

Natural Capital

(UNGC Principle 7,8,9)

We take our responsibility of environmental stewardship seriously and continuously strive to reduce our ecological footprint.

We aim to effectively manage the lifecycle impact of our operations by maximising energy and water efficiency, reducing emissions, minimising waste and protecting biodiversity while also fulfilling regulatory compliance requirements.

It is noteworthy that during the reporting period, there were no environmental regulatory non-compliances that would have resulted in levy of fines or prosecution by relevant authorities. (GRI 307-1)



Statutory Reports

Financial Capital

Social and Relationship Capital

Human Capital

Natural Capital

Intellectual Capital

Manufactured Capital

About the Report



Environmental pillars of Apraava Energy



Climate Action



Managing Emissions



Water Stewardship



Waste Management



Environmental Awareness

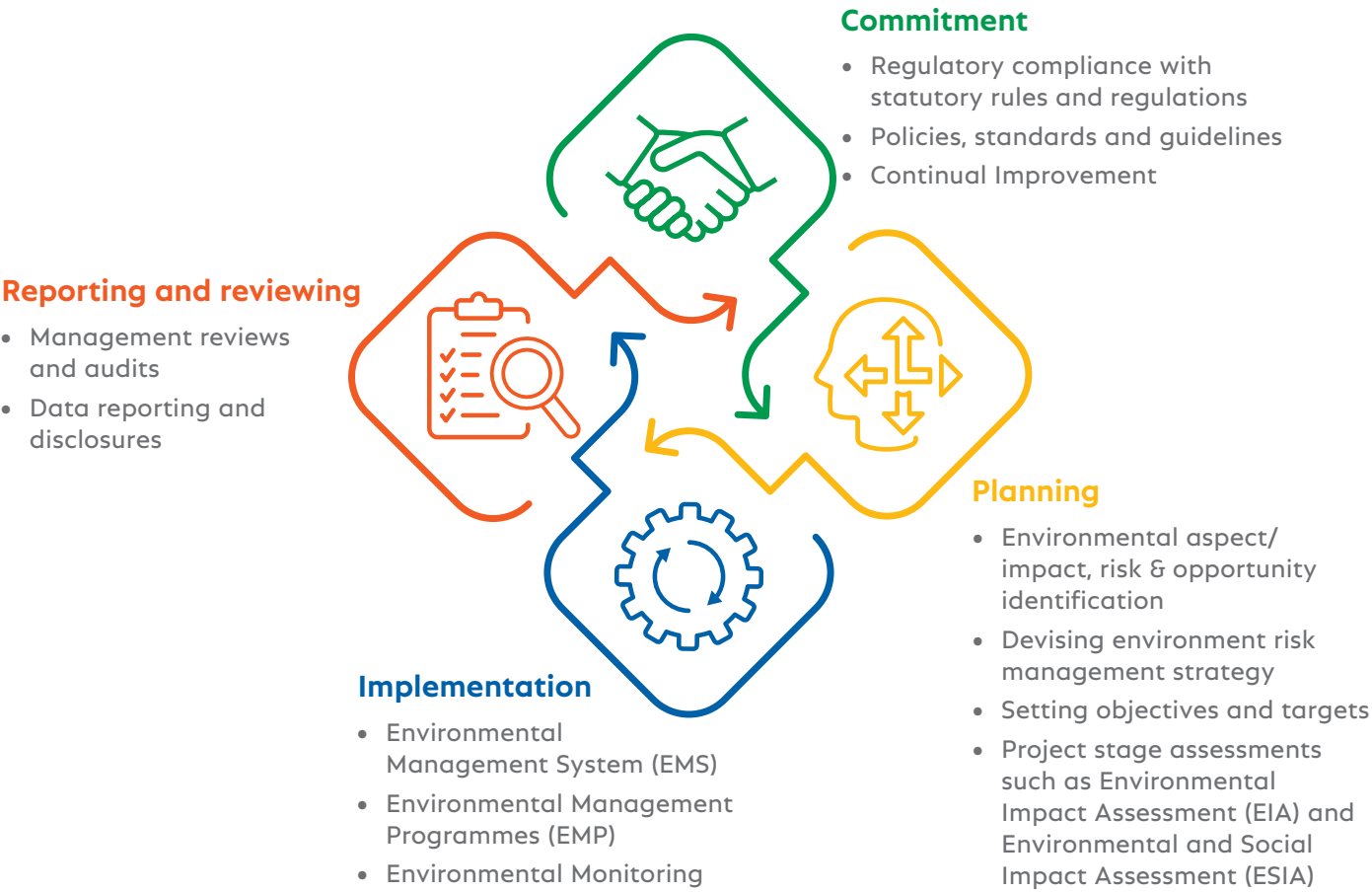


Protecting Biodiversity

Peacock spotted within JPL premises

In order to continuously measure and improve environmental performance, we have established an Environmental Management System (EMS) in accordance with ISO 14001:2015 requirements. As on 31 March 2022, fifteen assets of Apraava Energy, which include all twelve wind assets, JPL, Veltor and Sakri solar power plants have been certified with ISO 14001:2015 - EMS.

Environment Management Framework





Climate and Energy

(BRSR Principle 6; TCFD metrics and Targets-c; SDG 7,13)

We, at Apraava Energy, understand and acknowledge the dangers posed by climate change and are taking action to reduce the carbon footprint of our business by enhancing our renewable energy portfolio, improving energy efficiency, adding electric vehicles to our transportation fleet and increasing the deployment of clean energy in our operations.

As part of our efforts to amplify climate action, we aim to double our clean energy portfolio by 2025. Further, we have committed to the Science Based Targets initiative (SBTi) and target formulation is

under progress for validation by SBTi. The targets will be aligned to keep global temperature rise well below 2°C, compared to pre-industrial levels.

In the business of power generation and transmission, we also consume energy for our own operations. We drive process efficiencies to conserve maximum energy and provide more output to consumers. JPL has been nominated as a designated consumer of PAT cycle III as per Bureau of Energy Efficiency (BEE) under the National Mission on Enhanced Energy Efficiency (NMEEE).

Initiatives taken to improve Energy Efficiency at JPL

(GRI 302-4; SDG 9)



Advanced Process Control

Advanced Process Control (APC) optimisation techniques have been implemented. These techniques use a multiple input-output predictive model for improving existing performance of control loops to achieve the desired objectives i.e., efficiency improvement, fast load ramp rate, combustion optimisation etc. within a given set of constraints. Expected heat rate gain through APC is 6 Kcal/kWh thereby reducing energy consumption. Implementation of this system also leads to reduction of NO_x emissions due to better combustion and heat distribution.

Air Sealing Technology

Modern air sealing technologies have replaced conventional refractory material used to prevent accumulation of ash in the penthouse. Earlier, due to expansion and contraction of the boiler, refractory material would get damaged very frequently, and led to air ingress. The adoption of modern air sealing technologies has helped in improving boiler performance and reducing maintenance costs substantially.

LED Installations

We are in the process of replacing conventional lamps with highly energy efficient LED tubes with zero mercury content at all our facilities in order to enhance energy efficiency. During the reporting period, around 2,600 LEDs were installed resulting in estimated annual energy savings of 986,008 kWh, CO₂ emissions avoidance of approximately 828 tonnes and cost savings of roughly INR 3.4 million. JPL aims to replace 100% conventional lamps with LED tubes by FY 2023-24.



LED lights installed at Turbine floor of JPL

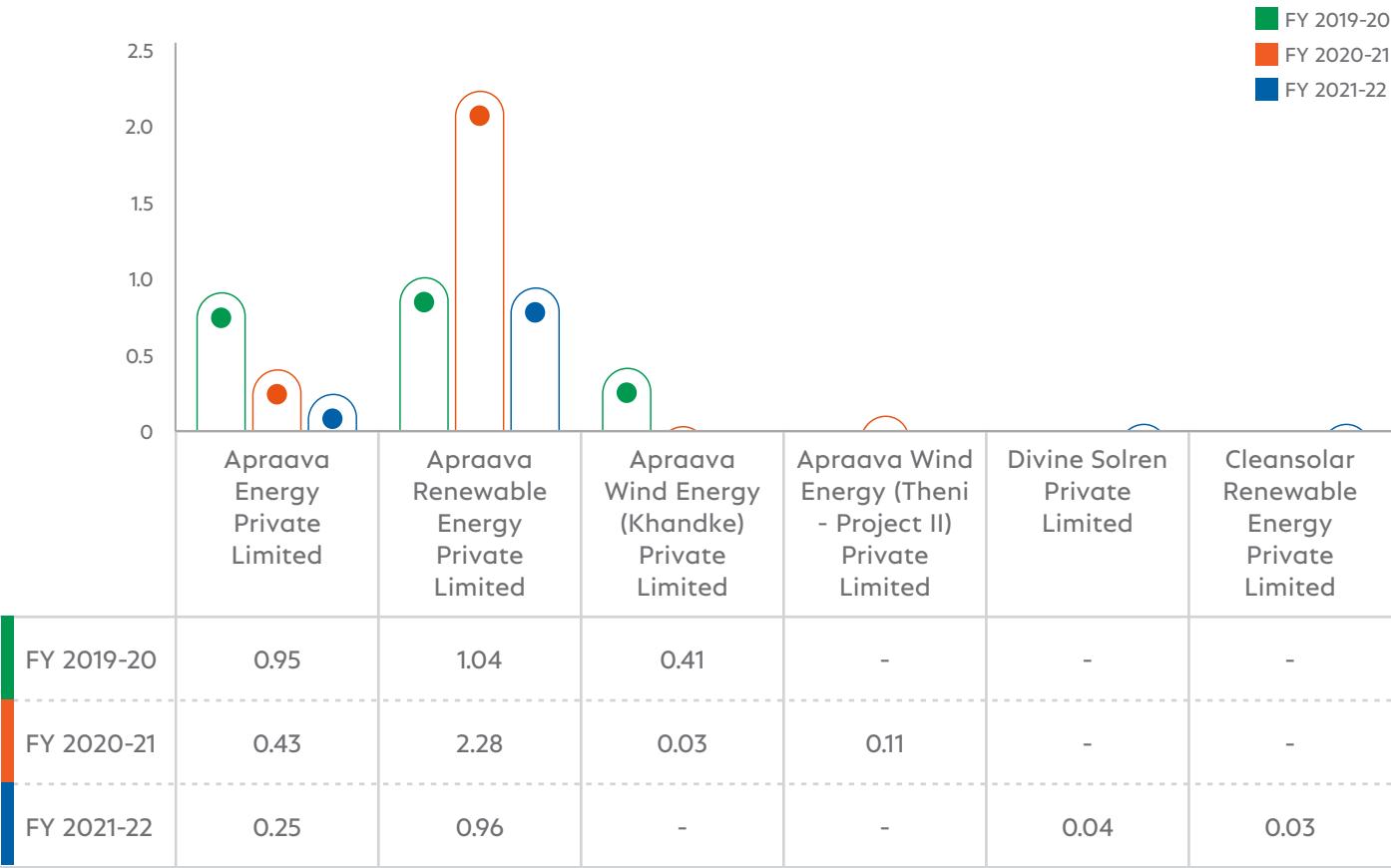


Carbon Credits

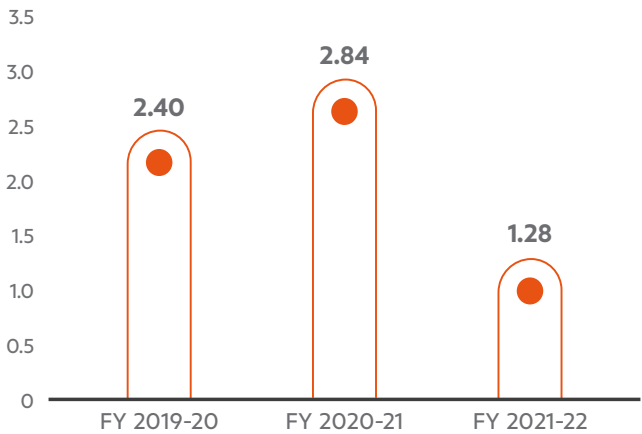
Carbon credits represent a direct investment in the transition to a low carbon economy. Our entire renewable energy fleet produces clean electricity in a sustainable manner while issuing carbon credits in accordance with international modalities and procedures. These carbon credits are tradable in domestic and international markets, and help fund corresponding projects. Our carbon offset is growing

as one of the most active and leading portfolios in the world. We have registered all our wind and solar assets in the world’s most reputed carbon offset schemes, namely the United Nations Framework Convention on Climate Change (UNFCCC)’s Clean Development Mechanism (CDM) and the Voluntary Carbon Standard (VCS) by Verra.

Issuance of Carbon Offsets (million tonnes)



Issuance of Carbon Offsets (million tonnes)



GHG Emissions

(GRI 305-1,2,4,5,6; BRSR Principle 6; TCFD Metrics and Targets-a, b)

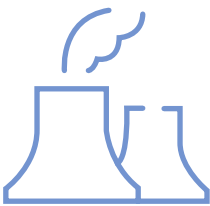
Apraava Energy has established a robust accounting methodology to calculate Greenhouse Gas (GHG) emissions i.e., Scope 1 (emissions from sources controlled or owned by the Company) and Scope 2 (emissions from purchased electricity) emissions data in accordance with the GHG Protocol Corporate Accounting and Reporting Standard. From this reporting period, we have commenced reporting GHG emissions for our renewable operations too. Going forward, we aim to measure and monitor Scope 3 emissions as well.

A critical factor that contributed to the marginal increase of GHG intensity in FY 2021-22 was a significant increase in energy sent out, which went up from 4,546 GWh in FY 2020-21 to 7,242 GWh in FY 2021-22 from our thermal power plant at Jhajjar, Haryana. This is attributable to the resumption of economic activity post lockdowns imposed due to the pandemic.

Emission of Ozone Depleting substances was 0.283 metric tonnes during FY 2021-22 at Apraava Energy.

GHG Emissions of Apraava Energy

GHG emissions	Unit	FY 2019-20	FY 2020-21	FY 2021-22
Scope 1	CO ₂ e (kt)	5,028.7	4,063.8	6,516.8
Scope 2	CO ₂ e (kt)	6.8	14.2	7.5
Total (Scope 1 and Scope 2)	CO ₂ e (kt)	5,035.5	4,078.0	6,524.3
GHG intensity	tCO ₂ e/MWh	0.67	0.62	0.70



Air Emissions

(GRI 305-7; BRSR Principle 6; SDG 3,11)

Along with GHGs, we also recognise the importance of measuring and monitoring air pollutants released from our operations. At Apraava Energy, JPL is the only source of air emissions. Preserving air quality in and around our facilities is a priority for us. Apraava Energy complies with all national as well as local regulations to ensure that emissions are well below the prescribed limit. Real time continuous emissions monitoring systems and ambient air quality monitoring systems are installed at the thermal power plant to measure Particulate Matter (PM), Nitrogen Oxides (NO_x), and Sulphur Oxides (SO_x). We have installed efficient dust suppression and extraction systems at emission sources for efficient dust control such as dry fogging, sprinkling, mechanised road sweepers etc.

Cleaner Technology used for Reducing Air Emissions

Emission Parameters	Available Emission Control Equipment
PM	Combination of Electrostatic Precipitator (ESP) and fabric filter (hybrid design)
NO _x	Combination of low NO _x burner and Separated Over Fire Air damper (SOFA)
SO _x	Wet type Flue Gas Desulphurisation (FGD)

During FY 2021-22, all major pollutants were measured in both absolute and specific terms as per details mentioned.

Air Emission Level at JPL

Air Emissions	Unit	FY 2019-20	FY 2020-21	FY 2021-22
PM	metric tonnes	808	496	986
SO _x		3,386	3,049	5,243
NO _x		5,325	4,524	7,334
Specific PM emission	kg/MWh	0.15	0.11	0.14
Specific SO _x emission		0.62	0.67	0.72
Specific NO _x emission		0.97	1.00	1.01



Water Stewardship

(GRI 303-3,4,5; TCFD metrics and targets-a; BRSR Principle 6; SDG 6)

Water is a vital natural resource for human life as well as business continuity. We recognise the availability of water as an increasing global concern and are conscious while using it in our operational activities. At Apraava Energy, the operations at our thermal power, JPL, are heavily dependent on the availability

of water. It is an essential commodity for power generation and maintenance of equipment. As water scarcity is one of the greatest challenges of our time, our Company is constantly stepping up its efforts to adopt water conservation practices and reduce water consumption in our operations.

Our water conservation initiatives include:

- Installing rainwater harvesting and groundwater recharging systems at various sites
- Treating and reusing wastewater at JPL site, which is a Zero Liquid Discharge (ZLD) plant. All the wastewater is treated and reused within the plant premises for dust suppression at various locations, horticulture, cleaning, and other suitable purposes. 140,836 kl of wastewater was recycled during the reporting period.
- Using robotic dredgers for desilting of sludge in water reservoirs at JPL to increase holding volume. This initiative will increase water storage capacity by 100,000 kl
- Increasing cooling water cycle of concentration at JPL

During FY 2021-22, JPL’s surface water (Total Dissolved Solids <1000 ppm) withdrawal from the JLN canal was 16.86 million kl of which 15.60 million kl was consumed for various operational and domestic uses in the plant and township. Of the remaining 1.26 million kl, majority was stored in the onsite reservoir while the rest was lost to evaporation and other minor unaccountable losses. JPL consumes more than 99% of the total water requirement of all operational assets of Apraava Energy. Total water withdrawal by Apraava Energy in FY 2021-22 was 16,900,337 kl. Jath site water withdrawal is excluded in FY 2021-22.



Rainwater Harvesting Structure at DSPL solar site

Water Withdrawal by Source at JPL

Water Source	Unit	FY 2019-20	FY 2020-21	FY 2021-22
Surface water	kl	15,009,864	9,806,215	16,864,036

Water Consumption of Apraava Energy

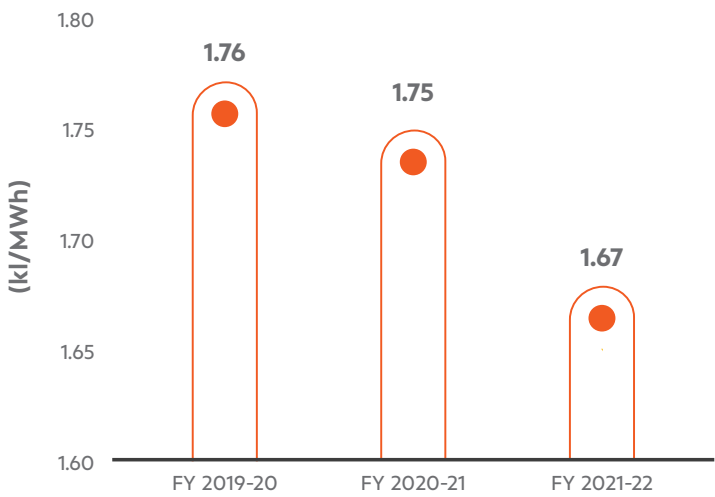
Water Parameter	Unit	FY 2019-20	FY 2020-21	FY 2021-22
Water Consumption	kl	13,302,643	11,464,589	15,633,793

Note : Water consumption measurement for renewables have been started from FY 2020-21. Jath site water consumption is excluded in FY 2021-22



Rooftop Rainwater Harvesting at Khandke wind site

Specific Water Consumption of Apraava Energy



Nature-based Sewage Treatment Plant at JPL township

A nature-based sewage treatment process on the lines of CAMUS-SBT (Continuous Aerobic Multistage System Soil Biotechnology), a globally patented technology of IIT-Bombay, has been adopted at JPL. The benefits of this technology are:

- Efficient wastewater treatment system
- Low lifecycle cost
- Low power consumption
- Minimal chemical consumption
- Handling fluctuating loads
- Low maintenance
- Odourless and noise-free

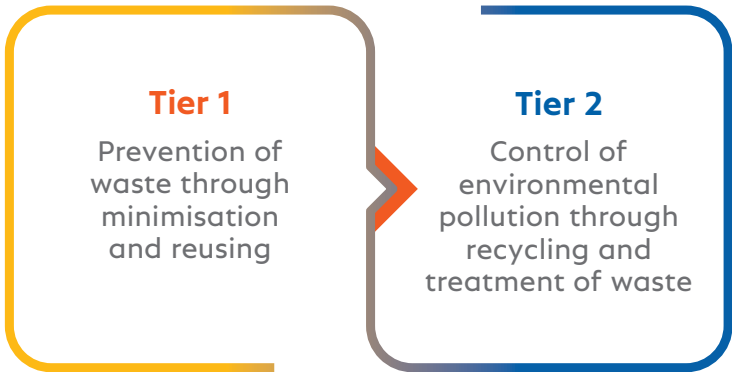


Waste Management

(GRI 306-2,3,5; TCFD metrics and targets-a; BRSR Principle 2,6; SDG 11,12)

With the advent of circular economy, attitude towards waste management has evolved significantly and Apraava Energy recognises this fact immensely and so it firmly ensures upright waste management practices across all sites. By putting our two-tier waste management approach & philosophy into practice, the principles of reducing, reusing and recycling waste, we aim to cut costs considerably and create a cleaner and safer working environment.

Waste Management Approach & Philosophy



JPL has been consistently prioritising the waste minimisation opportunities for 3R strategies implementation through departmental initiatives/EMPs. EMPs such as reuse of conveyor belt scraps, Actuator Card Repairing & reusing to reduce e-waste generation, reuse of metal scraps have been commenced since 2019 and continued till date. Below table displays the output of all the above mentioned EMPs since they were initiated.

Long-term Environment Management Programmes (EMPs) implemented to achieve Tier 1

EMPs	2019 (Achieved)	2020 (Achieved)	2021 (Achieved)	2022 (Target)
Reuse of conveyor belt scraps	55% of generated waste	56% of generated waste	65% of generated waste	50% of generated waste
Actuator Card Repairing	30 Cards	39 Cards	32 Cards	35 Cards
Reuse of metal scraps	25 metric tonnes	-	21 metric tonnes	20 metric tonnes

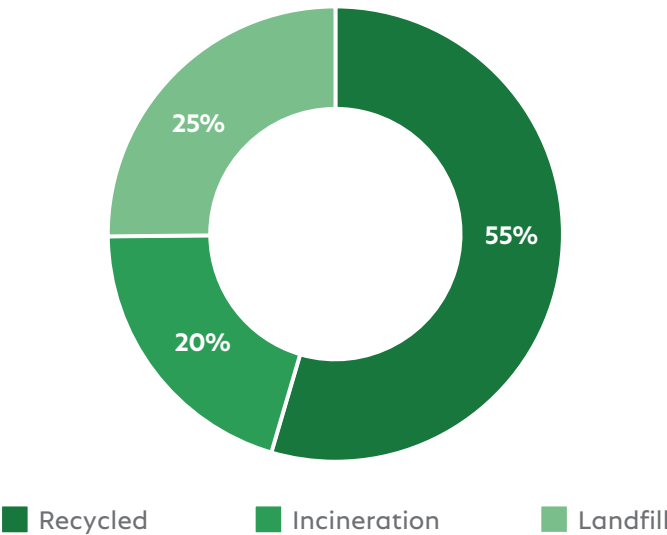
We are committed to minimising the amount of waste that enters landfills from our operations, and eventually achieve a ‘zero waste to landfill’ status. In line with our approach, we are also emphasising highly on the elimination of Single Use Plastic from our premises.

To us waste is not just a potential basis for environmental harm, but also represents a source of resources. Contaminated oil and insulation waste constitute a significant volume of our hazardous waste, whereas majority of non-hazardous waste is metallic waste. Our other non-hazardous waste mostly consists of wood, paper, etc. 100% of liquid hazardous waste is recycled through authorised recyclers. For renewable assets, all the wastes were disposed off responsibly. Details of disposal methods used during the reporting period for solid and liquid hazardous waste are illustrated in Figure 7.

Waste Generation Details

Waste Type		Unit	FY 2019-20	FY 2020-21	FY 2021-22
Hazardous Waste	Solid	metric tonnes	124.13	129.53	91.24
	Liquid	kl	70.27	28.42	66.64
Non-hazardous Waste	Solid	metric tonnes	274.73	336.35	718.53

Figure 7 : Hazardous waste utilisation of Apraava Energy



Fly Ash & Gypsum Management

We are committed to playing a significant role in fostering the circular economy at the industry as well as national level. We have steadily progressed towards zero waste to landfill by increasing fly ash and gypsum utilisation reaching 100% utilisation in FY 2020-21 and FY 2021-22. Ash and gypsum are regular by-products of the power generation process at our thermal power plant. At JPL, we have a dedicated ash management team that ensures effective ash and gypsum utilisation throughout the year, encouraging waste circularity.

Ash Utilisation

Fly Ash Details	Unit	FY 2019-20	FY 2020-21	FY 2021-22
Total Ash Generation	metric tonnes	1,440,751	1,039,831	1,804,515
Total Ash Utilisation	metric tonnes	1,995,085	1,040,636	1,804,518
Utilisation	%	138%	100.1%	100%

*Higher percentages of utilisation in FY 2019-20 was attributed to the disposal of old ash stocks from the ash dyke

Gypsum Utilisation

Gypsum Details	Unit	FY 2019-20	FY 2020-21	FY 2021-22
Total Gypsum Generation	metric tonnes	91,191	63,131	101,014
Total Gypsum Utilisation	metric tonnes	90,655	62,250	101,014
Utilisation	%	99%	99%	100%

JPL has tied up with several cement manufacturers, brick manufacturers, traders and ready-mix concrete plants for utilisation of dry fly ash and pond ash generated at the plant. Our team is in constant touch with state authorities, viz. the Public Works Department (PWD) and the National Highways Authority of India (NHAI) to explore potential uses for bottom ash. We regularly engage with such authorities to connect us with interested third parties

for utilisation of ash stored in the ash disposal site, even at our cost, for construction of roads and/or flyover bridges. We have tied up with multiple cement companies to ensure regular offtake of gypsum as well.

Despite challenges such as seasonal demand and COVID situation, consistent efforts have helped us in achieving 100% fly ash and gypsum utilisation at JPL over the last few years.



Environmental Awareness

At Apraava Energy, sustainability is not a goal but an ongoing process. In order to keep our stakeholders abreast of the various environmental, social and governance-related issues that impact our organisation and could influence our operations in future, we conduct regular training sessions for them. The limitations imposed by COVID-19 induced lockdown posed great challenges in conducting such trainings physically. Therefore, we utilised digital channels to hold ESG awareness sessions and held in-person sessions whenever it was feasible, ensuring strict adherence to all COVID-19 associated safety protocols.

Initiatives taken for Promoting ESG Awareness

We have organised various virtual and physical awareness sessions on ESG & sustainability insights to various stakeholders. Sessions educated our stakeholders on topics of ISO 14064, Biodiversity, Materiality assessment, Environment Management Systems etc. More than 400 people participated and benefitted from these trainings.

- Awareness training on 'ISO 14064' covered participants across various locations of Apraava Energy
- Training on 'Biodiversity Assessment' was conducted virtually involving participation of 45 employees from corporate team, JPL.
- Virtual workshops on Materiality Assessment (Sustainability Roadmap) were organised with support from CII-ITC Centre of Excellence for Sustainable Development. These workshops were attended by over 325 employees (~75% of total workforce)
- ESG workshop was conducted for our external stakeholders to seek their feedback on material issues for Apraava Energy. It was facilitated by CII and saw participation of 70 external stakeholders
- Four training sessions on environmental awareness were organised at the JPL premises by an external expert. The training witnessed participation of 182 person which included JPL Staff, contract partners and township residents
- A delegate of 30 industry and regulatory personnel visited the Flue Gas Desulphurisation unit at JPL plant as part of a training programme conducted by the Centre for Science and Environment, New Delhi on 'Reducing Environmental Footprint of Coal Power Plants'
- Apart from trainings, ToolBox Talks (TBTs) are another medium through which awareness on topics like waste management, housekeeping, water conservation etc are provided across all sites on regular basis



Environment and Biodiversity sessions by external experts

Celebrations on World Environment Day

To promote awareness on conserving ecosystems, 'World Environment Day 2021' with the theme of 'Ecosystem Restoration' was celebrated at all sites of Apraava Energy. At JPL, promotional programs were conducted from 28 May to 5 June 2021 with great fervor and vigor. The whole program was executed in virtual mode, given the COVID-19 restrictions. The program involved participation in innovative activities such as making of theme-based video blogs, online quiz and slogan-writing which received good participation from the stakeholders. A total of seven different virtual events were organised for participants including employees, families, contract partners, township children. Awareness activities such as tree plantation, campaign on 'Water Conservation', green quiz, and green talks were held at renewable sites.

Plantation drive on Independence Day 2021





Protecting Biodiversity

(GRI 304-1,2,3,4; BRSR Principle 6; SDG-15)

The health of the planet is deeply intertwined with the well-being of people. This in turn is closely related to the prosperity of businesses and communities. Apraava Energy's future goals have passed through the litmus tests of climate change, ecological balance, and preservation and protection of the planet. As a responsible organisation, we are aware of the significance of rich biodiversity on long-term

sustainability. As part of our effort to protect biodiversity, we have signed up to the India Business & Biodiversity Initiative (IBBI). As it serves a national platform for businesses and their stakeholders to foster dialogue sharing and learning, ultimately leading to mainstreaming of sustainable management of biological diversity into businesses.

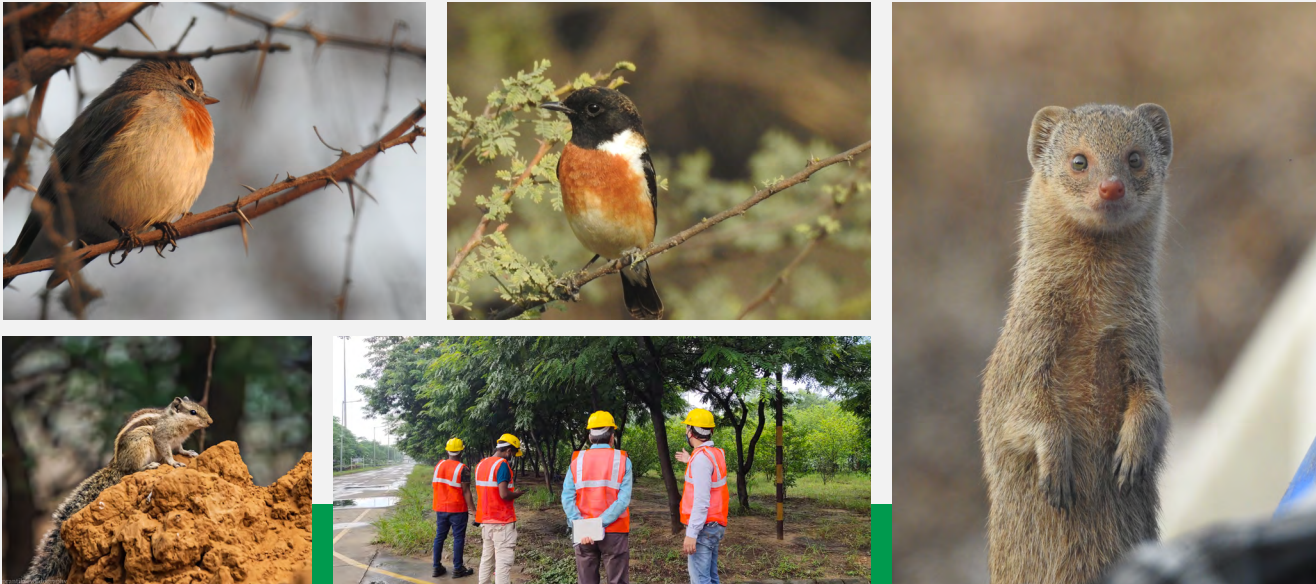
Our Biodiversity Conservation Goals

- Increasing the green quotient in and around assets through ongoing tree plantation, landscape development, and vegetation development
- Using advanced pollution control technologies and environmental practices to maintain air and water quality in surroundings that allow the existing ecosystem to thrive
- Making positive contributions to the conservation of flora and fauna in areas near Apraava Energy's sites

As part of our plan to strengthen biodiversity stewardship, a biodiversity roadmap for the future is in the works.

Baseline Biodiversity Assessment at JPL

JPL has conducted Biodiversity assessment across three seasons as per IBBI directives to map the business linkages with biodiversity and ecosystem services and to identify the risks and opportunities across their value chain. Natural Capital Action Plan (NCAP) has been developed to improve biodiversity quotient and to mitigate risks. The process of NCAP was focused on identifying, evaluating, conserving the relevant aspects of biodiversity and ecosystem services. The action plan has been developed for the high to medium impact and/or dependencies of the project. Main aim of NCAP is to mitigate biodiversity loss, with the objective of maintaining the diversity of species, habitats and ecosystems and the integrity of ecological functions; and seizing opportunities for enhancing biodiversity as a contribution towards the remediation.



Faunal species found at JPL during Baseline biodiversity survey

Biodiversity assessment for 2 seasons

 Monsoon Survey	 Winter Survey
A total of 124 plant species have been reported, which include 50 tree, 25 shrub, 30 herb and eight climber species from the core and buffer areas of the plant. Average floral diversity index is 3.087	11 new tree species have been reported in comparison to the results of the first floral assessment. Total number of plant species are 135 which include 61 trees, 25 shrubs, 30 herb and 8 climber species
A total of 168 faunal species were recorded during the survey, of which the highest number of species included birds (119 species) followed by butterflies (36 species), mammals (7 species) and reptiles (6 species). Faunal species diversity index for the project is 2.30, a healthy indicator	The mammalian diversity was represented by 7 species and 44 more birds and faunal species diversity index for the project enhanced to 2.49, during winter
Out of 119 bird species, 72 species were recorded from the plant area and 105 from the buffer zone. 58 species are common to both the JPL premises and the study area. 19 migratory species were recorded. Three 'Near Threatened' bird species and one 'Vulnerable' species were identified as per International Union for Conservation of Nature (IUCN)	311,513 trees in the project area were recorded during the tree counting exercise
37 species of butterflies were recorded during the study	Percentage of area under green belt is estimated to be 39.4%

Based on the assessment, some action plans have been recommended to enhance the overall biodiversity of the project. One such recommendation is the development of a wetland inside the plant premises to draw more faunal species. These recommendations are already being implemented.

Based on this baseline biodiversity survey conducted at JPL, similar assessments will be replicated for other biodiversity sensitive assets of Apraava Energy. As part of our plan to strengthen biodiversity stewardship, a biodiversity roadmap for the future is in the works. Also, we are taking small but meaningful initiatives. For example, all our visiting cards, letter heads, new year calendar are Forest Stewardship Council (FSC) certified. This certification ensures that products come from responsibly managed forests.

Conserving and sustaining natural capital are critical responsibilities that Apraava Energy has and will continue to undertake across its locations. We are also consciously trying to reduce our ecological footprint even as we transition to no or low carbon businesses while finding ways to offset emissions and reduce and recycle waste. Our vision is making our operations sustainable and having a positive impact on the people living around our plant sites. While we will continue using state-of-the-art technologies at JPL to reduce carbon emission intensity, our primary focus in future will be to increase our investment in a clean energy portfolio such as renewable energy generation and transmission and enhancing the biodiversity through natural capital action plan in operational sites. Protection of natural resources and contributing to preserving and enhancing biodiversity makes as much business sense as it means giving back to the planet. We intend to do both wholeheartedly.