



ESG at NTPC

Catalysing Transition towards Integrated and Sustainable Business

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

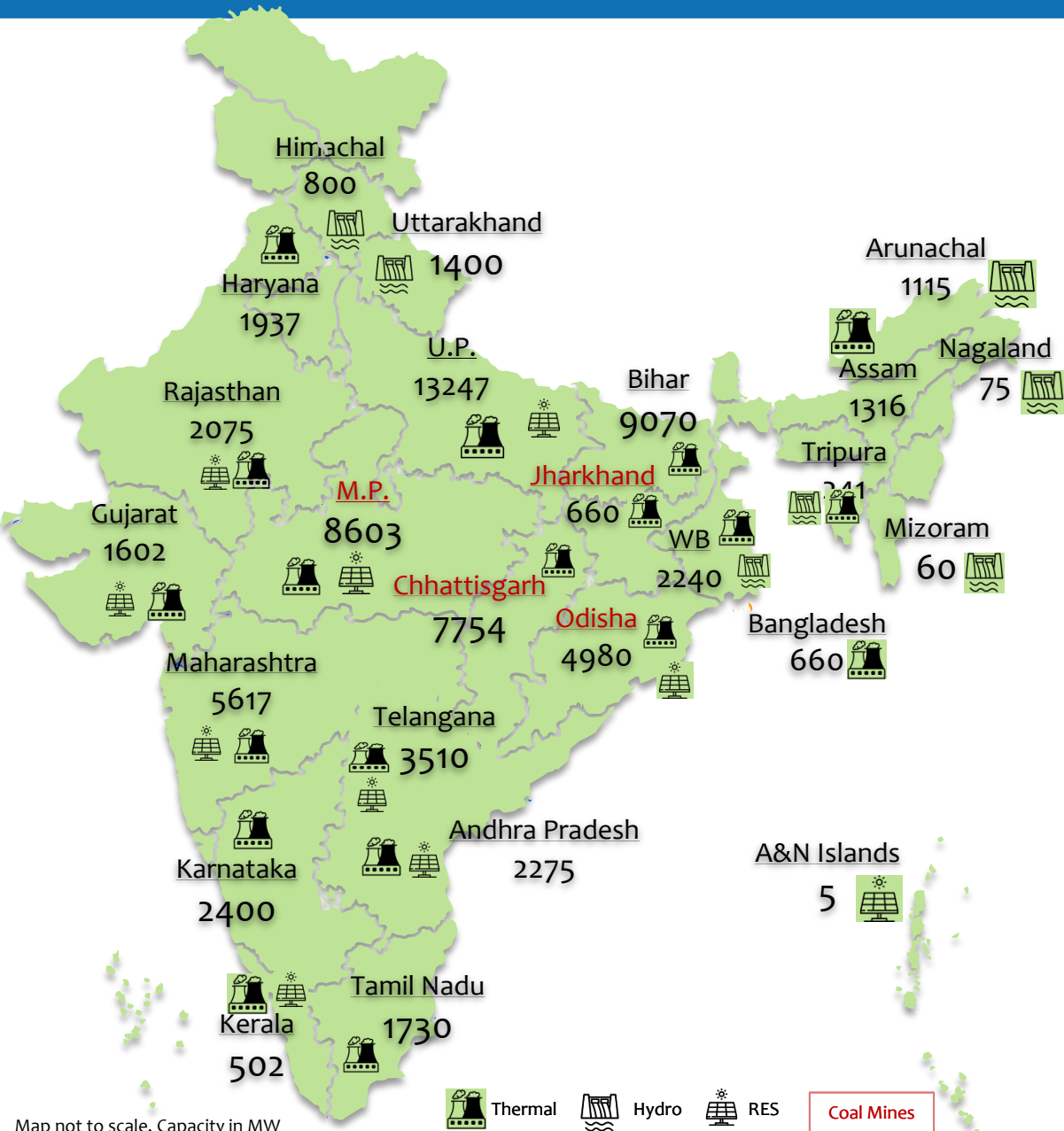


Core Values

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



Energizing India's Growth with Pan India Presence as on 13.03.2024



NTPC Owned			
Fuel Mix	Stations	Capacity (MW)	% Share
Coal	27	54,070	71.69
Gas/Liquid Fuel	7	4,017	5.33
Hydro	1	800	1.06
Small Hydro	1	8	0.01
Solar PV	15	403	0.53
Total (NTPC Owned)	51	59,298	78.63
Owned By JVs/Subsidiaries			
Coal	9	7,664	10.16
Gas/Liquid Fuel	4	2,494	3.31
Hydro	8	2,925	3.88
Small Hydro	1	24	0.03
Solar	16	2,800	3.71
Wind	4	213	0.28
Total (JVs/Subsidiaries)	42	16,120	21.37
TOTAL (NTPC Group)	93	75,418	100.00

Performance Highlights



Group installed capacity of 75,418 MW in Feb, FY'24; generation of 399+ BUs in FY'23



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



Total income crossed ₹ 1.7 Lac Cr mark in FY'23



Added 3952 MW (incl. 1352 MW RE) of commercial capacity in FY'23



~10 % of generation fleet is carbon free, target to achieve 60 GW of RE by 2032



Implementing "The Brighter Plan 2032" to improve ESG performance



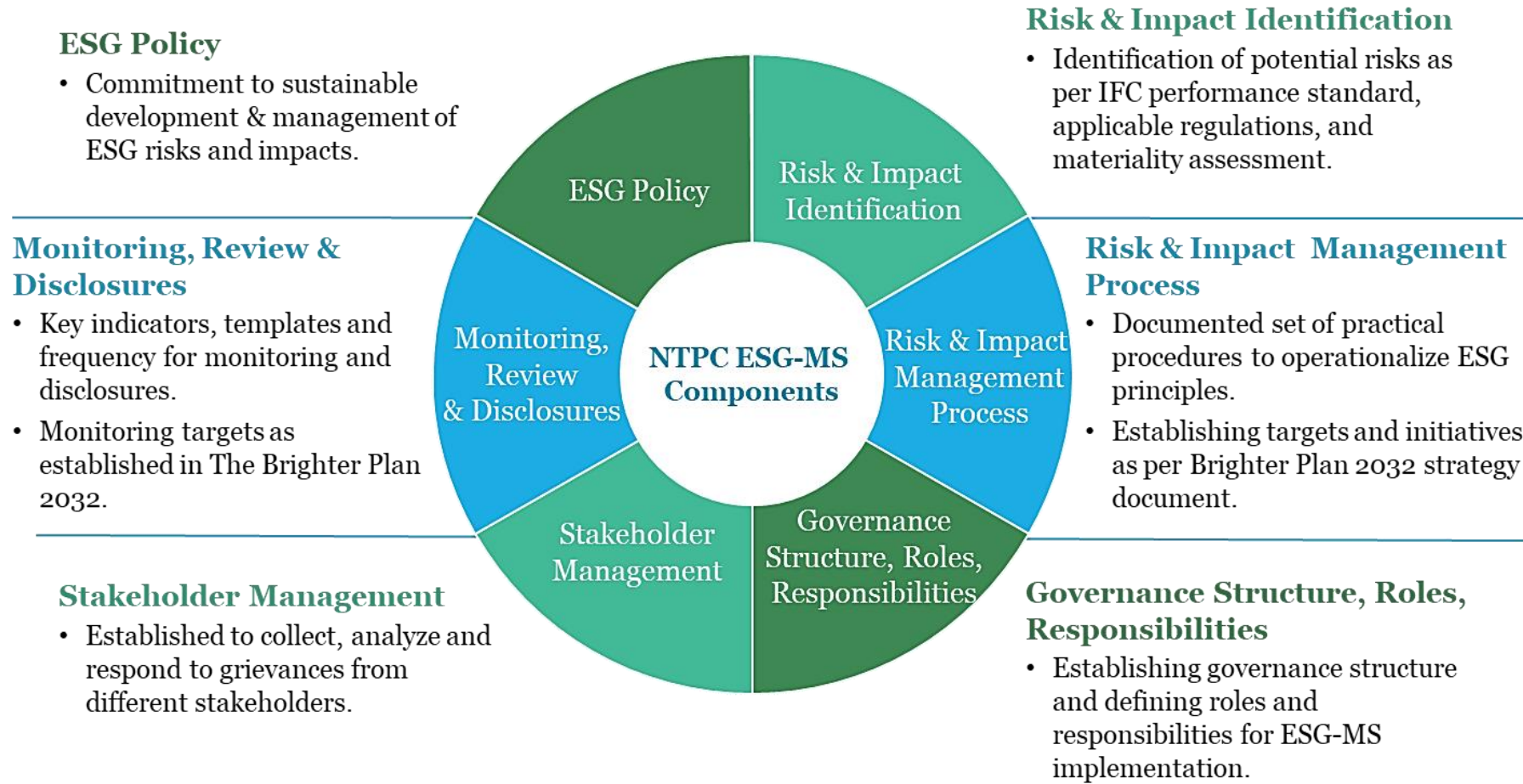
1st Energy company across globe to declare Energy Compacts at UN



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



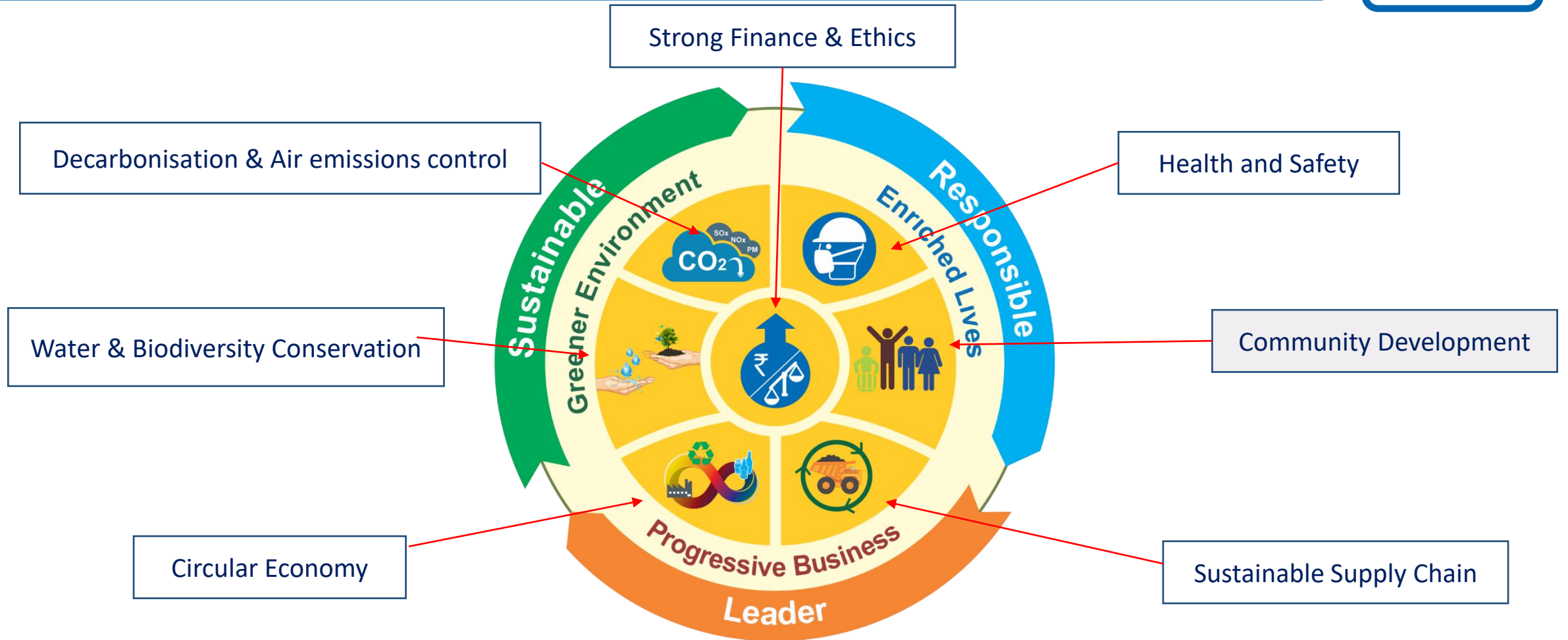
Our ESG-Management System



- ❑ Publishing Sustainability Reports as per the latest GRI frameworks since FY2012
- ❑ 4th Integrated Annual Report published in FY' 23 as per IIRC & GRI framework
- ❑ Expanded the boundary of reporting with inclusion of all JVs & Subsidiaries since FY2020
- ❑ Proactively Instituting measurement and monitoring systems for evolving KPIs around ESG
- ❑ 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: Target Settings



The Brighter Plan 2032

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



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
- Human Rights Policy
- ICD Policy
- R&R Policy
- Safety Policy
- Disaster Management Policy

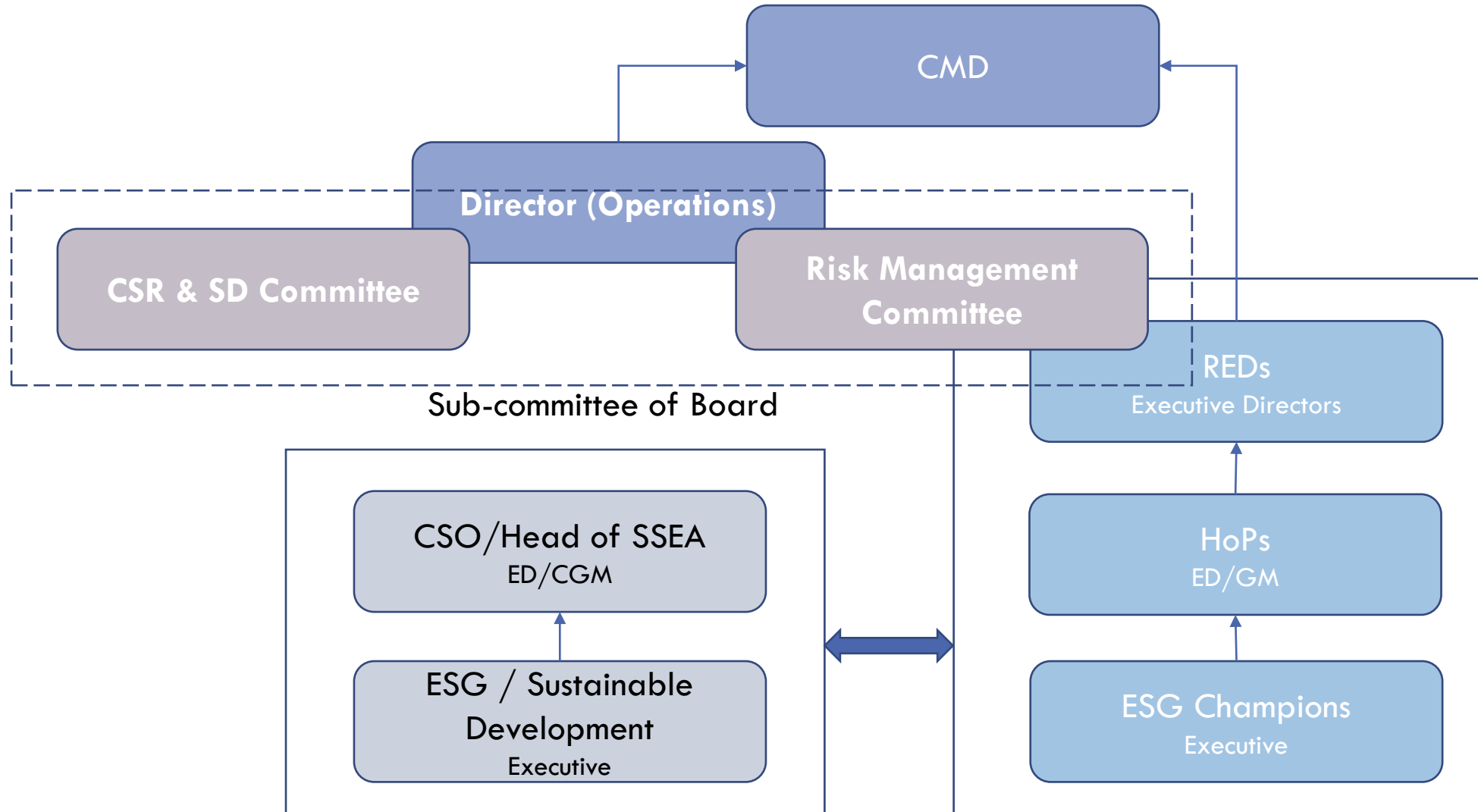
Governance

- Fraud Prevention Policy
- Whistle Blower Policy
- Complaint Handling Policy
- CDA Rules
- ACAB Policy
- Code of Conduct For BoD
- Related Party Transaction Policy
- Training Policy for Directors
- Policy on maintenance & preservation of documents

* These systems, policies and OGNs facilitate the attainment of goals



ESG Gov. Structure



NTPC Energy Compacts



United Nations

- NTPC has become 1st energy company and among few organisations across globe to declare its Energy Compact goals as part of UN High-level Dialogue on Energy (HLDE).
- NTPC energy commitments have been made public on UN's website.
- Major targets are:
 - To achieve 60 GW of cumulative capacity of renewables by 2032.
 - To reduce group net energy intensity by 10 % vs. 2012 levels by 2032.

Global Alliance for Sustainable Energy



- 17 Global energy players including Enel, Iberdrola
- To foster and promote sustainability along the entire renewable energy value chain
- Create metrics/KPIs/ standards for design, business models, and end of life solutions
- Disseminate and activate funding/collaboration frameworks
- Policy advocacy
- Launch tailored initiatives and studies around Water usage, Human rights, Net Zero

NTPC Net Zero Plan



NITI Aayog

- Development of Net Zero GHG emissions Roadmap for NTPC in alignment to GoI's 'Panchamrit' goals
- Emissions and energy (portfolio mix) modelling including development of scenarios for 2030, 2037, 2047 and 2070
- Assistance in establishment of Carbon Management Unit (CMU) in NTPC with the aim of integrating all GHG reduction initiatives under one umbrella



Awards and Recognition



**Top positions in 2023 Asia
Executive Rankings**
By Institutional Investor



**Asia's Best Employer Brand
Award 2023**
At the "ASIA'S BEST EMPLOYER
BRAND AWARDS" held on 17th
August 2023



**Most Preferred Workplace of
2023-24**
In the third edition of Most
preferred work places by Team
Marksmen



**CII ITC Sustainability Awards
2023**
NTPC Sipat won with
Outstanding Accomplishment
title



**Brandon Hall Group Double
Gold Award in Leadership
Development Awards**



**Economic times HR World
Future Skills Award 2023**

- "Best used of AI/AR/VR in learning and upskilling"
- "Best advance in creating an Extended Enterprise Learning Programme"

Forbes 2023
**WORLD'S BEST
EMPLOYERS**
POWERED BY STATISTA

4th

Rank among Indian Companies in **FORBES* World's Best Employers 2023**

* 261st Global Rank

Awards and Recognition



CSR Times Awards 2023 in 'Swachh Bharat' Category
For
'Revival and operation of Municipal Solid Waste Management Plant, at Karsada, Varanasi'.



Ranked No.1 amongst CPSUs and received "Platinum Award" w.r.t. Gem Procurement (GMV) of Rs. 24,216 crore.



ET-Sustainable Organization Awards 2023
Recognized as Sustainable Organization



Business World People HR Excellence Award 2023
For
"Excellence in Learning Technology (Gold) Awards"



SHRM HR Excellence Awards 2023"

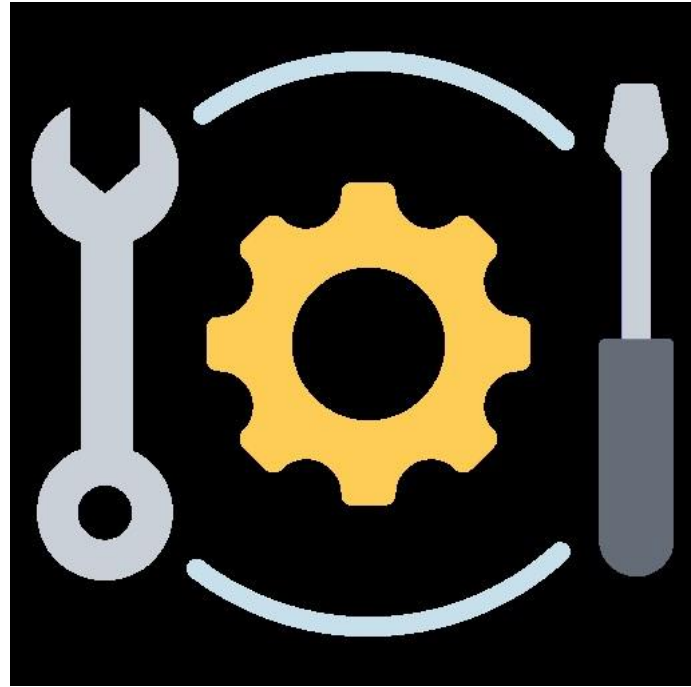
- Excellence in Developing Leaders of Tomorrow
- Excellence in Learning & Development
- Excellence in Health and Wellness Initiatives
- Excellence in Community Impact



Best Engineered Project MERCOM Award 2023
for
70 MW NTPC Kayamkulam Floating Solar Project

10th

Largest Indian company in Forbes Global 2000 ranking - 2023



Key Business Drivers

2

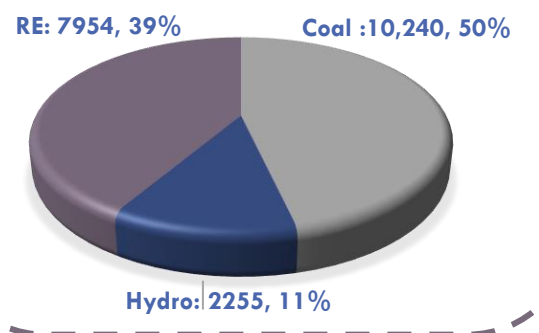
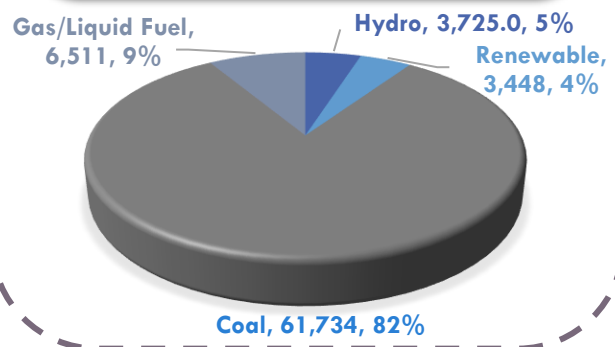
Future Scenario of Capacity Mix



Present Capacity
75.41 GW



Capacity Under Construction
20.45 GW



Thrust on RE →

Present Capacity
3.45 GW



Target Capacity by 2032
60 GW

New Business Initiatives

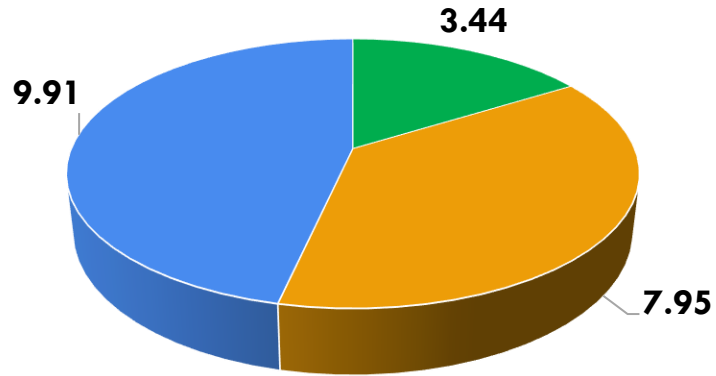
- Biomass Co-Firing in NTPC plants
- E-Mobility Business: EVs, Charging Infra
- H₂ Generation, CO₂ Capture & Methanol Synthesis
- Battery Energy Storage System (BESS)
- Waste to Energy and Waste to Charcoal Projects
- Industrial Parks within Power Plants – Kudgi & Pudimadaka
- Nuclear Power



Current Non-Fossil Portfolio of 26 GW

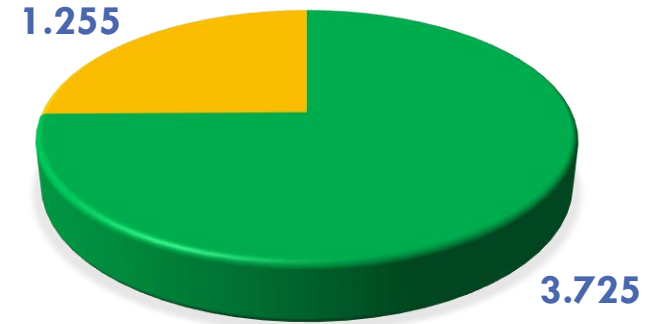


TOTAL RE: 21.33 GW



■ Commissioned ■ Under construction ■ Pipeline

TOTAL HYDRO*: 4.98 GW



■ Commissioned ■ Under construction ■ Pipeline



Battery Storage: 2GW/ 12 GWh

ESS of 4000 MW/ 24000 MWh under tendering



Pump Storage: 2GW/ 12 GWh

*Excluding pumped hydro



40GW Bid Based

TBCB
25 GW

CPSU Scheme
5GW.

Flexibilisation
10 GW



15GW Bilateral/ Merchant

C&I (incl BESS)
10 GW

Merchant
5 GW

6GW: Tie up of 1950 MW RE-RTC
power with C&I customers



5GW GH₂

Energy storage and
mobility

**Green H2 Blending with
PNG @ Kawas**

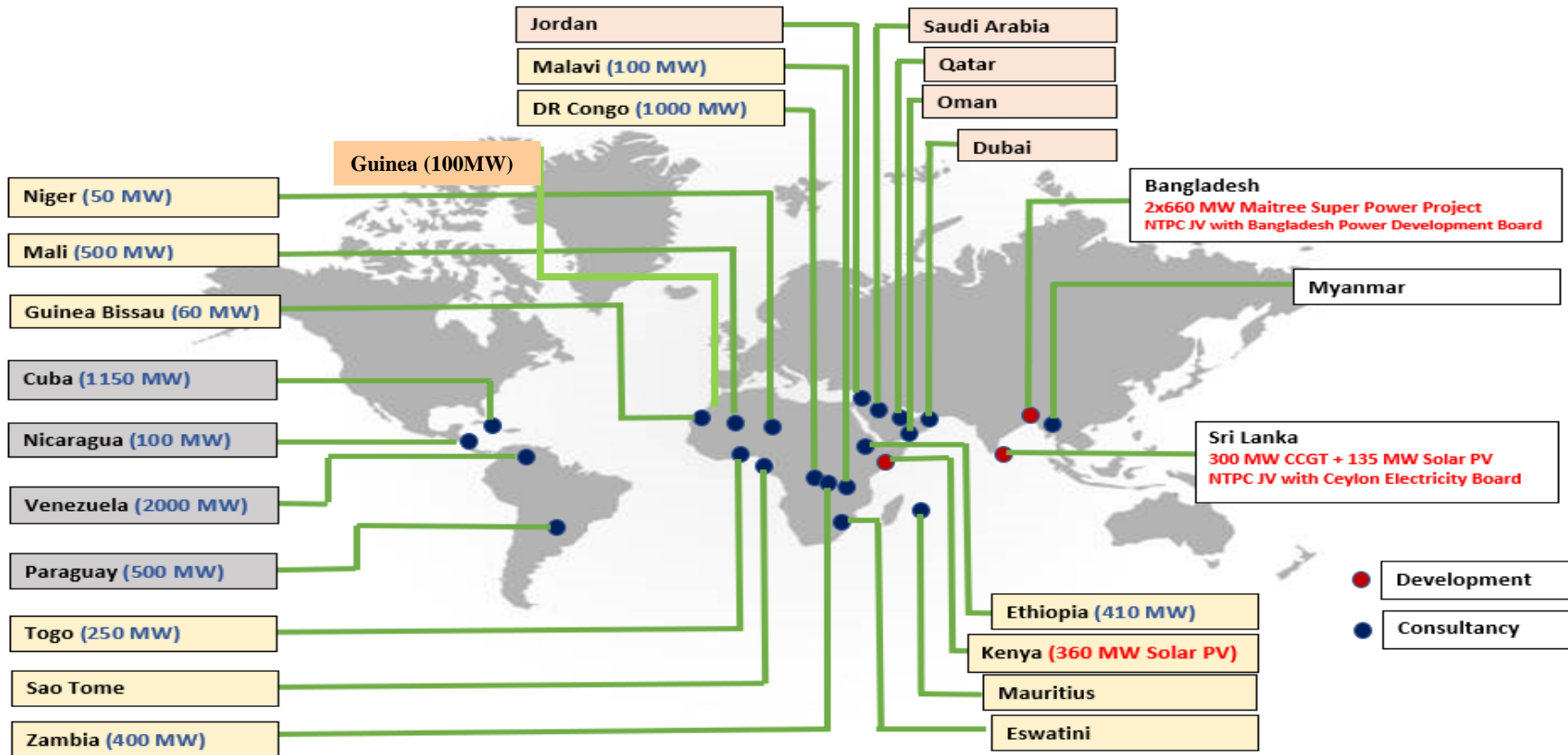
**Green Methanol
/ Ammonia**

GACL, NFL Vindhyachal,
Khavda, Kutch



- 7.3 GW of U/c UMREPPS
- 42 GW of other proposed UMREPPs

Expanding Beyond India



Sri Lanka

Phase I: 50 MW Solar + 40 km transmission line
Phase II: 85 MW solar

ISA Assignments

- **6620 MW** Solar PMC
- Latin America: 3750 MW
- Africa: 2870 MW
- **27 Countries** Solarization (ISA grant)
- DPR prepared for 21 countries and providing PMC services for projects in 11 countries.

NTPC is pursuing power sector assignments for O&M services, Engineering & PMC services for Thermal (Coal / Gas) Renewables (Solar / Wind) and Energy Storage solutions in **Africa, Middle East, SAARC, ASIAN, CIS, etc.** in collaboration with other partners.

Assignments secured in Mauritius, Eswatini, Jordan, Togo, Ethiopia, Sao Tome, etc. Capacity building for Myanmar officials.

Major Clean Energy Initiatives

1

Green Hydrogen Mobility (Leh, Ladakh and New Delhi)

2

Green Hydrogen blending with PNG at Kawas, GJ

3

Chemical – Methanol Production at Vindhyachal, MP

4

20kW Green Hydrogen based Microgrid at NETRA, UP

5

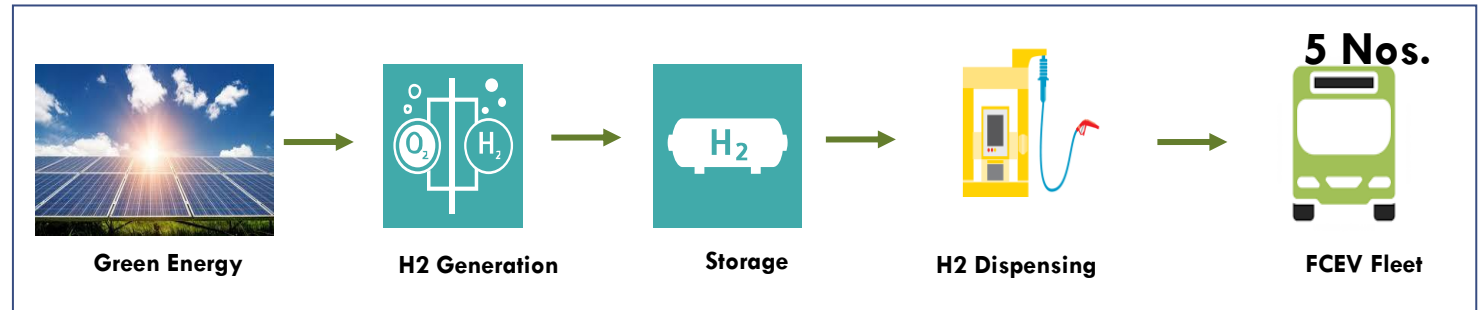
200kW Green Hydrogen based Microgrid at Ladakh

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Waste to Value and Biomass Co-Firing



Green Hydrogen Mobility



1.70 MW
7.68 Acres

80 kg/day
9 hrs opr.

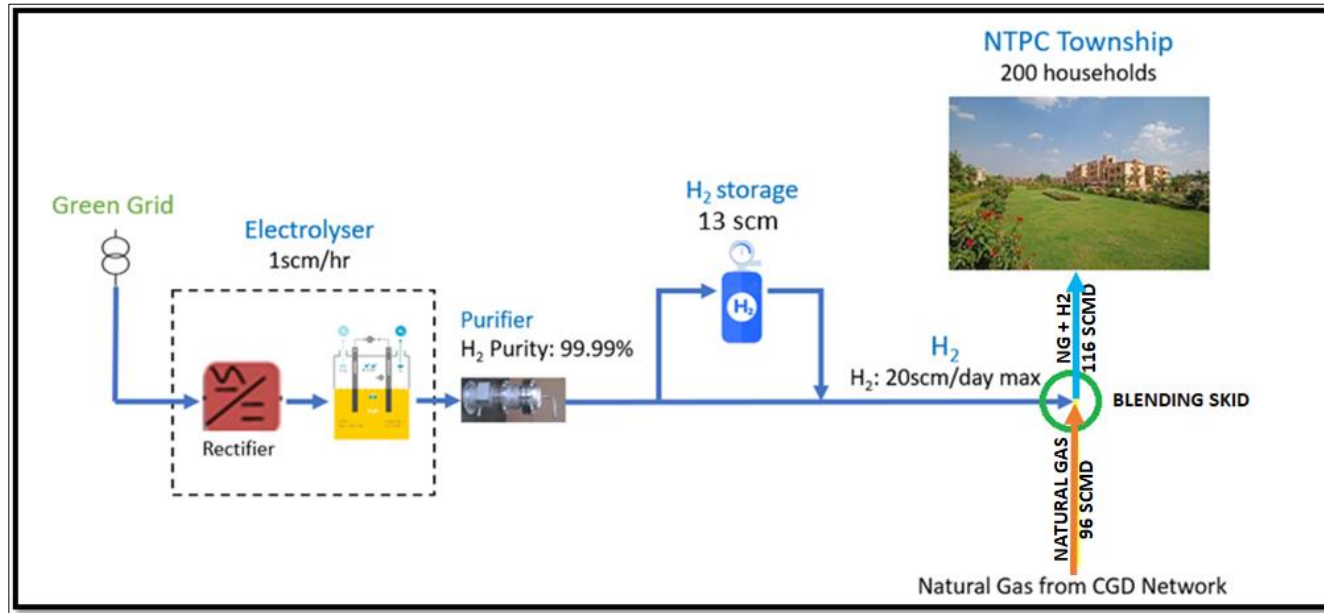
500 bar

350 bar

9m Buses



GH₂ Blending with Natural Gas



India's First Green Hydrogen Blending with Natural Gas



Location - NTPC Township, Kawas, Gujarat, India

- First Phase commissioned on Jan 2023 for 200 Households with blending of 5% v/v.
- Received Approval for 8% v/v and planning for further expansion by 20%.
- Green power is supplied for making Green H₂.



Green Chemical Initiatives (Ammonia & Methanol)



Industrial Land Lease
263 Ac

Green Hydrogen
1500 TPD

PEB Sheds Lease
3.4 Million SFt

Integrated Solar Rooftop
114 MWp

Commercial Space Lease
3.5 Million SFt

e- Methanol
1200 TPD

Green Ammonia
1300 TPD

Hydrogen based power
450 MW

Pudimadaka Energy Park in 2047

Electrolyser:

NTPC tie up with Electrolyser manufacturer for supply of

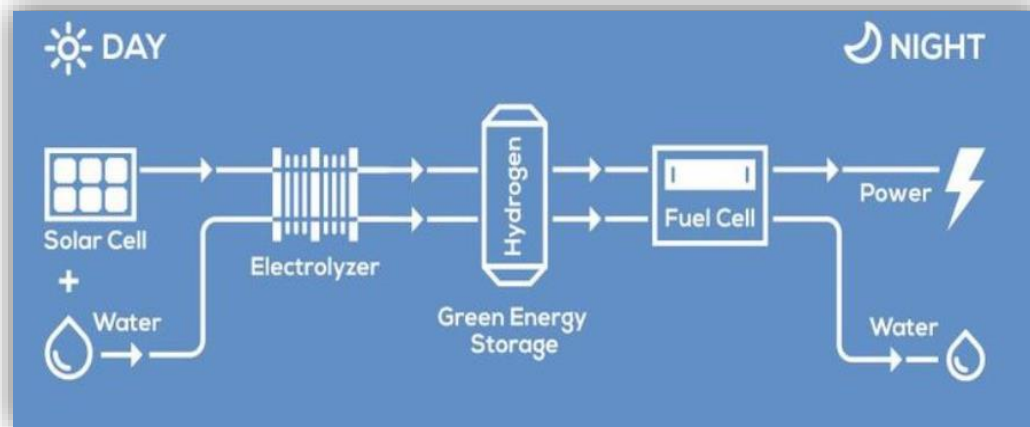
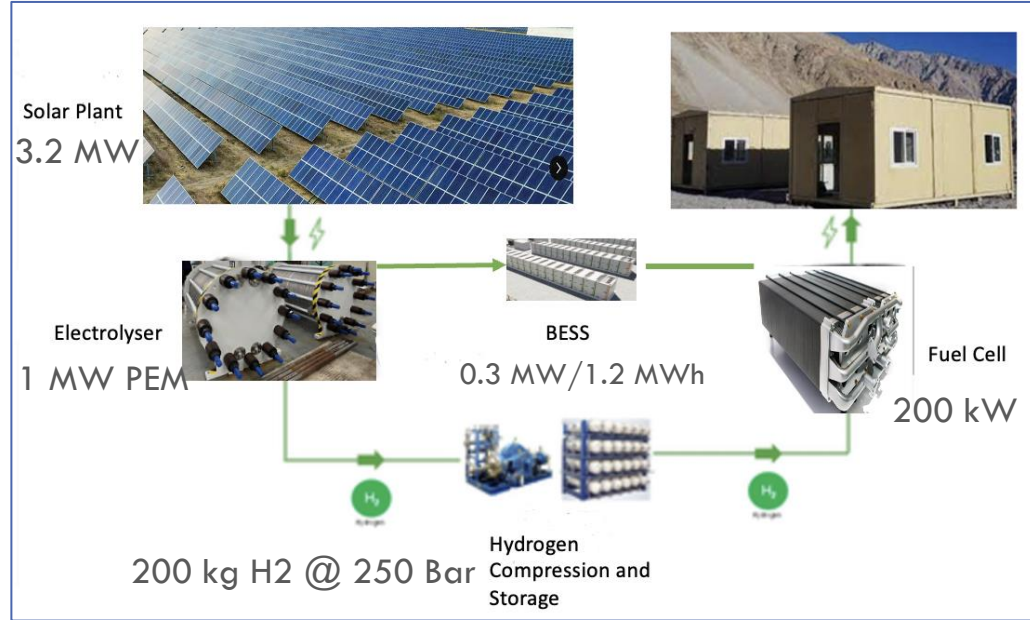
- 600MW Alkaline
- 400MW PEM

Green Chemical: Ammonia and Methanol

- NTPC Signed a MoU for Development of Green Hydrogen Hub in Ports
- DPR and feasibility Studies are in progress



200kW GH₂ Microgrid





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

- NTPC total biomass requirement of 13 Mn MT per Annum.
- Total Qty of 4.55 Mn MT ordered

NTPC Biomass pellet plant status:

- 40 TPD Non-Torrefied pellet plant is under erection at Lehra Mohabbat, Bhatinda.
- 100 TPD Torrefied pellet plant under erection at APCPL-Jhajjar.
- 50 & 100 TPD Non-Torrefied pellet plant under erection at Dadri & APCPL-Jhajjar(respectively).
- NTPC is planning to set up 05 Pellets plant each at Punjab and Haryana.



1.46 Lakh MT bio-mass pellets co-fired with coal at 20 NTPC stations & one JV.



Waste to Energy Projects

- 24 TPD/ 200 kW thermal gasification based Waste to Energy (WtE) plant to Varanasi
- MoU signed with IOCL for pilot WtE project (50 TPD) through Plasma Enhanced Gasification technology. Front end engineering and design (FEED) is in progress.



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 Koyal 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), Indore (500 TPD) and Bhopal (400 TPD).



GHG Mitigation

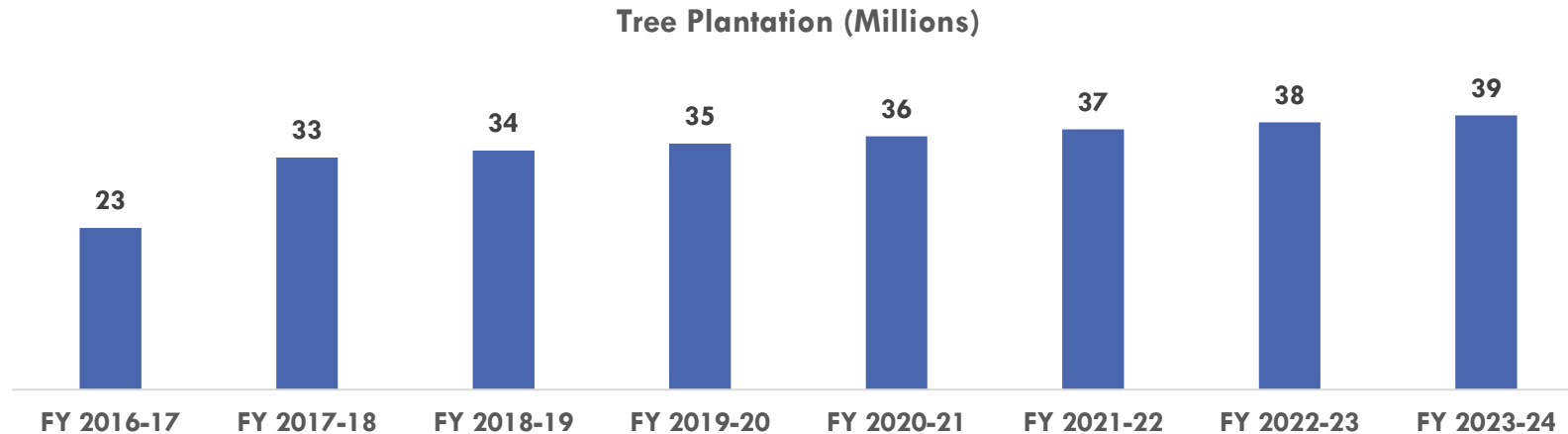


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Creating Carbon Sinks through massive afforestation Programme



- ❑ 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 10 millions in next ten years i.e. till FY 2026-27.



- ❑ More than 38 Million saplings planted till 2023-23 since inception (NTPC/Govt. Lands)

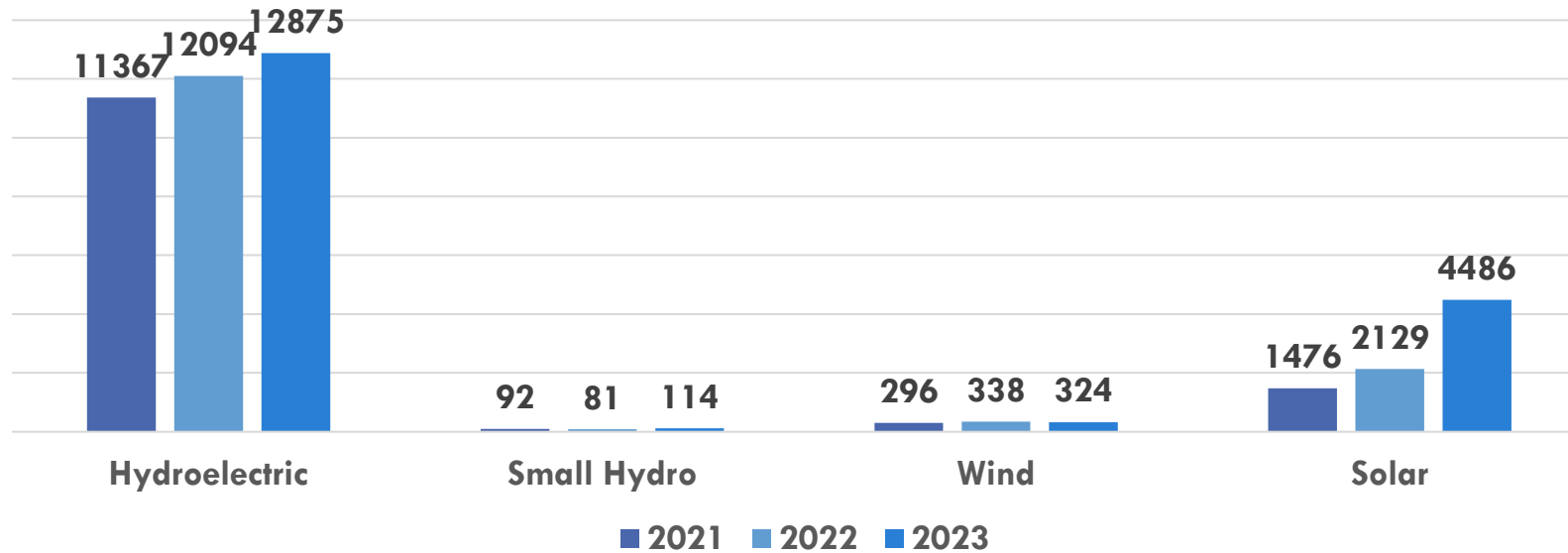
Tree Planted (Mn)	CO ₂ seq. (Mn Tonnes)
38	0.76



Avoiding GHG emissions through renewables



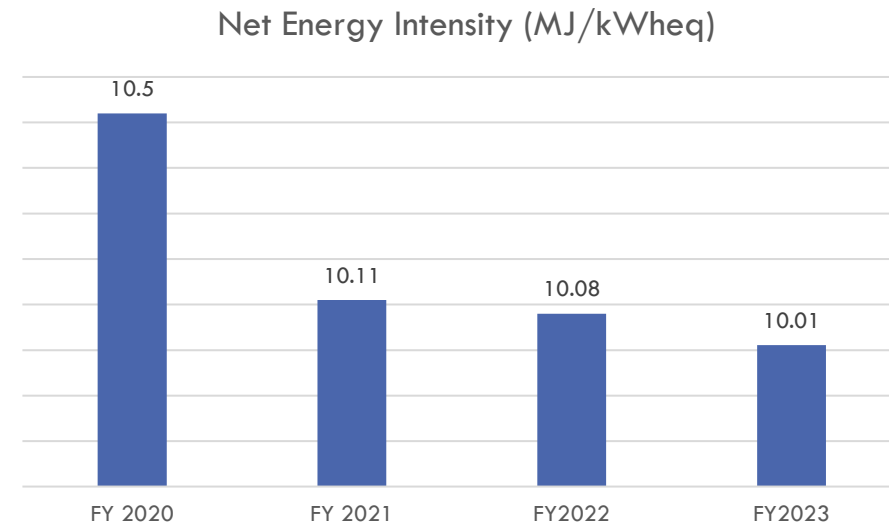
Non Fossil Gen (MU)



Non-fossil Installed (GW)	CO2 Avoided (Mn Tonnes)
6.9	14.6



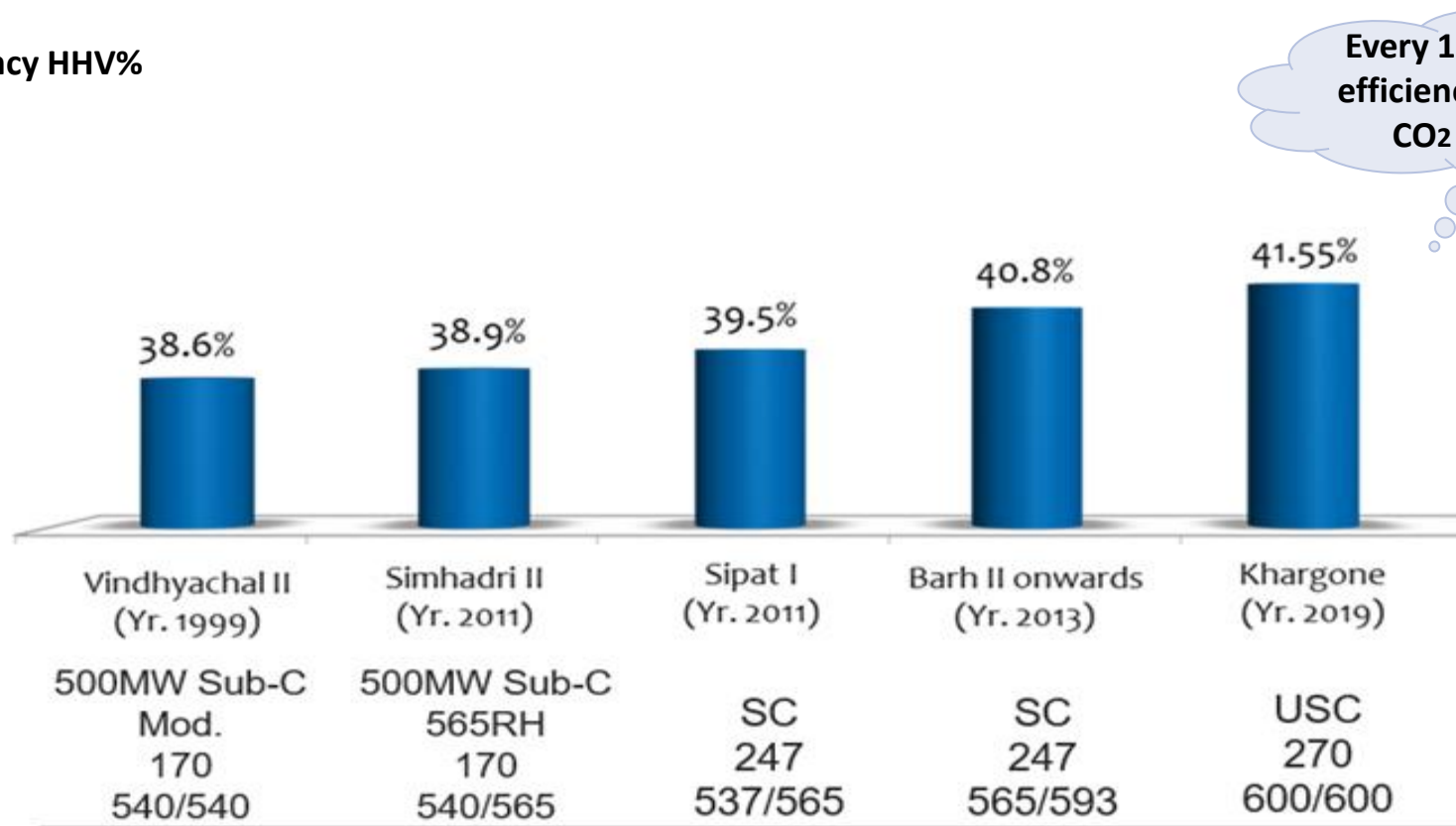
- HELE (High Efficiency Low Emissions) Technologies—Supercritical, Ultra Supercritical, Advanced Ultra Supercritical :31 units of supercritical and ultra-supercritical technologies, constituting total capacity of 21,860 MW
- In FY 2022-23, NTPC attained energy savings of approximately 1,735.5 TJ and surpassed the targets of the Perform, Achieve and Trade (PAT) scheme, leaving with a net surplus of 119,809 ESCerts.



Reducing GHG Emissions with Efficiency Improvement



Gross Efficiency HHV%



Every 1% increase in efficiency yields 2.5% CO₂ reduction

CO₂ *reduction

MMTPA	Base	0.04	0.13	0.33	0.44
(%)		(0.8%)	(2.3%)	(5.7%)	(7.6%)

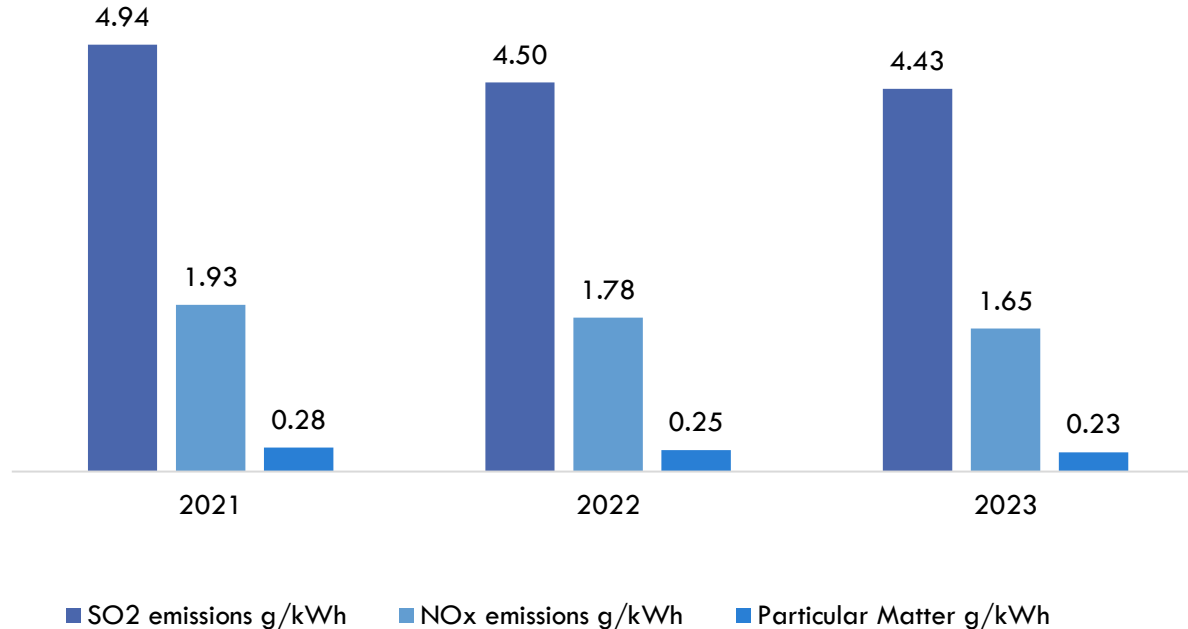
* Per 1000 MW installed capacity

Constant endeavor to reduce CO₂ emissions- steps to increase cycle efficiency



Reducing Non-GHG Emissions

Specific SO_x, NO_x, PM Emissions



SPM Reduction :

- ESP R&M completed in 13010/15960 MW
- Additional reduction being achieved through FGD installations

SO₂ Reduction :

- FGD including DSI Commissioned in 6760 MW
- Gas in achieved in 5710 MW
- FGD under various stage of Erection and Commissioning in 58+ GW capacity.

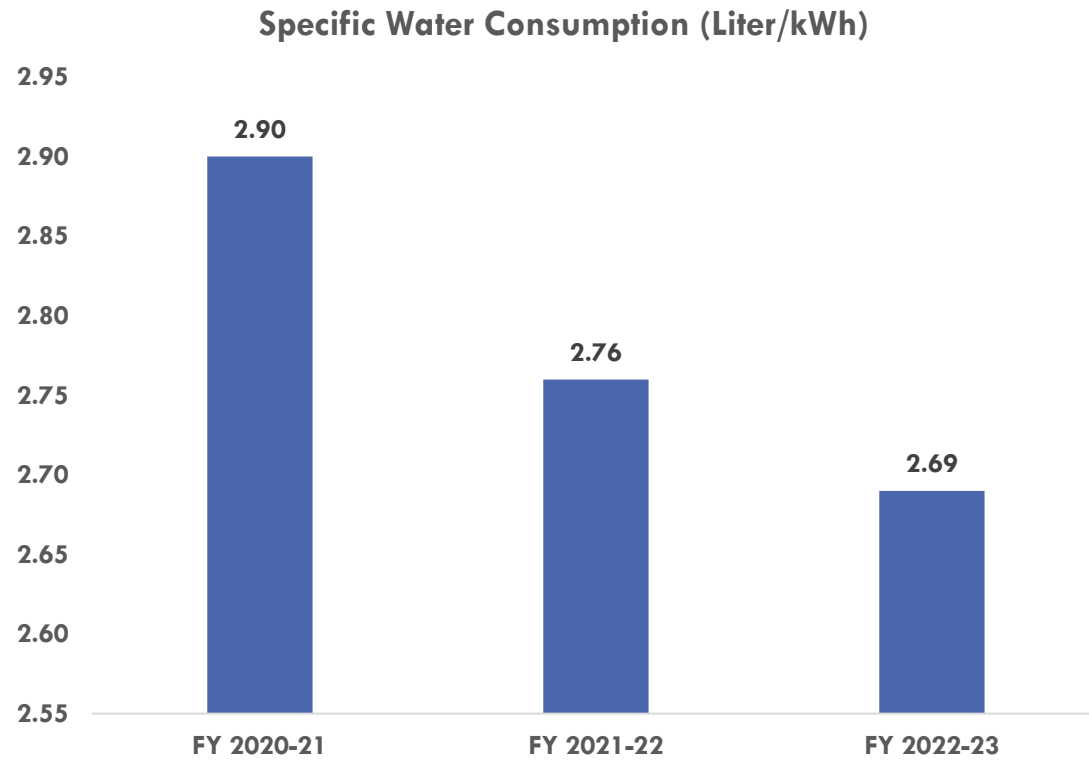
NO_x Reduction :

- . Modification completed in –20.81 GW /21.56 MW

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



Specific Water Consumption





CEO Water Mandate



- NTPC has become signatory of CEO water mandate since 23.03.2021.
- It is a special initiative established in 2007 by the UN Secretary General and the UN Global Compact (UNGC) in partnership with the Pacific Institute to advance corporate water stewardship around the world.
- 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.
- 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.



DIRECT OPERATIONS



COLLECTIVE ACTION



PUBLIC POLICY



**SUPPLY CHAIN & WATERSHED
MANAGEMENT**



**COMMUNITY
ENGAGEMENT**



TRANSPARENCY



Air Cooled Condenser (ACC)

- Thermal power plants use large quantities of water for condensation of steam and cooling of auxiliary systems. As per current norms of MOEF&CC, the water requirement for a 2x800 MW plants based on closed cycle cooling system is 4800 m³/hour.
- In water stressed regions, NTPC has been path finder in this regard by adopting Air Cooled Condenser system at North Karanpura (3x660 MW, two units commissioned) and at Patratu (3x800 MW) under commissioning.
- Adoption of air-cooled condenser systems in place of water-cooled condenser system reduces the water requirement to about 40%, i.e. 2000 m³/hour in place of 4800 m³/hour.
- On annual basis, this translates into a saving of about 21 million cubic meters of water, which can be used for domestic use, irrigation, pisciculture etc.
- NTPC has taken a policy decision to adopt ACC system in all upcoming plants except where technically not feasible..



Air Cooled- Condenser at North- Karanpura



Air Cooled- Condenser at Patratu Under Commissioning



Adoption of Dry Bottom Ash Handling System

- ❖ NTPC is already using Dry Fly Ash Extraction System (DAES) for extraction of dry fly ash for utilization in place of traditional method by mixing water & pumping to ash ponds.
- ❖ NTPC has also installed “Dry bottom ash” handling system at Patratu & Dadri stations. This system cuts down the requirement of water from 700 m³/hr to 350 m³/hr on an average.
- ❖ The adoption of new ash disposal system i.e HCSD Systems also has saved lot of water. The Ash slurry has concentration of 60% to 75% of ash by weight & it is pumped through piston diaphragm slurry pumps to ash pond.



North-Karanpura has adopted the dry ash handling system



NTPC Dadri has adopted the dry ash handling system



Water: Technological Innovations



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

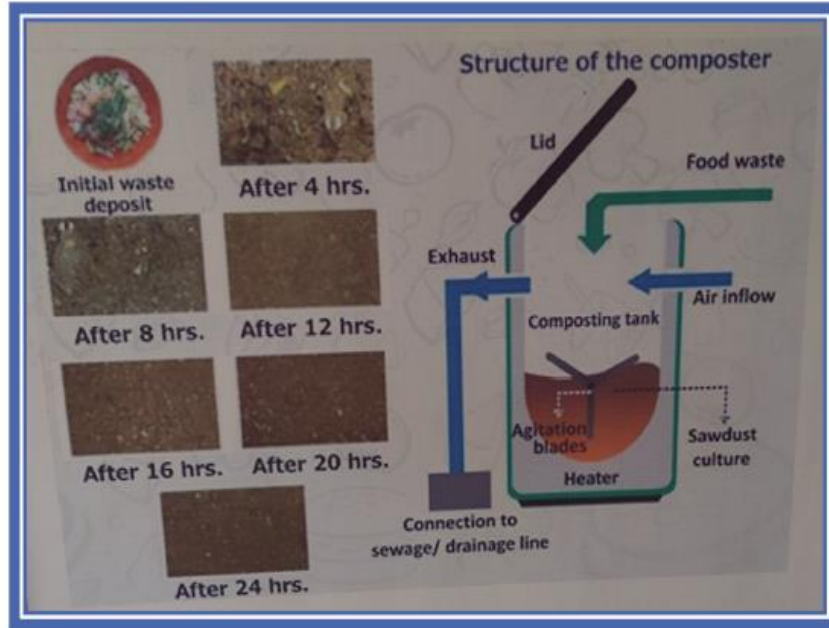


Waste Management in NTPC Premises





Vermi Composting



Composting Machine "Foodie" at NTPC Talcher Kaniha



Waste Management in NTPC Premises



Bio methanation Plant at Sipat





BioPellets from Dry Leaves- NTPC Dadri





Plant for Torrefied 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







Baling 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



E-Waste & Battery Storage



E Waste Storage at NTPC Kahalgaon



E Waste Storage (Tube lightes)
at NTPC Kudgi





Dry Waste Storage Facility at Dadri





Social Performance

5

SSCM Policy



Supply Chain Conference on Water with major partners
e.g. I&T, Ion Exchange, BHEL, IOCL, GE

Guidance Note: Sustainable Supply Chain Guideline



Supply Chain Sustainability Policy

In pursuit of providing reliable power and related solutions in economical, efficient, environmentally friendly and innovative manner, we at NTPC are committed towards augmenting the supply chain sustainability and reducing negative externalities of business operations. We seek to institute triple bottom line approach in our upstream supply chain and encourage our supply chain partners to follow best environment, social and governance (ESG) practices in their business operations. As a responsible corporate citizen, we incessantly endeavour towards creating synergistic and symbiotic value across our value chain to enhance our social, environmental and economic performance.

We at NTPC are committed towards:

- 1) Ensuring highest level of compliance to all applicable statutory and legal requirements across the supply chain and procurement practices;
- 2) Strengthening and maintaining robust health and safety management system in own and supplier managed operations;
- 3) Embedding transparent, ethical and fair procurement practices and providing equitable opportunity to our vendors;
- 4) Engaging positively with our suppliers to promote cost effective, resource efficient and environmentally and socially responsible business operations;
- 5) Fostering partnerships and collaborations with value chain partners to enhance quality and efficiency;
- 6) Nurturing and reinforcing a conducive work environment; adopting highest standards of human rights and labour practices;
- 7) Promoting diversity, inclusiveness and equality in workplace across supply chain;

NTPC is committed towards providing necessary governance support and allocating required resources for organization wide implementation of Supply Chain Sustainability Policy.

A periodic review and necessary upgradation of the policy shall be done to enhance the suitability and applicability.



CSR Activities



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.

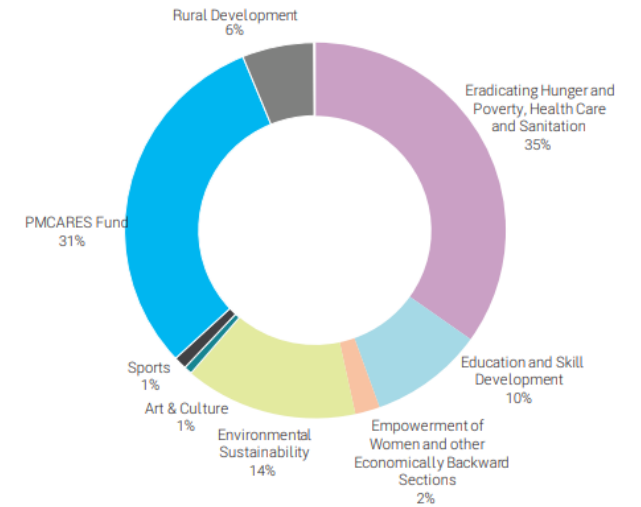
Developing Archery sport from grassroots level: expenditure of ₹ 115 Crore in 5 years.

PM CARES Fund for COVID-19:

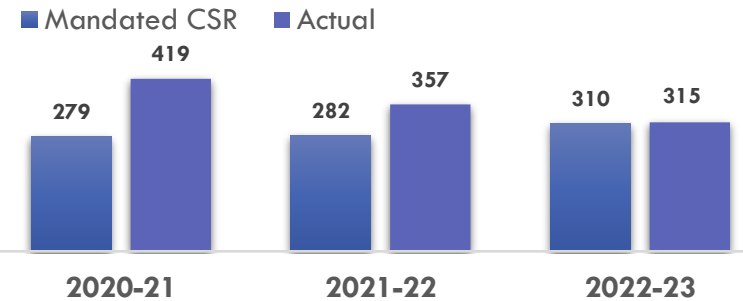
- 2022-23: ₹ 80 crore
- 2021-22: ₹ 80 crore
- 2020-21: ₹ 250 Crore

O&M of Municipal Solid Waste (MSW) processing plant at Karsada, Varanasi.

CSR Expenditure Break-Up



CSR Exp (Standalone) (in ₹ Crs.)



AIMA Award



FICCI Award



ASSOCHAM Awards



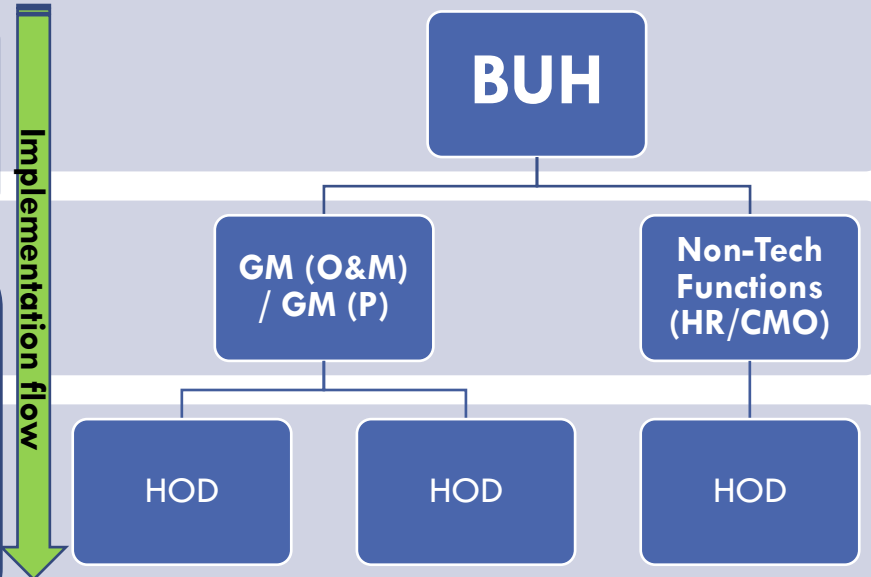
KEY FOCUS AREAS: SAFETY

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





- 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 its deep integration with the SAP ERP



■ 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 \(3 elements\)](#)

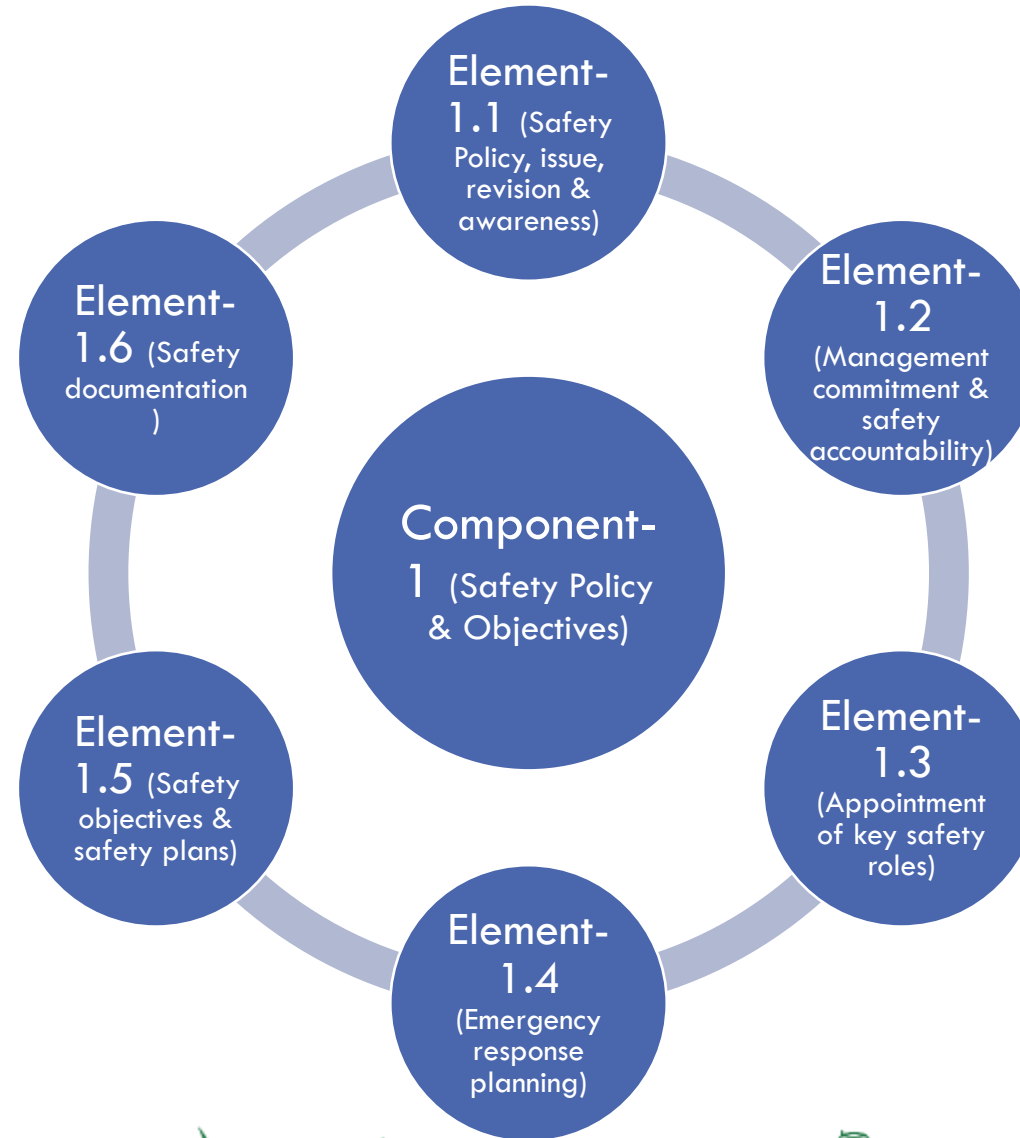
■ Systems in place for implementation like LMI, PTW, JSA, SOP, SMP

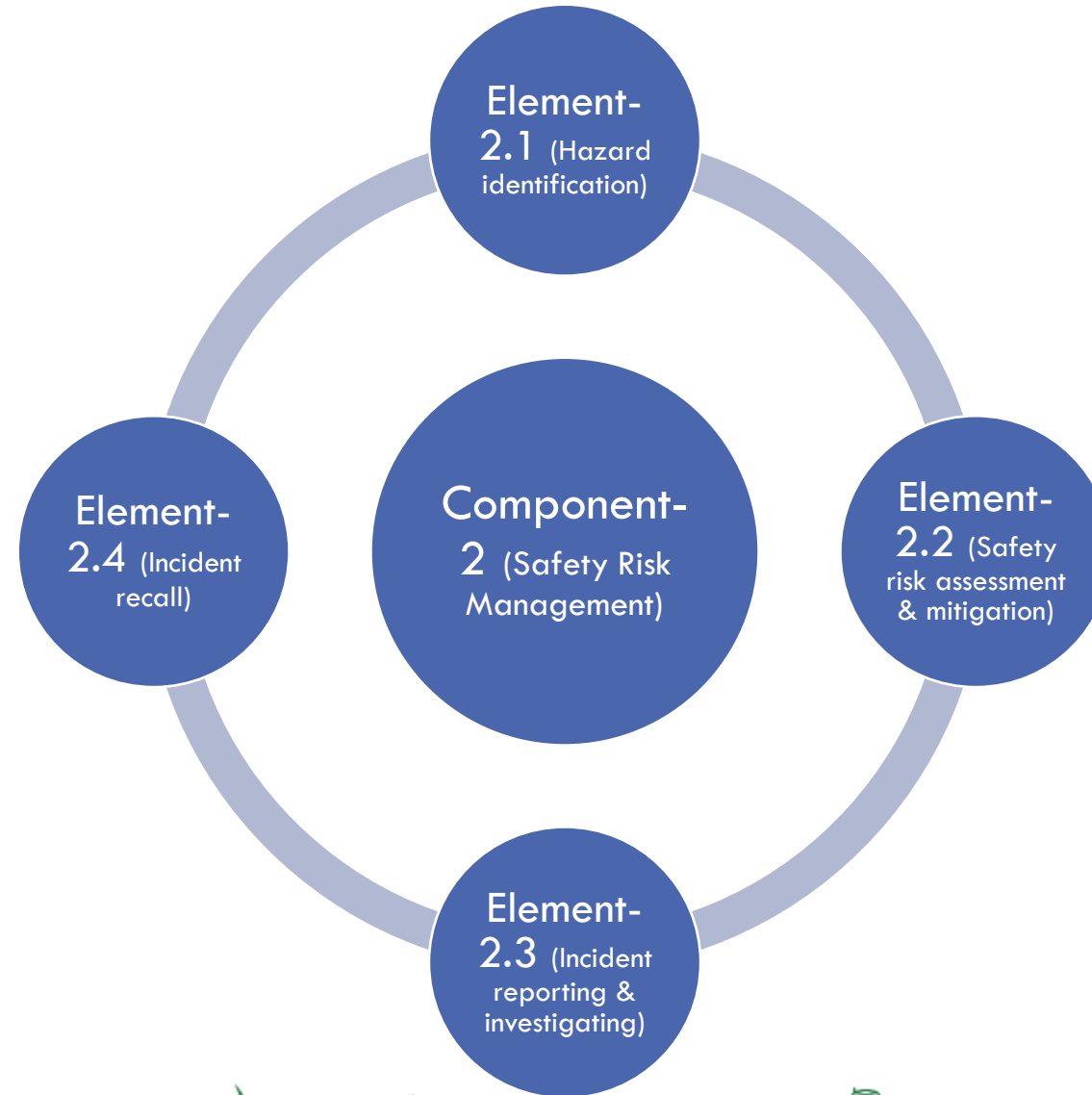
- [7 OD / 7 OGN](#)

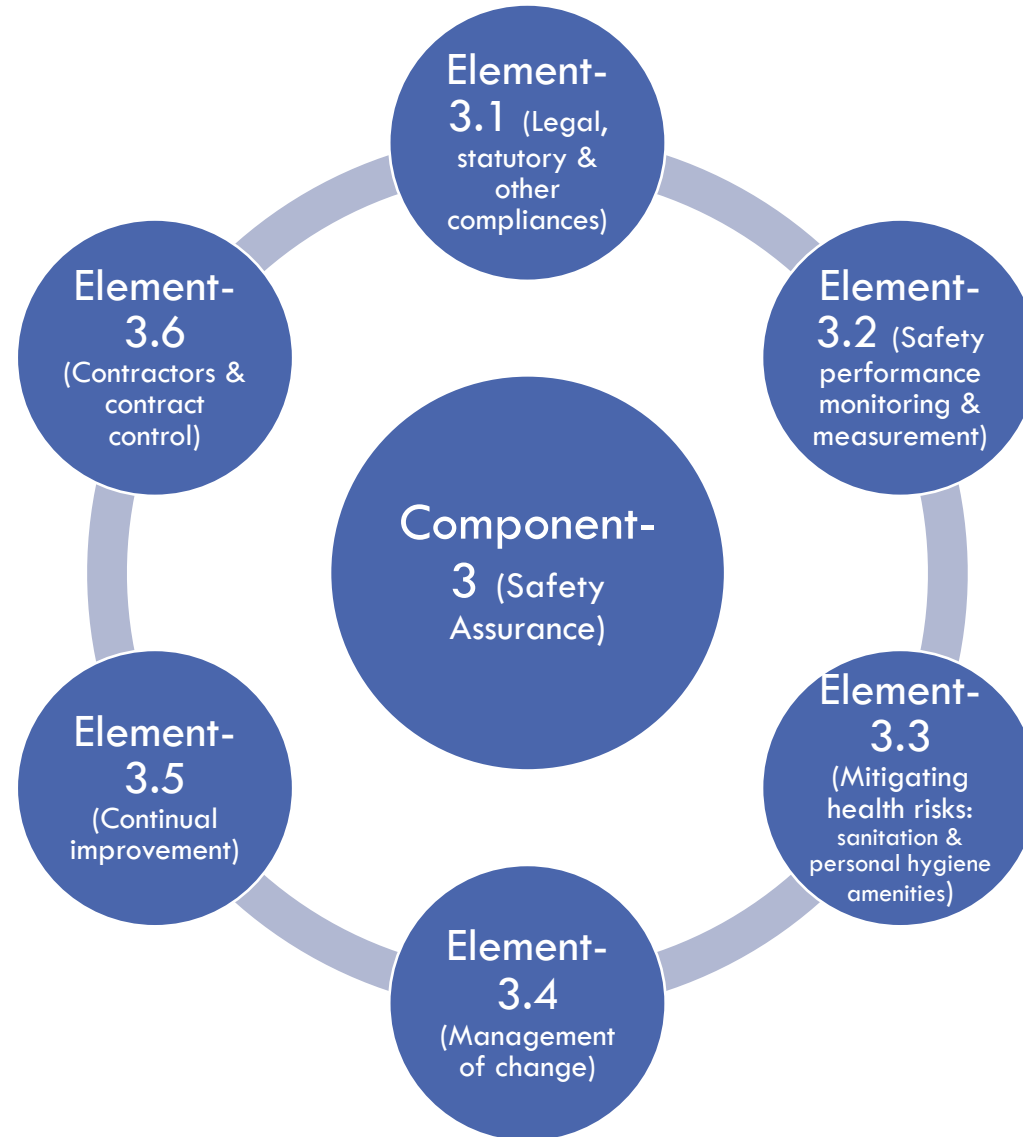
■ Standard Training Modules for Contract Workers

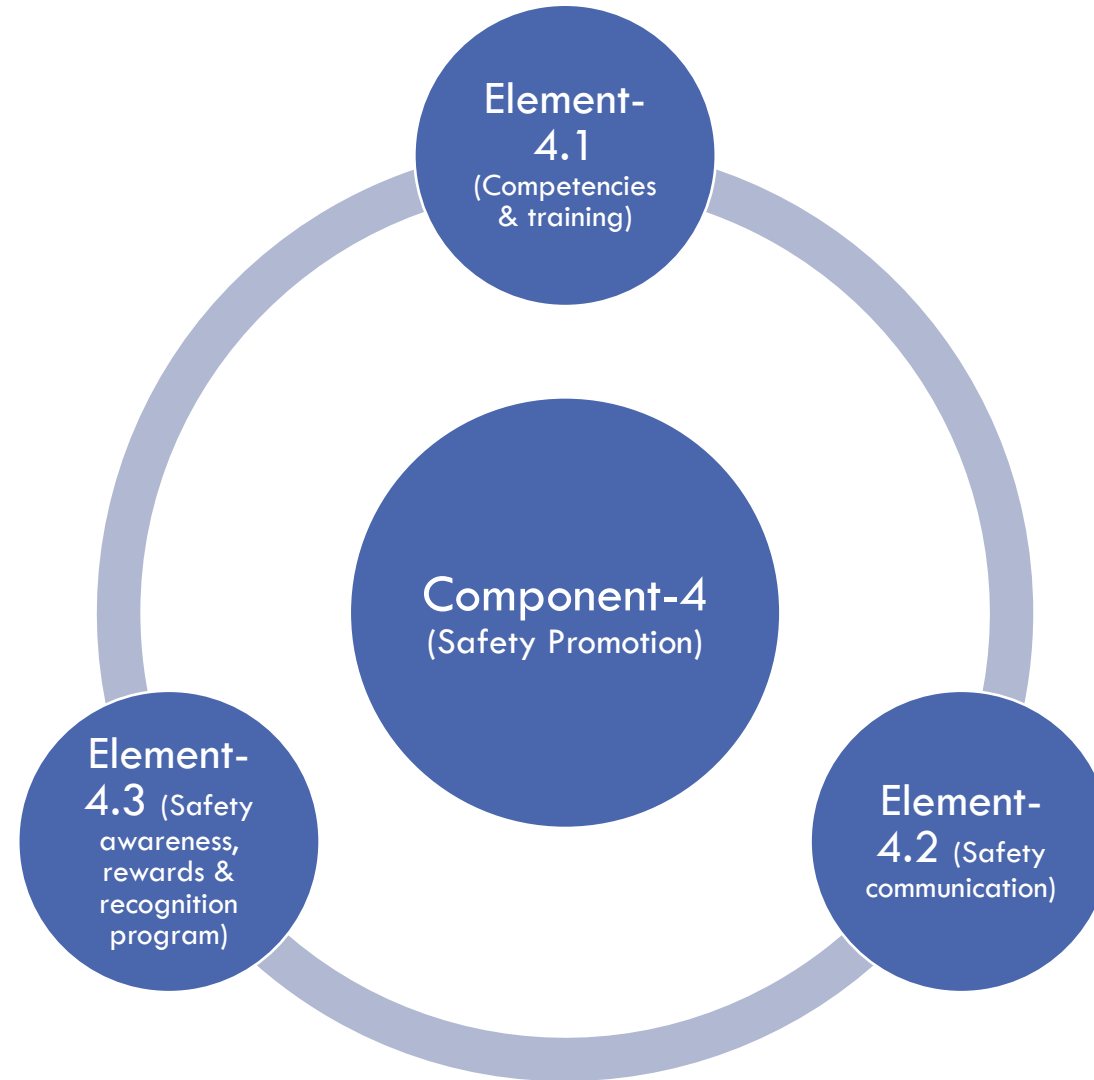
- [23 modules including induction & excluding first aid](#)











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





Thank You



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