ESG Progress

10.08.2022

Discussion Outline

1. **NTPC Overview**
2. **Key Business Growth Drivers**
3. **ESG Performance**

NTPC Overview

1

Our Vision, Mission and Core Values

Vision

To be the World's Leading Power Company, Energizing India's Growth

Mission

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

Core Values

Integrity, Customer Focus, Organisational Pride, Mutual Respect & Trust, Innovation & Learning, Total Quality & Safety

NTPC: INDIA'S LARGEST POWER GENERATING COMPANY

Govt. of India enterprise with **47 years experience** in power sector;

Presence in Thermal, Hydro, Solar, Wind, Hydrogen, Biomass, Waste to Energy, Coal Mining;

Developed projects of capacity **69GW, 78 Projects** and **Coal Mines;**

Target to reach 130GW by 2032 with **60GW** from RE;

In-house expertise providing end-to-end power plant solutions:

- Engineering & Project Management;
- Procurement;
- Erection, Testing and Commissioning & O&M;

Pool of around **~19600** competent, experience **manpower;**

Strong financials:

$15.8 Bn revenue in FY-22;

$16.5 Bn net worth;

$2.1 Bn Profit;

Performance Highlights

Group installed capacity of 69,134.20 MW ; generation of 360+ BUs in FY'22

Generating 24% of India's power with 17% Installed Capacity

Total income crossed ₹ 1.2 Lac Cr mark in FY'22

Added 3371 MW of commercial capacity in FY'22

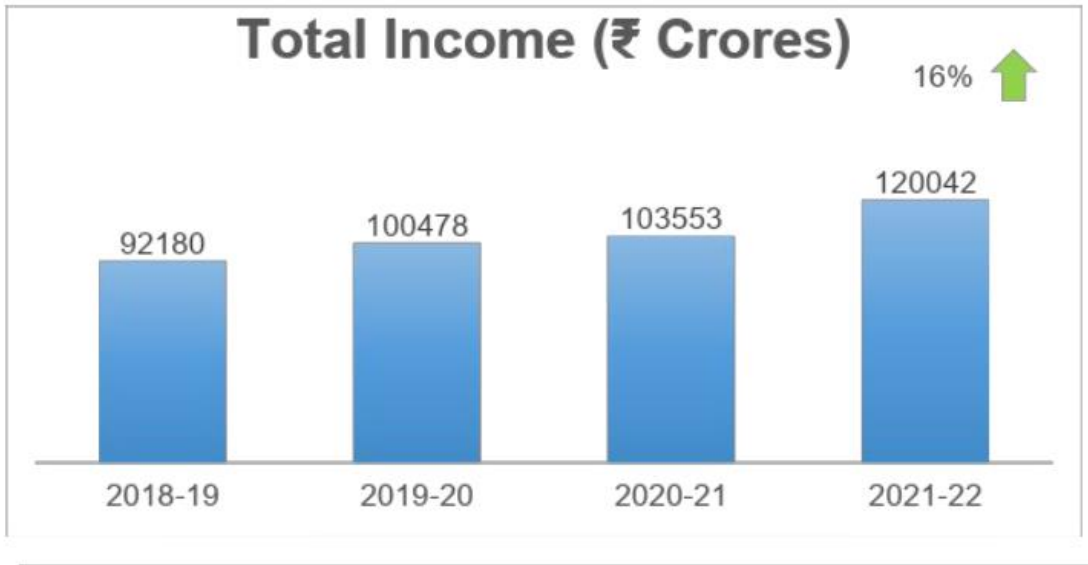
8 % of generation fleet is carbon free, target to achieve 60 GW of RE by 2032

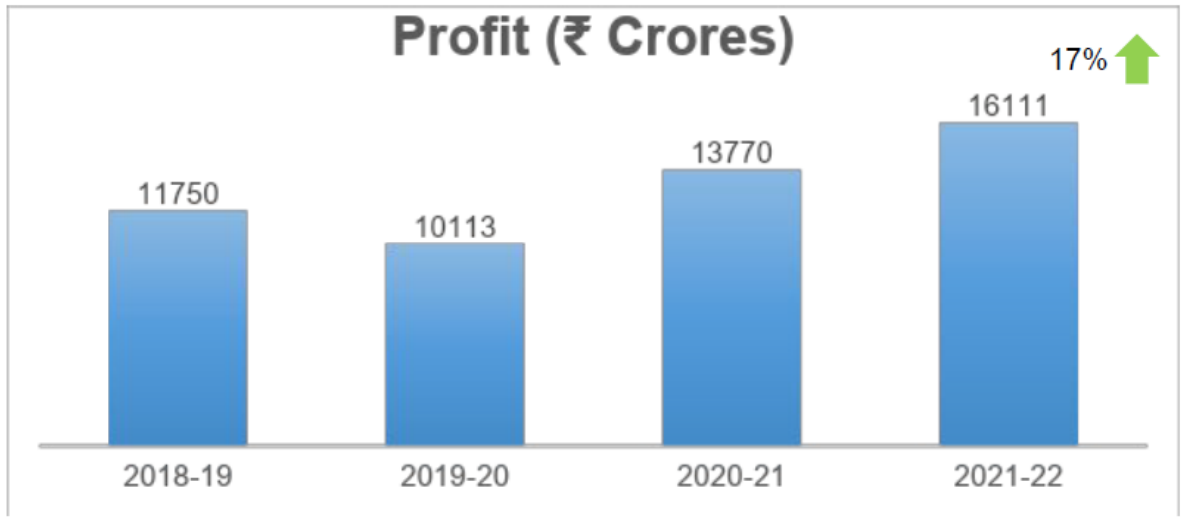
Implementing "The Brighter Plan 2032" to improve ESG performance

1st Energy company across globe to declare Energy Compacts at UN

Co-founded "Global Alliance for Sustainable Energy" with 16 global energy players

Strong Financial Performance





Awards & Recognitions

NTPC recognised as "Sustainable Organisation" at The Economic Times-Sustainable Organization Awards 2022 function held in Mumbai on 29th June, 2022

Awards & Recognitions

Team Marksmen in association of India Today Recognized NTPC as one of the

'Most Preferred Workplaces of 2022'

for maximizing employee well being, engagement & productivity alongside organizational performance.

Awards & Recognitions

NTPC has been awarded

Leadership in Air Pollution Management award

at the ESG India Leadership Awards 2021.

Awards & Recognitions

'Role Model' Award at 11th CII National HR Excellence Award

CII- ITC Sustainability Award-2021 to 5 NTPC stations

Excellent Rating from MOP, GoI

"Company with Best CSR Practice Award" in 8th Asia Business Responsibility Summit

Great Place To Work.

India's Best Employers Among Nation-Builders 2021

NTPC among top 50 @Great Place to Work in India - Recognised as the Nation Builders 2021

Digital PSU Award to NTPC at the 8th PSU Award 2021

ESG: Disclosures & Engagements

- Publishing Sustainability Reports as per the latest GRI frameworks since FY2012
- 3rd Integrated Annual Report published in FY' 22 as per IIRC & GRI framework
- Expanded the boundary of reporting with inclusion of all JVs & Subsidiaries since FY2020
- Conducted fresh Materiality Assessment in FY'22 with internal and external stakeholders
- Timely responding to DJSI, CDP questionnaires and other queries of concerned stakeholders
- Regular follow-ups and discussions with leading ESG Analysts and rating agencies
- ESG Profile for specific ESG disclosure as per prominent platforms such as SASB, CDP etc.

ESG: Strategy & Internal Controls

Strong Finance & Ethics

Decarbonisation & Air emissions control

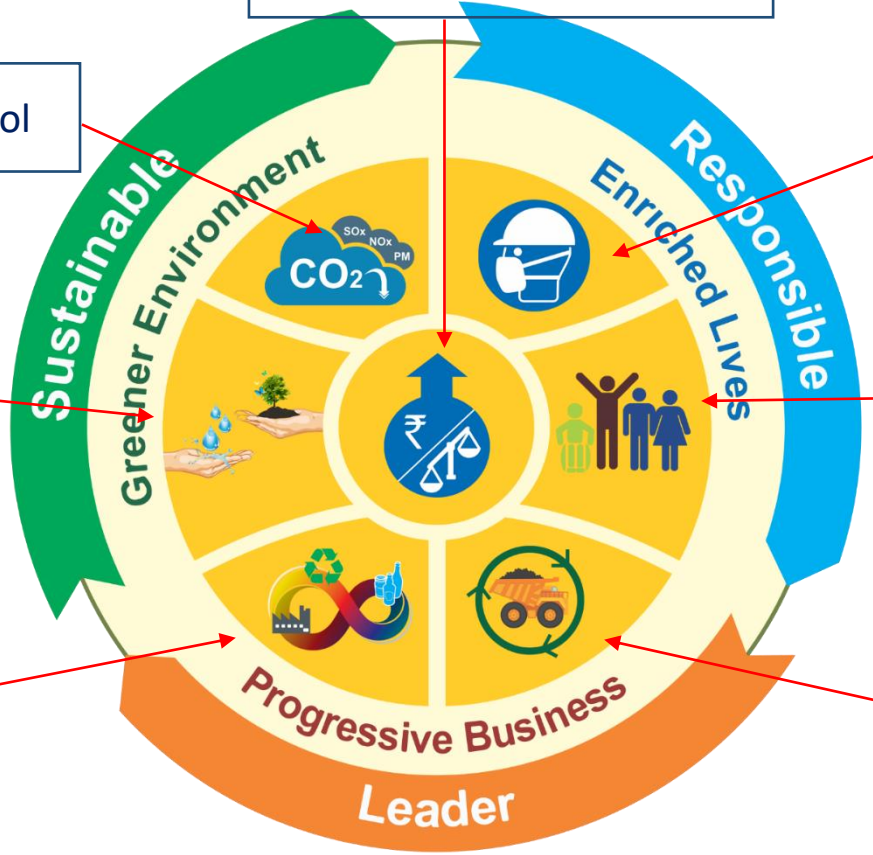
Health and Safety

Water & Biodiversity Conservation

Community Development

Circular Economy

Sustainable Supply Chain



The Brighter Plan 2032

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

NTPC ESG Policies

Environment

- Biodiversity Policy
- Environment Policy
- Integrated Plastic Management Policy
- NTPC Rainwater Harvesting Policy
- Ash Policy
- E-waste Policy
- Water Policy
- Waste Management Policy

Social

- Sustainable Supply Chain Policy.
- CSR policy
- NTPC Human Rights Policy
- ICD Policy
- R&R Policy
- Safety Policy
- Disaster Management Plan

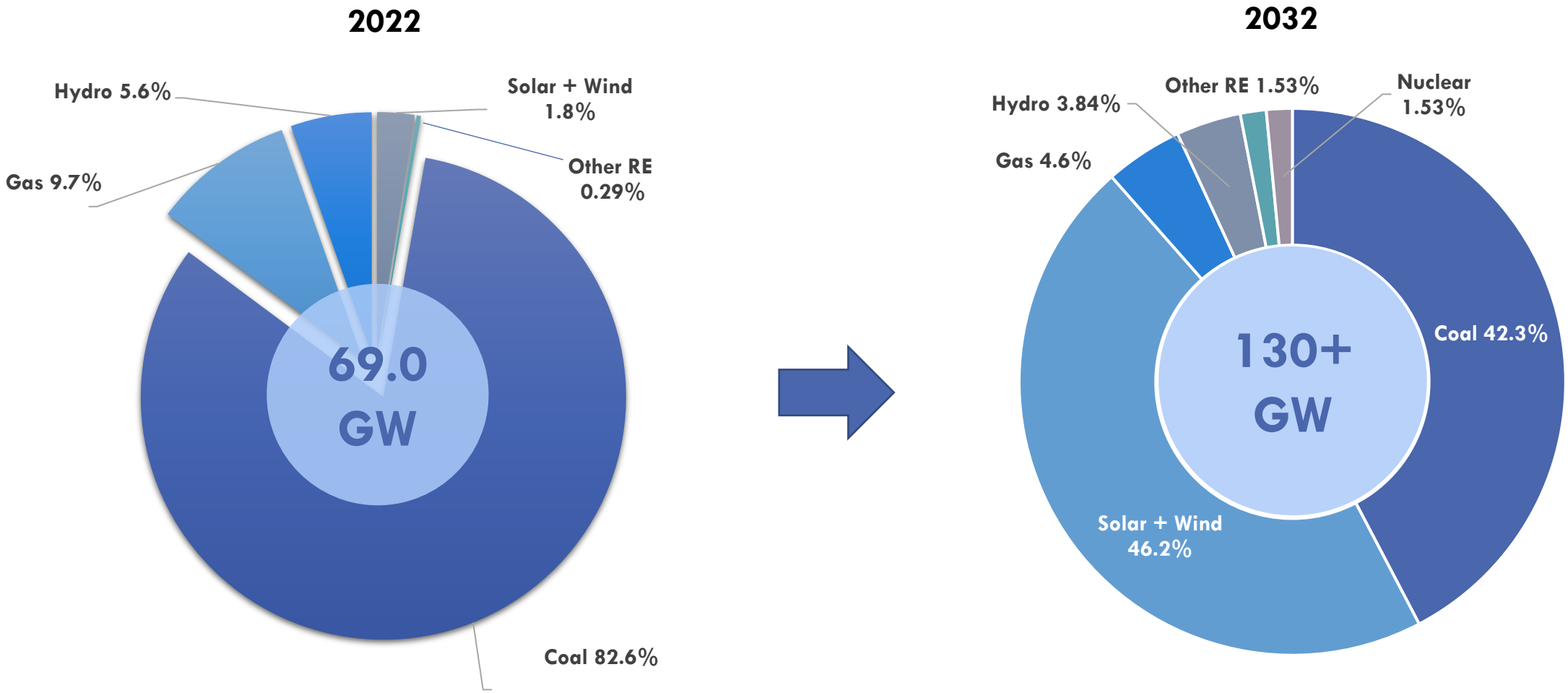
Governance

- Fraud Prevention Policy
- Whistle Blower Policy
- Complaint Handling Policy
- CDA Rules
- Code Of Conduct For Board Of Directors and Senior Management Personnel
- Related Party Transaction Policy
- Training Policy for Directors
- Policy on maintenance & preservation of documents

KEY BUSINESS GROWTH DRIVERS

2

NTPC LONG TERM PLAN



Renewable Power (Solar & Wind) : 1716MW (2022) → 60000MW (2032)

RENEWABLE ENERGY

Description	NTPC Group EPC Mode's Own Projects (11542 MW)			Total	Developer Mode Projects (6743 MW)
	NTPC	NTPC REL	THDC & NEEPCO	NTPC Group	NTPC
Commissioned	2131	--	192	**2323**	5083
Under Implementation	1999	1995	--	3994	690
Under Tendering	--	4925	--	4925	970
Cap. Won yet to tender		300		300	
Total	4130	7220	192	**11542**	6743

NTPC is taking various steps to make its energy portfolio greener by adding significant capacities of Renewable Energy(RE) Sources. By 2032, the company plans to have a minimum of 60 GW capacity through RE sources constituting nearly 45% of its overall power generation capacity.

Becoming RE Behemoth: Ultra Mega Renewable Energy Power Parks (UMREPP)

UMREPP	Capacity (MW)
Gujrat	4750
MP	630
Rajasthan	10000
Other proposed UMREPPs	
AP	4000
Maharastra	2500
DVC	2000
Maharastra Floating Solar	140
T O T A L =	**24,020 MW**

NTPC Renewable Energy Limited signs MoU with Government of Rajasthan for the Development of 10 GW Ultra Mega Renewable Energy Power Parks (UMREPP) in Rajasthan on 1.07.2022

NTPC's GREEN HYDROGEN VISION

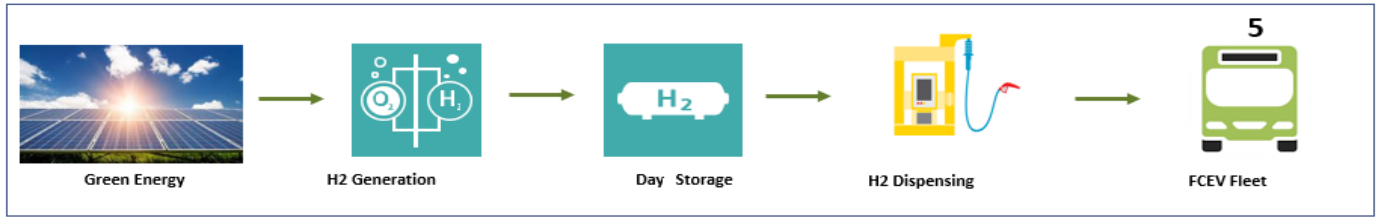
To reach leadership position in green hydrogen technologies

By 2030

6 Domains, 5 GW Electrolysers, 0.65 MMTPA Green H_2

GREEN HYDROGEN – MOBILITY

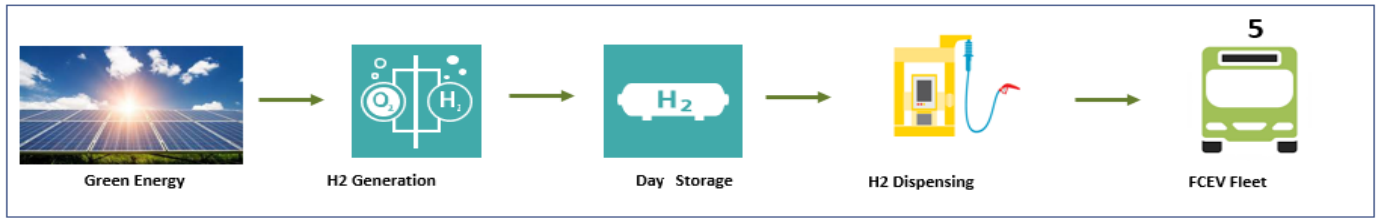
Mobility | Leh (Ladakh)



1.70 MW Min. 9 hrs. Operation	80 kg/day	500 bar	350 bar Min. Filling Rate 1.7 kg/min	33 Seater Buses 225 km/day

- Implementation is in progress
- ₹56 Cr. ($7.3 Million) – 1.7 MW Solar & Fuelling Station – 80 Kg/day)
  ₹19 Cr. ($2.4 Million) -05 FCEV Buses
- Route: Intracity @ Leh
- 3500m + MSL, Sub-zero temperature for more than 5 months

Mobility | Delhi



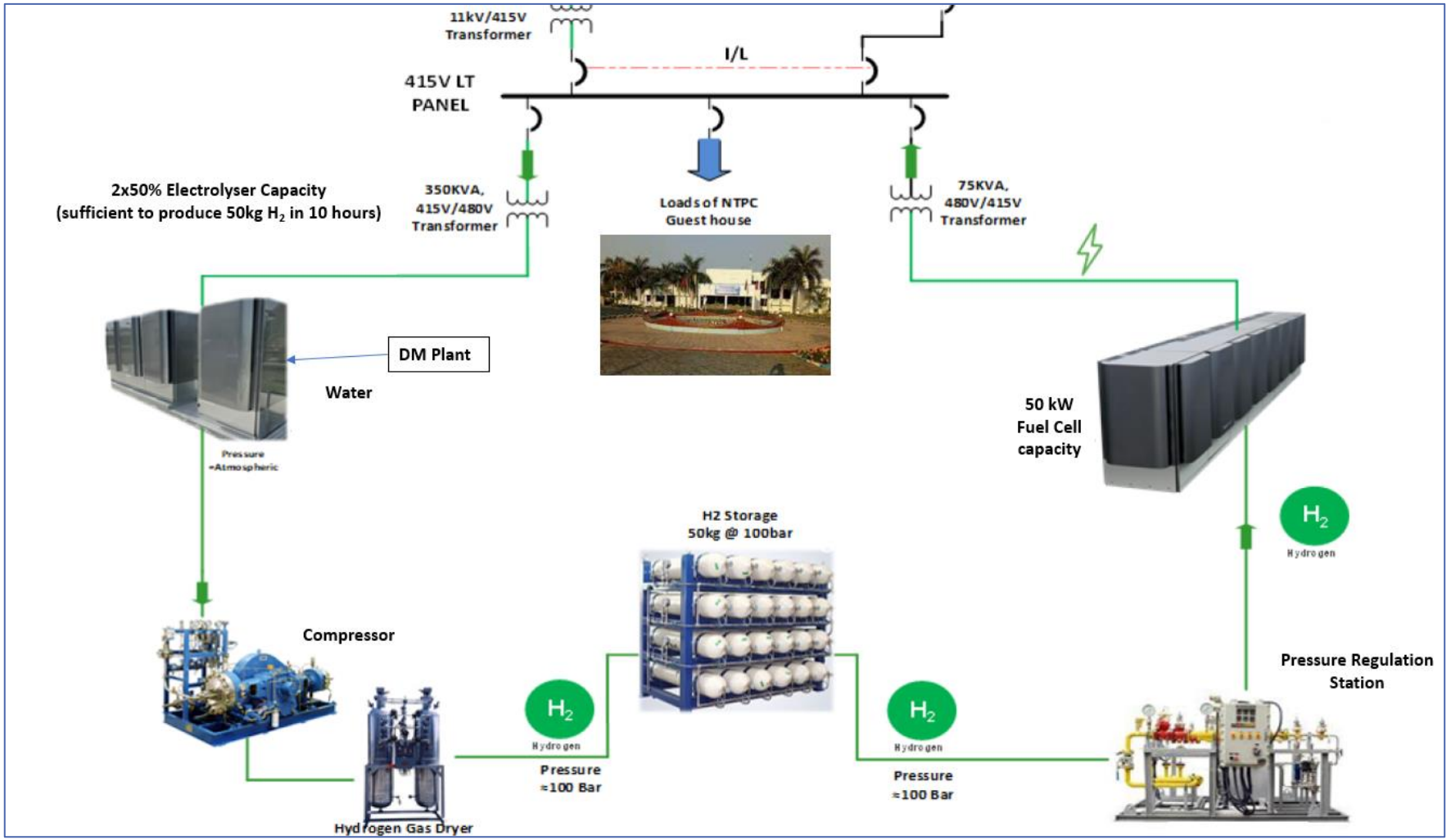
Floating Solar + Hydro Min. 9 hrs. Operation	260 kg/day	500 bar	350 bar Min. Filling Rate 1.7 kg/min	42 Seater Buses 425 km/day

- Proposal is in progress
- Cost: ₹65 Cr. ($8.5 Million) -Fuelling Station 260 Kg/Day
- ₹22 Cr. ($2.6 Million) -05 FCEV Buses
- Route: intercity applications
- 200m + MSL, 5-45 ^{0}C

GREEN HYDROGEN – MICROGRID

- Green Power from Solar project
- Electrolysis (240 KW)
  - Hydrogen – 50 kg/day
    10 hours (7AM to 5PM)
- Hydrogen Storage
  - 50 kg @ 100 bar
- Fuel Cell
  - 50 KW
    14 hours (5 PM to 7AM)
- Project
  - Cost: ₹11 Cr. ($1.5 Million)
  - Implementation stage
  - Completion by Oct'22

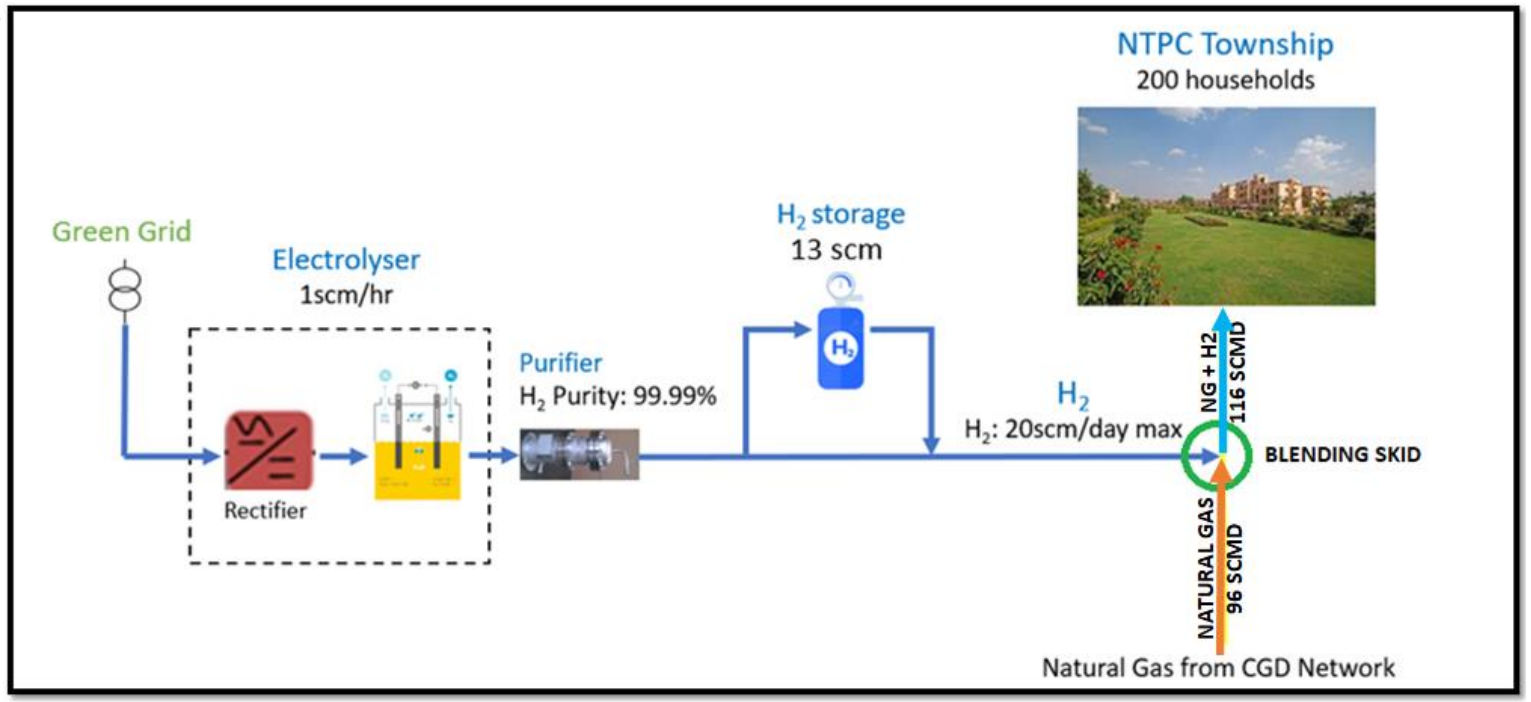
Hydrogen Energy Storage System | Simhadri (Visakhapatnam)



GREEN HYDROGEN – BLENDING

- Collaboration
  - NTPC & Gujarat Gas Limited
  - Contract awarded on 2nd June'22
- Blending H2 with PNG
  - 5-20% by volume
- Power (NTPC Kawas)
  - Floating Solar Plant (1MW)
- Electrolyzer
  - Hydrogen – Min 1Nm3/hr.
- Hydrogen Storage
  - 13 Nm3, Min. 10 bar
- Project
  - Cost (pilot) - ₹2.83 Cr. ($0.37 Million)
  - PNGRB – Go ahead approval
  - Hazop Study and Designing phase

Hydrogen Generation and Blending System for PNG
(200 Households at Kawas Residential Facility)

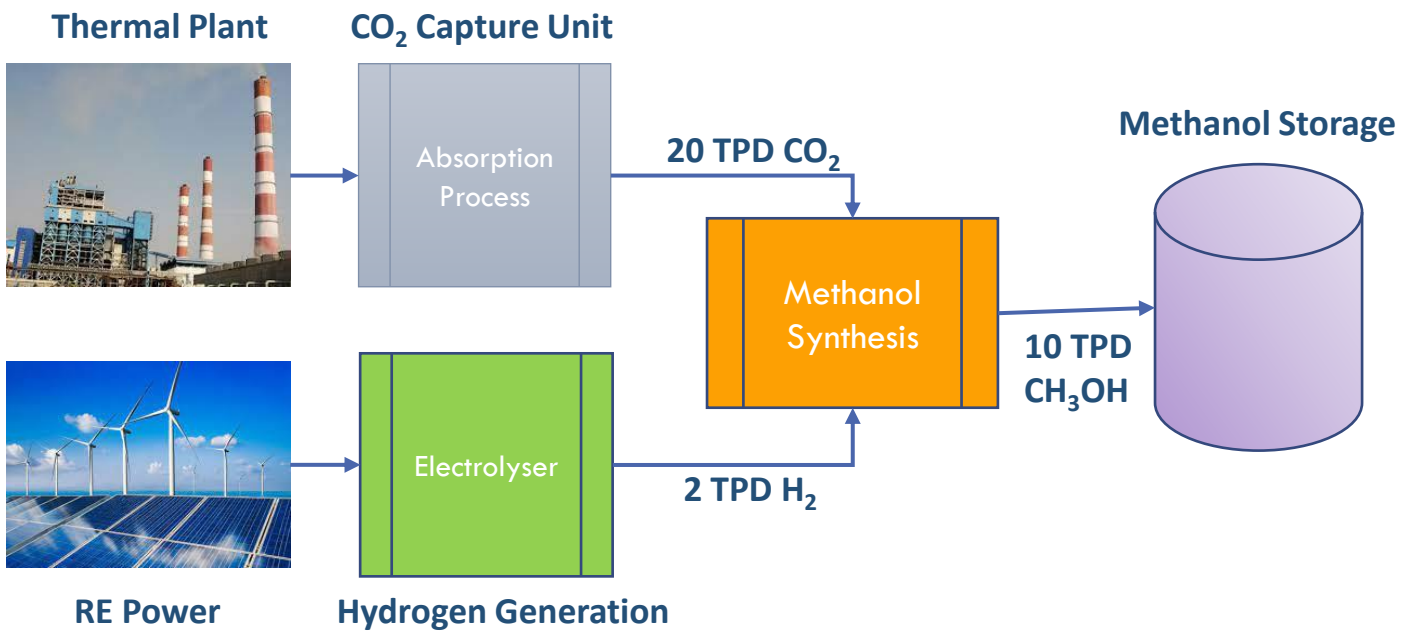


Upcoming Blending Project
- NTPC Solapur and Solapur Town
- NTPC Ramagundam

GREEN METHANOL

Methanol: 10 TPD Flue Gas - CO_2 to Methanol Plant (FG-CTM)

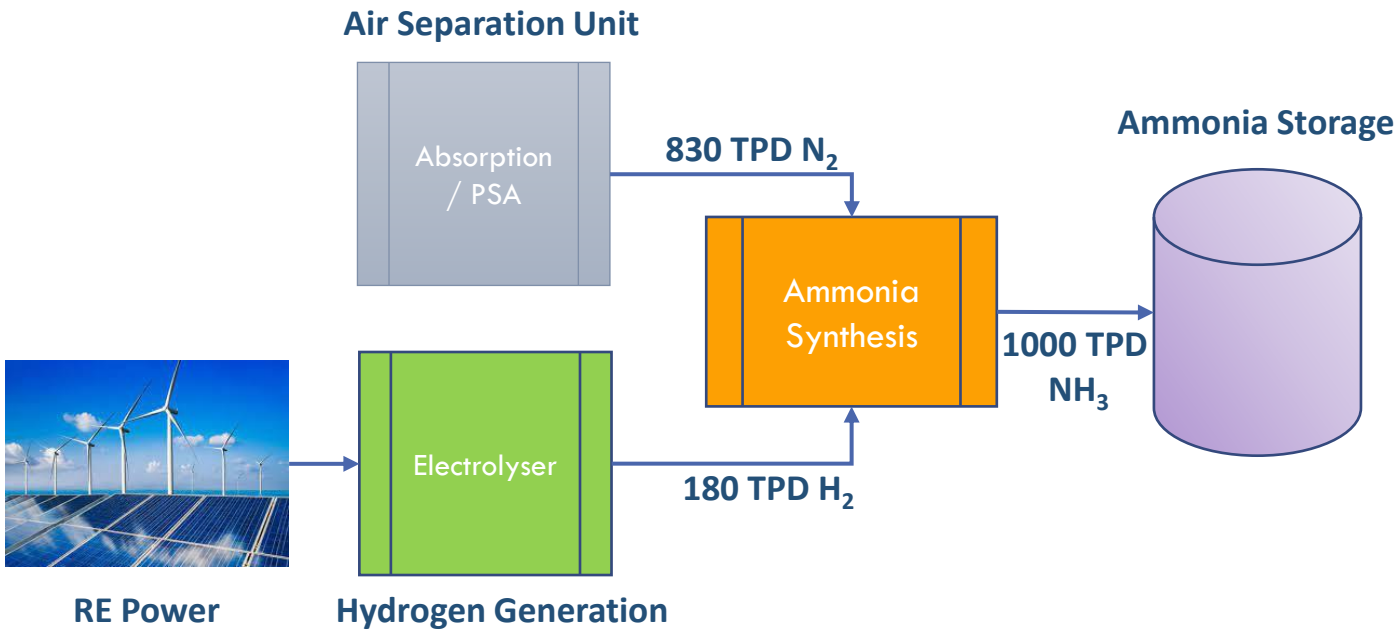
- Location: NTPC Vindhyachal, MP
- Carbon Capture Unit
  - 20 TPD CO_2 from thermal plant flue gas
  - Energy efficient amine absorption process
- Hydrogen Generation Unit
  - Generating 2 TPD Hydrogen
- Methanol Production Unit
  - Conversion of CO_2 to Methanol
  - Catalytic hydrogenation process
- Project
  - Cost: ₹66 Cr. ($8.6 Million)
  - Under implementation



GREEN AMMONIA

GREEN AMMONIA: 1000 TPD

- Location: Bhuj, Gujarat
- Air Separation Unit
  - Generating 830 TPD Nitrogen
  - Absorption/PSA process
- Hydrogen Generation Unit
  - Generating 185 TPD Hydrogen
- Ammonia Production Unit
  - Haber Bosch process
- Project
  - Estimated Cost: ₹9000 Cr. ($1.2 Billion)
  - DPR Study is in progress



NTPCREL & NFL to collaborate in Renewable Energy and synthesizing Green Ammonia to support the country's commitment to achieving renewable energy targets and reduce greenhouse emissions.

GREEN HYDROGEN – ELECTROLYSER

SELECTION OF ELECTROLYSER TECHNOLOGY PROVIDER(S)

- PEM Technology: **400 MW**
- Other/Non-PEM Technology: **600 MW**
- Design, engineering, manufacturing, supply, packing and forwarding, custom duties, insurance, transportation (Ex India), storage, installation, testing, commissioning, trial operation, PG test and O&M of electrolysers-based hydrogen generation plant
- Period: 2 years

Description	Tender Details
ETS Portal Tender Search Code (TSC)	NTPCREL-2022-TN000013
IFB No. and Date	NRE-CS-5851-004-9 02.06.2022
Period of Downloading of Bidding Documents	From 09.06.2022 to 30.06.2022
Price Bid Conference and Last Date for receipt of queries from prospective Bidders	06.07.2022
Last date and time for receipt of Techno-commercial bid	20.07.2022 17:00:00 (IST)
Date and time for opening of Techno-commercial bid	21.07.2022 11:00:00 (IST)

Co-firing of Biomass with Coal

8000 MT bio-mass pellets has co-fired with coal at NTPC Plants .

POs placed for 12.35 LMT for 20 stations of NTPC.

4110 TPD pellets has been awarded out of which 1320 TPD is non-torrefied.

Procurement for 7 years is in progress.

- No of Projects : 23 Projects
- Total Qty : 92 MMT
- In first lot : Bid floated for three NTPC stations & APCPL Jhajjar for 9.2 MMT

  (NTPC Stations – 7.36 MMT & APCPL Jhajjar- 1.84MMT)
- Nos. of bidders participated: 52
- Techno Commercial Evaluation Completed, 40 bidders were considered techno commercial responsive.
- Price bids for Dadri has been opened and Award is under progress

NTPC's Afforestation Programme

In tune with NDC-2030 of creating an additional carbon sink of 2.5 to 3 billion tonnes of CO_2 equivalent through forest and tree cover by 2030.

NTPC decided to create additional sink by planting 10 million trees across the country during 2016-17 as well as 10 millions in next ten years.

▶Plantation till 2021-22 since inception (NTPC/Govt. Lands) : More than 37 Million saplings

✓**2022-26 @1Million/ year : 4 Millions**

Afforestation with Miyawaki Method

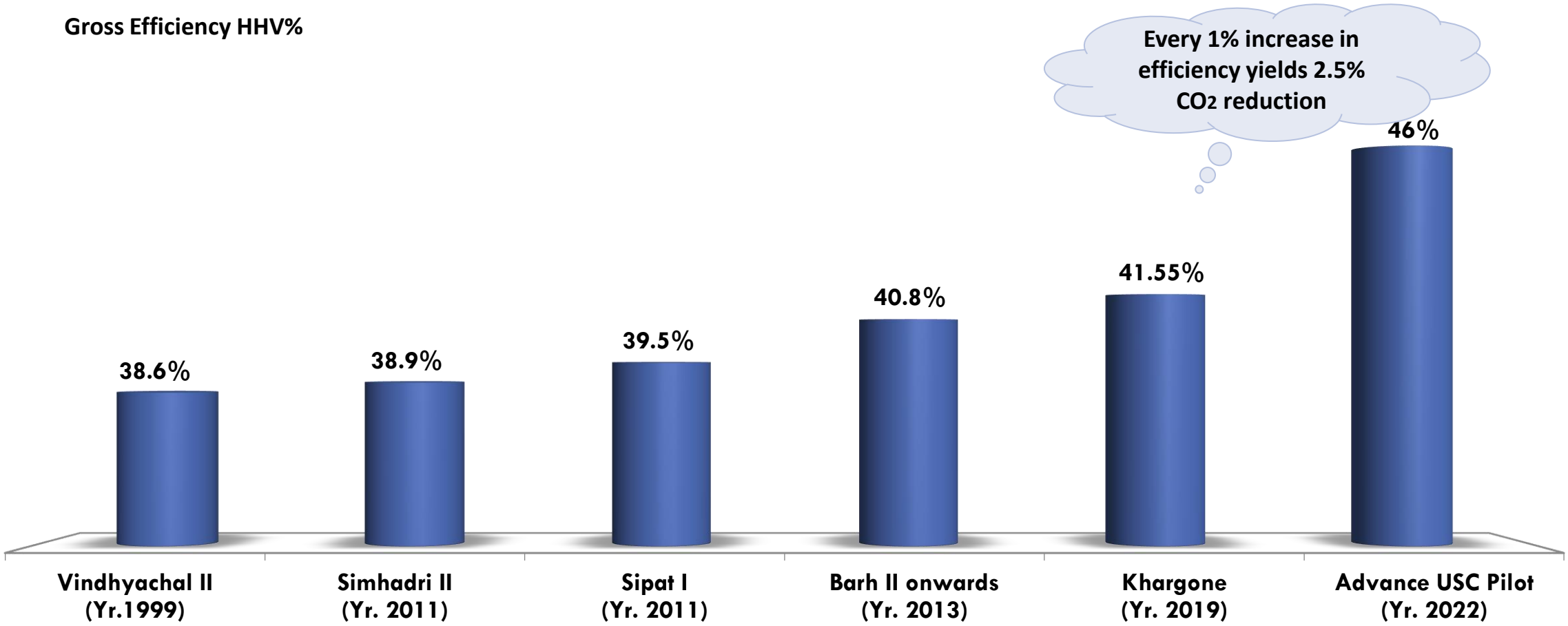
A Maharatna Company

TREE PLANTATION
MIYAWAKI METHOD
NTPC
RAMAGUNDAM/TELANGANA

NTPC's new initiative towards Afforestation with Miyawaki Method

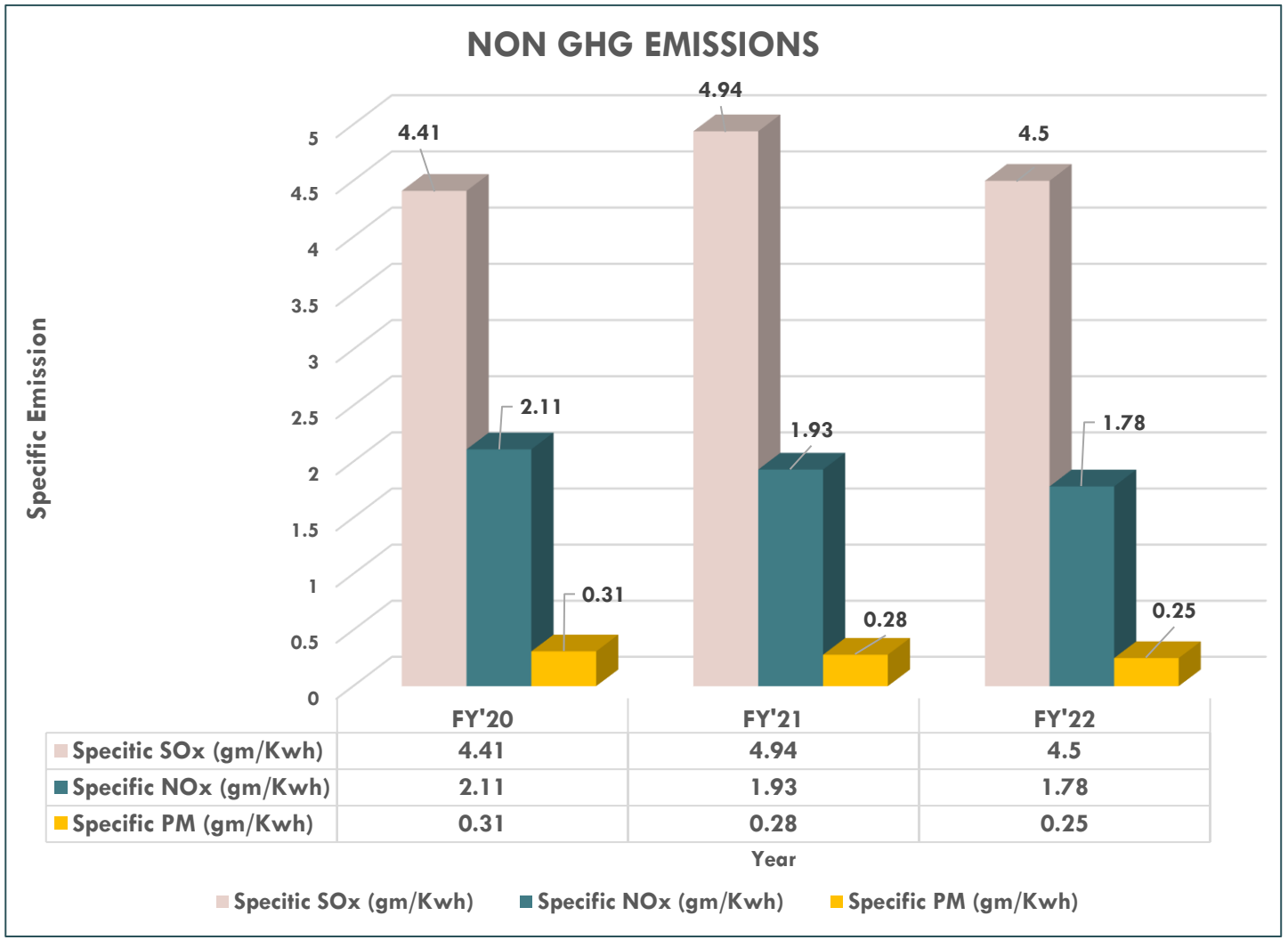
Flowering AND Fruits

Adoption more efficient technology with Time



Constant endeavor to reduce CO_2 emissions- steps to increase cycle efficiency

Non-GHG Emissions



SPM COMPLIANCE :

- ESP R&M completed in 12100/15960 MW.

SO_2 COMPLIANCE :

- FGD including DSI Commissioned in-1340 MW (U#13 VSTPP, DSI in Dadri St-I.). FGD under various stage of Erection and Commissioning in 60+ GW capacity.

NO_X COMPLIANCE :

- Modification completed in – 13295/21560 MW.

As per Notification Dated 31.03.2021 of Ministry of Forest & Climate Change , timeline for implementation is upto 31.12.2024

FUGITIVE DUST CONTROL

Plantation– Coal Pile area

Water Cover in Charged Lagoon

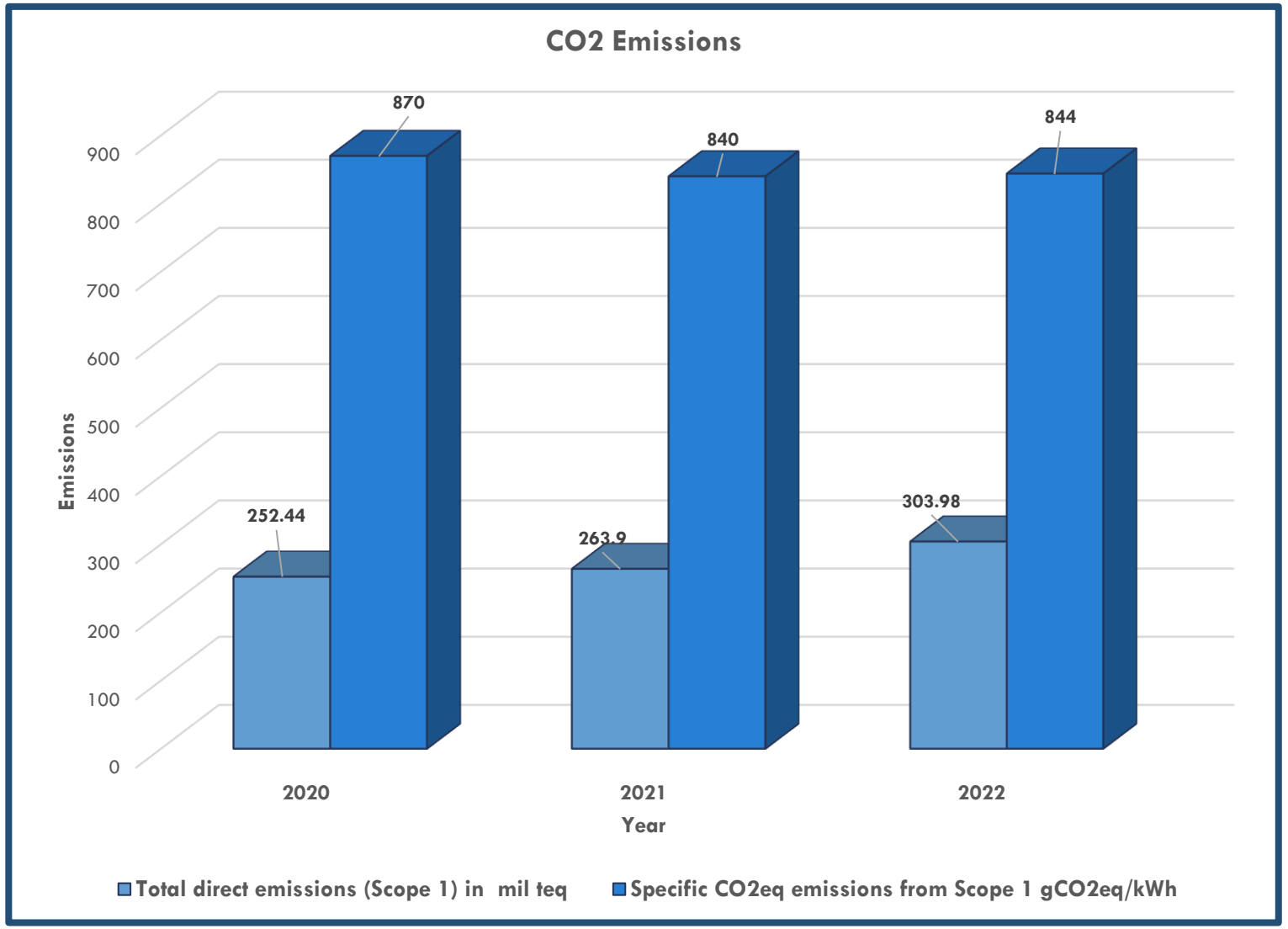
Wind barriers & Earth Cover

Plantation in Ash Dyke area

Water Sprinkling in Ash Dyke

Cow Dung Mulching

GHG Emissions



Community Development

Community Development

Cancer Screening, Bihar

Girl Empowerment Mission

Archery

MSW Plant, Karsada

Skill Development

Farm Productivity, Rihand

Highlights

GEM : ~ 4700 girl children have been benefited so far.

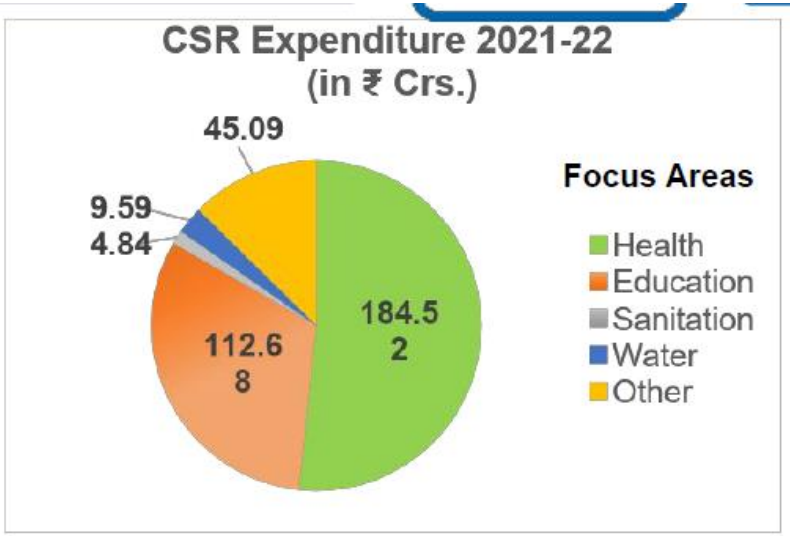
Developing Archery sport from grassroot level: expenditure of ₹ 115 Crore in 5 years.

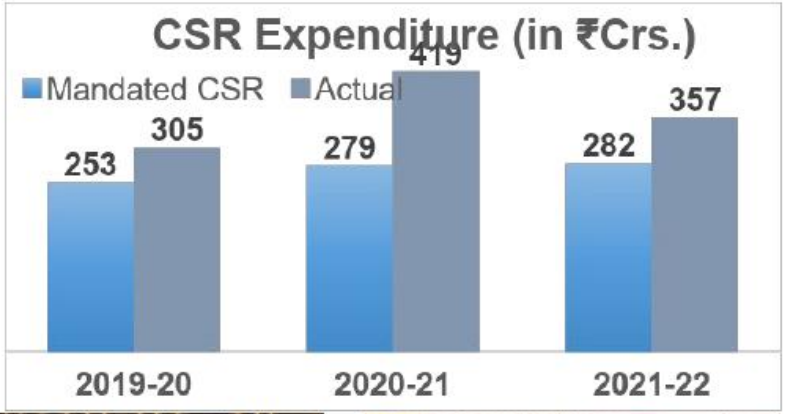
PM CARES Fund for COVID-19:

- 2022-23: ₹ 80 crore
- 2021-22: ₹ 80 crore
- 2020-21: ₹ 250 Crore

Installed PSA type O_2 generation plants at various Govt. hospitals

Support to DPE for procurement of items for cold [illegible]ram f[illegible]





FICCI Award

CII-ITC Sustainability Award

ASSOCHAM Certificate of Excellence

3 GOOD HEALTH

KEY FOCUS AREAS: SAFETY

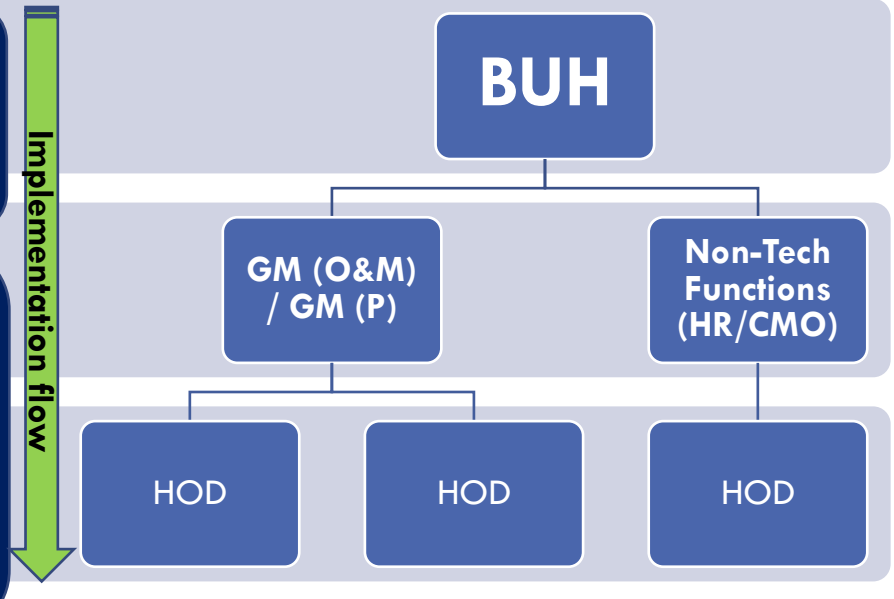
एनटीपीसी NTPC

Business Unit Head (BUH):

- Implementing this policy through LMIs
- Ensuring identification and display of all hazards
- Establishing cross-functional team for internal audits.
- Making employees accountable for working safely

Head of Departments (HODs):

- ❖ Identification, reporting & dealing hazards by EICs
- ❖ Cordoning of unsafe areas & reporting unsafe conditions by EICs
- ❖ Training of workers and awareness about the hazards
- ❖ Deployment of relevant safety equipment by the contractor
- ❖ Co-operation by all with management and observe rules and procedures .



TOOLS: IMPLEMENTATION

FOCUS ON LEAD INDICATORS

- Pep Talks/TBT
- Capturing Deviations
- Reporting Near Misses
- Daily Random PTW Checking
- Cross- Functional Teams (CFT)

REINFORCING OWNERSHIP

- KOM: SURAKSHA MITRA
- HOD & HOP enhanced involvement
- Routine & Surprise site visit by HODs/ROs
- Swearing-In Ceremony/Incident Recall
- Zone Leader- Role clarity

STRENGTHENING OF PROCESSES & SYSTEMS

- SURAKSHA App
- SAP Integrated Safety Framework
- OD/OGNs/LMIs
- Safety Dashboards
- HOP Review as per standard Format
- PMS- Safety KPAs
- Accident Examination & Recommendation Compliance System (AERCS)

CAPABILITY DEVELOPMENT

- Employee Training
- Auditor development programme
- Job specific training module (Contractor's Workers)
- SURAKSHAVALI
- ISO 45001 Certification

AUDITS, VISITS & PROMOTIONS

- External Safety Audit through reputed agencies
- Internal Audits
- Surprise Site Visits
- Theme based Safety Observance
- Short films /audio clips
- Safety Pledge & Policy- Acceptance

NTPC SAFETY FRAMEWORK

Integrated with SAP

SAFETY FRAMEWORK

- SFW is designed as the tool that translates policy into action.
- SFW is an evidence-based system that standardizes the consistency of effort across a large and distributed organization like NTPC.

  SFW streamlines and strengthens the ongoing efforts to make NTPC a safer workplace.
- The unique feature of the SFW is it's deep integration with the SAP ERP

Approach to Safety Culture

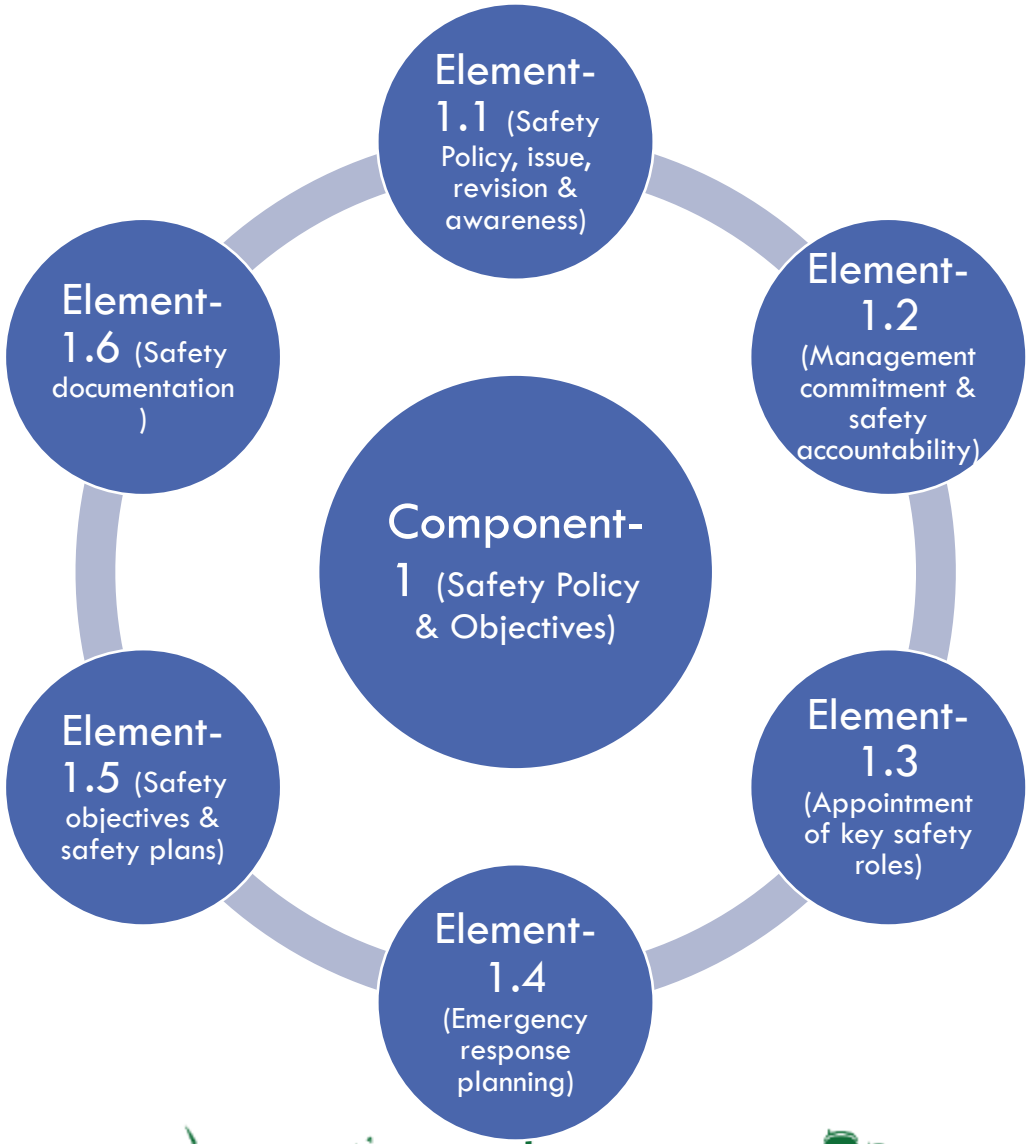
- Safety Policy
  - Objective to provide safe working environment & strive for zero incident at work
  - Accountability at all levels for safety which is to be visibly demonstrated
  - Acceptance by all

- Safety Framework
  - Component-1: Safety policy & objectives (6 elements)
  - Component-2: Safety risk management (4 elements)
  - Component-3: Safety assurance (6 elements)
  - Components-4: Safety promotion (3 elements)

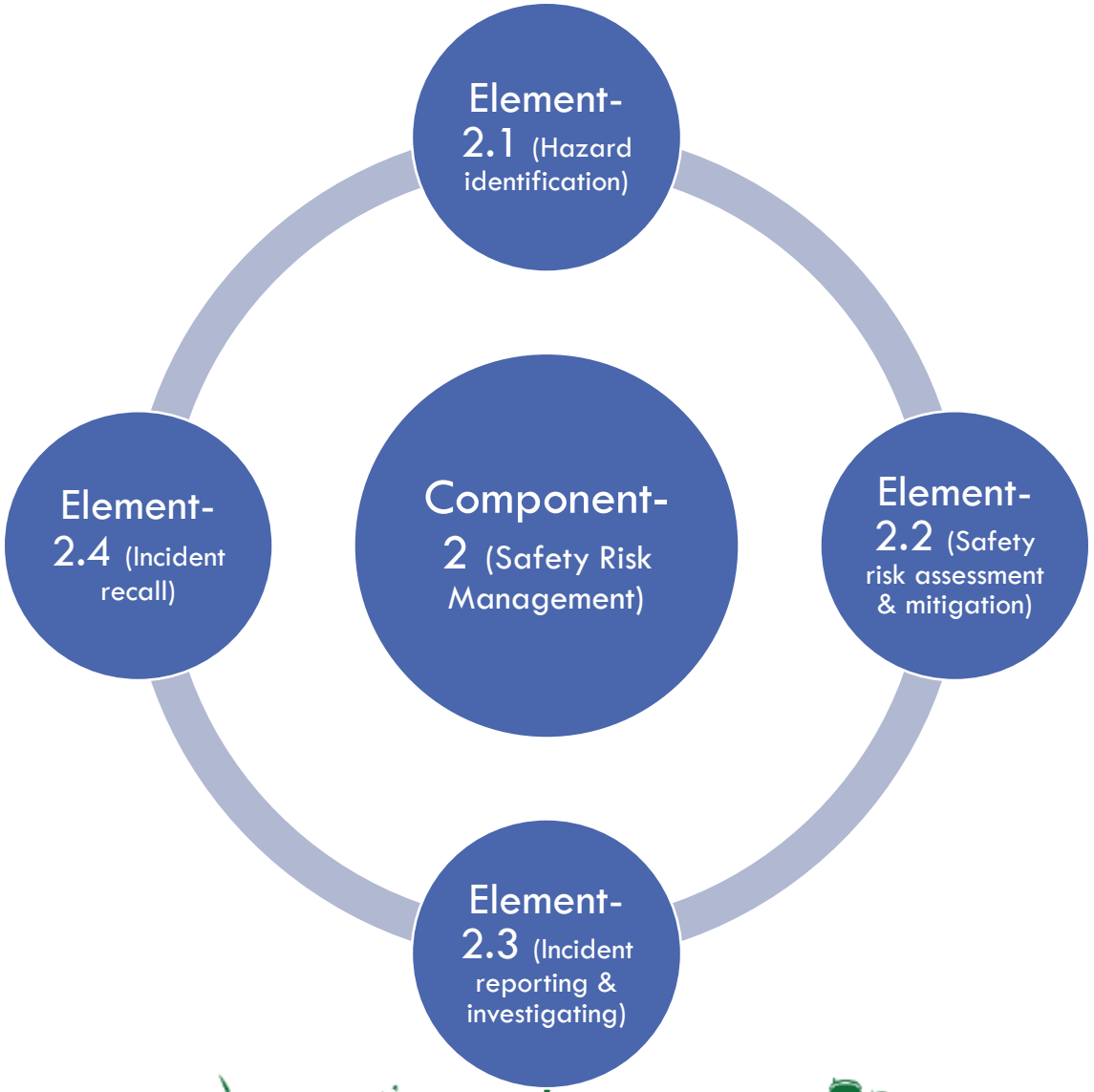
- Systems in place for implementation like LMI, PTW, JSA, SOP, SMP
  - 7 OD / 7 OGN

- Standard Training Modules for Contract Workers
  - 23 modules including induction & excluding first aid

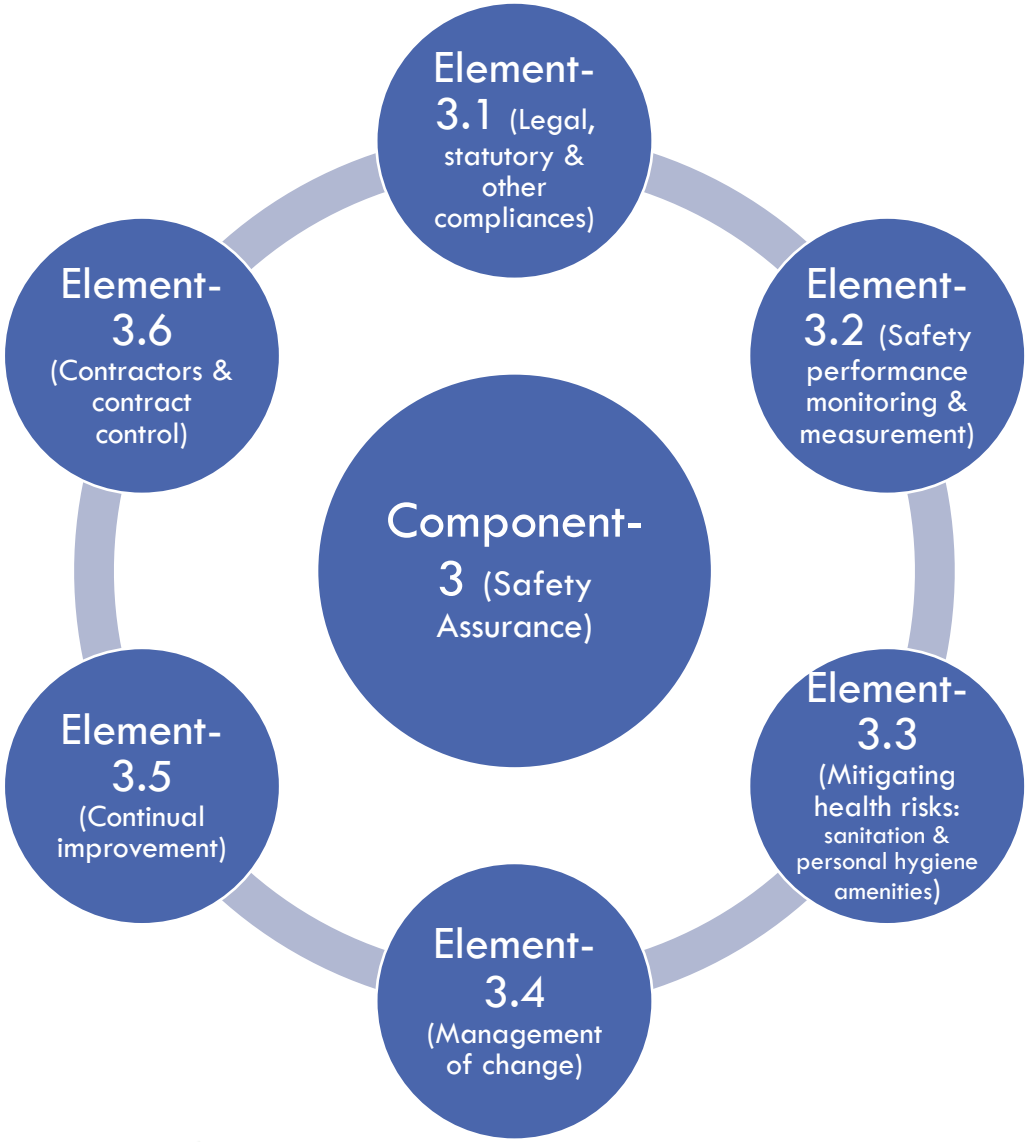
Safety Framework Component-1



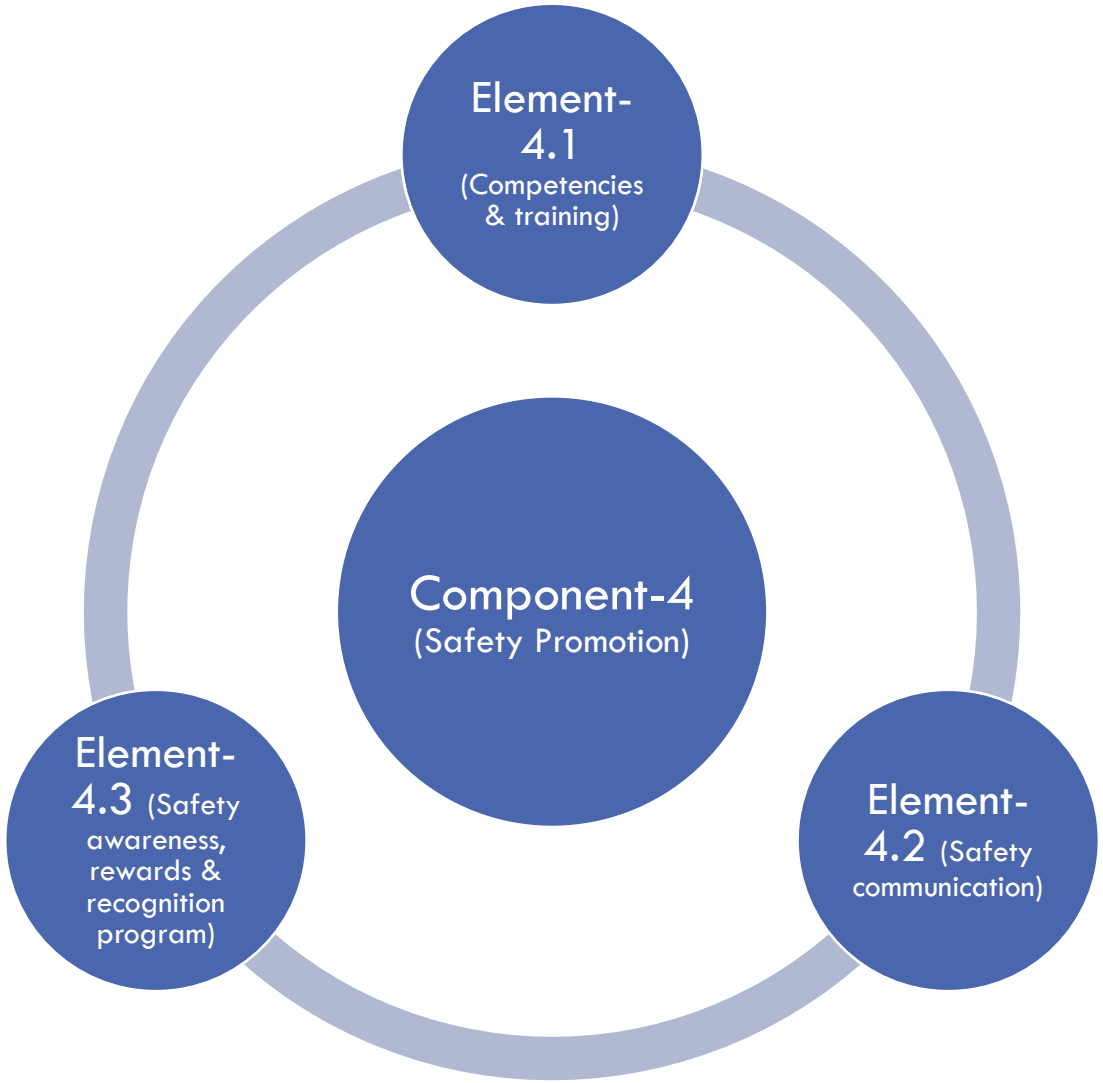
Safety Framework Component-2



Safety Framework Component-3



Safety Framework Component-4



Standard Training Modules

SL.	Module
01.	Induction
02.	Caught in / Caught by
03.	Heavy Vehicle Safety
04.	Work at Height
05.	Electrical Safety
06.	Confined Space
07.	Struck By
08.	Hand Tools
09.	Power Tools
10.	Fire Prevention
11.	Hot Work
12.	Work on or Near Water

SL.	Module
13.	Work Permit System Module
14.	PPE
15.	Manual Handling
16.	Excavation Safety
17.	Hazardous Substances
18.	Ergonomics
19.	General Safety & Hygiene for Office
20.	Demolition
21.	Slips and Trips
22a.	Material Handling
22b.	Material Handling-2
23.	CHP Housekeeping Workers on General Safety

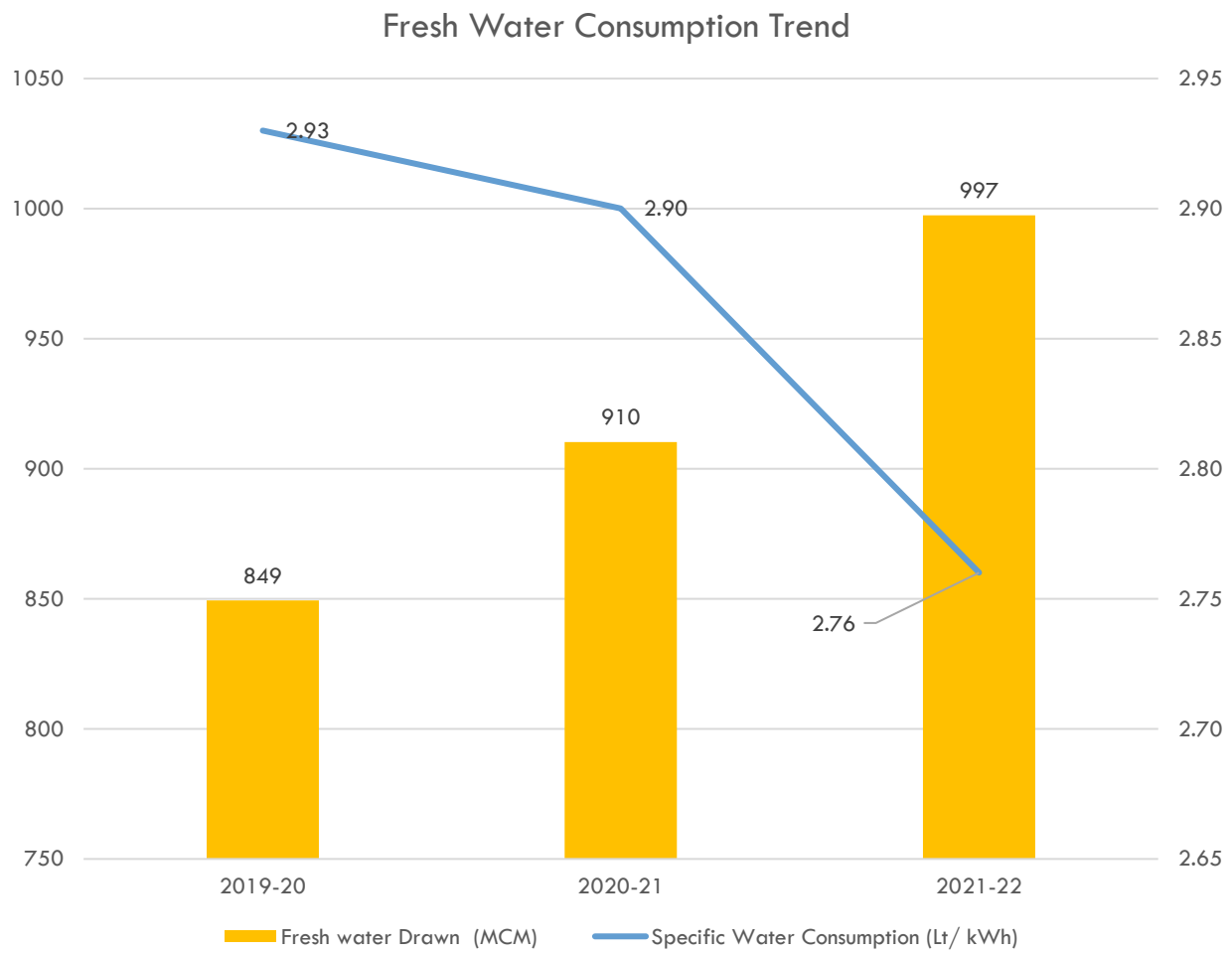
Our Strategy for Water

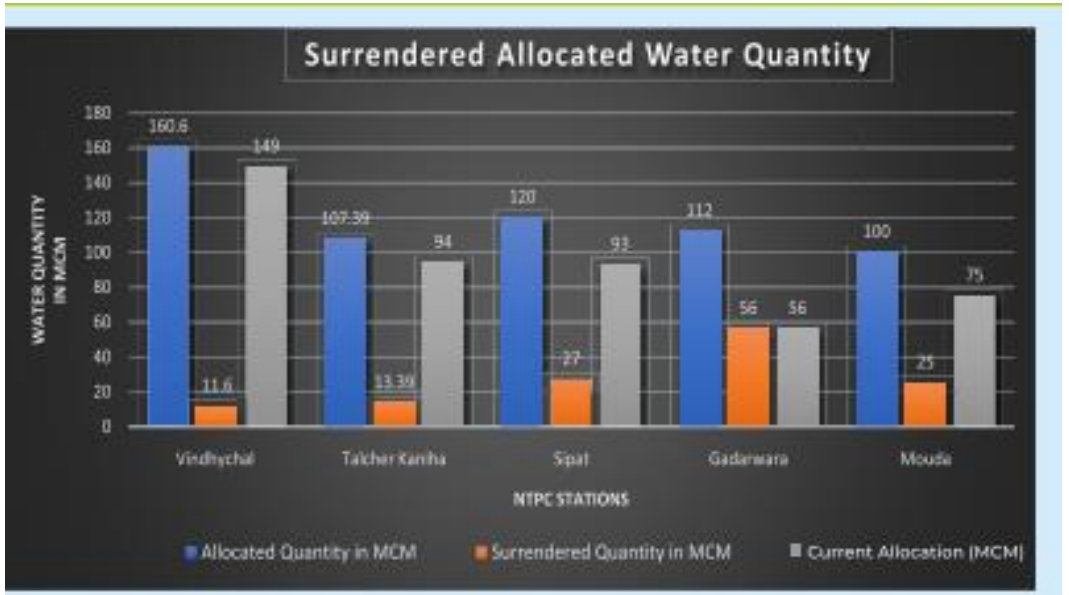
CEO Water Mandate

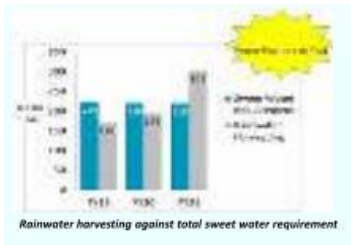
NTPC has became signatory of CEO water mandate on 23.03.2021, which is a highly collaborative partnership between the United Nations Global Compact, the Government of Sweden and a group of committed companies and specialized organizations dealing with the problems of water scarcity and sanitation. CEO Water mandate is designed as a private-public initiative with a focus on developing strategies and solutions to contribute positively to the emerging global water crisis.

The CEO Water Mandate is a UN Global Compact initiative that mobilizes business leaders on water, sanitation, and the Sustainable Development Goals. Endorsers of the CEO Water Mandate commit to continuous progress against six commitment areas of stewardship and in so doing understand and manage their own water risks.

Specific Water Consumption







Water: Technological Innovations

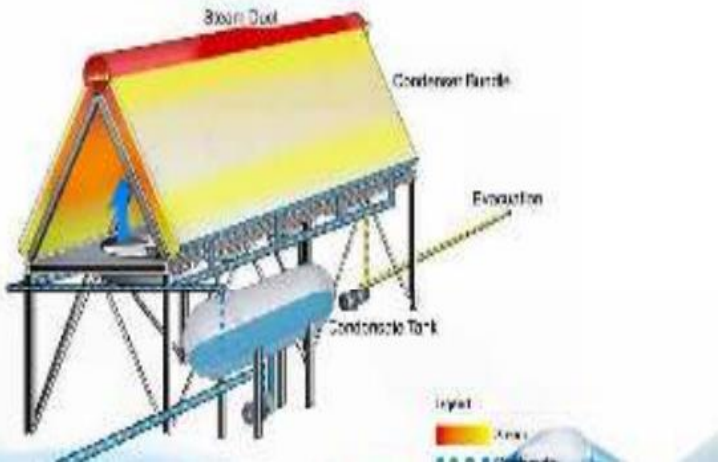
AIR COOLED CONDENSER

In water scarce and water stressed areas, Air Cooled condenser (ACC) is a good option to improve feasibility of setting up a power plant. NTPC has been path finder in this regard by adopting ACC based super critical units in North Karanpura (3x660 MW) and Patratu (3x800 MW).

Exhaust steam from the Turbine is led through Steam Duct to the Air-Cooled Condenser where it is distributed into finned tubes configured in A-frames for condensation.

Air is circulated by the cooling fans over the finned tubes. For higher size units' single row, flat carbon steel tubes with Aluminum fins are used. ACC for a typical 660 MW unit consists of about 80-100 nos of Fan Modules. Footprint of ACC is about "125m x 100m" with height of Fan deck and Top Steam duct as 40m and 70m respectively.

Saving of water in Air cooled condenser is approx. 63% in comparison to water cooled condenser.



HIGH CONCENTRATION SLURRY DISPOSAL SYSTEM

In conventional Lean Concentration Slurry Disposal (LCSD) System ash is disposed in ash dykes as lean slurry. This system have limitations/disadvantages on account of higher amount of water requirement, vast land requirement etc.

High Concentration Slurry Disposal (HCSD) Systems is a modern technique of disposing fly ash from thermal power plants to ash pond. In HCSD, Ash slurry is produced at a concentration of 60% to 75% of ash by weight and pumped through piston diaphragm slurry pumps to disposal area. The mixture behaves like semi solid and a non-newtonian fluid. The disposal of this highly viscous and nonnewtonian fluid requires special type pumps.

In HCSD system, water consumption is reduced. Water requirement is about 1/10 as compared to LCSD. HCSD system requires less land for disposal of fly ash. Specific energy consumption is also reduced.

Water: Technological Innovations

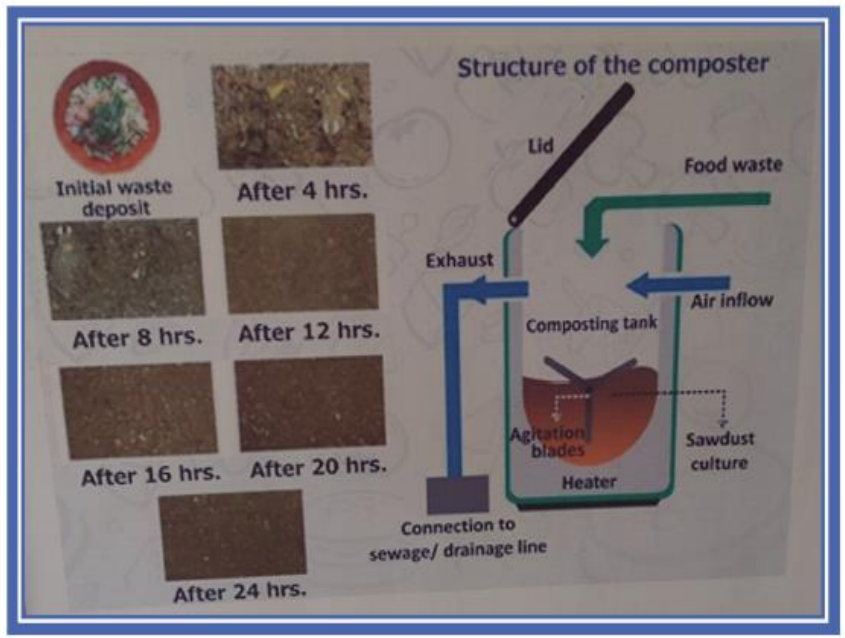
WATER ATMS

Water ATMs have been set-up by NTPC at various locations.

Waste Management in NTPC Premises

Vermi Composting

Organic Waste Converter Machine at NTPC Kudgi (Ref PO no. 4600048276)



Composting Machine "Foodie" at NTPC Talcher Kaniha

Waste Management in NTPC Premises

Bio Methanation Plant at NTPC Sipat (Ref Po. No.5500016609)

BioPellets from Dry Leaves- NTPC Dadri

Plant for Torrified Coal from Solid and Agriculture waste at NTPC Dadri

Dry Leaves/ Garden waste composting at Kudgi

Make Bed size of 6ft B x 6ft H x 12 ft L

Compact all dry leaves mixed with cow dung (liquid)

Compacted all dry leaves

Cover with Jute cloth and maintain in moisture condition for 45 days

Paper waste Recycling Unit at NTPC Tanda
(Ref Po No.4600052029)

Bailing machine at NTPC Simhadri

NTPC Jhajjar

hydraulically compacts plastic bottles and other plastic wastes to 100-150 Kg blocks for reduction in volume and economic storage & transportation

Plastic Shredding Machine at Kudgi
(Ref PO No.: 4600060455
Vendor: ARUN ENTERPRISES)

Plastic & dry waste disposal
for coprocessing in cement - Kudgi

Dry Waste Storage Facility at Dadri

E-Waste & Battery Storage

E Waste Storage at NTPC Kahalgaon

E Waste Storage (Tube lightes) at NTPC Kudgi

THANK YOU