



Sustainable Measures for Power Generation & Township Management

National Conference on Sustainable Urban Transformation



Discussion Outline



NTPC Overview

Operational Footprint

1

NTPC's Energy Transition

Avenues

2

NTPC ESG Strategy

Ratings, Targets

3

Environment Performance

Initiatives & Trends

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NTPC Overview



1

Vision

To be the World's
Leading Power Company,
accelerating India's growth and energy transition

Mission

Provide Reliable Power and energy transition
Solutions in an Economical, Efficient and
Environment friendly manner, driven by
Innovation and Agility

Core Values

Integrity

Customer Focus
& Agility

Organisational
Pride

Mutual Respect
and Trust

Innovation and
Learning

Total Quality
and Safety



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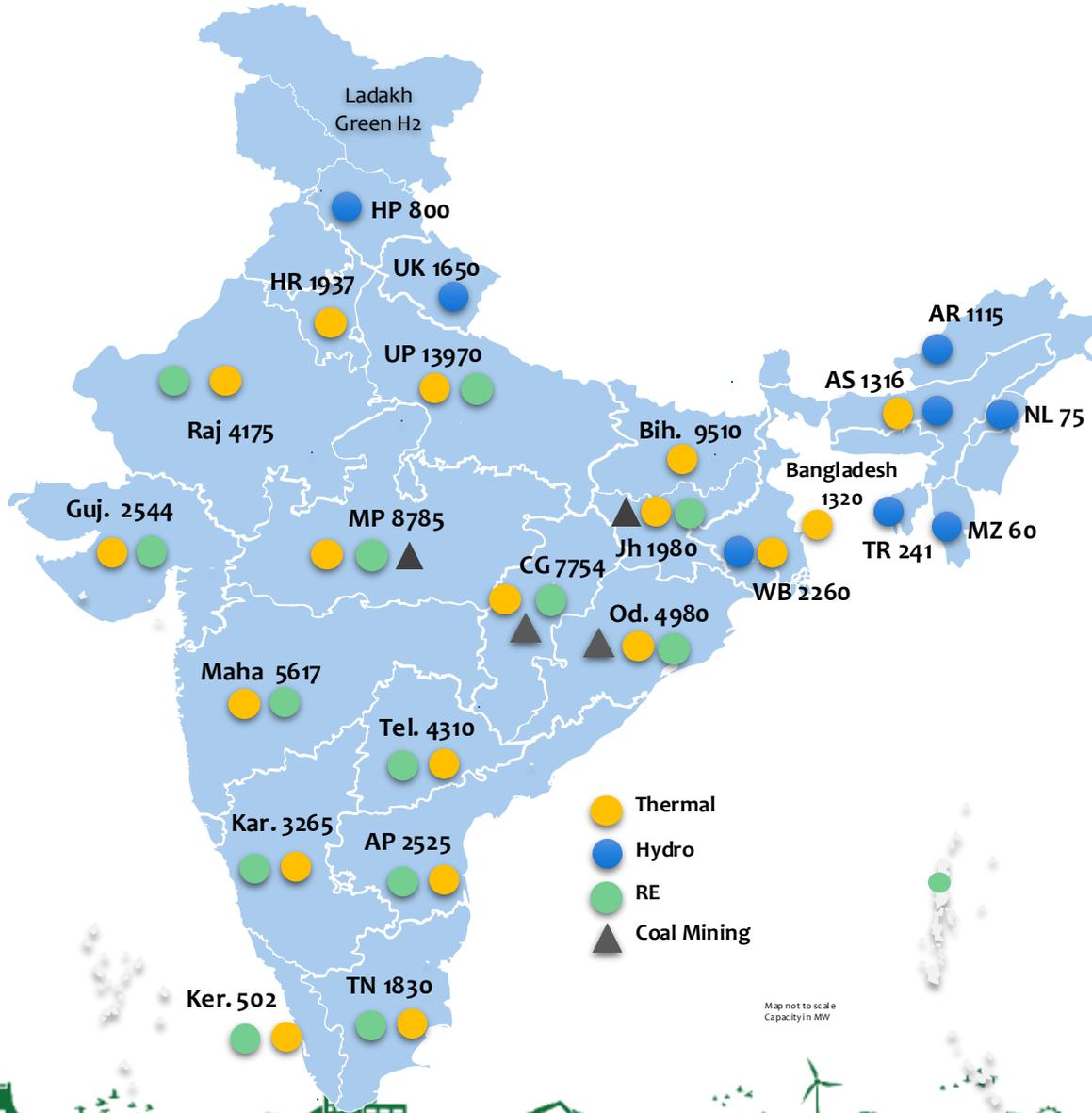
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- NTPC to be a 149GW + 1GW Pump hydro storage company by 2032 with diversified fuel mix and a 600 BU company in terms of generation.
- Coal would continue as predominant fuel with 65% share of coal based capacity in the portfolio.
- Non-fossil fuel based capacity would achieve a share of 30% and Thermal based generating capacity share would be 70%.
- Share of RE (including hydro) would be 28%
- NTPC targets a market share of 25% in ancillary services and storage
- NTPC aims to achieve 10% of the estimated market share for supply of electricity in E-mobility business

in GW	Dec 2026	By 2032	% Mix
Thermal	74	83.6	56.11
Hydro	4	4.7	3.15
Renewables	21	60	40.27
Nuclear	0	0.7	0.47
Total	99	149	100
PSP	1	1	
BESS (GWh)	2	22	





117 GW

Power Generation Portfolio
84 GW operation 33 GW Under Construction

24 %

Contribution in all India generation with 17% installed capacity

84.85 GW

Capacity under Operation

32.5 GW

Capacity under construction

13 %

Non-Fossil Capacity under Operation

8.92GW

Renewable Capacity under Operation
13.8 GW under construction

45 MTPA

Coal Mining Capacity
[6 Mines operational +3 Under Development]

\$ 40 Bn

market Cap; 14th largest company of India

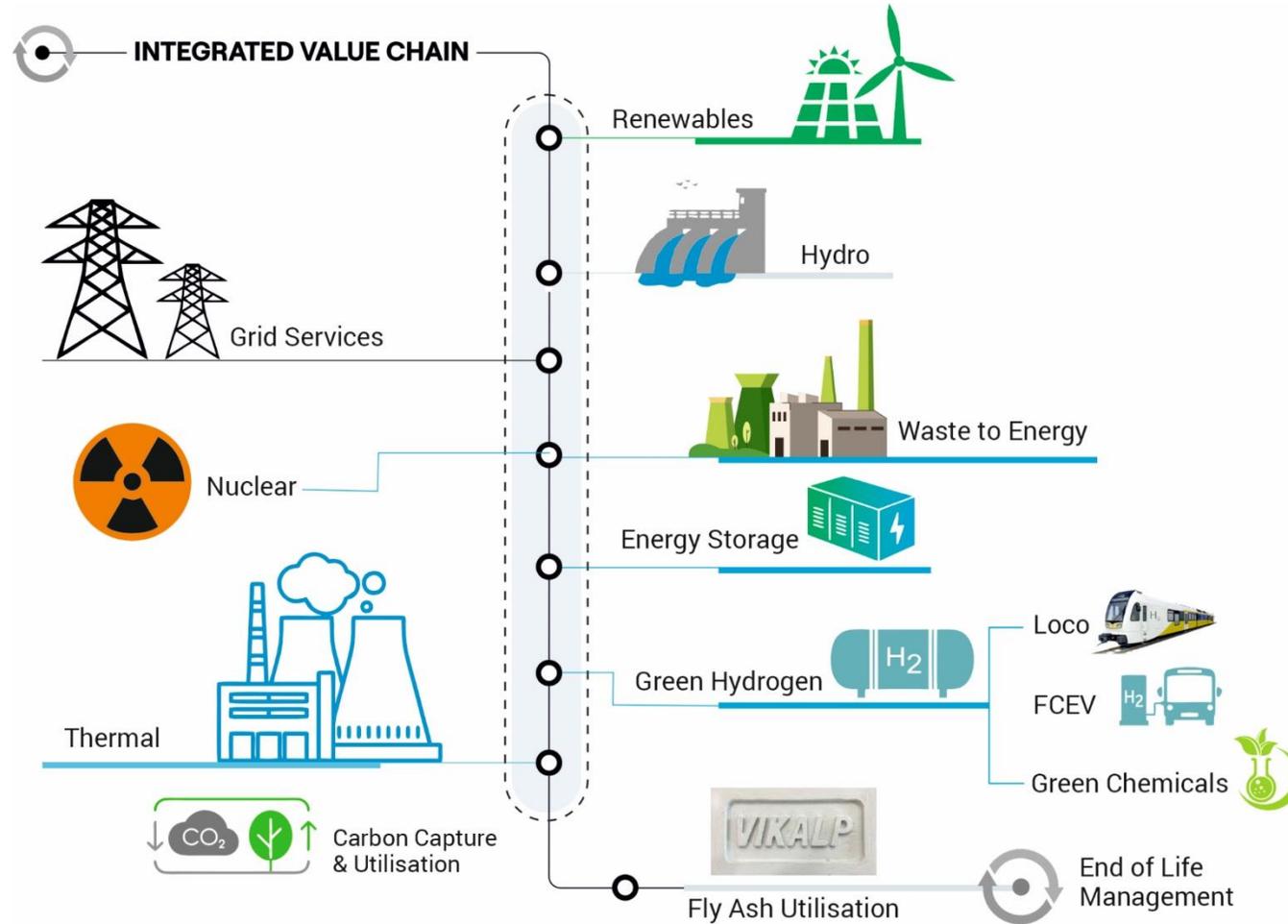
27 Companies

11 Subsidiaries
16 Joint Ventures

20,000+

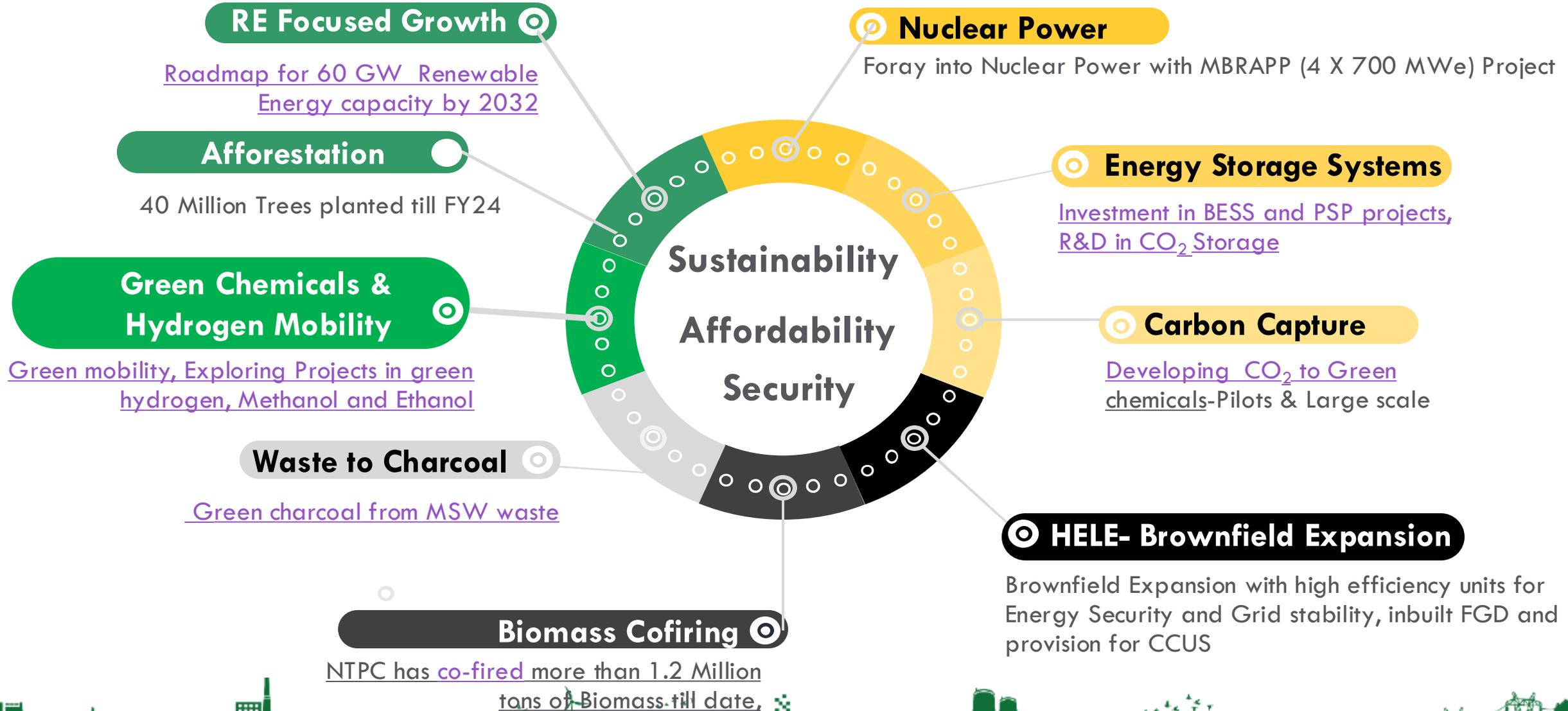
Group Employees (Regular)

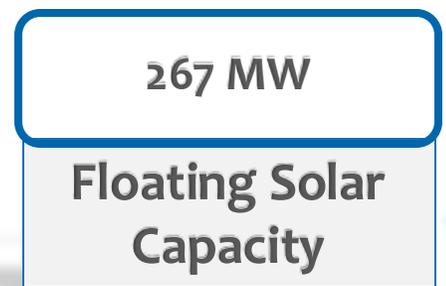
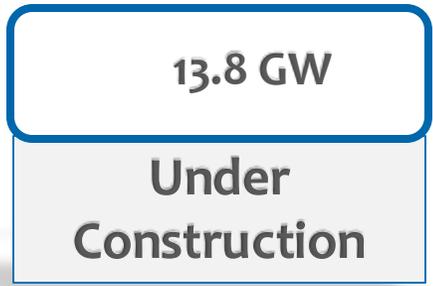
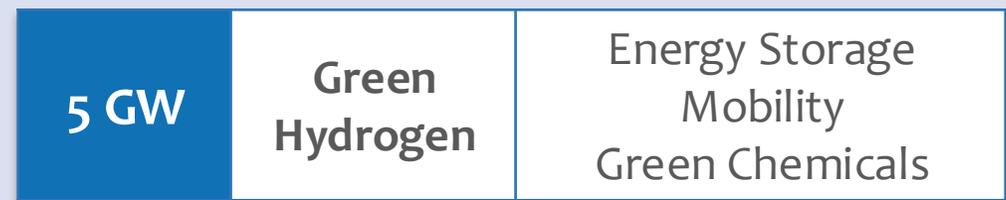
NTPC's Energy Transition



2

NTPC's Plan for orderly Energy transition





Pump Storage Projects

- 11550 MW - 9 PSPs Indicated to NTPC by MoP
- Allocated Capacity: 4000 MW-4 PSPs
 - THDC : 500 MW under Construction, MoUs signed for 10 PSPs of 11,740 MW
 - NEEPCO: 2620 MW, 3 PSPs identified

Focussed and accelerated RE capacity addition through **NGEL**



 **ASHVINI- Anu Shakti Vidhyut Nigam Limited : A JVC of NPCIL & NTPC (51:49) respectively**



Govt approved ASHVINI to build, own, and operate nuclear power plants on 13th Sep '24.



Hon'ble PM laid the foundation stone of MBRAPP on 25th Sep '25



Equity infusion of INR 700.00 Crs to JVC approved by NTPC board.



Joint team of NTPC and NPCIL is working together at MBRAPP site.

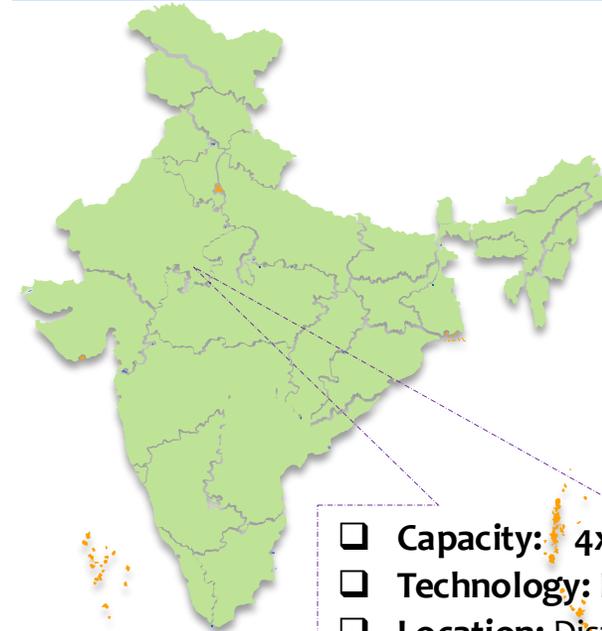


AERB (Atomic Energy Regulatory Body) transferred Consent for Siting from NPCIL to ASHVINI



JVC intended to take benefit of both NPCIL's technical expertise & NTPC's large & complex project handling capacity.

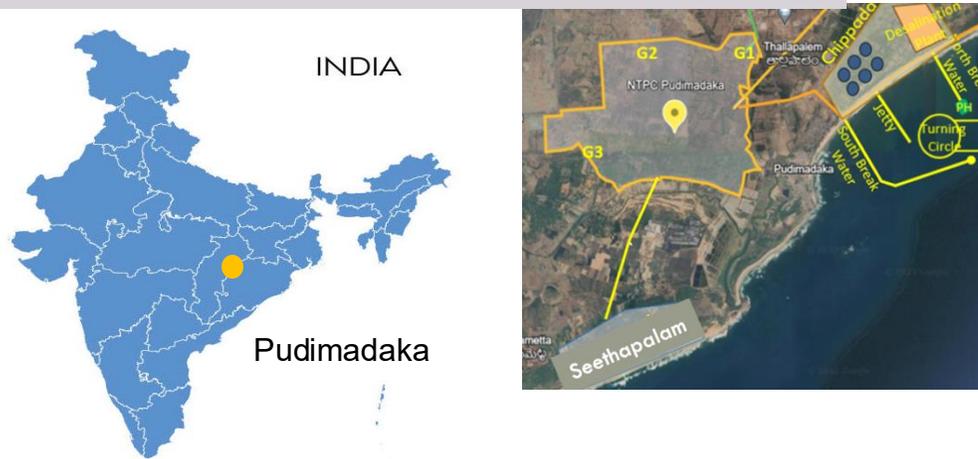
Mahi Banswara Rajasthan Atomic Power Plant (MBRAPP)



- ❑ **Capacity:** 4x700 Mwe
- ❑ **Technology:** Indian PHWR
- ❑ **Location:** Dist.- Banswara, Rajasthan
- ❑ **Nearest Airport:** Udaipur-180KM,
- ❑ **Nearest Railway station:** Ratlam-60KM



Green H2Hub, Pudimadaka - Overview



Project Location : Pudimadaka, Visakhapatnam, AP
Power Supply : 7 GW RE-RTC through CTU Open access
Planned Infrastructure :

- Green Hydrogen: 1500 TPD (300 TPD Liquid Hydrogen)
- Green Ammonia: 4500 TPD
- Green Methanol: 1500 TPD
- Sustainable Aviation Fuel (SAF): 600 TPD
- Green Urea: 1350 TPD
- 300 Acres for common infra and Green Belt
- 600 Acres for Green Chemicals

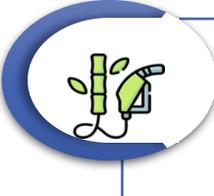
Other Initiatives



Mobility @ Leh and Delhi NCR
10 buses, 2 Filling stations



Tie-up for Electrolysers
400 MW PEM | 600 MW Alkaline



CO2 to Methanol @ Vindhyachal

- CO2 Capture Plant (20 TPD)
- Methanol Synthesis & Distillation Plant (10 TPD)



Hydrogen-PNG Blending @ Kawas
8% by volume, 0.7 TPA H2

Pipeline for compression and transportation of flue gas CO2 from NTPC Simhadri to Pudimadaka, which can enable large-scale movement of CO2 and development of CCU/CCS hubs.

Carbon Capture & Utilisation-Pilot Projects



1. Flue Gas CO₂ to Methanol Plant at NTPC Vindhyachal

- World's First CO₂ to Methanol Plant has been commissioned at NTPC Vindhyachal
- It has carbon capture capacity of ~6000 TPA to produce ~3000 TPA of green methanol using first indigenous methanol synthesis catalyst.
- Captured CO₂ is converted into Methanol using Green Hydrogen

2. CO₂ to Sustainable Aviation Fuel (SAF) Plant at NTPC Pudimadaka

- Production Capacity of 1800 TPA; capturing 4200 TPA of CO₂
- Potential for a Carbon-Neutral Fuel Cycle
- Energy security and diversification for sustainable aviation fuel
- Potential for Economic Benefit

3. Detailed geological studies at Pakri Barwadih mines along with drilling of CO₂ Injection Bore which can explore the viability of storing CO₂ in coal seams.

- The CO₂ borewell is being drilled to an approximate depth of 1,200 meters.
- The initiative aims to rapidly develop indigenous CCS capability



Biomass Co-firing with Coal: Avoiding Fossil GHG Emissions

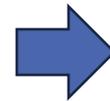
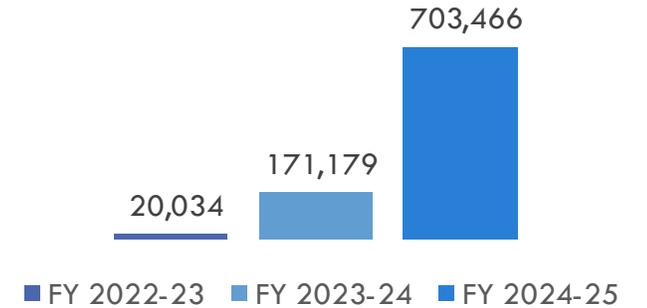


Crop residue (paddy straw) burning in Punjab & Haryana cause air pollution and heavy smog in NCR.



- NTPC consumed 703,466.12 MT of Biomass in FY 2024-25.
- Total Qty of 7.48 Mn MT ordered across 22 NTPC stations and one JV (APCPL Jhajjar)

Biomass Co-Fired



Waste to Energy Projects

- NTPC has signed a Land Use and MSW Agreement with Meerut Nagar Nigam for the processing of 900 TPD of MSW into green charcoal.
- An MoU was the Municipal Corporations of Gurgaon and Faridabad for developing similar MSW-to-charcoal projects, which will be implemented by APCPL Jhajjar



Waste to Compost

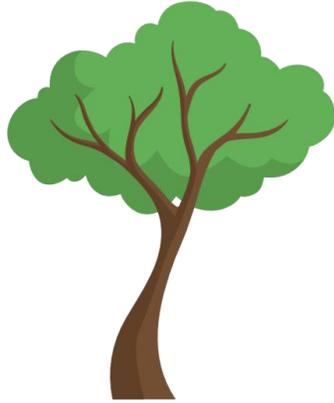
- NTPC revamped and managing O&M of Waste to Compost plant at Varanasi having 600 TPD Capacity. It generates 60-80 TPD of compost.

Waste to Charcoal Projects

- Dadri Pilot project for MSW to charcoal plant already commissioned.
- Varanasi Harit Koyala Pariyojana has been commissioned with 600 TPD MSW capacity. It is based on Torrefaction Technology
- Other MSW to Charcoal Plants are under planning & implementation at Gorakhpur (500 TPD), Hubli-Dharwad (200 TPD), Noida (900 TPD) and Bhopal (400 TPD).



Creating Carbon Sinks through Afforestation

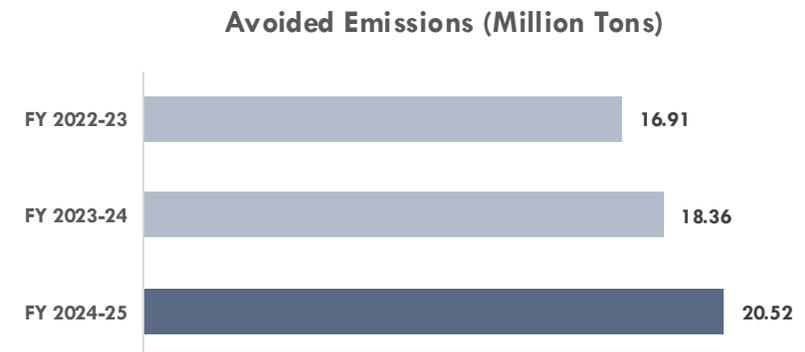


- Supporting country's NDC of creating an additional carbon sink of 2.5 to 3 billion tonnes of CO₂ equivalent through forest and tree cover by 2030.
- Have planted 10 million trees across the country during 2016-17 and continuing to create additional sink by planting 1 million tree each year
- More than 40 Million saplings planted till 2024-25 since inception (NTPC/Govt. Lands)

Avoiding GHG emissions through Non-Fossil Generation



- Avoiding GHG emissions through operational Non-fossil based power generation

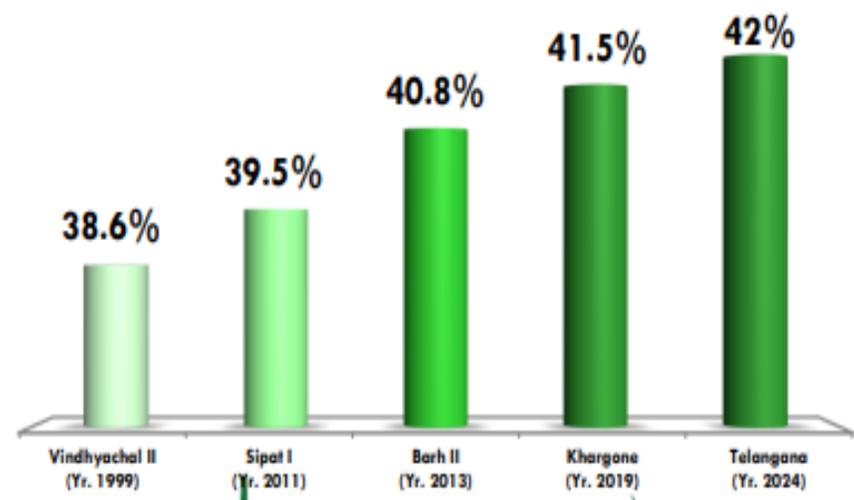


Technology Upgradation & Efficiency Improvement

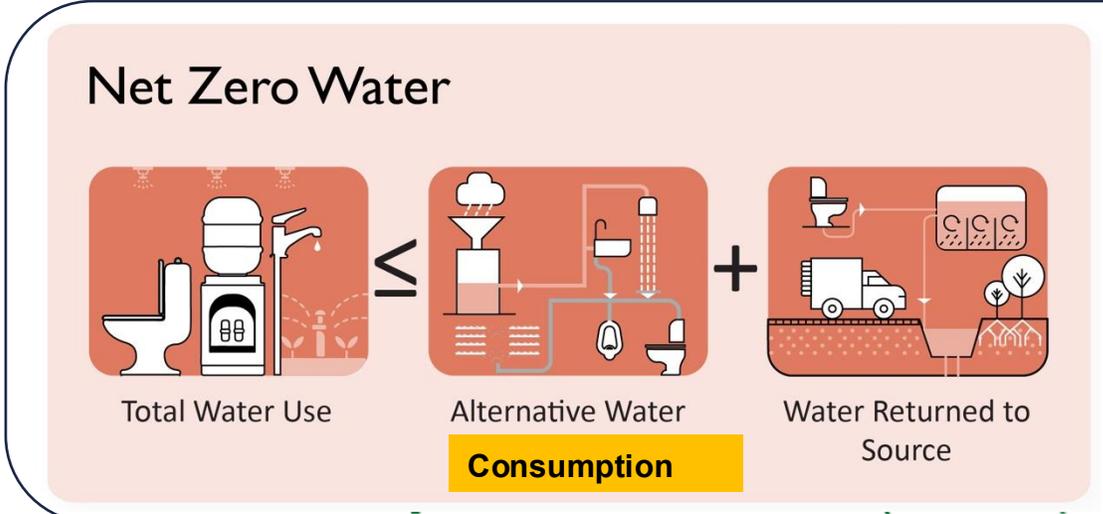
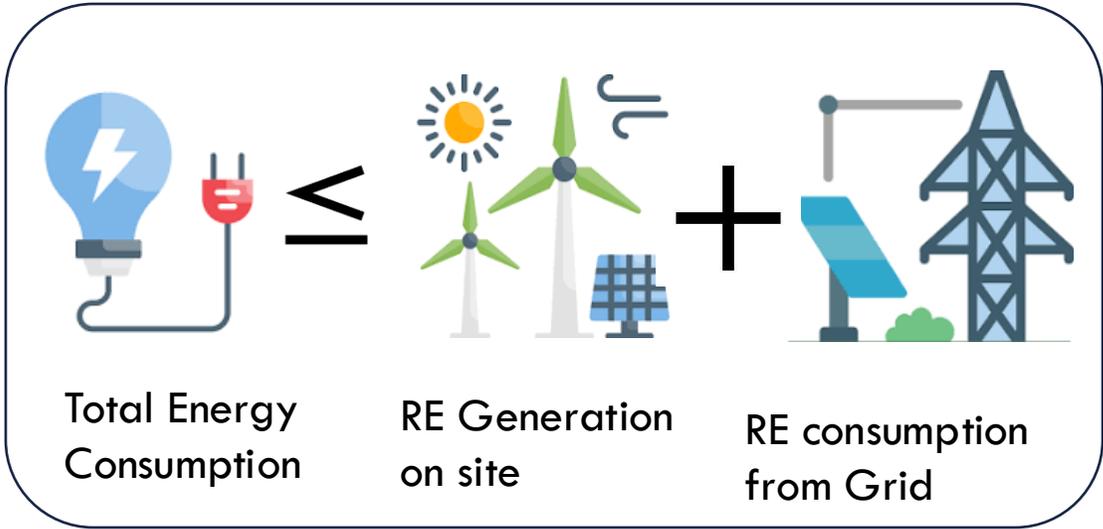
- All new coal capacity additions (15.6 GW) is based on HELE (High Efficiency Low Emissions) Technologies — Supercritical, Ultra Supercritical, Advanced Ultra Supercritical
- In FY 2024-25, NTPC attained energy savings of approximately 1,955.4 TJ



Every 1% rise in efficiency leads to 2.5% CO₂ reduction



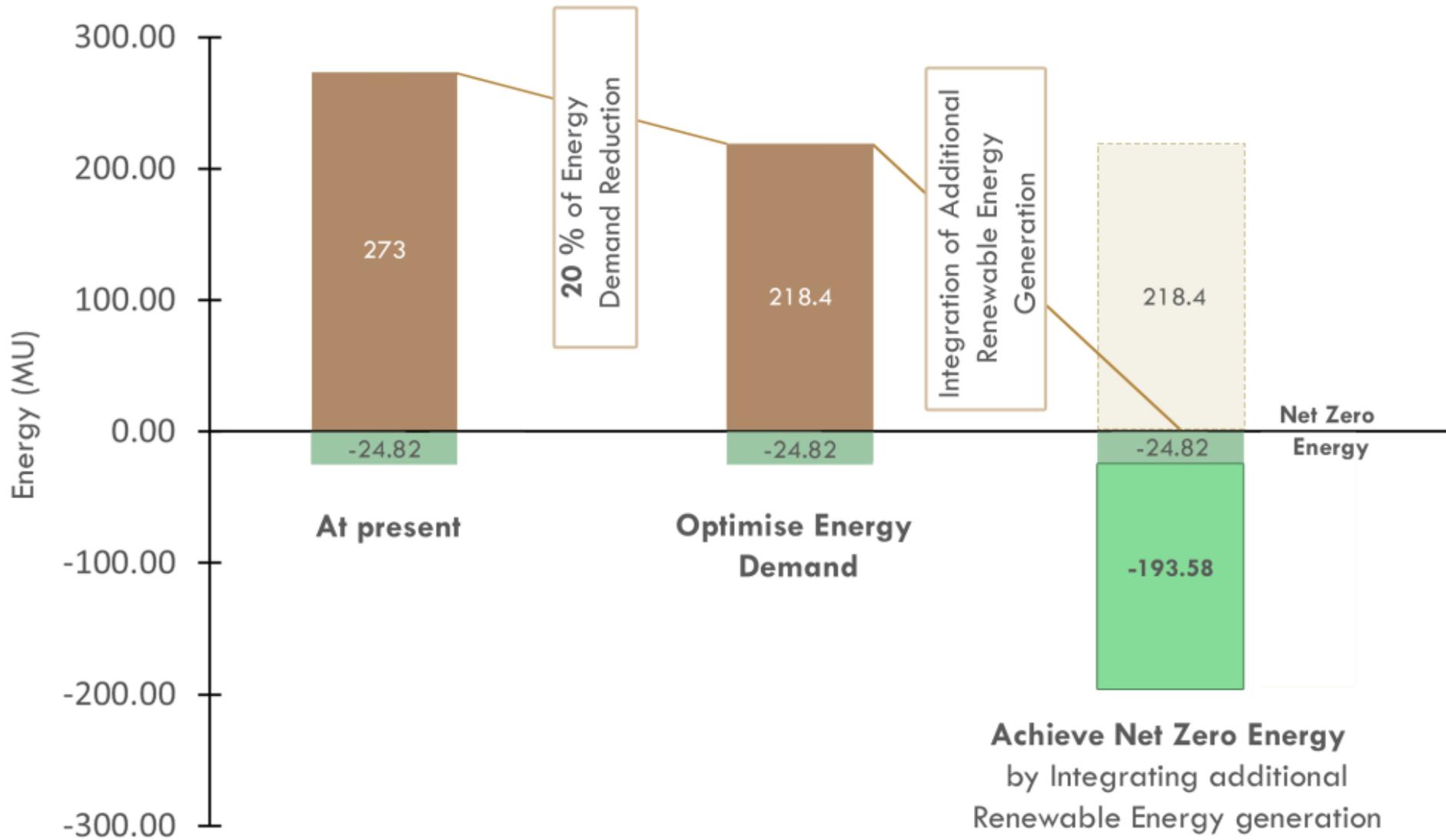
Net Zero-Energy, Water & Waste Initiative



Alternative Water : Rainwater harvesting, treated wastewater, or recycled water consumed

Water Returned: Water treated and returned to the environment e.g. to surface water or through groundwater recharge





Annual Average Energy Consumption of Existing NTPC Townships
 Annual Renewable Energy Generated in Existing NTPC Townships
 Additional Annual Renewable Energy required to be generated in Existing NTPC Townships

Net Zero Energy Transformation for Existing NTPC Townships

NZ Energy (Kudgi, NETRA) and NZ Water (RGPPPL) Townships



RGPPPL Ratnagiri Township | Net Zero Water



Site Area	90 Acres
Building Typologies	Residential, Institutional, Healthcare, Assembly & Retail
Annual Water Requirement	2,75,000 m ³
Annual Rainwater Storage	2,80,000 m ³

Net Zero Water Strategies

- Zero Liquid Discharge (ZLD) Implementation
- Sewage Treatment Plant (STP) for Wastewater Reuse
- Rainwater Harvesting

Kudgi STPS Township | Net Zero Energy



Site Area	169 Acres
Building Typologies	Residential, Institutional, Healthcare, Assembly & Retail
Annual Energy Requirement	2,562.93 kU
Annual Renewable Energy	8,685.02 kU

Net Zero Energy Strategies

- Energy Efficiency: The lighting power density [lpd] of the buildings in the township is less than 0.6 W/ft² or 6.45 W/m²
- Renewable Energy: NTPC generated energy from a 393.6 kWp rooftop solar plant producing 566.93 kU and a solar-wind hybrid plant with a capacity of 1,375 kWp Solar PV and 2,000 kWp wind turbines, generating 8,118.09 kU annually
- Thermal Comfort: The thermal environment is generally well-regarded, with 75% of participants expressing satisfaction

NTPC NETRA | Net Zero Energy

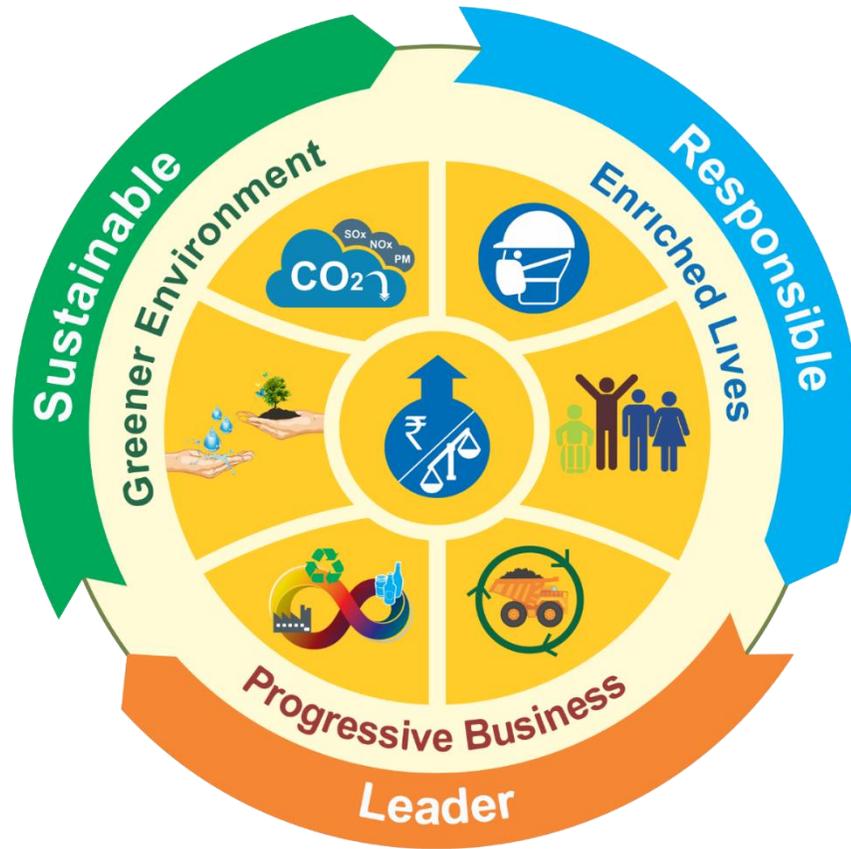


Site Area	75 Acres
Building Typologies	Commercial, Residential, Institutional
Annual Energy Requirement	1,010.51 kU
Annual Renewable Energy	1,069.98 kU

Net Zero Energy Strategies

- Energy Efficiency: lpd < 0.6 W/ft² or 6.45 W/m² and energy efficient glazing [double glazed unit] is installed
- Renewable Energy: NETRA's microgrid is designed to meet the Round The Clock (RTC) electricity demand of its campus from the available DER's in the NETRA

Sustainability Strategy



The Brighter Plan 2032

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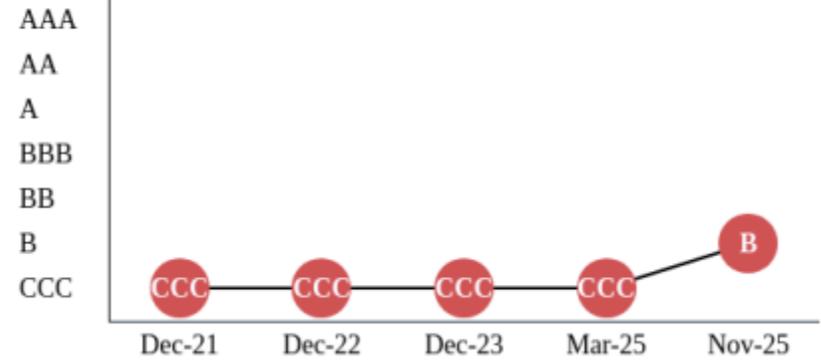
Improving ESG Rating



Improvements in corporate governance; health and safety management



ESG Rating history



Close to achieving a band change from “High” to “Medium”.

Score and Risk Category

31.0 High Risk



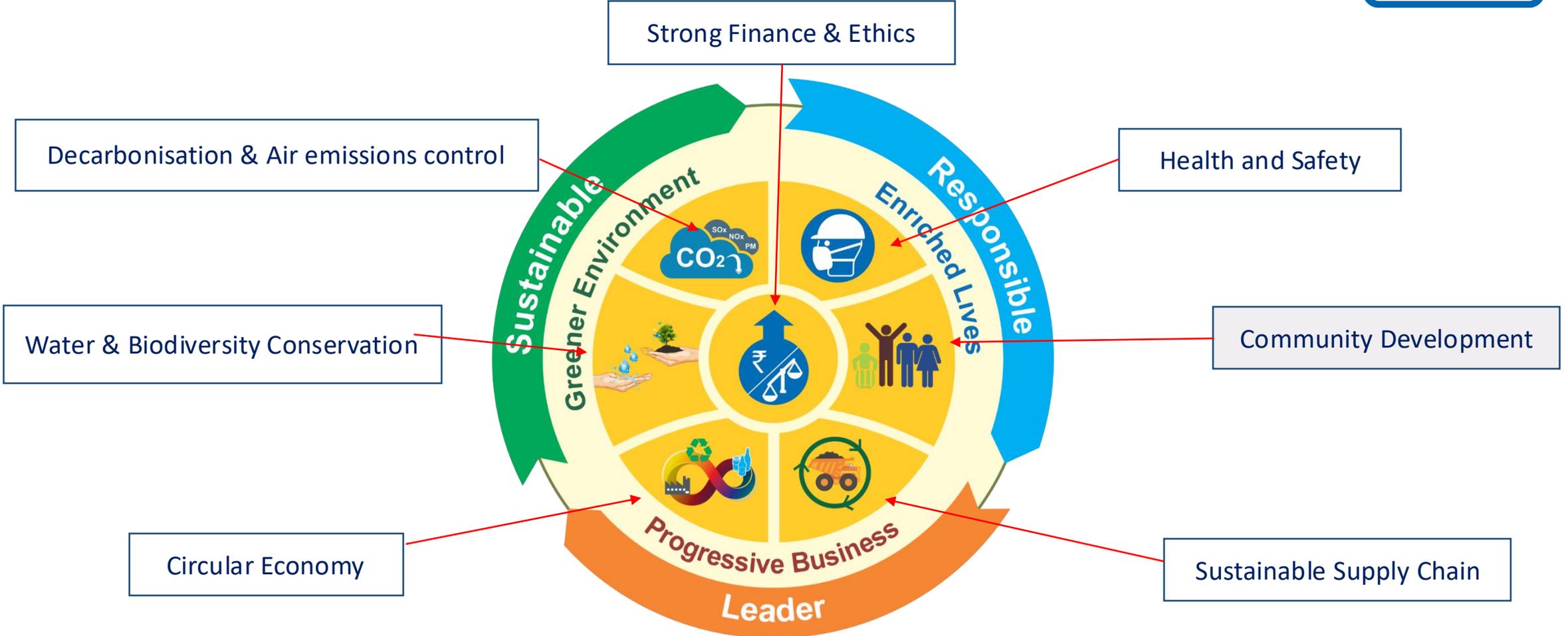
ESG Risk Rating History



ESG : Environment, Social & Governance



ESG: Target Settings



The Brighter Plan 2032

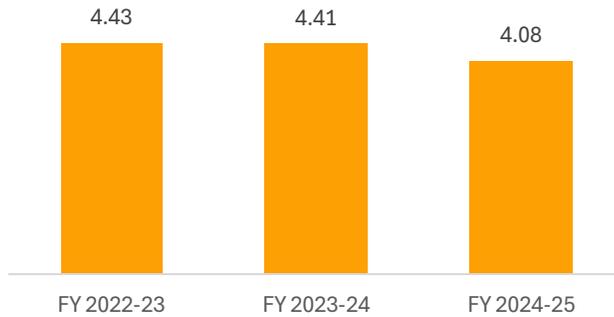
Aligned to core business strategy, 26 KPIs of 7 focus areas on Economic, Social and Environmental fronts



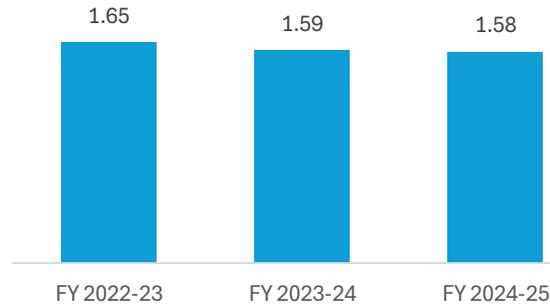
Reducing Non-GHG Emissions



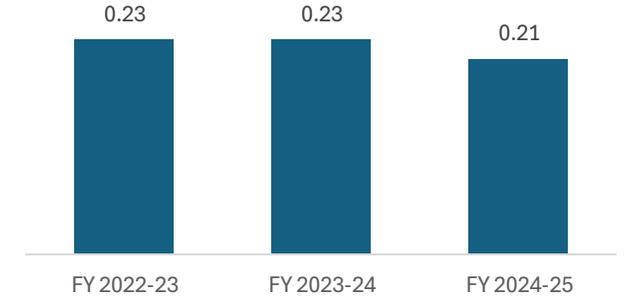
Specific SO_x (gm/kWh)



Specific NO_x (gm/kWh)



Specific PM (gm/kWh)



SO₂ Reduction :

- FGD awarded for ~64 GW
- COD done for 18 GW
- FGD under various stage of Erection and Commissioning in rest of capacities

NO_x Reduction :

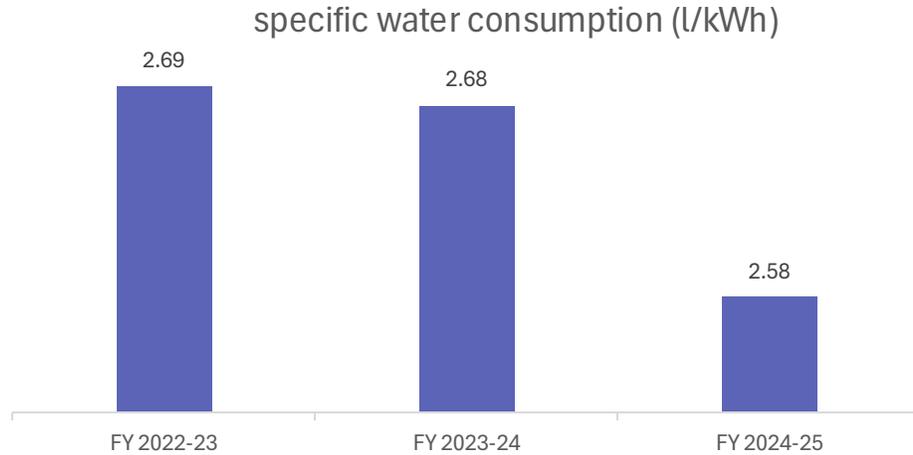
- Combustion Modification completed in all 21.56 MW

SPM Reduction :

- ESP R&M completed
- Additional reduction being achieved through FGD installations



Water Conservation



- NTPC is a signatory of CEO water mandate since 23.03.2021.
- NTPC has taken a policy decision to adopt ACC system in all upcoming plants except where technically not feasible. This saves around 60% of water.

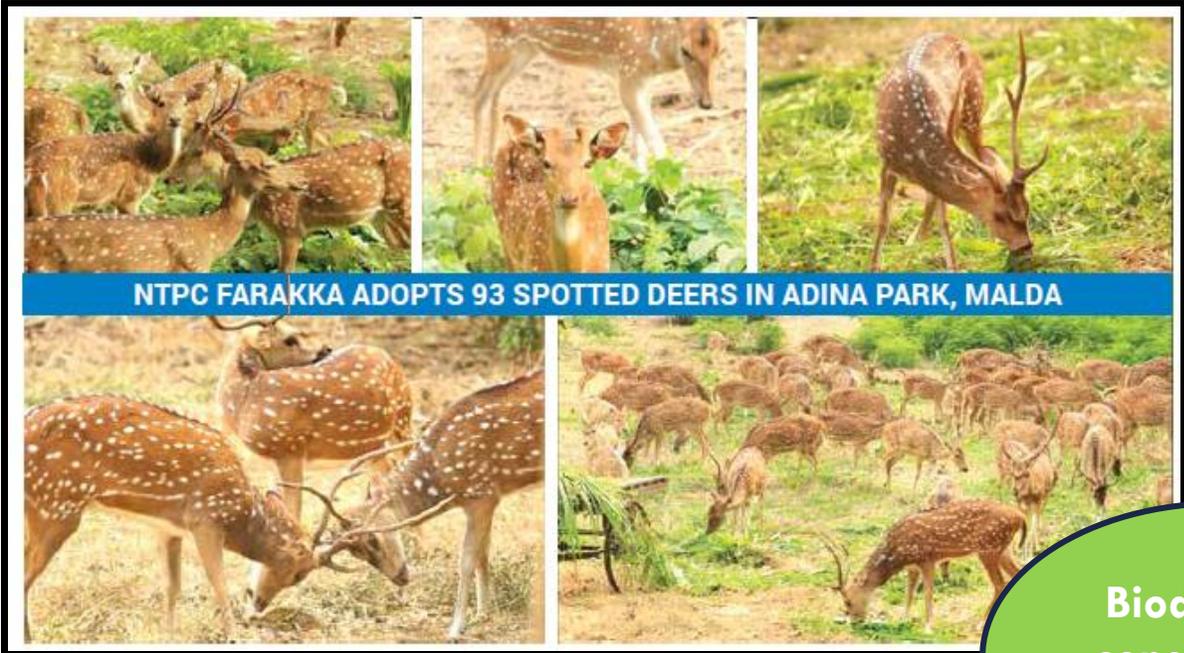


Air Cooled- Condenser at North- Karanpura



-  R&D Efforts
-  Air Cooled Condenser (AAC)
-  Treatment & Reuse of Sewage Treated Water
-  Liquid Waste Treatment Plant (LWTP)
-  Ash Water Recirculation System (AWRS)
-  Rainwater Harvesting
-  Zero Liquid Discharge
-  Increasing Cycles of Concentration

Biodiversity Conservation Initiatives



NTPC FARAKKA ADOPTS 93 SPOTTED DEERS IN ADINA PARK, MALDA



River ranching programme at NTPC Farakka(Fish conservation in Ganga river)

Biodiversity conservation initiatives



24 ha Mangrooves afforestation in NTECL land



Conservation of Olive Ridley Sea Turtles by NTPC Simhadri

Restoration of the Old Herbarium Building

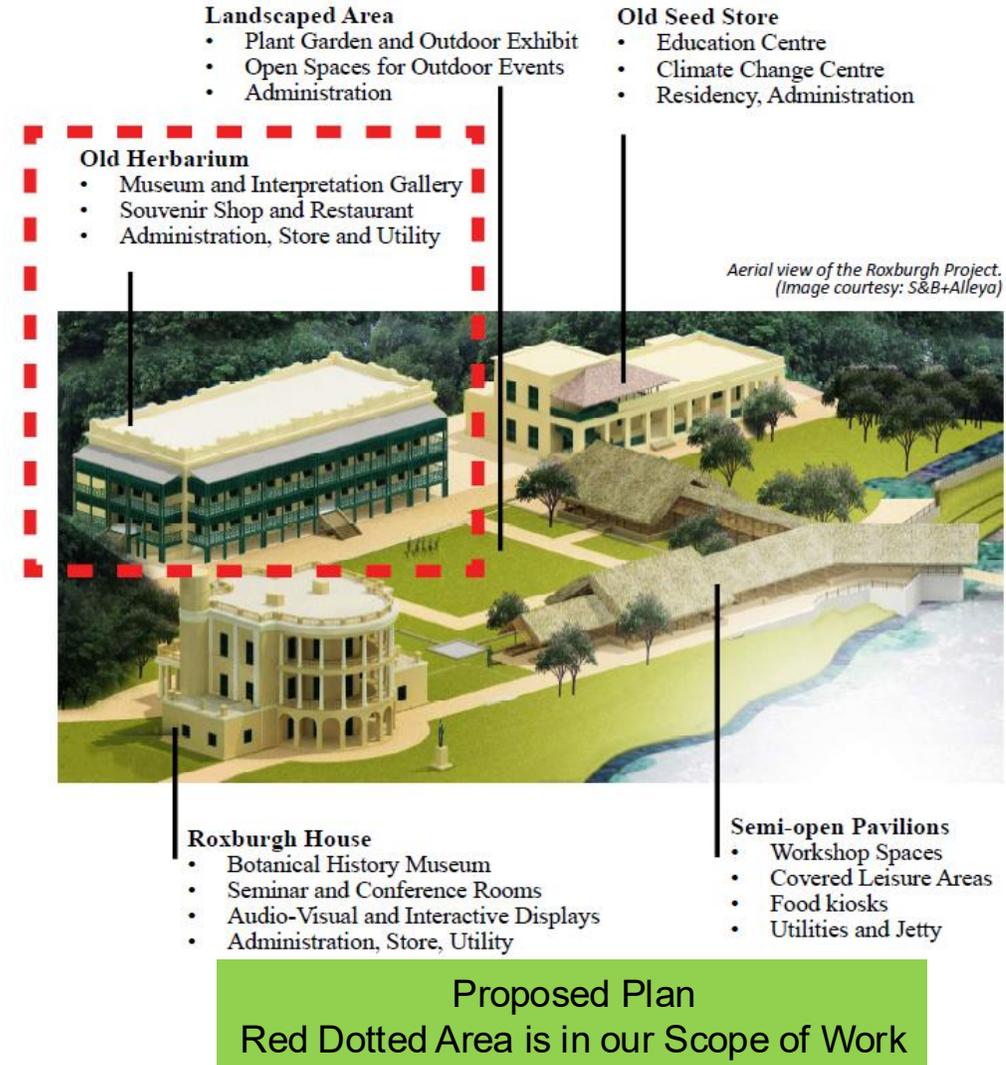


Left side view of Existing Herbarium Building

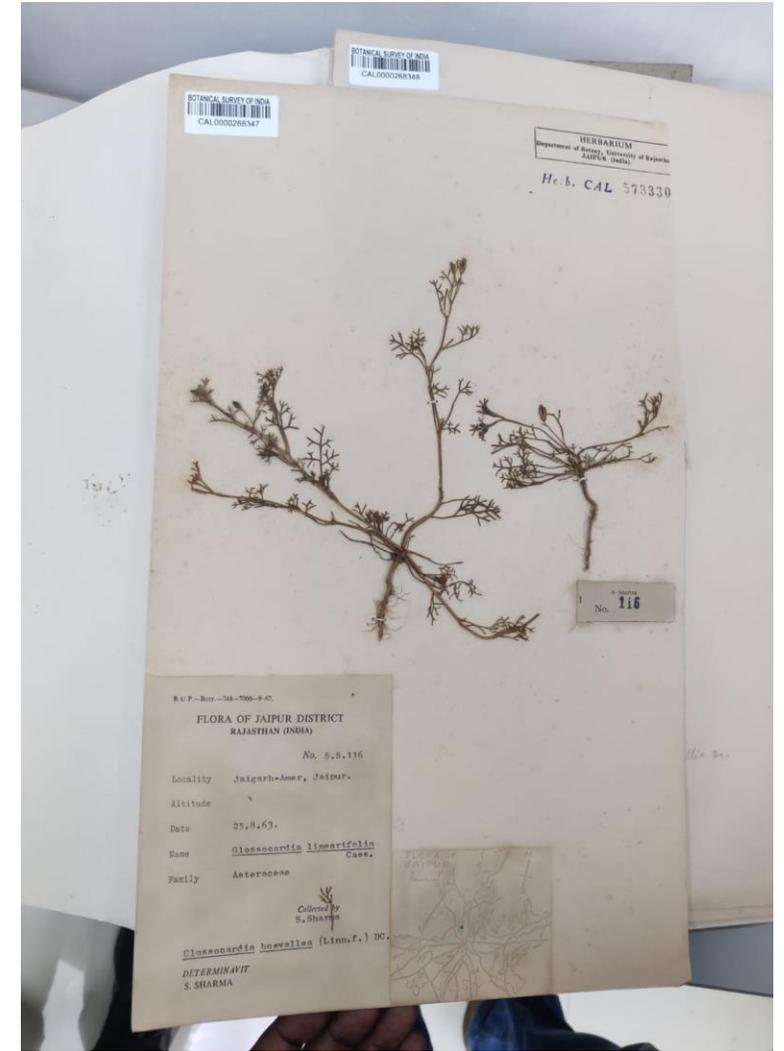
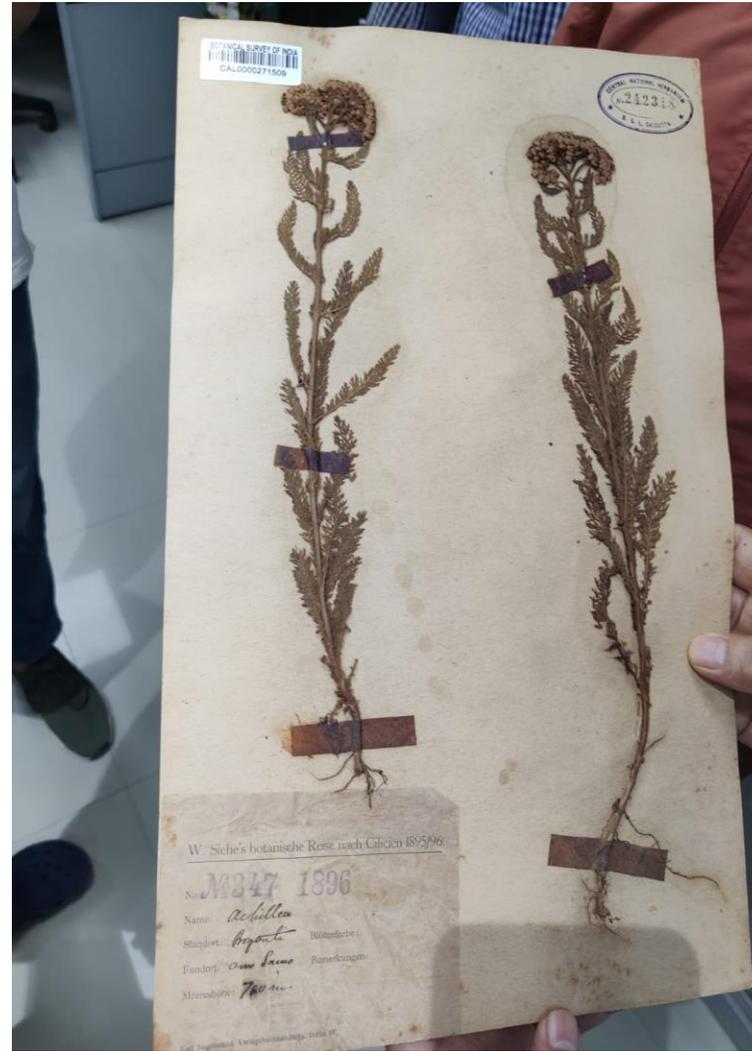
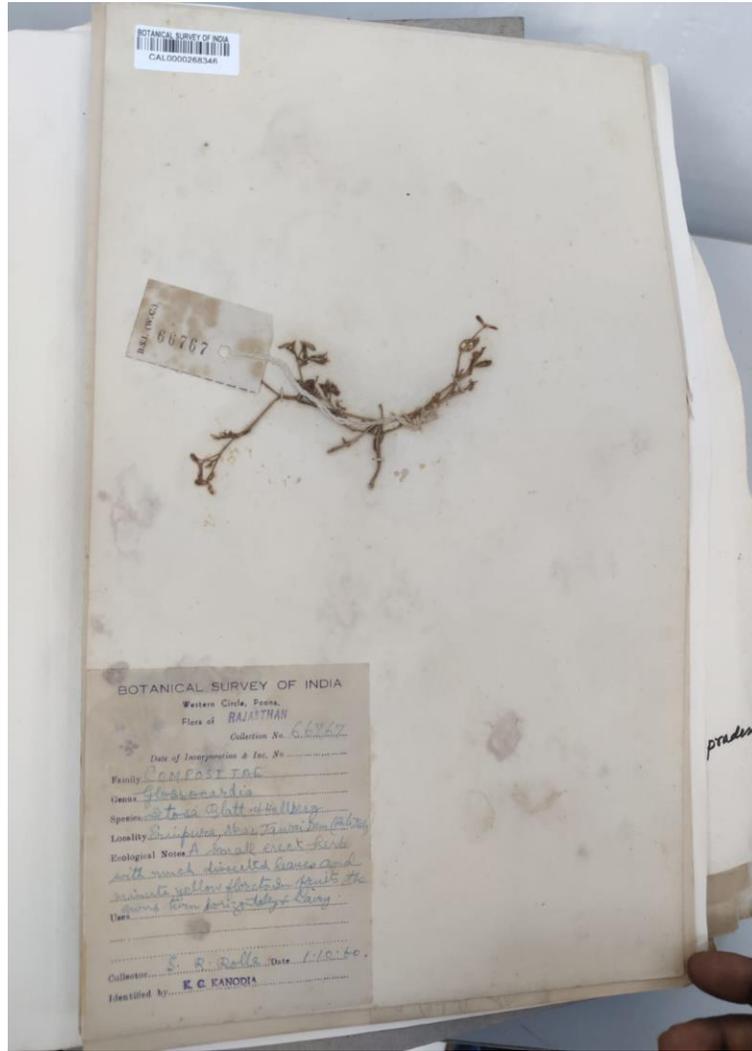


Right side view of Existing Herbarium Building

Built in 1883, the Old Herbarium building at AJCBIG, is a significant Victorian colonial public building of its time, made in brick, timber and wrought iron.



Digitization of Herbarium Sheets - Photos



Wastewater Management Facilities



ETP Facility



Neutralization Pit at DM Plant



Sewage Treatment Plant



CSSP



Vermi-Compost



Integrated Waste Storage Facility



Biogas Plant





Thank You



Website: www.ntpc.co.in