Jhajjar Power Limited
(2x660 MW)

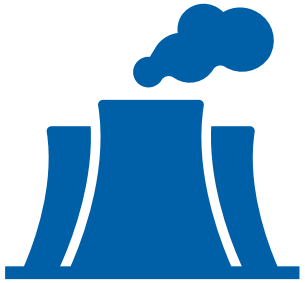
WATER MANAGEMENT PRACTICES

Jhajjar Power Limited
An Apraava Energy Company

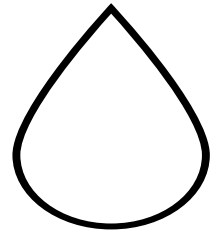
APRAAVA ENERGY

Content of Presentation

About Apraava



JPL’s Journey



Water Management Practices

Overview of Apraava Energy

Apraava Energy is a diversified power company, jointly owned by the CLP Group – one of the largest investor-owned power businesses in Asia & Caisse de dépôt et placement du Québec (CDPQ) – a global investment group.

Founded in 2002, Apraava has evolved from being a single-asset company to a forward-looking, climate-conscious organization.

The company aims to invest in low-carbon growth areas, including renewable energy, power transmission and distribution, as well as other non-generation, customer-focused energy businesses.

Apraava Energy is among the handful Indian power sector companies to commit to the SBTi and only the second in the sector to have them validated.

Agni (Fire) **Prithvi (Earth)** **Ambu (Water)** **Vayu (Wind)**

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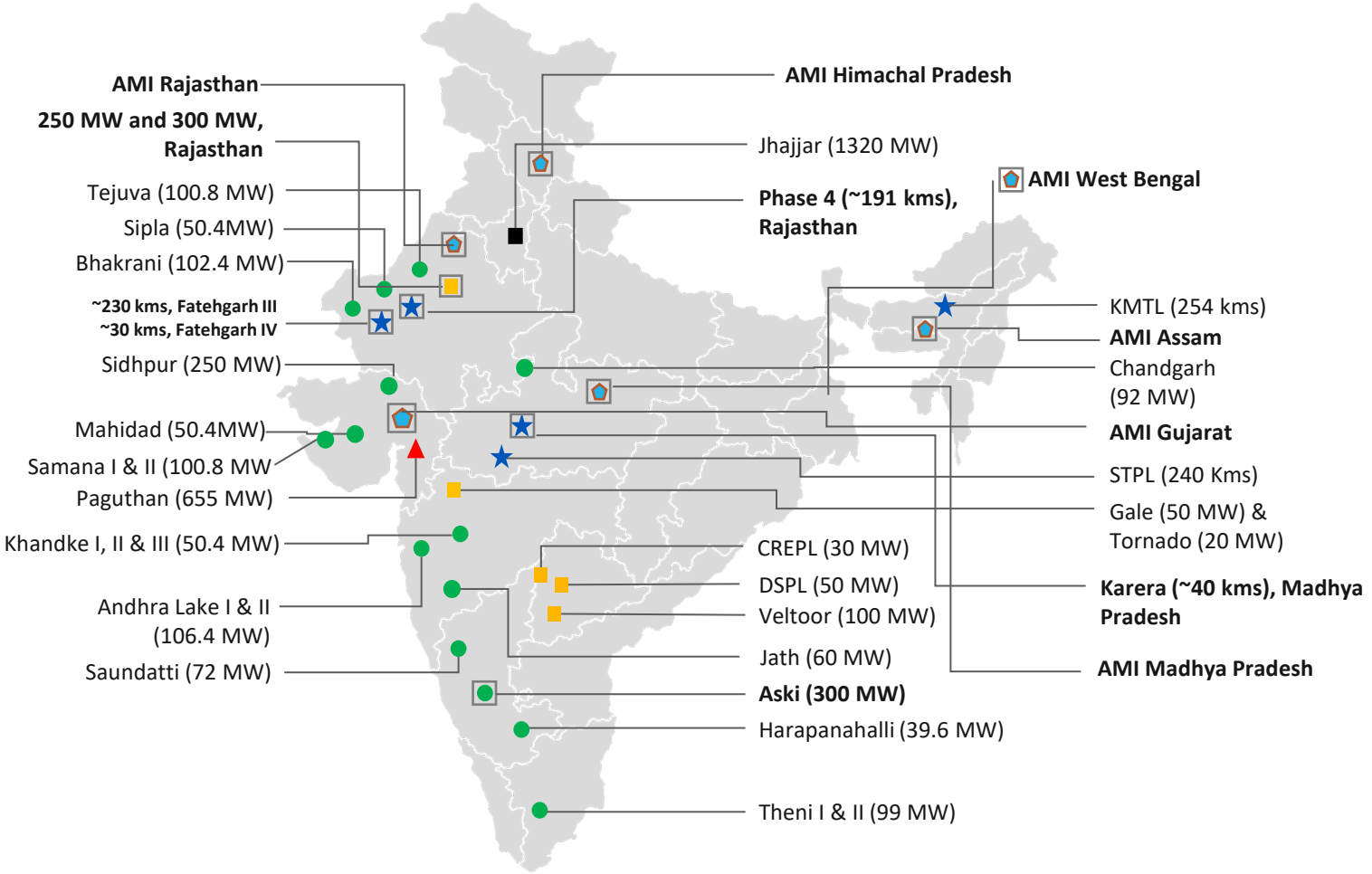
Apraava Energy: Portfolio



Renewable Energy

- **1350+ MW operational:** 1200+ MW of wind and 250 MW solar
- **~900 MW under construction**
  - 300 MW, Karnataka (Wind)
  - 250 MW, Rajasthan (Solar)
  - 300 MW, Rajasthan (Solar)

Transmission

- **~494 kms** wide-spread transmission projects
- **Four greenfield transmission assets (~485 kms) under construction**
  - a 230 kms and a 30 kms in Fatehgarh, Rajasthan
  - ~40 kms (Karera) in Madhya Pradesh
  - ~191 kms (Phase 4) in Rajasthan

Thermal

- **1,320 MW** super-critical coal-fired power plant in Jhajjar, Haryana
- **655 MW** gas-based, combined-cycle power plant in Bharuch, Gujarat (PPA expired)

AMI (Smart Meters)

- **~6.86 million** smart meters to be installed in Assam, Gujarat, West Bengal, Himachal Pradesh, Rajasthan and Madhya Pradesh

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JPL Milestones

26-Mar-2009

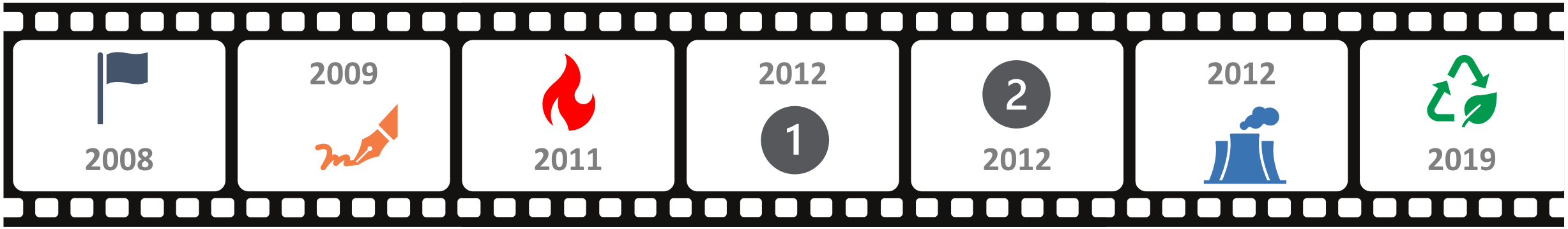
SEPCO III contract signing

12-Jan-2012

Unit 1 Full Load

19-Jul-2012

Station COD - Achieved 3 days ahead of schedule



23-Jul-2008

Project Awarded

07-Dec-2011

Unit 1 Boiler light-up.

11-Apr-2012

Unit 2 Full Load

Feb 2019

FGD recommissioned & put into continuous operation

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JPL Uniqueness

1. 1st Supercritical technology plant in North India
2. 1st case of foreign investor winning a competitive bid in India.
3. Only plant in India to have built-in FGD, when commissioned in 2012, making us most cleaniest plant in Delhi - NCR
4. Low NOx coal burners & Hybrid Ash removal system- ESP & Fabric filters
5. Lowest specific water consumption with FGD in operation in India
6. Zero Liquid discharge plant
7. First thermal power plant in India to achieve Zerowaste to Landfill Certification
8. 1st TPP to receive CII- ITC Sustainability Awards - Biodiversity and signatory to IBBI
9. Front runner in Biomass Co-Firing mandate in India

Business Model of JPL

JPL

Total Fuel Supply Agreement (FSA)
Annual Quantity- 5.057 MMT

Coal Sourcing from CIL through FSA

22% of FSA

8 sidings

NCL

1197 Kms

61% of FSA

10 Sidings

CCL

1335 Kms

17% of FSA

8 Sidings

BCCL

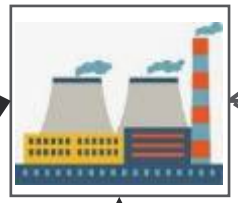
1337 Kms

Limestone Sourcing

Jodhpur, Rajasthan

500 Kms

JPL



JLN Canal, Akhedi- (HID)

15 Kms

Water Sourcing

Gypsum Sale (By Product)

Fly Ash Sale (By Product)

UHBVNL - 45%
DHBVNL - 45%

Electricity Sale through long term Power Purchase Agreement

Tata Power Trading 10%

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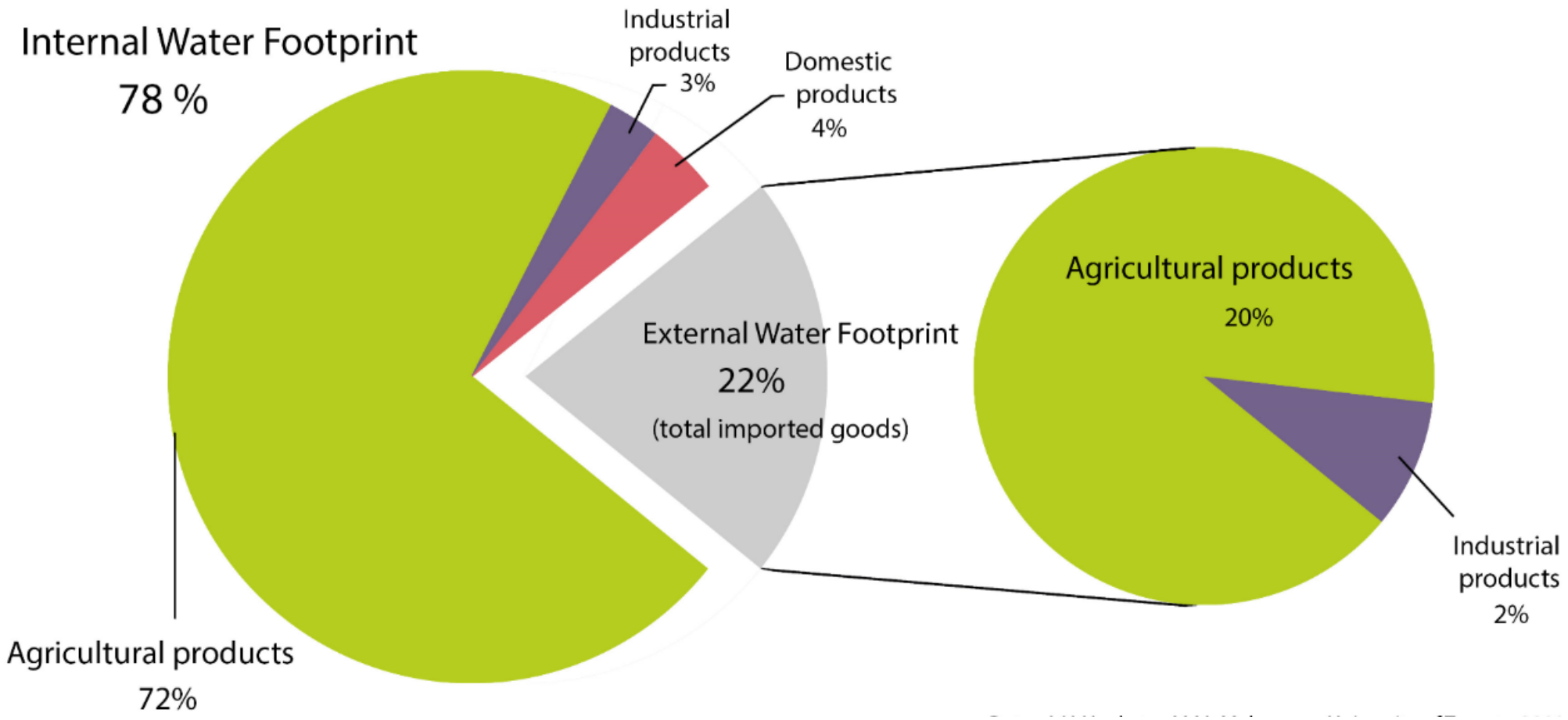
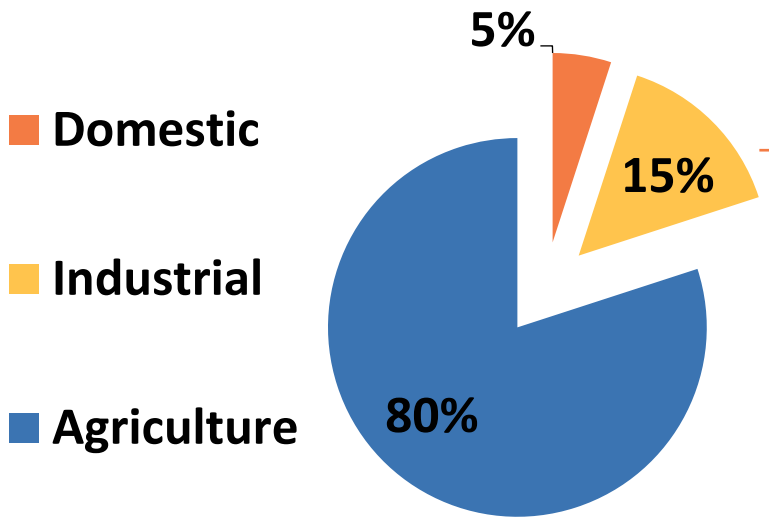
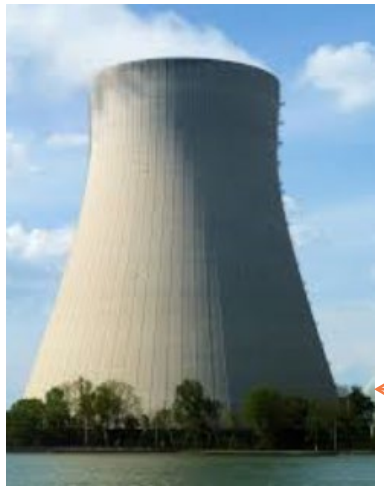
Global Water Footprint by Sector



Data Source: A. Y. Hoekstra, M.M. Mekonnen, University of Twente, 2011

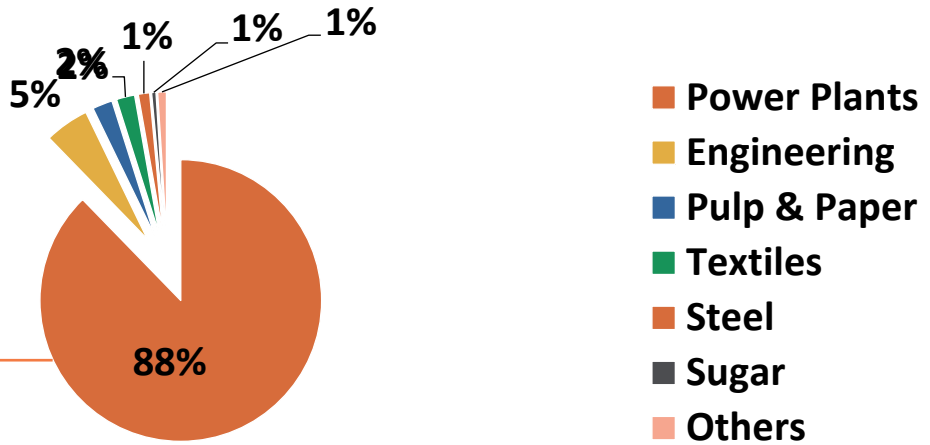
Water Use Pattern in India





80-90%

Industrial Sector Water Uses



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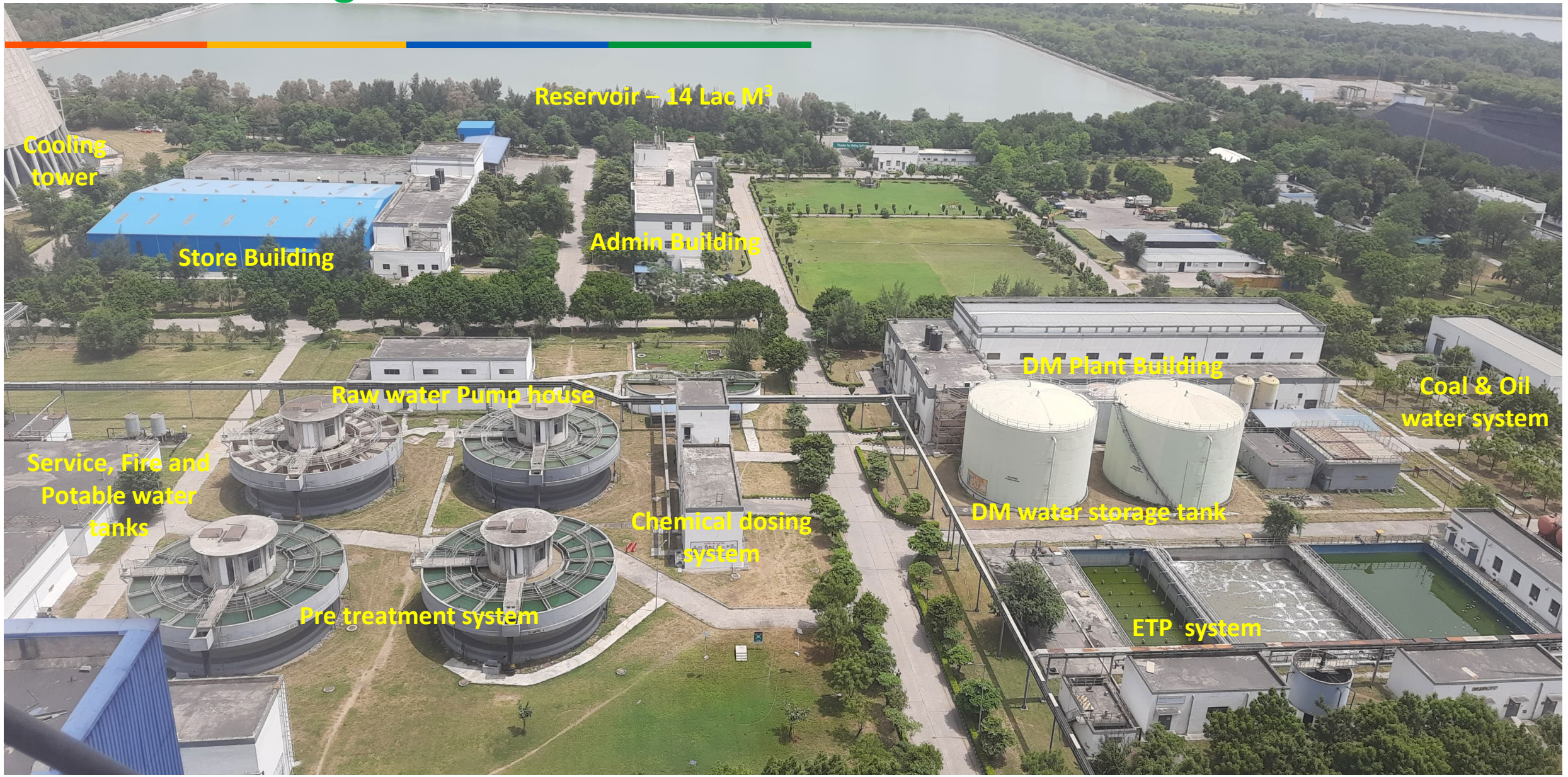
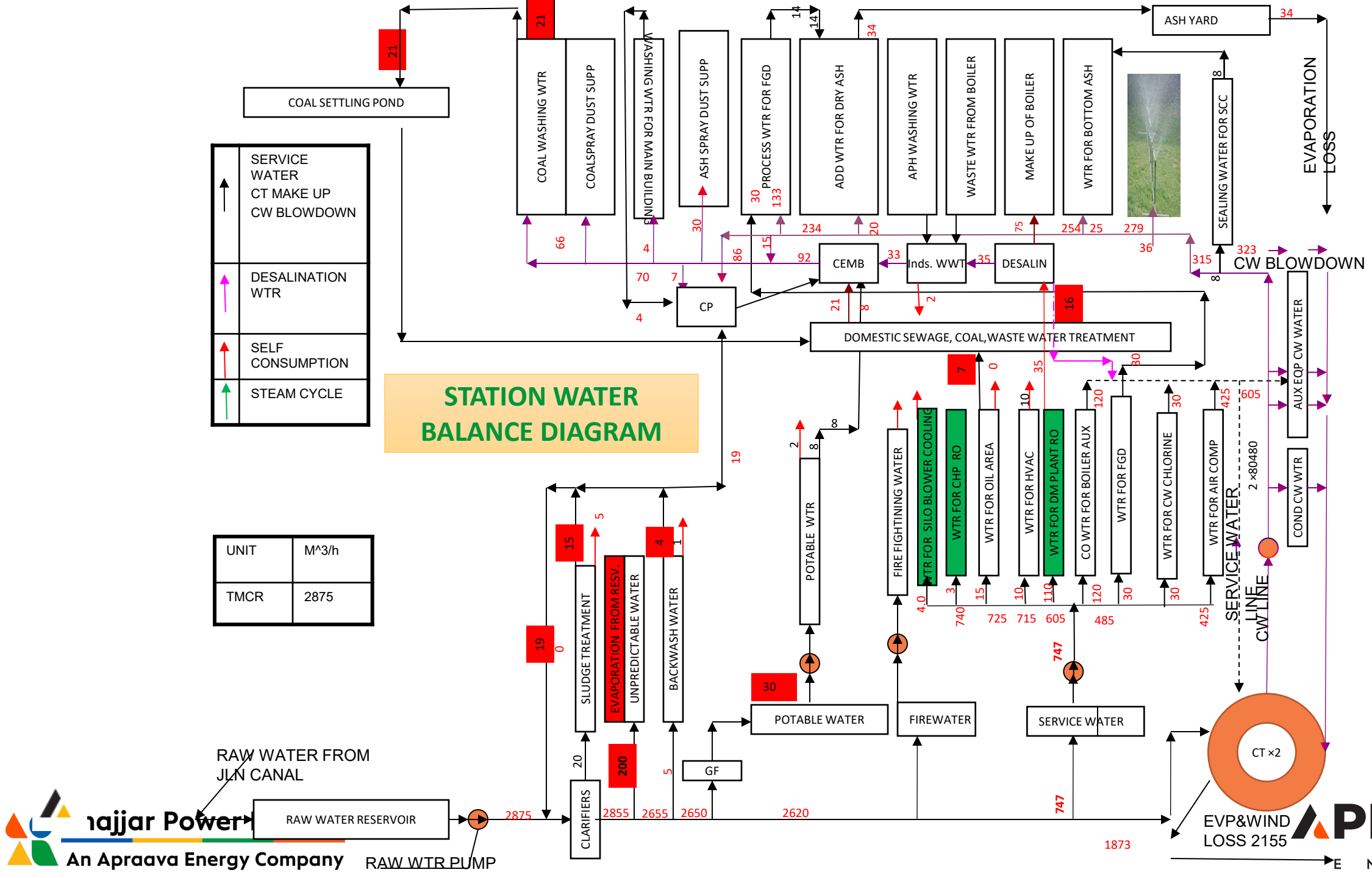
JPL Water Management Overview



STATION WATER BALANCE DIAGRAM

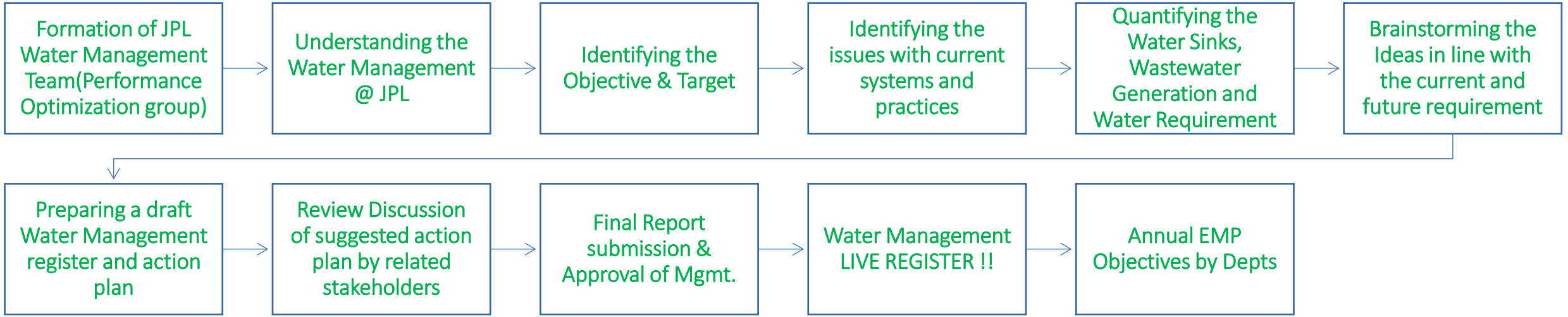


Summary

The objective of the project was to assess the water management practices of JPL and prepare a road map with action plans for achieving the following long term water optimization goals:

- Quantifying Raw Water Sinks
- Quantifying the Wastewater Generation
- Identifying and quantifying the Wastewater Requirement
- Identifying options for Water Conservation and Wastewater Reuse/Recycling
- Metering requirement

Water Monitoring and Review Mechanism



Process of Program implementation

- Formation of Cross Functional Team
- Identifying the gaps
- Implementation of identified actions through EMP Objectives
- Monitoring the progress

Impact of the Program

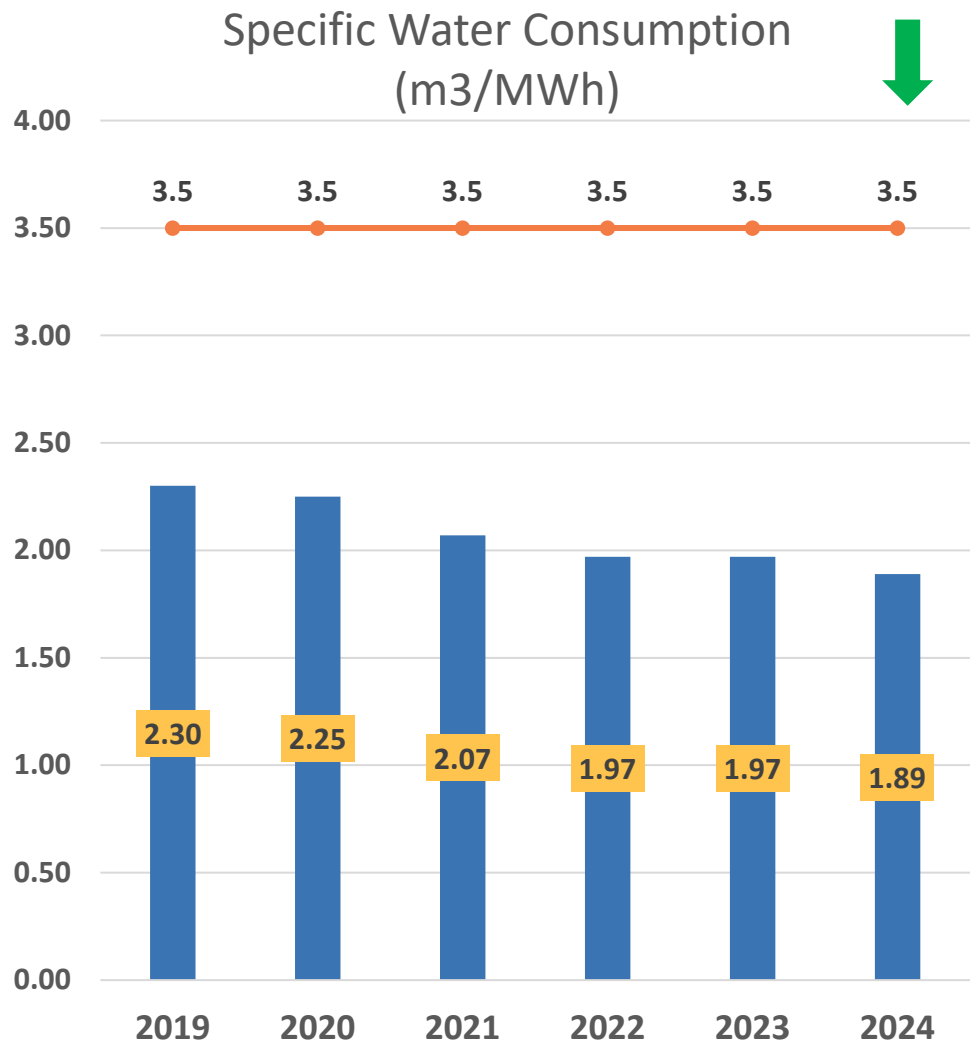
- Visible impact in Specific Water Consumption
- Going beyond legal compliance
- Reducing water risk which impacts plant operation
- Cost saving

Success factors for the Program

- Continuously achieving improved water consumption
- Sharing with peer industries

Reducing Water Consumption

- Incitiative Installation of Rainwater Harvesting and Groundwater Recharging Systems
- 100% Recycling and Reuse of wastewater at JPL
- Zero Liquid Discharge (ZLD)
- Reuse of treated wastewater in horticulture, cleaning, dust suppression within plant premises and wherever suitable



Key approaches

- Awareness on Water conservation
- Water Monitoring and Study on sites
- Increasing the COC of CW water from 6.0 to 7.5

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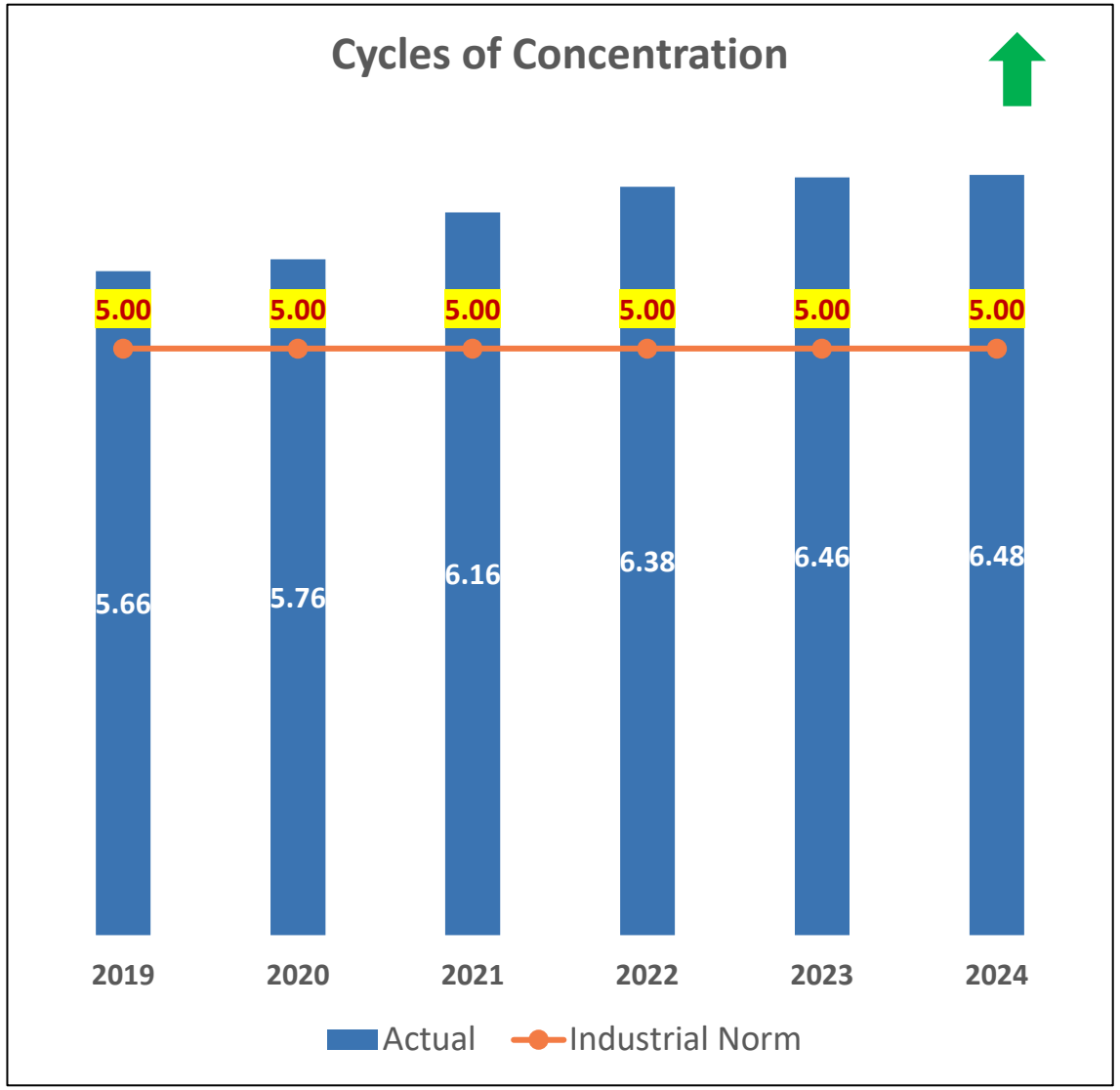
Specific Water Consumption- Increasing COC

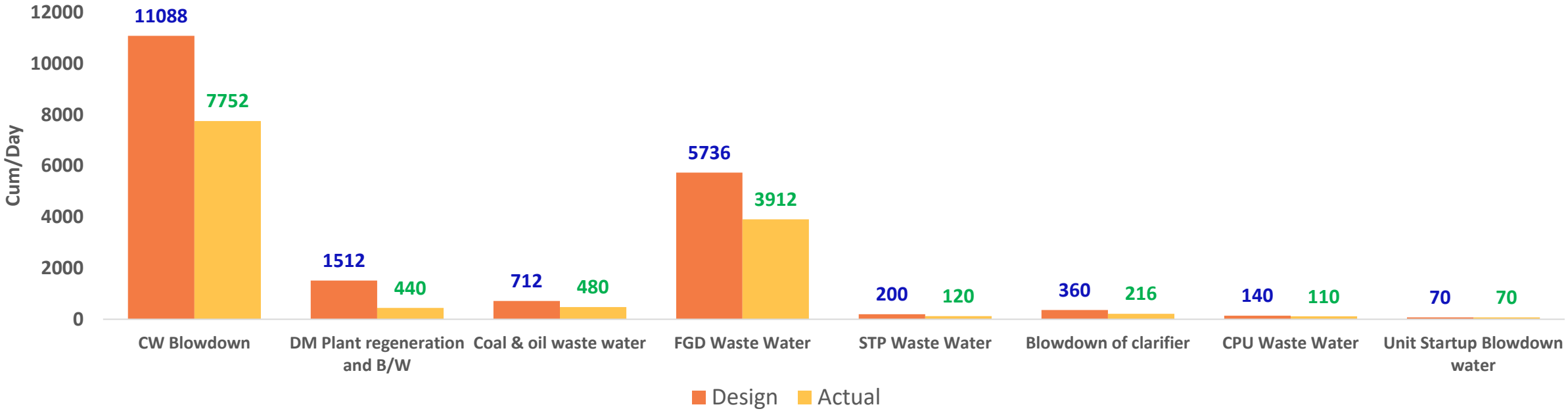


Trend **Positive**

Remark:
Far better than industrial norm

Future Forecast:
To increase up to maximum feasible value

Wastewater Management



Different Types of Wastewater treatment system

- Sewage Treatment Plant
- Nature Based Sewage Treatment Plant
- Effluent Treatment Plant
- FGD Wastewater System

- JPL is a Zero Liquid Discharge plant.
- The wastewater generated from water treatment is used for coal and ash dust suppression within the plant premises and road/floor washing.
- The cooling water blow down water is reused in Flue Gas Desulphurization unit and also used for greenery development within site.
- Station water balance includes the wastewater balance also.

Continual Improvement

Water Audit at JPL

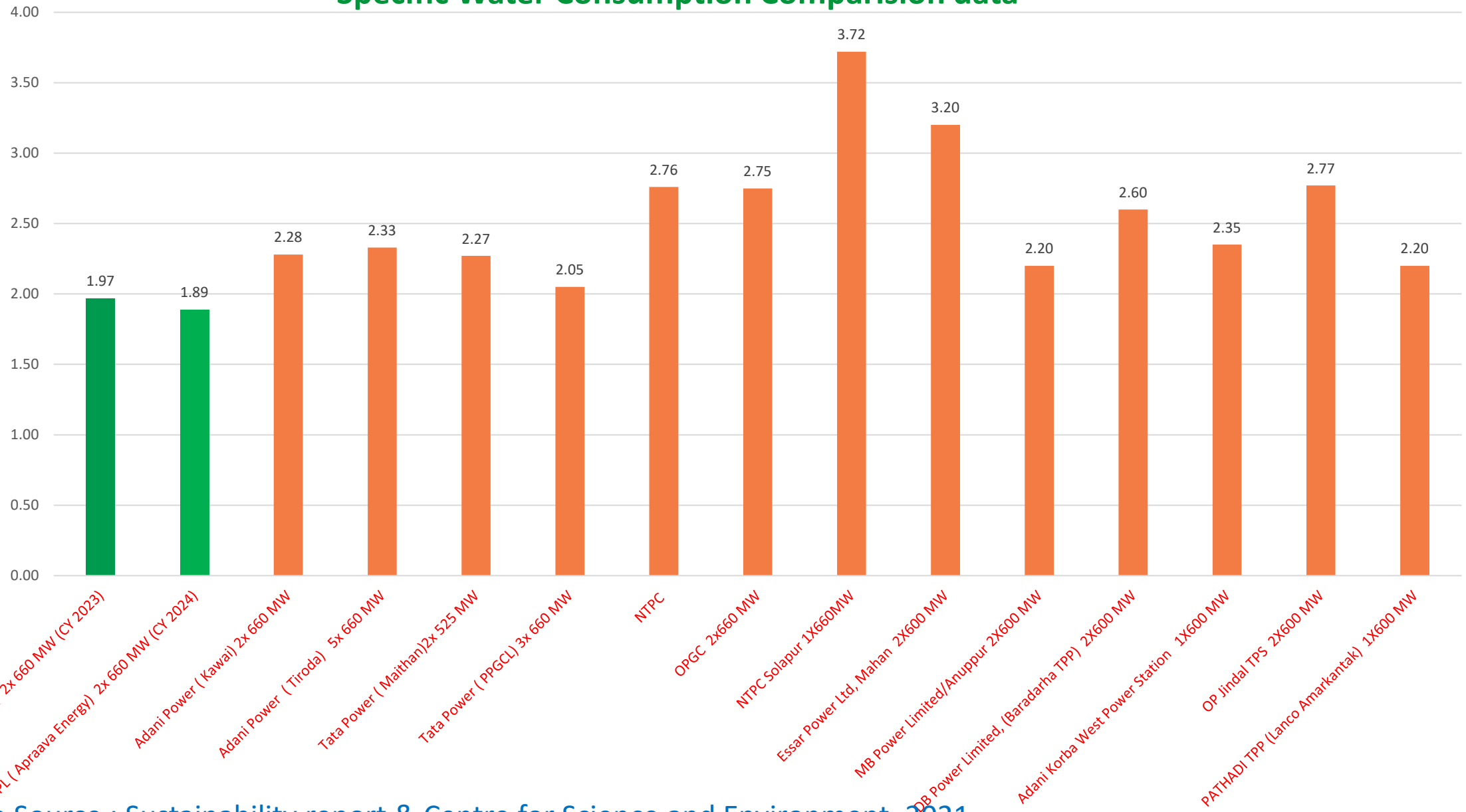
- Water Drawl Review
- Distribution System Confirmation
- Test and Calibrate Source Meters
- Metered Usage Analysis
- Non-Metered Usage Analysis
- Consumption, Reuse & Recycle Review
- Leak Detection Survey
- Audit Findings and Recommendations
- Water Saving, Reuse & Recycle Target
- Improvement Monitoring

Biodiversity & National Capital Action Plan

Wetland Development

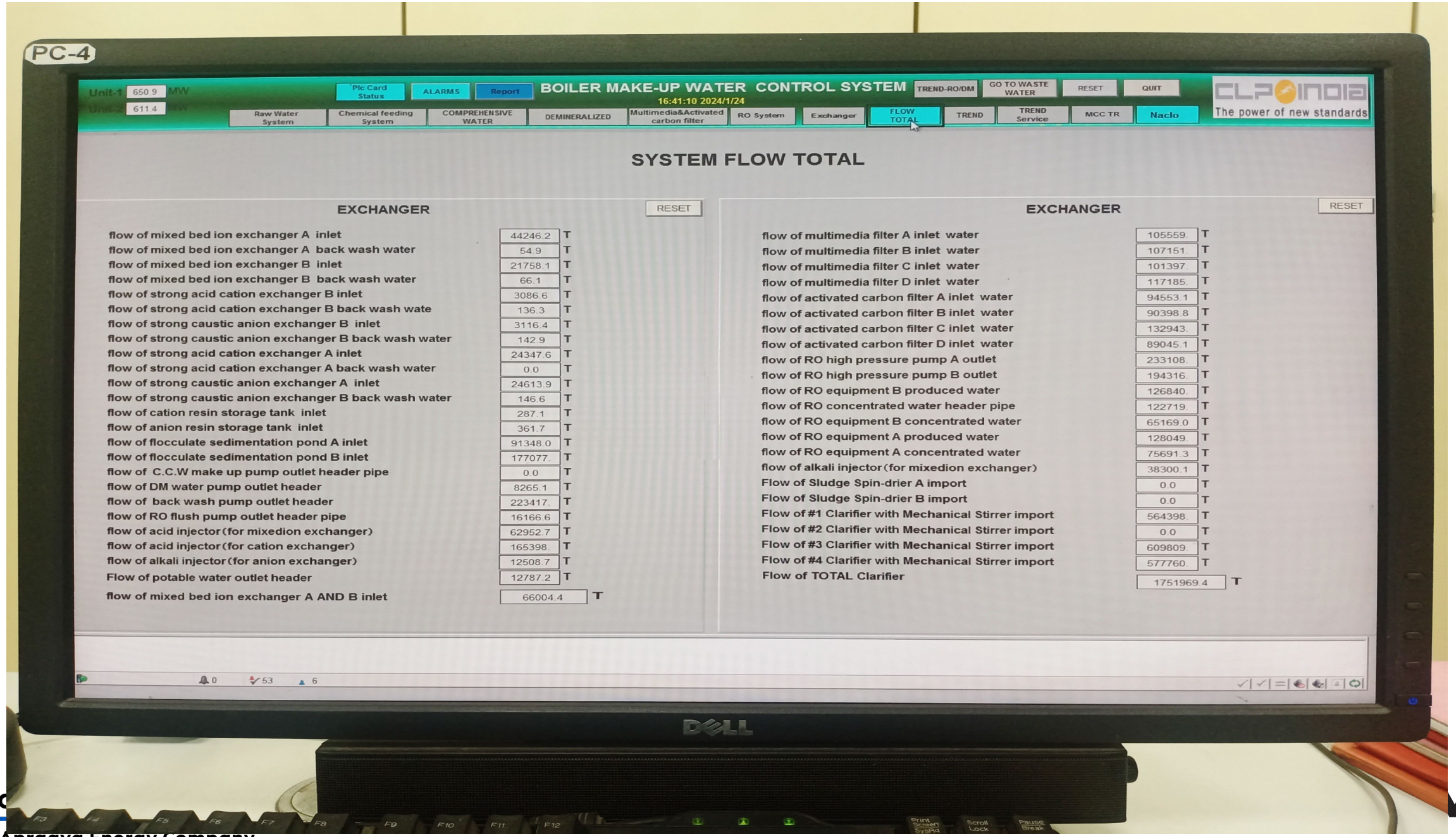
Butterfly Park

Specific Water Consumption Comparision data



Data Source : Sustainability report & Centre for Science and Environment, 2021

Water Consumption monitoring system (Flow Meters)



Major Projects Undertaken

Condenser return hot water bypassed to Basin directly

- 5% of condenser return water connected with CT basin during winter season
- Reduction of Evaporation loss of Cooling tower in seasonally and resolved High DO in Condensate water
- Around 550 M3/day @ 75 % PLF in winter season

Cooling water system Automation

- 3D tracer Implemented and receiving parameters
- Monitoring Online parameters instantly and taking precautions accordingly. Optimization COC
- Reduction of chemical cost real time monitoring parameters like scaling ,corrosion inhibitors , pH and Conductivity

Service water Return line above the ground.

- Service water return line modified above the ground
- Leakage visible and improved system monitoring
- Close monitoring the system healthiness

CPU output between regeneration time to be increased

- CPU OBR Increased to up 1.8% to reduce water scarcity and chemical cost
- Complied with water quality on continuous monitoring
- Reducing chemical cost

JPL ESG Projects

Elimination of Single Use Plastics

-Certification done for 3 yrs

Towards Zero Waste to Landfill

-Certification done for 2nd yr

CFL/LED Replacement

-100% installation of LED replaced

Towards Paperless Office

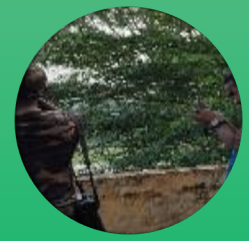
-108 Apps made
- 65% decrease in paper consumption from 2022

Increasing the COC of CW water from 6.0 to 7.5

Specific water consumption reduced to 1.8 from 2.1

Nature-based Sewage Treatment for JPL's Shakti Vihar Colony

- Functional since March 2023



Biodiversity Assessment for Long-term Roadmap

-3 seasons Assessment done.
-Biodiversity Score-60/100
-15 NCAPs(National Capital action plans) generated
-13/15 completed.

SDGs Impacted

11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
15 LIFE ON LAND

11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
15 LIFE ON LAND

7 AFFORDABLE AND CLEAN ENERGY
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
11 SUSTAINABLE CITIES AND COMMUNITIES
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9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION

6 CLEAN WATER AND SANITATION
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
11 SUSTAINABLE CITIES AND COMMUNITIES
14 LIFE BELOW WATER

6 CLEAN WATER AND SANITATION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND

Towards Single Use Plastics Free & Zero waste to Landfill

Replacing plastic bottles with glass bottles

SUP cutlery replaced with wooden/paper

Distributing cotton bags to Contract partner

Distributing Steel Bottles to Bulker Drivers

Material Recovery Site Facility Set Up

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Food Waste Circularity

Food Grown/Plantation

Using Manure for Plantation

Cooking to Dining

Sapling & Manure Distribution

Food Waste Collection

Converting Manure

Composting & Converting to manure

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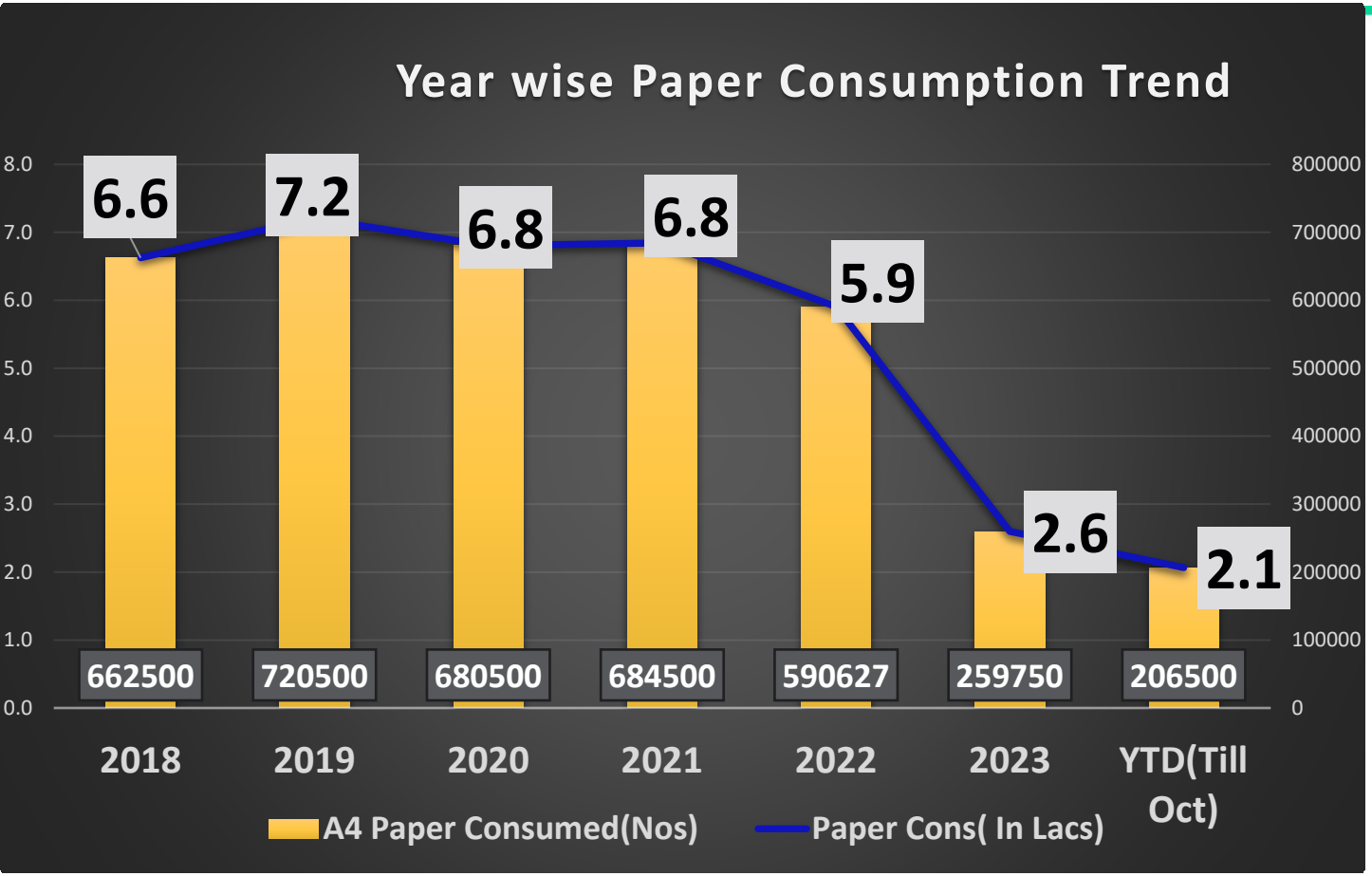
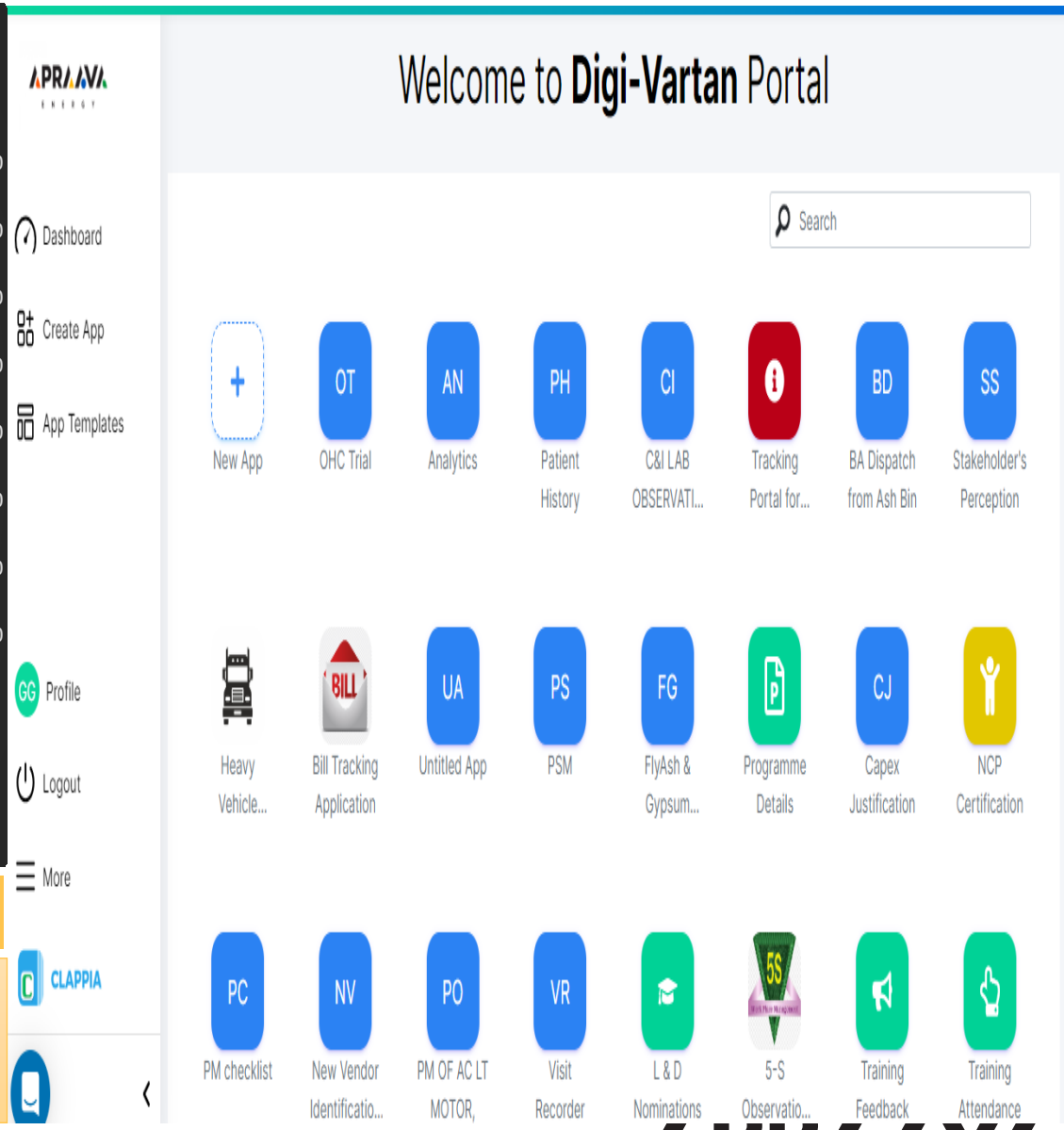
Towards Paperless Office- JPL

"Digi-Vartan": Accelerating the Digital Transformation Journey at JPL

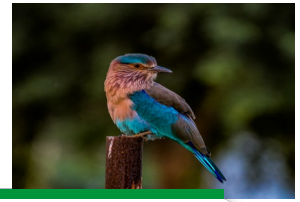


Paper Consumption Trend



Migration to greenfield ERP solution to achieve paperless processes

Biodiversity Conservation



Signatory to India Business & Biodiversity Initiative (IBBI)

Tree plantation drive, contribution towards flora and fauna conservation

Baseline biodiversity assessment at JPL

Apraava Biodiversity Committee

Monitoring of environmental compliance and ESIA study

Natural Capital Action Plan (NCAP)

Usage of Forest Stewardship Council (FSC) certified products

Activities and Awareness events on Environment Day

Key Goals on Biodiversity

- Baseline Biodiversity Assessment for all sites
- Development & Implementation of NCAP
- Formation of Biodiversity Roadmap

- ✓ Flora (135) and fauna (222) has shown a considerable increase w.r.t last EIA study during project times (54 flora and 38 fauna species)
- ✓ Carbon sequestered by trees in plant & township area ~33000 Tons
- ✓ Biodiversity Index Score of JPL is 60 /100
- ✓ 15 NCAP (Natural capital action plan) recommended. 13/15 completed.

115 KLD Nature based STP

At JPL, we have installed the globally patented technology called CAMUS-SBT (Continuous Aerobic Multistage System Soil Biotechnology) developed by IIT Bombay.

Benefits include :

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

Integrated Water Management Project in CSR

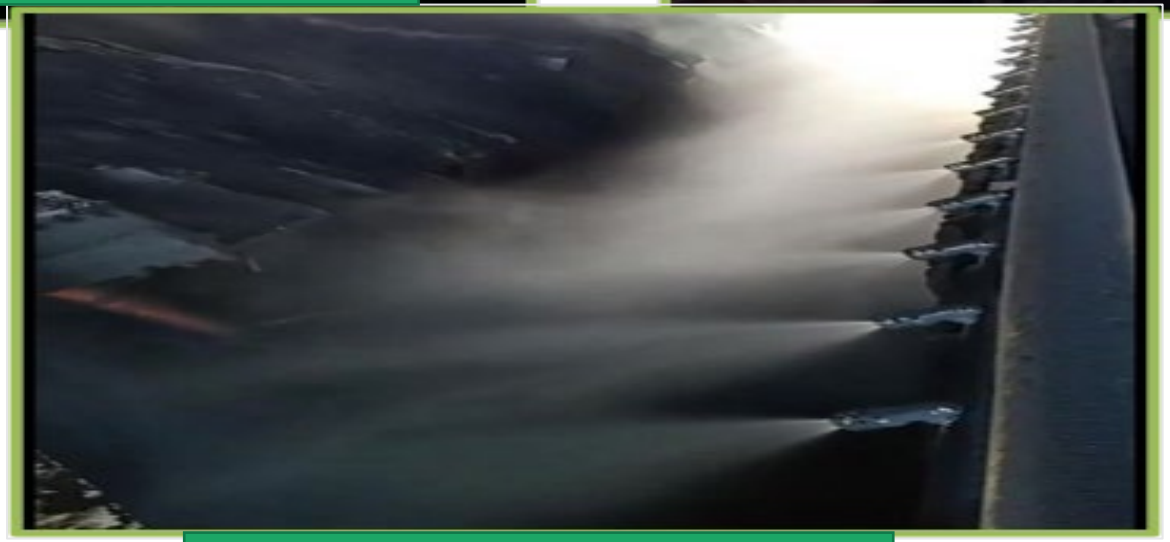
Renovation of wastewater pond in Jhamri village

- **Integrated Water Management Project-Sanjeevani** is a comprehensive approach towards water mgmt. including rejuvenation of village ponds, construction of rainwater harvesting structures, wastewater treatment and soil health management.
- Renovated two wastewater ponds in Jhamri and Jharli villages
- Expanding water storage capacity to 11.7 TCM
- Replenishing of pond through water pumping station

Wastewater Reuse for Dust Suppression

Sprinkler line around the coal yard

Pre-wetting line for coal wagon



WT Grizzly Dust Suppression

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Jhajjar Power Limited - Wetland

“WETLAND”

At Jhajjar Power Plant, our commitment to sustainability led us to create a wetland drain (Rainwater)using repurposed coal boulders.

This innovative initiative aims to harness rainwater for the development of a biodiverse wetland area on our premises. By incorporating eco-friendly practices, we not only contribute to water conservation but also foster a thriving ecosystem within the power plant. This forward-thinking approach aligns with our dedication to environmental responsibility and underscores our efforts to integrate green solutions into our operations for a more sustainable future.

Sustainability Initiatives at JPL

- **Biodiversity improvement:** Baseline Biodiversity Assessment resulted in 15 Natural Capital Action Plans. 8 out of 15 completed and 7 under different stages of completion.
- JPL declared **SUP (Single use plastic) free** from Nov-2022. Few actions taken in local surrounding:
  - ✓ 1.2 km stretch of Matenhail forest area cleared of 2.3 Mt SUP in March 2023.
  - ✓ SUP cleaning and elimination drive at metro market area done in April and May 2023.
- **Increase of COC** of Circulating water from 6.0 to 7.5
- **Digitization initiatives towards paperless office:**
- **Nature based 115 KLD STP** at Shakti Vihar township is functional since March 2023.
- **JPL received the Zero Waste to Landfill certificate** by the CII (validation from 21 August 2023 to 20 August 2024)
- Evaluation of GHG Scope 3
- 100% replacement of conventional light by LED
- 100% Waste Recycling

CII-ITC Centre of Excellence for Sustainable Development

CII Confederation of Indian Industry

SUP free

Certificate

Single-use Plastic Free

Jhajjar Power Limited
(An Apraava Energy Company)
Village- Khanpur,Tehsil- Matenhail, Distt- Jhajjar, Haryana, India

This is to certify that Jhajjar Power Limited (An Apraava Energy Company) at the location mentioned above, is Single-use Plastics free as verified by the Confederation of Indian Industry, under the provisions of the **Plastics-use Protocol: Verification and Certification (1.0)**.
This Certificate is valid from 04 November 2022 to 03 November 2023.

Ms Seema Arora
Deputy Director General
Confederation of Indian Industry (CII)
Centre of Excellence for Sustainable Development (CESD)

Certificate Date: 29 November 2022 **Certificate No.: CII/PuP/2022/012**

JPL SUP free Certification 2022

Apraava Energy's SBTi Target "To reduce generation-related GHG emissions intensity (Scope 1 & Scope 2) by 46.3% per tCO2e/MWh by 2027 from a 2022 base year" validated by Science Based Target initiative (SBTi) in June 2023. We are the second power company in India to receive SBTi validation for targets.

Environmental Compliances

Emission Parameters	Statutory Limit (wef Dec 2017)	Emission Status compliance	Status
PM (mg/Nm3)	50	**30 (ESP & FF)**	In-compliance
NOx (mg/Nm3)	450	**290**	In-compliance
SO_2 (mg/Nm3)	200	**180 (FGD)**	In-compliance (From Feb'2019)
Mercury (Hg) (mg/Nm3)	0.03	**<0.01**	In-compliance
Water Use (M3/MWh)	3.5	**1.89 (CY-2024)**	In-compliance
100 % Fly ash utilization as per Fly Ash Notification 2016		Continue last four years 100 % in- compliance	

Recent Awards - A Glimpse

JPL has been awarded with the prestigious "Platinum" recognition at the CII-EXIM Bank Award for Business Excellence 2024

Apraava Energy won the prestigious Sustainability Award for Excellence in Environment Management at the 18th CII-ITC Sustainability Awards in March2024

Joint Winner in the "Best Green Procurement Project of the Year" at the 3rd Procurement Strategy India Summit & Awards 2024

TERI-IWA-UNDP Water Sustainability Awards 2022-23 for Excellence in Water Use Efficiency

Being acknowledged as "Oriented" in the first application with JPL as a sample assessment site showcases Apraava's actions to combat climate change-2024

CII- ITC Sustainability Awards - Biodiversity “Commendation for Significant Achievement in Biodiversity”

Awareness - Natural resource Management

Wetland Day Celebration with Eco-champs and employees

Awareness in Nearby Schools

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Introducing ECO CHAMPS of JPL

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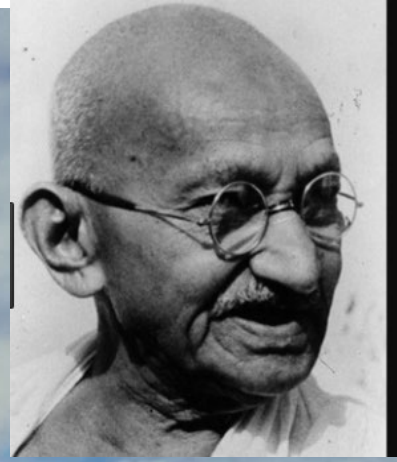
Water Management - Awareness through Signages

Awareness signage. The initiative aimed at enhancing environmental water awareness through signage. We believe these actions will contribute significantly to fostering a greater understanding of environmental/ water responsibility within our community and our workforce.

Water Management - Awareness sessions through Mass TBT

Thank You



The world is big enough to satisfy everyones needs, but will always be too small to satisfy everyones greed

— Mahatma Gandhi —