



## Natural Capital



Efficient and sustainable utilisation of natural resources across our operations is a key parameter regularly monitored at all our power plants. We are benchmarking these KPIs with national and international peers and pursuing continual improvement in our utilisation efficiency. The leadership team is increasingly focused on investments made in the renewable space to protect the consumption of natural resources, thereby creating a positive impact on the environment. This approach also aligns with our business strategy of becoming Net Zero, on or before, 2050.

## Description

This Capital focuses on efficient utilisation of natural resources and increased participation in renewable projects to create a positive impact on the environment.

## Management Approach

Benchmarking the KPIs of GHG emissions, water consumption, waste management and air emissions to create a sustainable eco-system in the immediate vicinity of our plants.

## Significant Aspects

- Climate
- Preservation of biodiversity
- Management of environmental footprint
- Energy efficiency
- Preservation of natural resources

## Afforestation activities

### Plantations, Green Cover and Slope Stabilisation

JSW Energy has developed a culture to enhance the green cover at each project location and operating plant. Over the last year, the Vijayanagar plant has developed lush green lawns in several parts, with neatly dressed hedges and plants and their contrasting colours adding to the visual beauty and greenery of the location.

At the Ratnagiri plant location, about 2,478 new Mango saplings have been planted. This is a part of the ongoing development of a larger Mango plantation area, which will not only add to the existing eco-system, but also enhance the location's environmental quality in the years to come.

At the Barmer plant, tree plantations is a regular feature within and outside the plant location. Recently, Guava and Mango tree saplings have been planted in and around the plant.

At our hydro plants, slope stabilisation is achieved through regular plantations near our plants and communities. On special occasions, the employees come forward for plantation activities and join hands with district administration for such plantation activities.

# 33,719

Total saplings planted at several locations in FY 2023

Key Performance Indicators	Material Topics	Strategy Linkage
<ul style="list-style-type: none"> <li>• GHG emissions</li> <li>• Energy consumed</li> <li>• Energy saved</li> </ul>	<ul style="list-style-type: none"> <li>• Managing carbon emissions</li> </ul>	<p><b>S02</b> Embracing a greener future</p>
<ul style="list-style-type: none"> <li>• Water consumed</li> <li>• Water recycled</li> </ul>	<ul style="list-style-type: none"> <li>• Waste management</li> <li>• Water management</li> </ul>	<p><b>S04</b> Measuring environmental impact of our operations</p>
<ul style="list-style-type: none"> <li>• Waste generated and disposed</li> </ul>	<ul style="list-style-type: none"> <li>• Biodiversity</li> <li>• Energy efficiency</li> </ul>	<p><b>S05</b> Ensuring efficient operations of our existing assets</p>

## Sewage Waste Management

Sewage waste management system has been integrated at all the plants of JSW Energy. The domestic waste water is collected in the sewage sump and treated through the Sewage Treatment Plant (STP). The treated water is either recycled within the plant processes or is utilised in horticultural activities. The recycled water reduces the overall water consumption requirement at each plant, and in the process, contributes in reducing water stress of the region.

## Solid Waste Management

Solid waste such as plastic waste, MS Scrap and e-waste are disposed off and segregated into bio-degradable and non-biodegradable through authorised agencies. These agencies subsequently re-cycle and reuse these materials. Sludge waste generated through the PT plant at the Barmer plant is used in horticulture activities as manure to enhance plantations. This has been yielding good results in increasing the green cover.

## Environment and bio-diversity initiatives

JSW Energy has engaged a knowledge partner to conduct ecosystem and biodiversity studies at all its major operating plants and project locations. This is a part of the focused initiative to achieve 'No Net Loss' of biodiversity at all locations by 2030. At Barmer, the biodiversity and ecosystems study has already been completed, including one year's seasonal study of various species, flora and fauna around the plant. An implementation plan will soon be finalised based on the final report of the knowledge partner. The biodiversity study for other projects is also under progress since Q4 FY 2023. Phase - 1 of this is expected to be completed by June 2023, followed by another year of study at these plants. The renewable project locations of Tuticorin, Dharapuram and Sandur are also included in these biodiversity studies, along with Ratnagiri and Hydro project at Sholtu.

## Waste Management initiatives

Waste management teams at all our plants ensure that all compliances related to the handling of waste material, whether hazardous or non-hazardous, are followed in a responsible manner. All plants have tie-ups with authorised agencies for re-cycling, reuse and disposal of waste in a safe and sustainable manner. Under the hazardous waste category, all the plants mainly have waste oil generated during their maintenance activities, which needs a safe disposal through authorised agencies.

### Waste Management

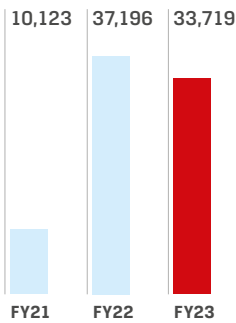
	FY 2023		
	Reused	Recycled	Safely Disposed
Plastic (Including Packaging) MT	0	0	2.43
E-Waste MT	0	6.02	0
Hazardous waste MT	0	30.085 (waste oil)+ 104.54 (battery waste)	0
Other Waste MT	1378753.48 (FlyAsh & Bottom Ash + Primary Sludge)	1.875 (Food Waste)	0.62 (Biomedical waste) +1508.31 (MS Scrap)

Small quantities of e-waste, battery waste, MS scrap waste and plastic waste is generated at most locations where these wastes are handled and disposed in a responsible manner. Under non-hazardous waste, ash is produced by thermal power plants. All plants have tie-ups with cement making and brick making companies who take away all the ash from plants, which is used as an input material for their product. In FY 2023, 100% ash has been utilised at all plants.

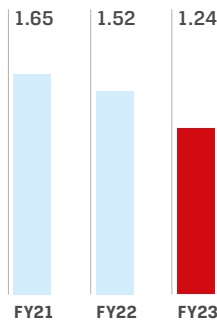
During the year, a 45,000 MT Ash Silo has been constructed at the JSW port, adjacent to JSW Energy Power plant at Ratnagiri. The Silo and all its associated infrastructure has been completed and Ash is now being filled up in the Silo. The sea route will be utilised to transport Ash to all the prospective buyers, both in the national markets and based on international requirements to other countries. In FY 2023, no environmental related penalties have been imposed upon JSW Energy Ltd. by any agency.

## Key Performance Indicators

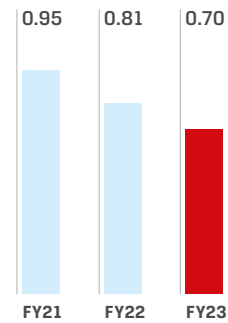
### Number of Saplings Planted



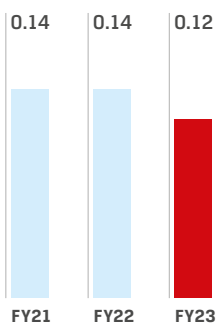
### SOX (kg/Mwh)



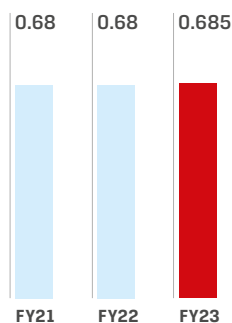
### NOX (kg/Mwh)



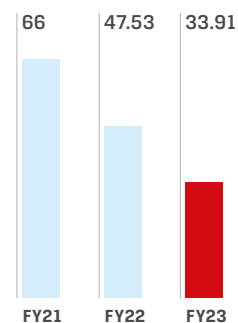
### PM (kg/Mwh)



### GHG Emissions Intensity (tCO<sub>2</sub>/MWh)



### Energy Savings (MU)



## Plant-Wise Energy Saving Initiatives

### Barmer Plant

Energy Reduction Initiative	Energy Reduction in GJ*	GHG Emissions saved due to energy saving (MTCO <sub>2</sub> e)
APH Tube Plugging done in Unit#3 (Energy savings - 573.21 KW)	10,913.43	1,102.26
APH Tube Plugging/Replacement done in Unit#7 (Energy savings - 323.61 KW)	5,218.74	527.09
APH Tube Plugging done in Unit#5 (Energy savings - 1058.14 KW)	18,906.39	1,909.54
APH Tube replacement done in Unit#4 RHS SA1 &PA1 (Energy savings - 2276 KW)	28,850.12	2,913.86
APH Tube replacement done in Unit#3 SA1 &PA1 (Energy savings - 1798 KW)	10,003.33	1,010.34
<b>Total</b>	<b>73,891.999</b>	<b>7,463.092</b>

### Ratnagiri Plant

Energy Reduction Initiative	Energy Reduction in GJ*	GHG Emissions saved due to energy saving (MTCO <sub>2</sub> e)
Augmentation of rain water harvesting system	103	-
Replacement of HP exhaust dump valve to avoid the passing of high energy steam in Unit-4	10,273	907
Improvement in Aux. Power Consumption by de-staging of BFP in Unit-1	837	205
Sequential Valve Mode of Turbine Governing Valve Operation	36,901	3,168
<b>Total</b>	<b>48,114</b>	<b>4,307</b>

### Vijayanagar Plant

Energy Reduction Initiative	Energy Reduction in GJ*	GHG Emissions saved due to energy saving (MTCO <sub>2</sub> e)
SBU1 BFP recirculation valve logic modification has given a saving of 311 kwh at 90MW	12.96	1184.4
SBU1 PA fan auto pressure set point based on coal flow has given a saving 15 kwh	0.33	30.2
SBU1 U2 BFP stopping at low load	21.97	2,007.8
SBU2 U1 to reduce slip losses in turn to reduce BFP Power Consumption	20.05	1,832.5
SBU2 U1 Low load operation CEP VFD locking speed reduced from 700 to 600 to avoid throttling losses	1.67	152.4
SBU2 U1 Two mill Operation at low (<120 MWh & coal flow < 58 TPH	6.00	548.4
SBU2 U1 Two mill Operation at low (<120 MWh & coal flow < 58 TPH & reduced header pressure Up to 5.5 Kpa and 3 mill operation reduced header pressure up to 7.0 Kpa	23.80	2175.6
SBU2 U1 Rectification of blade pitch mechanism malfunction, Secondary Air Flow reduced to 480 to 440 tph	1.66	151.4
SBU2 U1 Reducing secondary air Flow and reducing PA flow by two mill operation	8.26	755.0
SBU2 U1 ESPT Power Consumption Optimisation by stopping 4 <sup>th</sup> and 10 <sup>th</sup> filed in both passes during Low load operation hours	1.94	177.5
SBU2 U1 Ash handling Compressor stopping up to max 12 hrs, according to load condition in turn to reduce power consumption	1.82	166.6
SBU2 U1 Switching OFF 2 CT fans stopped for power optimisation during 90 MWh operation at < 92 Kpa vacuum	10.02	915.9
Cooling towers blade replacement in SBU1 (6 Nos.)	0.53	48.5
<b>Total</b>	<b>110.469</b>	<b>10,146.120</b>

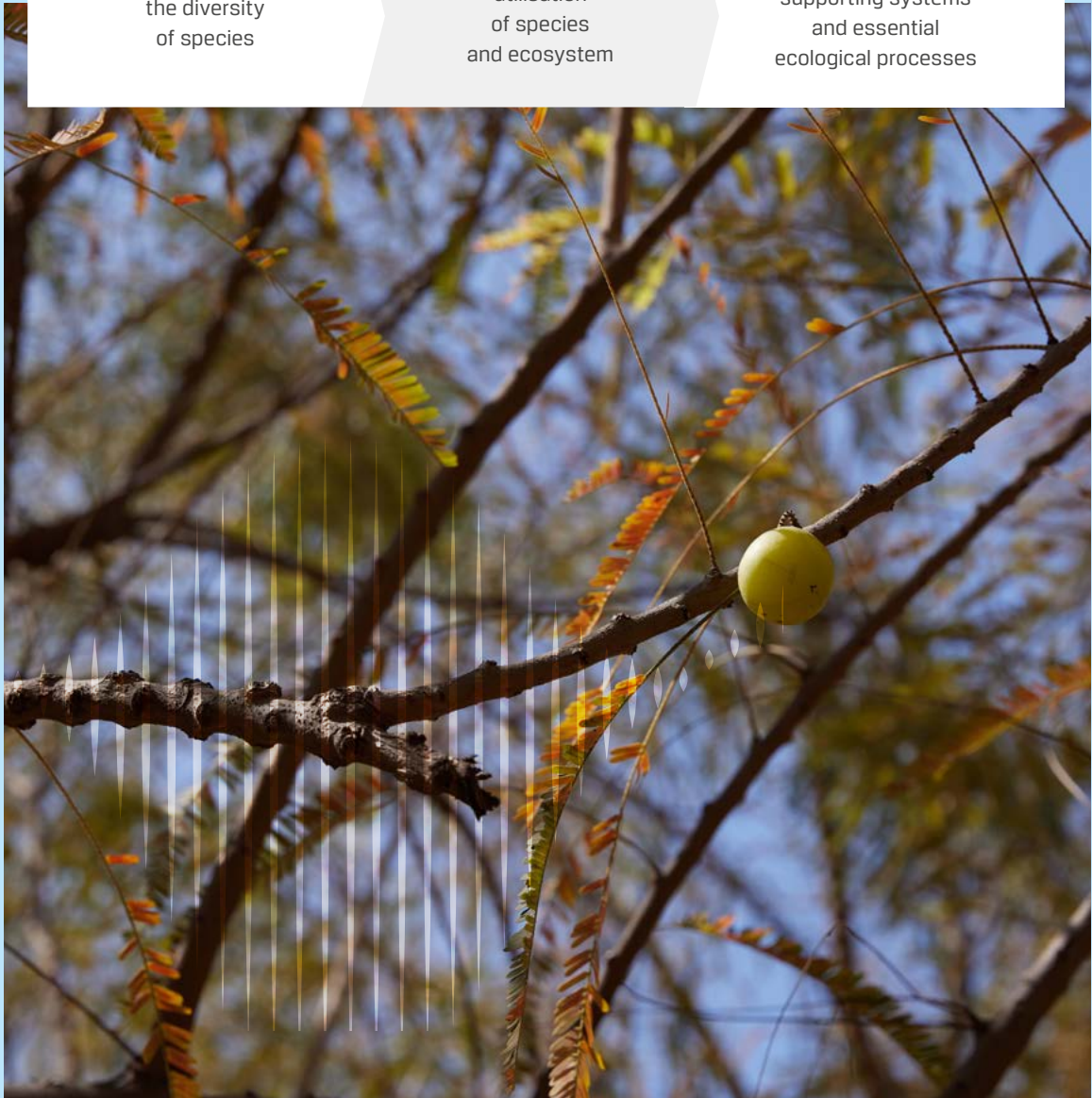
\* Giga-Joules

# BIODIVERSITY INITIATIVES AT BARMER

A CASE STUDY

Biodiversity conservation refers to protection, upliftment and management of biodiversity, in order to derive sustainable benefits for the present and future generations

## Key objectives of Biodiversity Conservation:



The following are the important strategies followed for Biodiversity Conservation:

1. Analyse impacts and dependency of our operations on Biodiversity & Ecosystem Services to develop and implement a robust biodiversity management plan
2. All four types of ecosystems in and around the plant area preserved
3. Poaching and hunting of wild animals is prohibited
4. Pollutants to ecosystem are not allowed
5. Deforestation is strictly prohibited
6. Environmental laws are strictly followed
7. IUCN (International Union for Conservation of Nature) RED-LIST and WPA (Wildlife Protection Act) Schedule-1 species are identified and conserved in their natural and artificial habitats

8. Awareness is created regarding biodiversity conservation and its importance

9. Plantations drive is rigorously done and is evident in plants

Even as JSW Energy's Barmer plant is located in Thar Desert, we managed to achieve an overwhelming 39.4% (132 acres) of the green belt. This provides key ecosystem services such as improving air quality, carbon sequestration, nutrient recycling, runoff control, temperature regulation, noise reduction and biodiversity protection. The greenbelt consists of 76 species of trees, shrubs and herbs.

**Some species available at the Greenbelt:**

## Trees

Neem, Sesame, Flowers: Kaner and Tikoma and ornamental types

## Fruits

Mango, Banana, Orange, Sweet Lemon, Guava and Pomegranate

## Leaf Plants

Olive, other plants: Amla, Ber, Dates and Sugarcane

Two reservoirs of JSW Energy act as a habitat for several aquatic animals, thereby supporting aquatic biodiversity. In addition, we also fixed water points at several places at each plant, which further plays a key role in protecting the ecosystem.

- Breeding and nesting site for 20 species, with 46 migratory birds
- Conserving 7 nos. of IUCN RED-LIST species and 15 nos. of WPA Schedule-1 species<sup>1</sup>

**Biodiversity at JSW Barmer:**

- Total 164 fauna species consisting of Birds (121 species), butterfly and Insects (30 species), mammals (8 species) and reptiles (5 species).