerns. We have established policies and frameworks to monitor KPIs across each focus area.

Our Key Business Prerogatives

- Accelerated and sustainable growth;
- A future-ready organisation, powered by increased investment in innovation and technologically advanced platforms; and,
- ESG excellence and attractive returns.

As a leading player in the global energy sector, we have formulated strategic plans to reduce our environmental footprint and associated risks. We have pledged to various climate-related initiatives such as SBTi, Global Framework for Decarbonising Heavy Industry, Responsible Energy Initiative India, becoming a Net-Zero Company by 2050, and strengthening investments in renewable energy sources, among others. Our commitment and progress towards SBTi demonstrate our common, robust and science-based understanding of Net-Zero and thorough inclusive and transparent disclosures. Our commitment towards climate change initiatives and targets has also been accepted at the **UN ENERGY COMPACT**.

Our commitment to environmental stewardship can be clearly seen with JSW Energy being awarded the **leadership band of A -** against the sector average of B - making it the only energy company in India to achieve this feat in **CDP Climate change disclosures**. We are recognised for implementing the best practices in corporate transparency and climate change action among 13,000 companies.



Policies that steward the Environment pillar at JSW Energy

- Climate Change
- Energy
- Raw Material Consumption
- Water Resource Management
- Waste Water
- Waste Management
- Air Emissions Management
- Biodiversity
- Local Considerations

For details on each policy, visit our website:

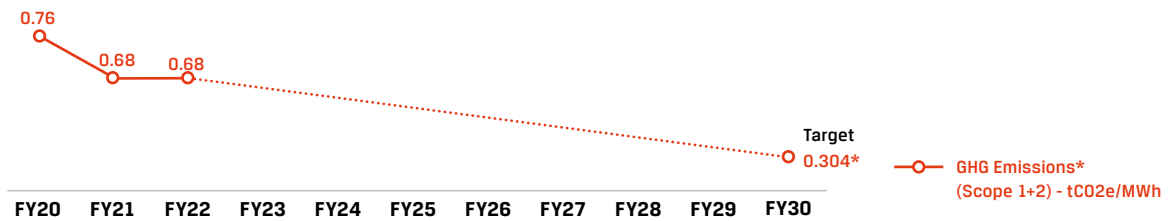
<https://www.jsw.in/investors/energy/jsw-energy-sustainability-policies>

Target For Environment Sustainability

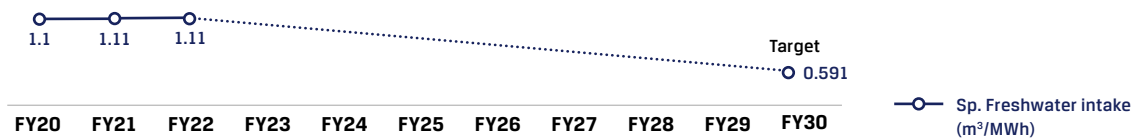
Env. Parameter	KPI	Actuals			Target
		FY20	FY21	FY22	FY30
Climate Change	GHG Emissions (Scope 1+2) - tCO2e/MWh	0.76	0.68	0.68	0.304*
Water Security	Sp. Freshwater intake (m³/MWh)	1.1	1.11	1.11	0.591
Waste	Waste - Ash Utilisation (%)	100%	100%	96.9%	100%
	Sp. PM (Kg/MWh)	0.16	0.14	0.14	0.05
	Sp. SOx (Kg / MWh)	1.78	1.65	1.52	0.68
Air Emissions	Sp. NOx (Kg/MWh)	1.01	0.95	0.81	0.37
	Biodiversity at our Operating sites				Achieve no 'Net loss' of Bio-diversity

Our Key Performance Indicators are illustrated below:

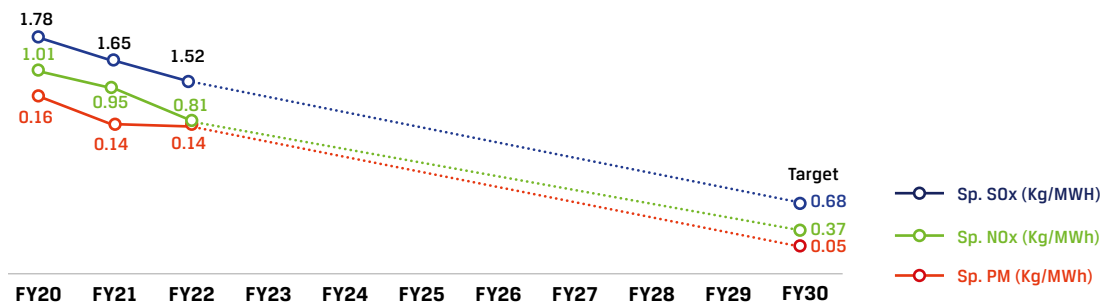
Climate Change



Water Security



Air Emissions



* GHG Target shall be aligned to the SBTi, which has been submitted and is under approval

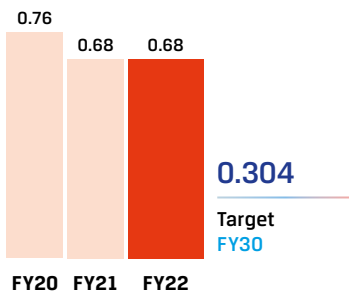
Climate Change – Building Resilience



Targets

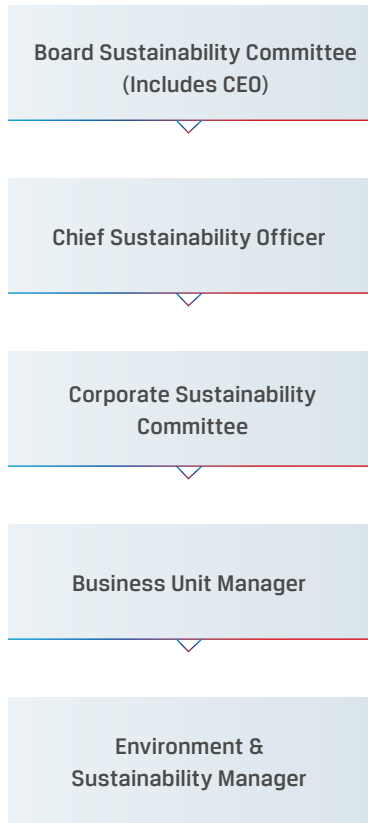
Reduce our carbon emissions by more than 50% (baseline 2020) by 2030.

GHG Emissions Intensity (tCO₂e/MWh)



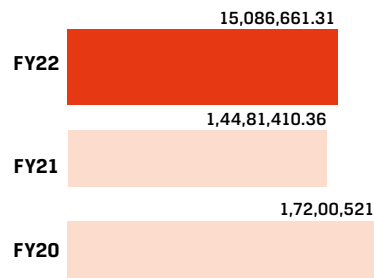
Being an energy company, we will take the leadership in decarbonising the energy supply in India and contribute to its achievement of Nationally Determined Commitments. Climate change is the prominent emerging risks for any energy business. Hence, it requires the development of resilient infrastructure and futuristic strategic planning. At JSW Energy, we are cognizant of the significant impact that climate change risk poses on our infrastructure landscape. We reaffirm our commitment to SDG 13 "Climate Action" to take urgent action for combating climate change and its impact. We have pledged to achieve Net-Zero operations by 2050 and have strategised plans to diversify our investments towards the Renewable Energy portfolio. We have set up a target of enhancing our capacity to 10 GW by FY25 and 20 GW by FY30 from the current 4.6 GW over the next decade. We periodically analyse the financial and non-financial impact of climate change risk on our operating sites and remain committed to maintain transparency in disclosing all the appropriate information. We carry out extensive climate risk assessments across all power plant locations in alignment with TCFD requirements. The ultimate responsibility of ensuring the management approach and availability of internal systems to mitigate material climate-related risks and issues rests with the Board. The Sustainability Committee of the Board coordinates the actions to be taken at the plant level as a part of its executive-level responsibility.

Focus Areas	KPI's	Unit	FY 21-22	FY 20-21	FY 19-20
Climate Change	GHG Emissions Intensity	tCO ₂ e/MWh	0.68	0.68	0.76

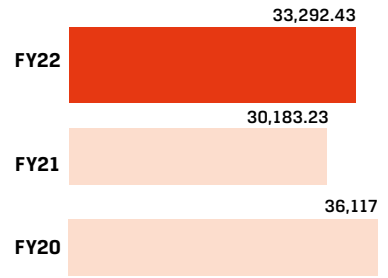


During the current year, the Company has made a good progress to achieve its future targets by reducing its carbon emissions by 11% as compared to the baseline year. JSWEL reaffirms its commitment towards its path in combating climate change and is making continuous efforts towards its goal to become a Net-Zero Company by 2050.

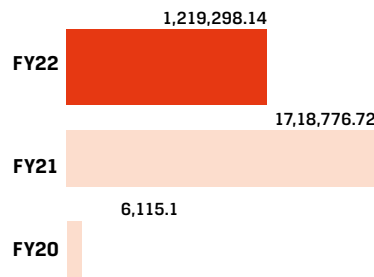
Scope 1 (tCO₂e)



Scope 2 (tCO₂e)



Scope 3 (tCO₂e)



Scope-3 GHG emissions covers -

1. purchased goods and services,
2. capital goods,
3. fuel and energy,
4. upstream transportation,
5. waste generated in operations,
6. business travel,
7. employee commute, and
8. upstream leased assets (limited to third party vehicles in Vijayanagar).

Offset of GHG at JSW Energy Hydro Plants

Carbon credits and carbon markets are a component of national and international attempts to mitigate the growth in concentrations of greenhouse gases (GHGs). One carbon credit is equal to savings of one tonne of carbon dioxide (tCO₂e), or in some markets, carbon dioxide equivalent gases (tCO₂e) which in a usual business scenario would have been emitted. Carbon credit trading aims to allow market mechanisms to drive industrial and commercial processes in the direction of low emissions or less carbon intensive approaches than those used when there is no cost to emitting carbon dioxide and other GHGs into the atmosphere. The use of proceeds of such carbon credits can, but not limited to, be used to finance projects that intend to reduce carbon emissions.

JSW Energy has two hydro power plants which are located at Karcham and Baspa with installed capacities of 1091 MW (Approved 1045 MW) and 300 MW respectively. These projects have been registered in the Clean Development Mechanism (CDM) which is the first global, environmental investment and credit scheme of its kind, providing a standardised emissions offset instrument, Certified Emission Reductions (CERs). Offsets, on account of Hydro power generation, are 4.37 million tonnes for FY 2021-22.

SDG's Impacted



TCFD Alignment

Our climate risk assessment and management is aligned to TCFD and the same is delineated below:

Governance

Our Board members and senior management take an active role in defining and steering the Company's climate actions. Every level of our governance structure participates in assessing the risks and opportunities that climate change poses to the company.

Board Oversight

At the Board level, the Sustainability Committee and the Risk Management Committee are primarily responsible for reviewing climate-related risks and opportunities during their biannual meetings. These committees have open channels of communication with each other allowing them to collaborate as and when necessary. Some of the key climatic themes that were covered by the committees over the course of this year included our Net-Zero commitment, SBTi commitment, UN Energy compacts and the ESG performance of the company.

Management Oversight

The executive committee, comprising of Joint Managing Director (JMD) & CEO, Director (Finance) and Head of Plants along with their direct reportees, supported by Chief Sustainability Officer (CSO), are responsible for closely reviewing and governing climate-related matters on a month-on-month basis.

Additionally, climate-related considerations and parameters have also been integrated within our current Enterprise Risk Management (ERM) framework which is built on the globally recognised Committee of Sponsoring Organizations of the Treadway Commission (COSO) framework.

Scenario Analysis

Climate-related scenario analysis is based on Inter-Governmental Panel on Climate Change (IPCC) forecasting models (Representative Concentration Pathways), and also integrating the requirements of Nationally Determined Contributions (NDCs). Through the aforementioned scenarios, we examine climate change related short-term and long-term risks along with geopolitical developments.

In line with RCP 8.5, we have developed three scenarios – short-term (0 to 3 years), medium-term (3 to 10 years), and long-term (10 – 30 years) – in such a way that it augments our strategic and industrial expansion plans. The selected time horizons are identified as per our decarbonisation targets. The physical risks scenario is modelled in line with RCP 8.5 which

indicates a baseline scenario in which emissions continue to rise at the current rates. Accordingly, our climate models use the global climate data which is downscaled to fit specific Indian regions.

It has been observed that climate variables like heat wave, temperature rise, sea-level rise are prominent risks for us in the long term. On the other hand, increased frequency of floods is a prominent risk in the short term. These climate models suggest that most regions in which we operate will have a temperature rise of around 2°C. We have quantitatively established the risks associated with each of these climate variables and are working towards climate-related physical risk assessment in other IPCC scenarios.

JSW Energy continues to make efforts to combat climate change not only by safeguarding itself against risks and embracing the opportunities but also by making efforts to bring a greater change by providing access to cleaner and greener energy options to the larger society.



Key Climate Change Risks and Opportunities

<p>Physical risks</p> <p>Physical risks resulting from climate change can be event driven (acute) or longer-term shifts (chronic) in climate patterns.</p>	<p>Chronic:</p> <ol style="list-style-type: none"> 1. Water unavailability leading to significant operational impacts to our plants located in regions with high water stress. 2. Disruption of operations due to extreme heat waves caused by the temperature change. <p>Acute: Extreme climatic events like intense rainfalls, cyclones leading to flooding which may result in operational shutdowns and/or service disruptions, unstable raw material procurement.</p> <p>Mitigation Strategy: We are diversifying our operations across India and are committed to expand widely in RE which does not require any raw materials during the operational phase. All our plants are zero liquid discharge plants and we aim to maintain this status while reducing the specific fresh water consumption in the years ahead. We are also evaluating the modalities to improve the water conservation and build an additional storage facility to avoid any effect on the operations due to water scarcity. While these measures help us in increasing the resilience of our operations, we will work towards setting up the systems to monitor the weather patterns (especially rainfall patterns) to understand the likelihood of these risks occurring in the near term.</p>
<p>Transition risks</p> <p>Transitioning to a lower-carbon economy may entail extensive policy, legal, technology, and market changes to address mitigation and adaptation requirements related to climate change.</p>	<p>Policy: Increasingly stricter environmental laws and regulations such as the Perform, Achieve, and Trade (PAT) mechanism, Carbon tax, Increased Coal Cess – altogether potentially increasing the cost of production and lower profit margins.</p> <p>Market:</p> <ol style="list-style-type: none"> 1. Change in consumer preferences with increasing demand for renewable energy to substitute thermal energy. 2. Risks associated with the volatility of prices of coal as well as its quality. <p>Technology: Financial non-viability of capital intensive low-carbon technologies and the associated challenges in adopting to these breakthrough technologies.</p> <p>Reputation: Adverse impacts of our business decisions on our social licence to operate which is intrinsically tied to our contributions towards the well-being of the wider community and environment affecting our standing with our investors as well as society at large.</p> <p>Mitigation Strategy: We are in the process of substituting the coal-based boilers at one of our location with the waste gases from our Group company, JSW Steel. This avoids the need for fossil fuel thereby reducing the policy and market risks. Our ICP of 12 USD/tCO₂e of carbon will allow us to adopt a balanced view of the feasibility of any proposed low carbon in the near and medium term, ensuring that we continue in our low carbon journey without losing our competitive edge.</p>
<p>Opportunities</p>	<p>We see the increasing demand for renewable energy as an opportunity for JSW Energy alongside India's commitment to have 500 GW of fossil free energy by 2030.</p> <p>We are committed to expand only in the renewable space and by 2030, 85% of our power mix is expected to be from RE which is a significant increase from the current levels of 30%.</p> <p>Furthermore, increasing policy and regulatory push towards low carbon growth creates advantage for our ongoing expansion plans to have 20 GW by 2030.</p> <p>Our commitment to be a Net-Zero company by 2050 is further supported by our Science Based Targets (SBTi) taken for 2030. We are also working towards ultra low carbon technologies like green hydrogen and CCUS (carbon capture and utilisation and storage) that can have a positive impact in promoting the decarbonisation of other industries.</p> <p>While we recognise that not all of these measures are viable today, we are continuously monitoring the landscape to ensure that we do not miss the bus on any of these opportunities as and when they do turn the corner.</p>



Energy

Mitigating the impact of climate change on the nature and on people requires a rapid global build-up of renewable energy. As the world is transitioning to clean energy fuels, it is imperative for the energy industry to expand its investments in evolving renewable energy landscapes. At JSW Energy, we are augmenting our renewable energy portfolio with diversified investments in Solar, Wind, Hydro and green hydrogen projects. In addition, to limit the global temperature rise to 1.5°C in line with Paris Climate Accords, we are deploying various energy conservation initiatives at our operating plants with the aim of progressing towards a low-carbon future.

working towards deployment of diversified energy sources in our operations with low carbon emissions, as evidenced by our Net-Zero commitment.

We are also making strenuous efforts to implement the energy-saving initiatives which will result in increased operational efficiency at our plants and subsequently reduce associated GHG Emissions.

For details on Energy Conservation initiatives, refer Pg No. of Intellectual Capital.

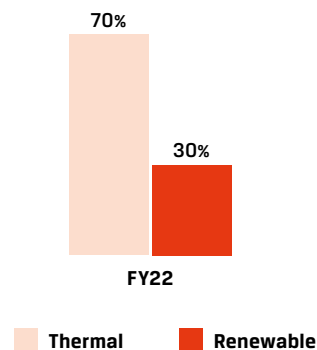
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Targets

- Enhance the Renewable Power to 4/5th of our Total Installed Capacity by 2030
- Reduce our Energy Intensity and Auxiliary Power Consumption by more than 50% by 2030

Our energy consumption is sourced from renewable and non-renewable sources like coal, lignite, solar and hydro-power. We are

Thermal / Renewable Installed Capacity Mix (%)





Value Creation Story – 225 MW Solar Power Plant

Strategic Objective

Being committed to become carbon neutral by the year 2050, JSW Group has been exploring all possibility to generate and use green power.

Summary

- JSW Energy Limited has set up a 225 MW Solar Power generating plant through its wholly-owned subsidiary JSW Renewable Energy (Vijayanagar) Limited at Thimalapura village of Sandur Taluka, Bellary district and supplies power to JSW Steel Plant of Vijayanagar through 400 kV dedicated transmission corridor
- The plant is installed on approximately 1000 acres' land spanning over three villages within a period of 12 months, in April 2022
- The complete plant is well automated with the help of SCADA system and provides access to generation and control to multiple locations

Key Impacts created

- It is one of the largest captive Solar Power Plants installed to supply power to any Steel Manufacturing Industry in the country at 400 kV
- Budgeted energy generation from the said plant is 527 MU's in the first year of operation
- The solar plant has been installed in a safe manner complying to all EHS norms of JSW Group and without any Loss Time Injury (LTI)

SDG's Impacted



Renewable Energy

JSW Energy's Target: Increase the share of Renewable Energy to 85% by 2030

The transition to a low-carbon economy encompasses the expansion of the Renewable Energy portfolio of JSW Energy. This will play a significant role in combating climate change, while also meeting the national target of energy independence. The government policies are inclined towards encouraging renewable energy projects in the country to meet its ambitious target of installing 500 GW of renewable capacity in India by FY30, for which several incentives have been made available to the interested organisations.

Aligned with the nation's energy ambition, JSW Energy intends to increase its renewable portfolio share to 70% by FY25, reaching a total capacity of 10 GW. It plans to further increase the RE portfolio share to 85% by FY30, reaching 20 GW installed capacity. Through Hydro and Solar plants, JSW Energy offsetted 43,80,420 tCO₂e in FY 2021-22. In addition, it is also proactively exploring the opportunity for establishing waste-to-energy projects for utilisation of waste gases from manufacturing plants of JSW Steel. Further, the recent developments in the manufacturing of cost-effective solar panels will lead to reduced direct costs. This will provide the pace for JSW Energy to participate in India's transition to a low-carbon economy.

Value Creation Story – Energy Compacts

Strategic Objective

JSW Energy has voluntarily committed to accelerate the adoption of clean, affordable energy and achieve Net-Zero status by 2050 fast-forwarding India's commitment towards Net-Zero.

Summary

- In line with JSW Energy's Net-Zero commitment, our application to **UN Energy Compacts** is accepted.
- JSW Energy has set a vision of becoming a 10 GW company by 2025 and 20 GW company by 2030, with all the incremental capacity additions coming predominantly from the Renewable Energy sources. In achieving this vision, JSW Energy has committed to become carbon-neutral by 2050.

Target(s)

To increase the renewable energy share in JSW Energy's mix generation to 80% by 2030.

Key Impacts created

Supporting India's Panchamrita pledge in COP 26 to enhance India's non-fossil energy capacity to 500 GW by 2030.

SDG's Impacted



ENERGY COMPACTS

Submission of JSW Energy

JSW Energy has set a vision of becoming a 10 GW company by 2025 and 20 GW company by 2030, with all the incremental capacity additions coming predominantly from the Renewable Energy sources.

In achieving the vision JSW Energy has committed to become carbon-neutral by 2050.

Target(s): To increase the renewable energy share in JSW Energy's mix generation to 80% by 2030

- Time frame: 2030 (10 years)
- Baseline: 2020-21 (30% of mix)
- Target: 2030 (80% of mix) Operating Capacity of 20GW out of which Renewable Energy Share will be about 16.8 GW.





Green Bonds

JSW Hydro Energy has raised funds through the issuance of green bonds for its Hydro-based power plants. Green Bonds have been issued in FY 2021-22 and more issuances are likely to be done in the future as well. As part of its broader sustainability strategy, JSW Hydro Energy has established a Green Bond Framework. The purpose of this Framework is to have a single robust methodology in place for all future Green Bonds, ensuring that for each instrument issued, the principles of this Framework apply. The Framework is aligned with the ICMA Green Bond Principles ("GBP", 2018), which are a set of voluntary guidelines that recommend transparency and disclosure and at the same time promote integrity in development of a sustainable finance market. The instrument has proved effective for JSW Energy to collate its investments for clean energy projects.

The Framework is presented through the following key pillars:

Use of Proceeds:

JSW Hydro Energy will refinance river hydropower green projects where an amount equal to the net proceeds raised through any green bonds will be allocated to the financing and refinancing of these eligible Green Projects.

Process for Project Evaluation and Selection:

The evaluation and selection process ensures net proceeds are allocated to projects that meet the set criteria. For the assessment of Eligible Green Projects teams from Finance & Accounts and Sustainability get involved to take the evaluation forward to its conclusion. This team will govern the process and is responsible for:

- Evaluating the compliance of proposed projects
- Approving the inclusion of pre-selected Eligible Green Projects in our Green Project Portfolio. The Committee has full discretion to object the inclusion of any project
- Monitoring and managing the Green Project Portfolio and corresponding Green Bond net proceeds through a virtual register which captures the initial and continued assignment of Eligible Green Projects to the Green Project Portfolio

- Replacing projects that no longer meet the Eligibility Criteria or due to any divestments
- Observing developments in the sustainable financing markets and approving updates in the Framework to reflect changes in corporate strategy or market developments

Process to mitigate environmental and social risks stemming from eligible projects:

JSW Hydro Energy's environmental and social risk assessment process ensures that the hydropower projects undergo a formal Environmental Impact Assessment (EIA), stakeholder consultations, preparation of an Environmental Management Plan and receives an environmental clearance from the appropriate authority in line with the requirements of the relevant regulations as formulated by the national Ministry of Environment and Forestry.

Management of Proceeds:

JSW Hydro Energy will establish a Green Project Portfolio and track the allocation of net proceeds from any Green Bonds issued to Eligible Green Projects. All Eligible Green Projects must meet the Eligibility throughout the term of the Green Bonds. If an Eligible Green Project ceases to fulfil the Eligibility Criteria or exit our portfolio, JSW Hydro Energy will, on a best effort basis, substitute the project as soon as reasonably practicable.

Reporting:

JSW Hydro Energy is committed to be as transparent as possible and will publish a Green Bond Report including allocation and impact reporting which will be publicly available on our investor relations page at (<https://www.jsw.in/energy>) within one year from the issuance of any Green Bonds and update it annually until full redemption.

External Review:

JSW Hydro Energy has engaged an external verifier to review the Green Bond Framework. The independent Second Party Opinion (SPO) on the Framework's environmental credentials and its alignment with the Green Bond Principles has been received by Sustainalytics. The independent SPO is published on our investor relations website at (<https://www.jsw.in/energy>).

Internal Carbon Pricing (ICP)

Internal Carbon Pricing (ICP) is used by companies to carving out plans to reduce carbon emissions. JSW Energy is amongst India's leading private power producing companies. Over the years, JSW Energy has enhanced its power generation capacity from 260 MW to 4,559 MW. The Company has set a vision of becoming a 10 GW company by 2025 and a 20 GW company by 2030, with capacity additions coming predominantly from renewable energy sources. By embracing modern green energy as its foundation for dynamic growth, the Company is transforming itself to ensure that it becomes a 'Net-Zero' contributor of greenhouse gas (GHG) emissions by 2050 or even earlier.

Value Creation Story – Internal Carbon Pricing

Strategic Objective

JSW Energy has committed to the Science Based Targets initiative (SBTi) and has set targets for CO₂ reduction to 70% from its 2020 emission level of 0.76 tCO₂/MWh. To fulfil these commitments, the Company is using an internal carbon price (ICP) as a lever to drive clean technology implementation and diversify as a renewable and sustainable company.

- Make informed decisions and incentivize low carbon product developments;
- Use ICP as a preparatory tool for future climate change policies; and better understand the potential impact of carbon pricing on the profitability of the projects and initiatives.

Summary

JSW Energy has adopted a shadow price for arriving at the Internal Carbon Pricing and methodology of selecting a shadow carbon price primarily consists of five steps:

- Review and compile existing carbon pricing regulations and trends;
- Review future projections for carbon pricing regulations;
- Review of peer carbon prices;
- Mathematically analysing the carbon prices and its applicability context across sectors and regions; and
- Understanding the sectoral context (in this case, power/energy) and also understanding the regional context.

The Company evaluated the carbon prices in developed and developing economies, including several Asian countries, and has arrived at an ICP range of USD 10-12 per tCO₂e. Key Impacts created:

- ICP provides the required leverage for JSW Energy for transitioning to low-carbon investments by also incorporating the impact levels of emissions in future, as impact will significantly accumulate over time
- By adopting an ICP, coupled with other supporting decarbonisation strategies and levers, JSW Energy aims to:
 - Prioritise climate-related risks and capitalise on opportunities;

SDG's Impacted



Heavy Industries Decarbonisation Route

JSW Energy is advancing in the transition to a low carbon economy in India by walking its decarbonisation path. Heavy industrial emissions account for nearly one-third of global greenhouse gas emissions, which provides the chambers for reduction of GHG emissions. At JSW Energy, we are reinforcing this transition by aligning with the global movement to achieve the ambitious target of limiting the global temperature rise by 1.5°C in line with the Paris Agreement. We have also committed to SBTi 1.5°C business ambition pledge. We have declared our commitment to carbon neutrality by 2050 and also developed an emission reduction target in line with the SBTi's criteria. Further, we have also endorsed the global framework principles for decarbonising heavy industries which was publicly released in February 2021 to support policymakers decarbonise their heavy industries as part of COVID-19 economic recovery plans. The framework sets out six core principles which clearly delineates the strategies for policy makers to ensure the successful decarbonisation of steel, cement, chemicals and other heavy industries.



We are happy to support the Global Framework Principles on Heavy Industries initiative. Industrial emissions account for nearly a third of global greenhouse gas emissions, which means this is a critical area to focus decarbonisation effort to help limit global warming to 1.5°C. At JSW Energy, we have committed ourselves towards carbon neutrality by 2050 and setting science based targets as per the SBTi.



Prashant Jain
Jt. Managing Director and CEO

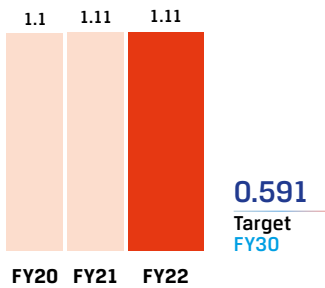


Water Resources

Targets

Reduce our water consumption per unit of energy produced by 50% by 2030

Sp. Freshwater Consumption (m³/MWh)



Access to clean, safe and reliable water is vital for the development and sustenance of our operations. In thermal power plants, water remains the medium of production. Water also finds its usage in cooling, ash disposal, heat removal in plant auxiliaries, and various other consumptive purposes such as fire fighting and gardening. As we increase our renewable energy capacity, water will continue to play a significant role.

At JSW Energy, we recognise the need for the efficient management of water resources within and outside our operating sites. We take myriad efforts to increase water use efficiency, while also ensuring its availability for all stakeholders. We have streamlined our institutionalised systems to identify, manage and report water-related issues. Through active engagement with stakeholders, we intend to identify water-related risks and opportunities in and around our operating sites. We proactively strategise our plans to effectively manage the identified risks and implement sustainable solutions for watershed management in our operating locations.

At Ratnagiri, rainwater harvesting is done by construction of dams near Vinayakwadi township with a water storage capacity of 35,000 cubic metres which is pumped to clarified water storage tank near the plant from July to December. In FY22 about 2,35,321 cub. mtr water was pumped from rainwater harvesting facility to the plant for process and drinking water use. We have also conducted detailed Water Audit for Vijayanagar plant and evaluated the water saving opportunities where the potential water saving per day is 2,435 kLD/day. In FY 2021-22, the total water consumption stood at 24,869 million litres. The water consumption at Barmer plant is based on the billing done at the withdrawal point of the Indira Gandhi canal from which the value of the water stored in the plant reservoir is deducted to arrive at the consumption values. We are in the process of further improving the monitoring of water consumption.

Focus Areas	KPI's	Unit	FY22	FY21	FY20
Water Resources	Water Consumption	Million kL	24.87*	23.69	23.36

* Excluding 3.4 million kL of stored water.



Value Creation Story – Access to Clean and Safe Water

Strategic Objective

For making water available as a resource throughout the year to the desert community in the Great Indian Desert, Thar.

Summary

JSW Energy (Barmer) has synergised its contribution to conserve nature and natural resources in larger interest of all the existing life forms of the desert ecosystem. JSWEL has initiated the following three major projects for ensuring the access to clean and safe drinking water among the surrounding communities:

- Revival of rangelands and restoration of village reservoirs to collectively prepare the desert dwelling communities to mitigate likely impact of climate change
- Installation of hand pumps to avoid the drudgery of the female population
- Rural water supply scheme

Key Impacts created

- Rejuvenation of ponds to deal with extreme environmental conditions for the benefit of the community
- Small habitations set in difficult and remote locations are being addressed through tapping groundwater sources wherever potable quality exists
- Prudential utilisation of piped water and collective management of distribution and maintenance assuring minimum wastage and good running condition of RWSS in community interest

period, we have mobilised our watershed management program "Restoration of Traditional Community Water Bodies" in the Barmer district of Rajasthan. This involves restoration of ponds and tanks close to the thermal power plant. The program also includes development of associated catchment areas. Through this program, 15 prominent water bodies in Barmer district have been restored, resulting in increased storage capacity of these water structures in drought-prone region, which was beneficial in harvesting rainwater.

Water saving initiatives at Ratnagiri plant

Ratnagiri plant receives treated water from MIDC having its treatment plant at Nivali. Distance between Nivali WTP and Jaigad plant is 50 km. Quarterly walk through are arranged along this pipe line to inspect and arrest leakages.

Rainwater harvesting is done by construction of dam near Vinayakwadi township. Water storage capacity of this dam is 35,000 cub.mtr. Manual interventions are constructed at upstream side of dam to increase water hold-up. Water is pumped to clarified water storage tank near plant from July to December from this facility. Raw water is treated at two nos. of automatic water treatment plant of capacity 50 cub. mtr. per hr each. Two nos. of pumps are installed at this dam to pump and utilise about 2,000 m3 per day during rainy season. In FY22 about 2,35,321 cub. mtr. water was pumped from rainwater harvesting facility to plant for process and drinking water use.

Flow meters are installed at various distribution point and consumption is monitored and recorded on daily basis.

From clarified water storage tank, water is supplied to labour colony situated adjacent to the plant. By arresting leakages and operating tank inlet valves at predetermined time, water consumption is reduced to 500 m3 per day from 700 m3 per day.

Sewage water is treated in STP and treated water is utilised for gardening. Effluent of demineralise water treatment and Boiler water blowdown water is used as make up to cooling water system.

SDG's Impacted



Through our "Better Everyday" program, we ensure our unwavering commitment to water conservation. In line with our sustainability strategy, the Barmer plant achieved excellence in its ETP plant operation, which involves treatment of high concentrated cooling tower blowdown and other wastewater generated.

Our water stewardship program has been extended to the surrounding communities through our community development programs. During the current reporting



Waste Water

Targets

Maintain a 'ZERO LIQUID DISCHARGE' for all our power plants by 2030

All our plants operate on the principle of 'ZERO LIQUID DISCHARGE'. JSW Energy plants are designed to manage the discharge of process waste water internally by using the approach of recycle, recovery and reuse eliminating the need of discharging the waste effluents outside the premises. This way JSWEL also ensures maximising the recovery of freshwater and minimising the effluent volume. Waste water is treated and recycled in the water use cycle or diverted for horticulture use. Through our "Better Everyday" program, we ensure our unwavering commitment to water conservation. In line with our sustainability strategy, the Barmer plant achieved excellence in its ETP plant operation, which involves treatment of high concentrated cooling tower blowdown and other wastewater generated. In Ratnagiri plant, Sewage water is treated in STP and treated water is utilised for gardening. Effluent of Demineralise water treatment and Boiler water blowdown water is used as make up to cooling water system. In FY 2021-22, 3,629 million litres water was recycled and reused.

Wastewater recycled (kL)



Focus Areas	KPI's	Unit	FY 21-22	FY 20-21
Waste Water	Wastewater recycled	kL	36,29,999	32,53,124.95



TAKE STRUCTURE



Waste Management

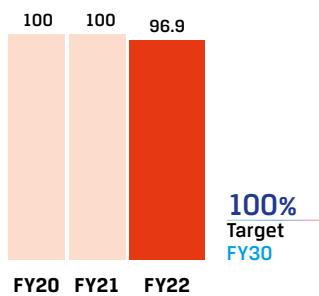
Targets

Maintain 100% recycling of fly ash and wastes generated from our operations

Plants engaged in generation of electricity involve combustion of solid or liquid fuels that generate large quantities of solid residues – primarily ash, slag, and desulfurisation/sulphur by-products. Indian industries operating power plants generate comparatively higher ash content which also comprise of contaminants such as mercury, cadmium and arsenic. Sustainable waste management of the generated ash is a paramount responsibility of power plants. Fly ash generation from coal-based thermal power plants in India stood at 226.13 million tonnes in FY 2019-20 .

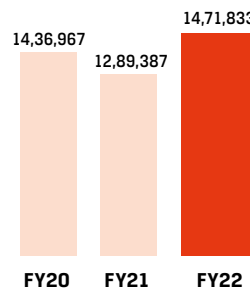
At JSW Energy, we realise the necessity to formulate strategies for sustainable management and disposal of wastes. Through various waste management measures such as recycling rejected coal from a pulveriser, recycling of hazardous wastes by certified recyclers, use of ash in cement manufacturing plants, we foster circularity principles in the operations. In FY 2021-22, total ash generation is 1,518,959.29.

Waste - Ash Utilisation (%)

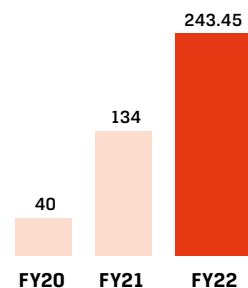


Focus Areas	KPI's	Unit	FY 21-22	FY 20-21	FY 19-20
Waste	Waste recycled (Ash)	%	96.9%	100%	100%

Non-hazardous Waste Utilisation (MT)



Hazardous Waste (MT)





Value Creation Story – Waste to Wealth

Strategic Objective

To sustainably utilise the fly ash produced in the thermal power plants by exporting to international markets.

Summary

- The compliance with respect to fly ash utilisation and disposal is one of the key concerns of any power plant
- There is an increasing demand of fly ash in the international market. JSWEL took one step forward to export the by-product produced from Thermal Power Plant in a sustainable way
- The flyash is stored in plant silos and transported through conveyor pipes pneumatically to the port for export

Key Impacts created

100% utilisation of fly ash by exporting it to international markets through ships to ensure statutory compliance and generate wealth from waste.

SDG's Impacted



Completed the construction of 45,000 MT Ash Silo of JSW Energy at Ratnagiri JSW Port



Air Emissions

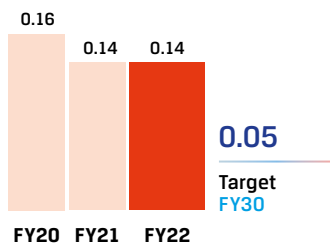
Targets: (Base Year 2020 and Target Year is 2030)

- Reduce the dust emissions, per unit of energy produced, by 2/3rd
- Reduce the emissions of Oxides of Sulphur and Nitrogen, per unit of energy produced, by 60%

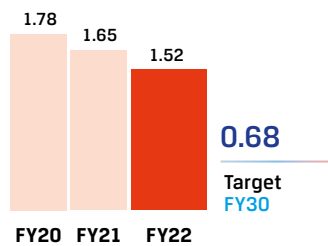
Air pollution continues to be a global concern. As estimated by the World Bank, air pollution results in decreased productivity by more than USD 5 trillion every year. Thermal power plants using coal as fuel lead to serious environmental contamination owing to the release of particulate matter, SOx and NOx into the surrounding atmosphere. Unabated burning of coal in thermal power stations and a delay in implementation of latest carbon capture storage technology are among major reasons of air pollution in India, according to a recent study.

We at JSW Energy consider effective management of air quality as an important part of our sustainability strategy. We have developed various plant-level mitigation strategies to control the release of gaseous Emissions due to our operations. At Barmer, we are installing Electrostatic precipitators (ESPs) with improved efficiency to remove the particulate matter from waste gas stream. In Ratnagiri plant, Flue-gas desulfurisation (FGD) is used to remove the sulphur emissions from exhaust flue gases preventing air pollution.

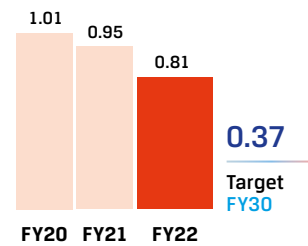
Sp. PM (kg/MWh)



Sp. SOx (kg/MWh)



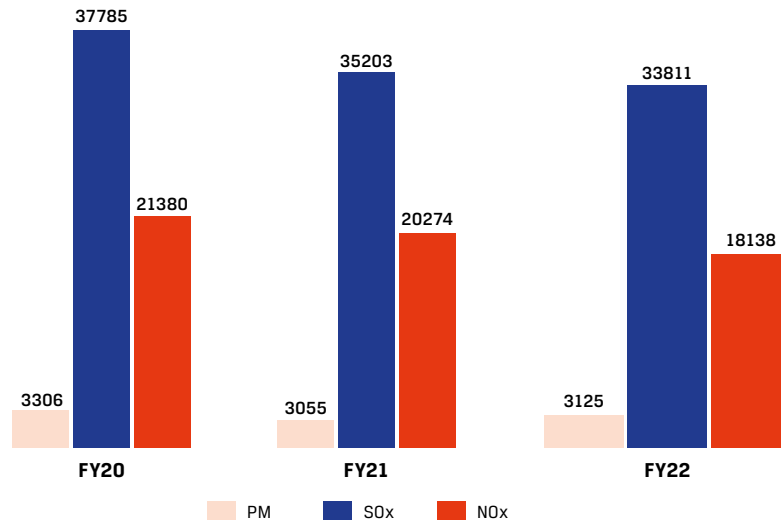
Sp. NOx (kg/MWh)



Focus Areas	KPI's	Unit	FY 21-22	FY 20-21	FY 19-20
Air emissions	Particulate Matter	Tonnes	3,124.68	3,054.82	3,306.33
	SOx	Tonnes	33,810.60	35,203.20	37,785
	NOx	Tonnes	18,137.79	20,273.52	21,380



Non-GHG Emissions (Tonnes)



Biodiversity

Target

Achieve a 'no net loss' of biodiversity at all our operating sites

Our sustainability strategy aims to proactively identify and manage risks with an ambition of achieving no net loss of biodiversity across all the operating locations. We align our efforts in a way that minimises the environmental impact resulting out of our operations and investments. We take considerable efforts to conserve biodiversity. We have promoted several ecological conservation programmes in Ratnagiri and Barmer plants. Our biodiversity conservation programmes aim to create congenial rural wildlife habitat through various plantation programmes.

Focus Areas	KPI's	Unit	FY 21-22	FY 20-21	FY 19-20
Bio diversity	No. of saplings planted	Nos.	37,196	10,123	12,002

Value Creation Story – Plantations for Green Cover Improvement

Strategic Objective

Conservation of endemic flora and enhancing aesthetic value of human habitations through silvi-pasture plantations, roadside plantations and mango plantations in Barmer and Ratnagiri plants.

Summary

- Ratnagiri team initiated the development of 100 acre mango plantation within the land parcel available with JSW Group. Initially, 25 acres area is being developed and about 607 alphonso mango orchards are planted on 7 acre area so far. The entire project will be completed within 3 years in a time bound manner
- Silvi-pasture plantations and roadside plantation initiatives were carried out by Barmer plant which tends to preserve the palatable grass reserve of the surrounding community

Key Impacts created

- In Ratnagiri, the high density mango plantation with drip irrigation system results in the development of lushgreen ecosystem
- In Barmer, Silvi-pasture plantations leads to the conservation of palatable grass reserve of the surrounding community rangelands which is supporting the livestock and wildlife. Roadside plantations initiative also enhanced the aesthetic value around the villages

SDG's Impacted

