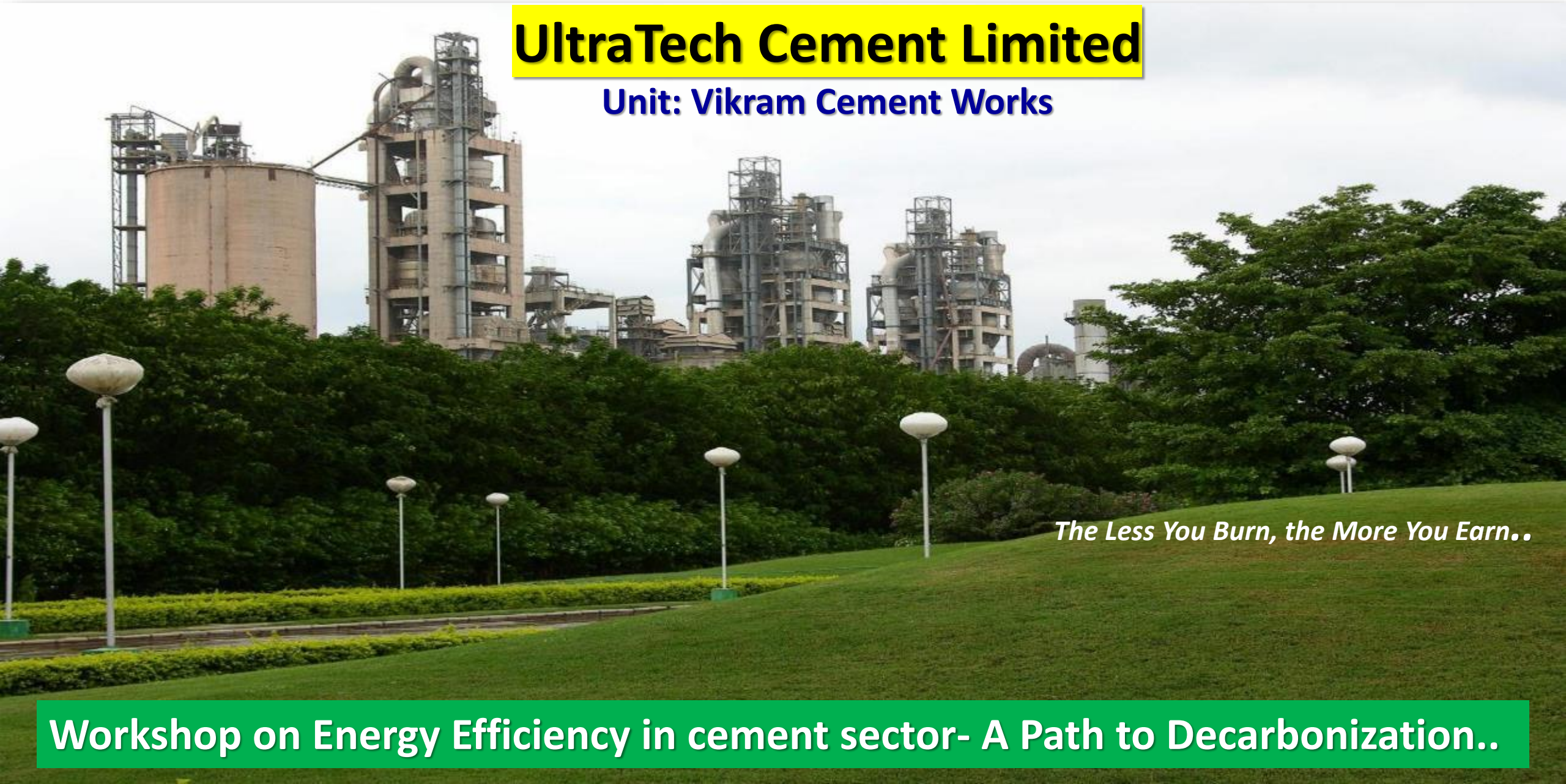
UltraTech Cement Limited

Unit: Vikram Cement Works



The Less You Burn, the More You Earn..

Workshop on Energy Efficiency in cement sector- A Path to Decarbonization..

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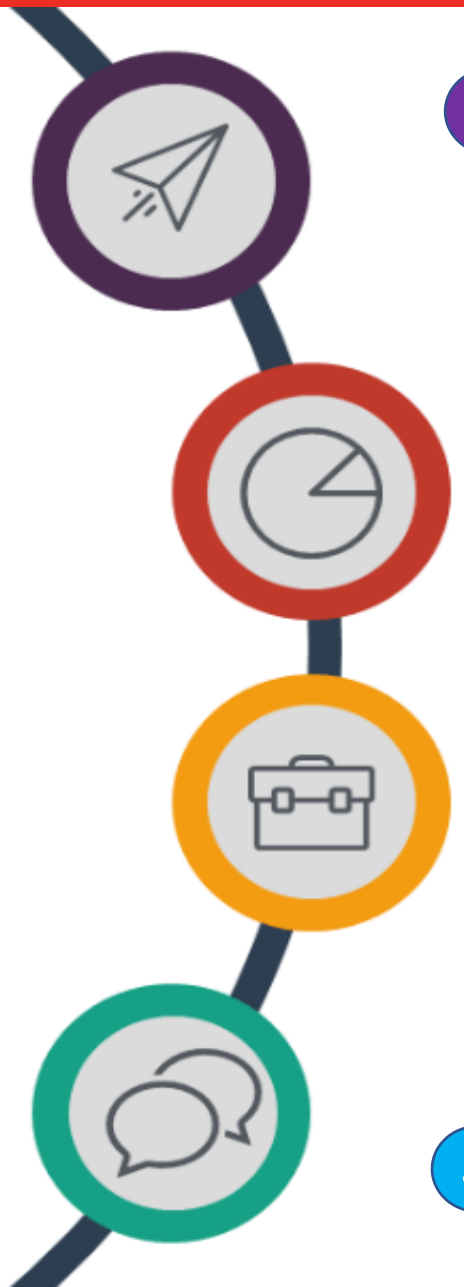

1. Business Overview
   - Unit overview

2. Business & Unit Objectives
   - Roadmap for decarbonization.
   - Best practices adopted

3. Bio-Diversity
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4. Reward & Recognition
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Business Overview

Our ABG Group Drives

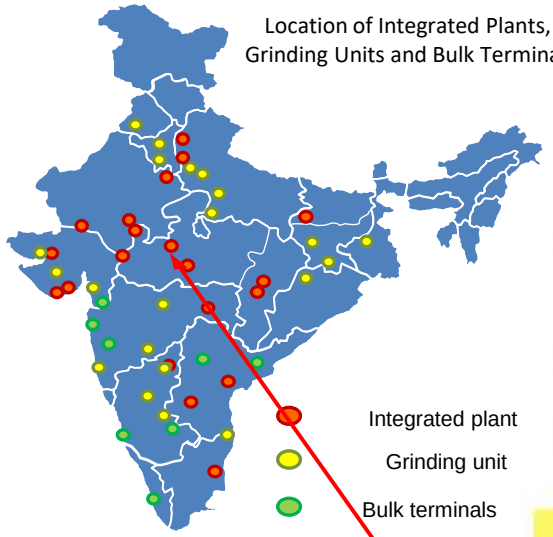
LIVING the VALUES

Company- UltraTech Cement Ltd

23 Integrated Manufacturing Units → 29 Grinding Units → 01 Clinkerisation Unit → 08 Bulk Packaging Terminals

Largest manufacturer of grey cement in India
3rd Largest producer cement in the world (Excluding-China)

Consolidated Capacity 132.35 Million Tons Per Annum (MTPA) of Grey Cement



VISION

TO BE THE LEADER IN BUILDING SOLUTIONS

MISSION

To deliver superior value to stakeholders on the four pillars of SUSTAINABILITY, CUSTOMER CENTRICITY, INNOVATION AND TEAM EMPOWERMENT

Unit Overview

- ✓ First Cement plant to win TPM Award : JIPM, Japan in 1995
- ✓ Present Capacity of 4.0 MTPA Cement
- ✓ Six times water positive
- ✓ Certified with ISO 9001, 14001, ISO 45001, ISO 50001, ISO 27001, SA8000
- ✓ Achieved +360 days of Kiln run in FY17-18
- ✓ Utilization of 100% pet coke in kilns
- ✓ Using Municipal waste (MSW) – since July'07
- ✓ Installed SNCR & Low NOx burner in Kilns
- ✓ 3 KM Curved Conveyer for LS transport
- ✓ Backed with 46 MW Captive Thermal Power Plant
- ✓ 8.9MWp Solar Power Plant
- ✓ 482KWp Roof Top Solar Plates
- ✓ Five mining leases in close vicinity of the plant.

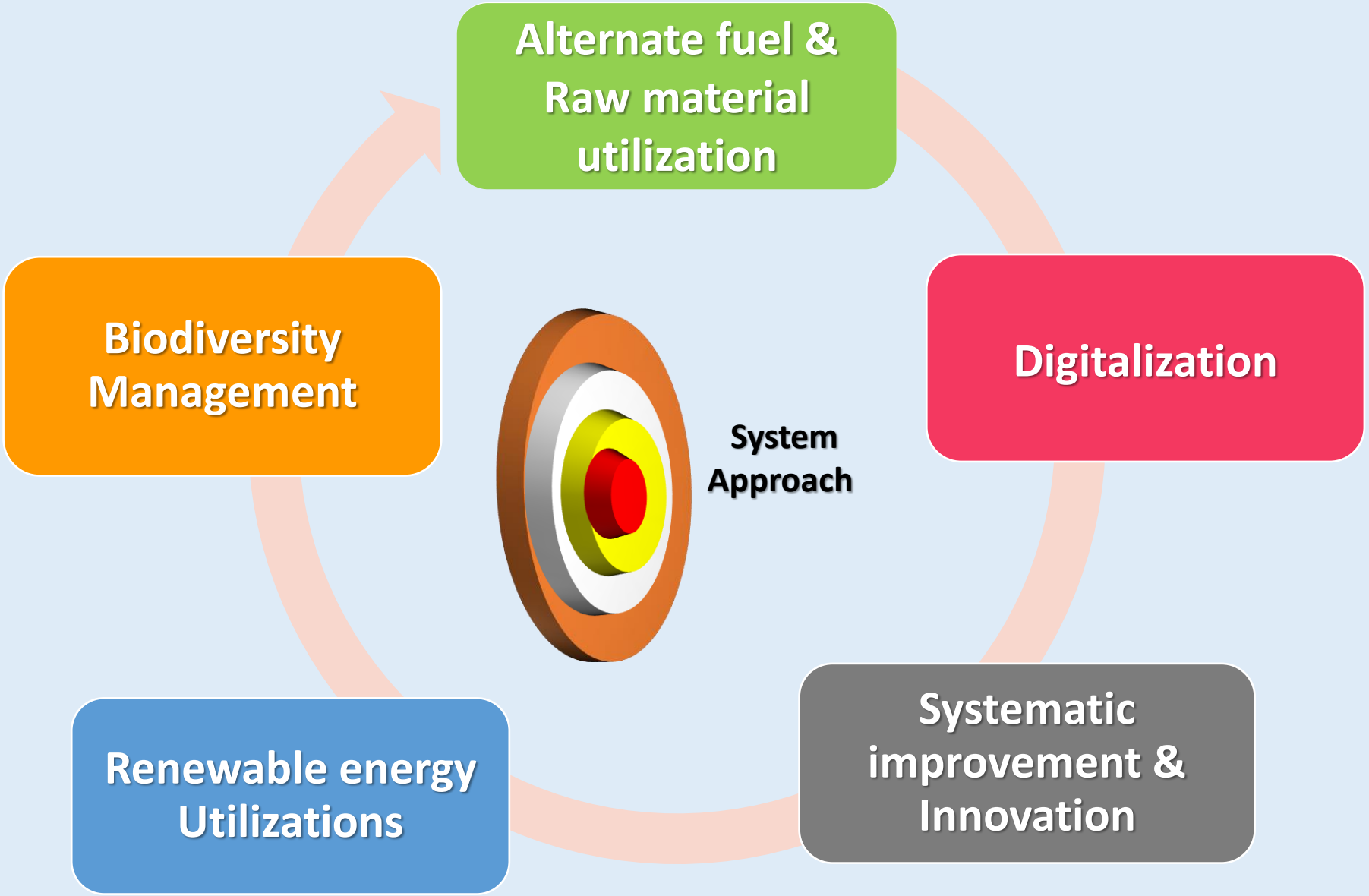
Total ML Area	: 1855.417 Ha
Villages Covered	: 13 Villages
Total Reserves mioT	: 177.67

UTCL : Vikram Cement Works

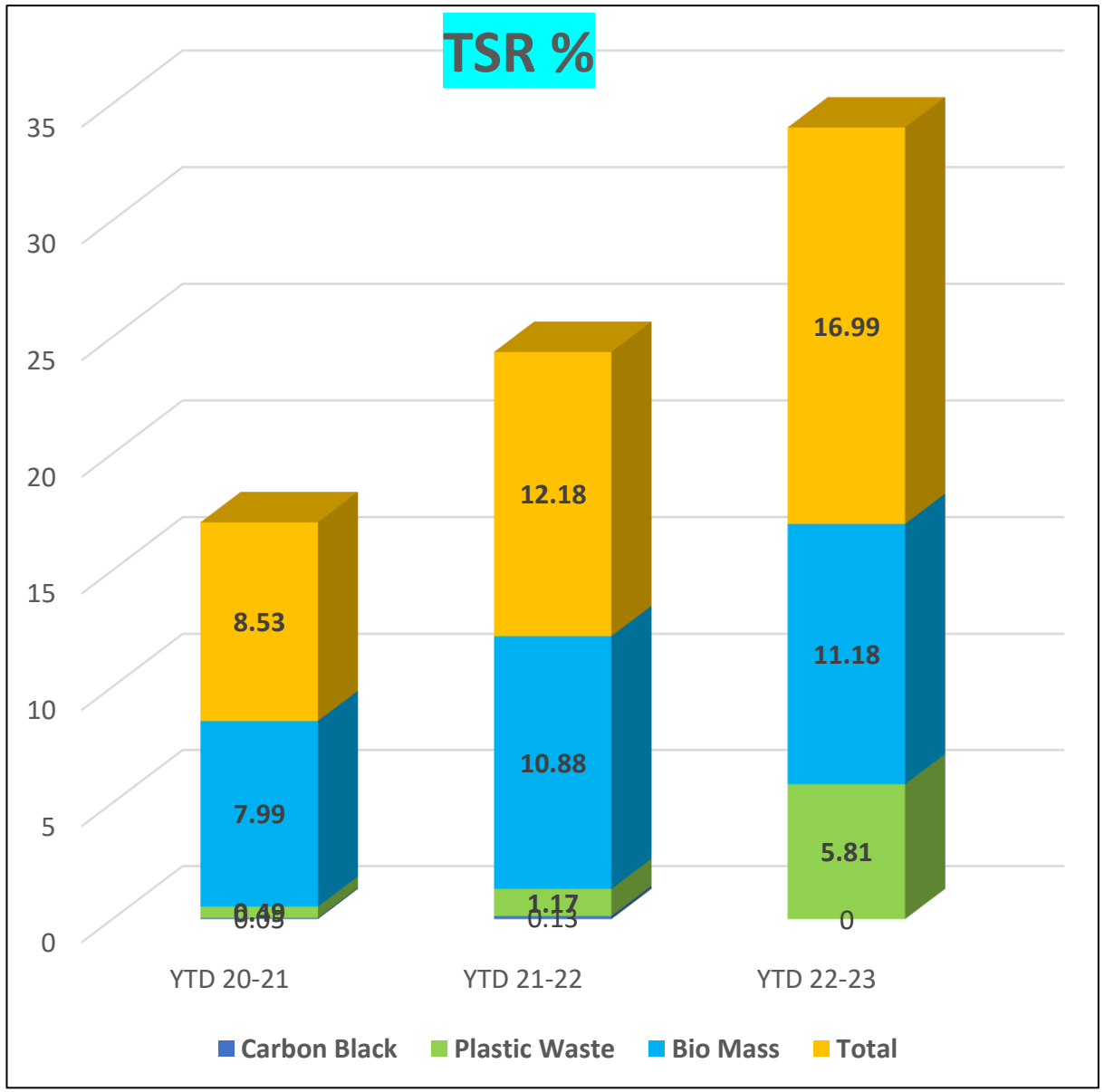

ADITYA BIRLA
UltraTech

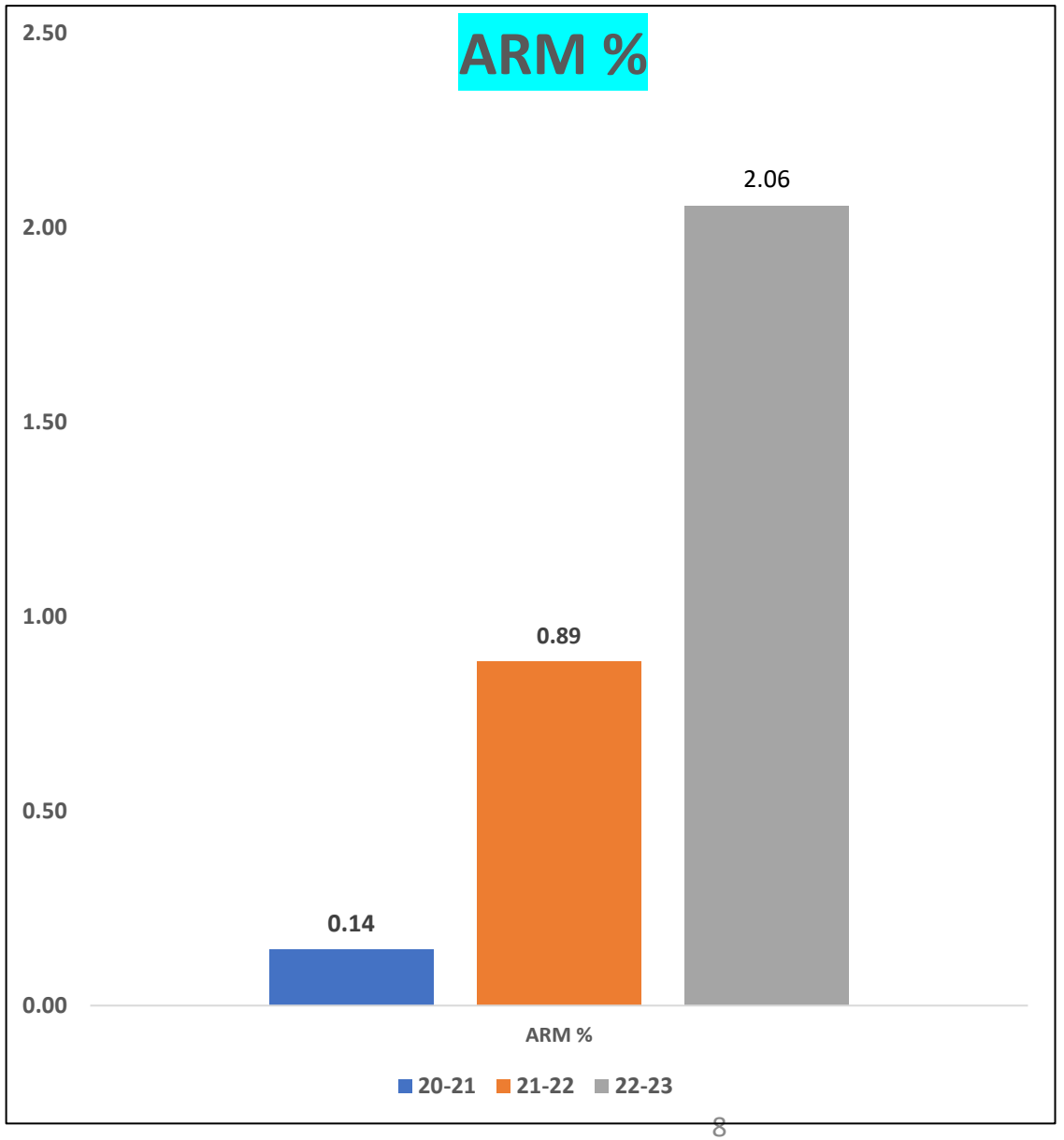
Business & Unit Objectives

Roadmap for Decarbonatization



Alternate fuel & raw material utilization





Best Practices : Increase Plastic waste utilizations

Purpose

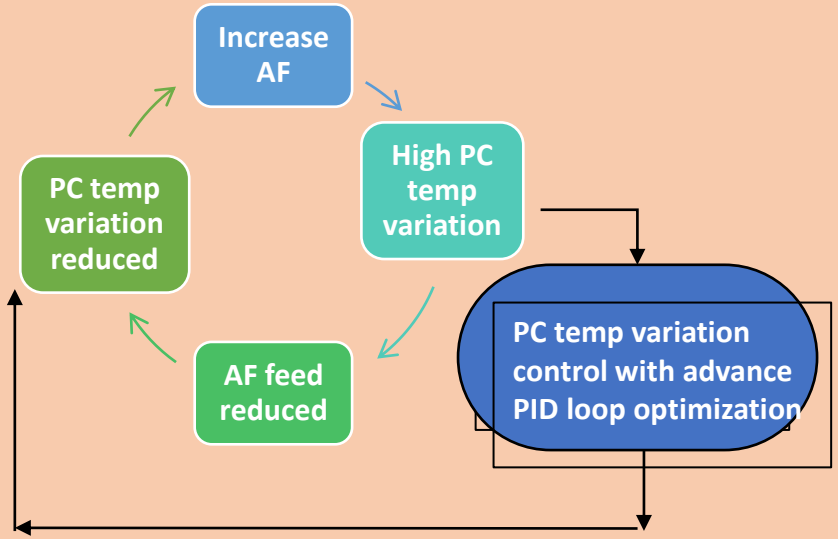
To Increase plastic waste consumption in process with stable operation
On increasing the plastic AFR feeding , following problems/challenges were faced

- ❑ Frequent Cyclone Jamming & reducing conditions
- ❑ Unstable operation due to process disturbance
- ❑ PreCalciner temperature variation

Benefits

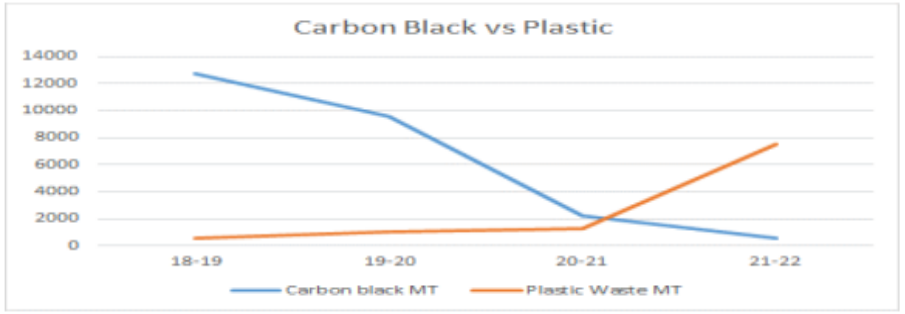
- ✓ Frequent Cyclone Jamming & reducing conditions avoided.
- ✓ Stable operation , No process disturbance.
- ✓ Minimum PreCalciner temperature variation reduced.

Pyro Firing Optimization

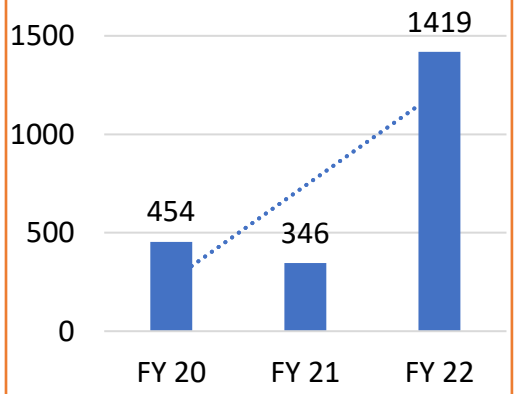


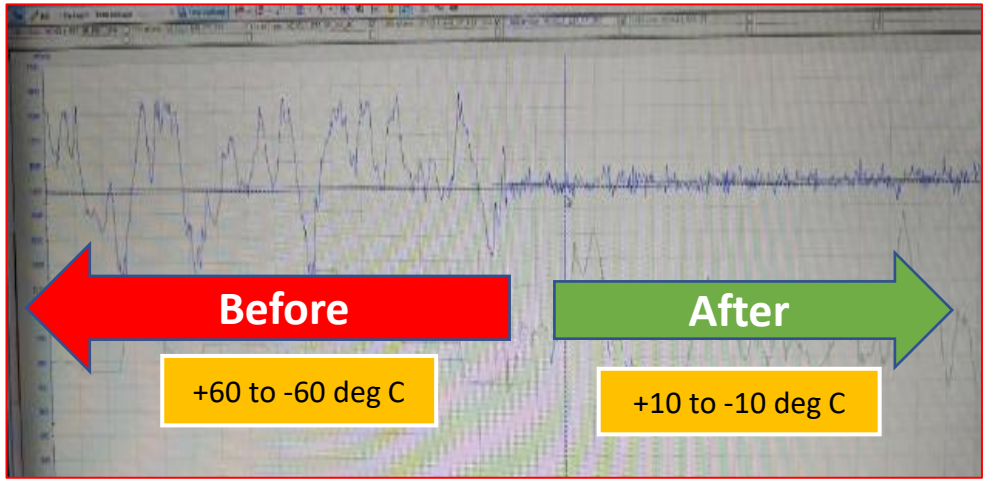
Continuous substitution of fossil fuel & carbon black with plastic waste as shown.

FY	18-19	19-20	20-21	21-22
Carbon black MT	12686.92	9557.56	2188.17	523.69
Plastic Waste MT	562.58	1057.22	1267.20	7535.23



Savings through AFR substitution Rs Lacs





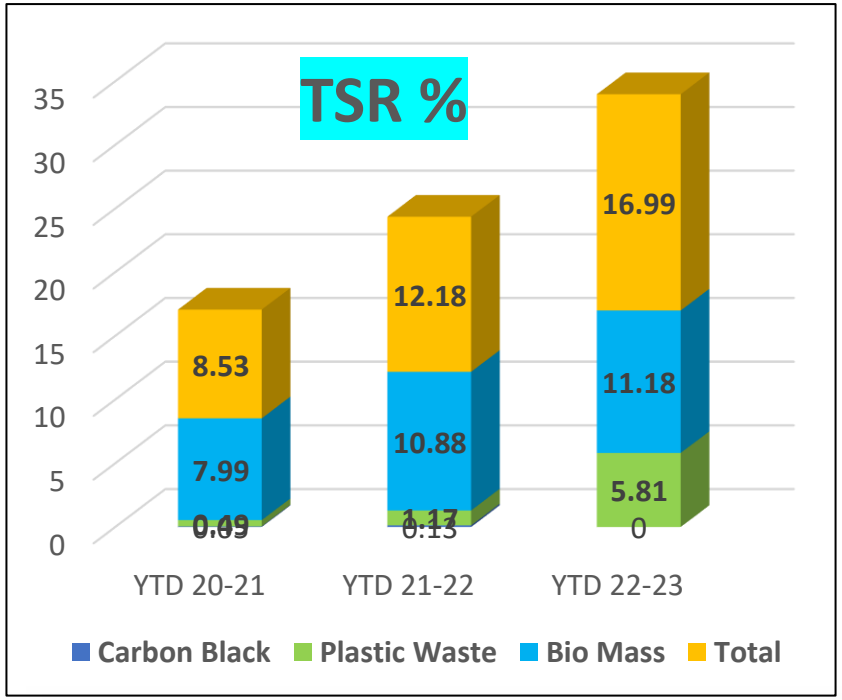
Best Practices : Increased Agro & Liquid fuel utilizations

Purpose:

- To increase utilization of Agro & Liquid fuel to increase TSR

Benefits:

- ✓ Increase TSR% in Line-3 up to 24% in a month and achieved the over all TSR 7.59 % (in YTD).
- ✓ Resulted Cost savings 824 Lakhs.
- ✓ Hazardous waste liquid consumed in Line:1 & 2 & gained negative cost of Rs.28.62 lakhs.



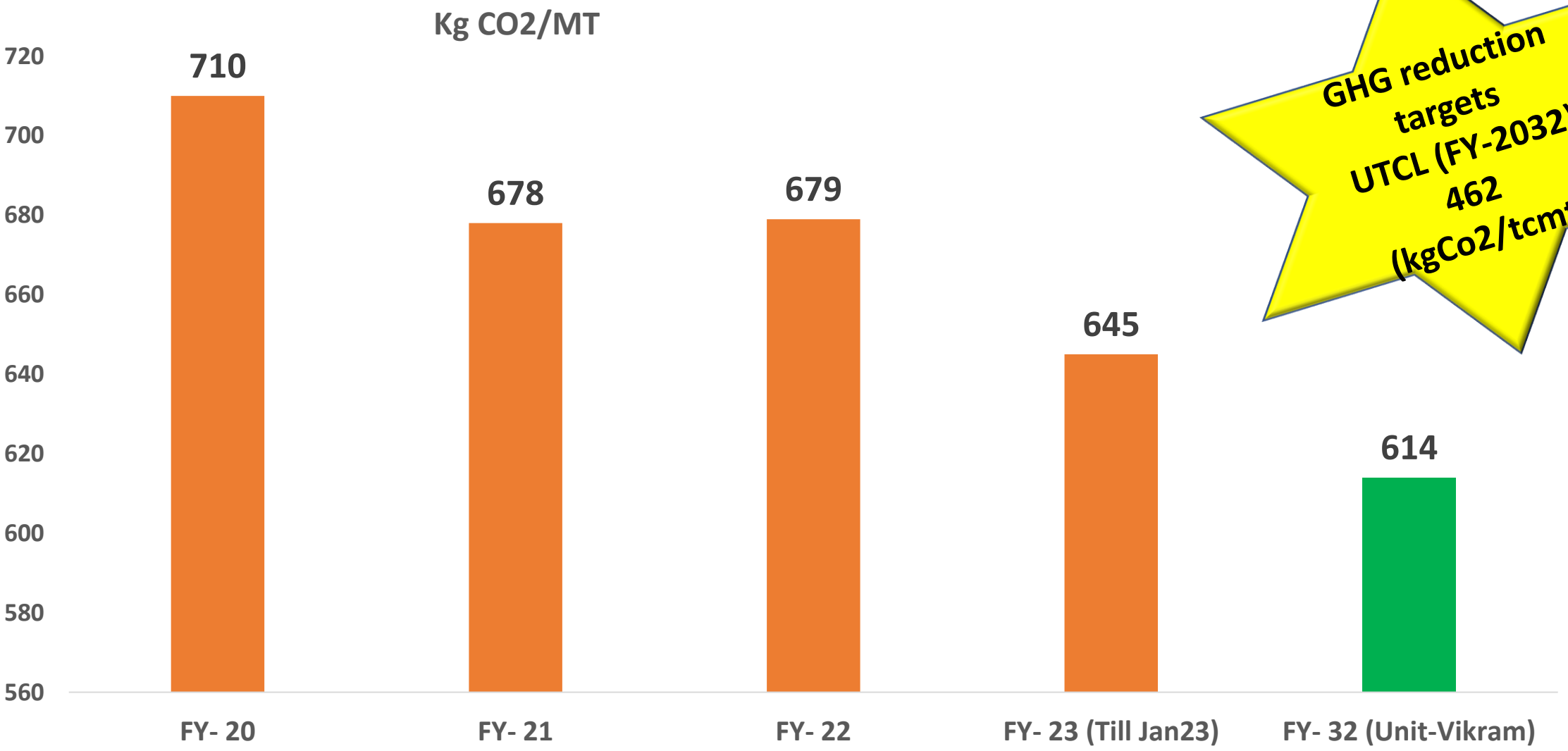

Step – 1 Unloading of Alternate Fuel


Step – 2 Storage and Feeding Hoppers


Step – 3 Storage and Feeding Hoppers

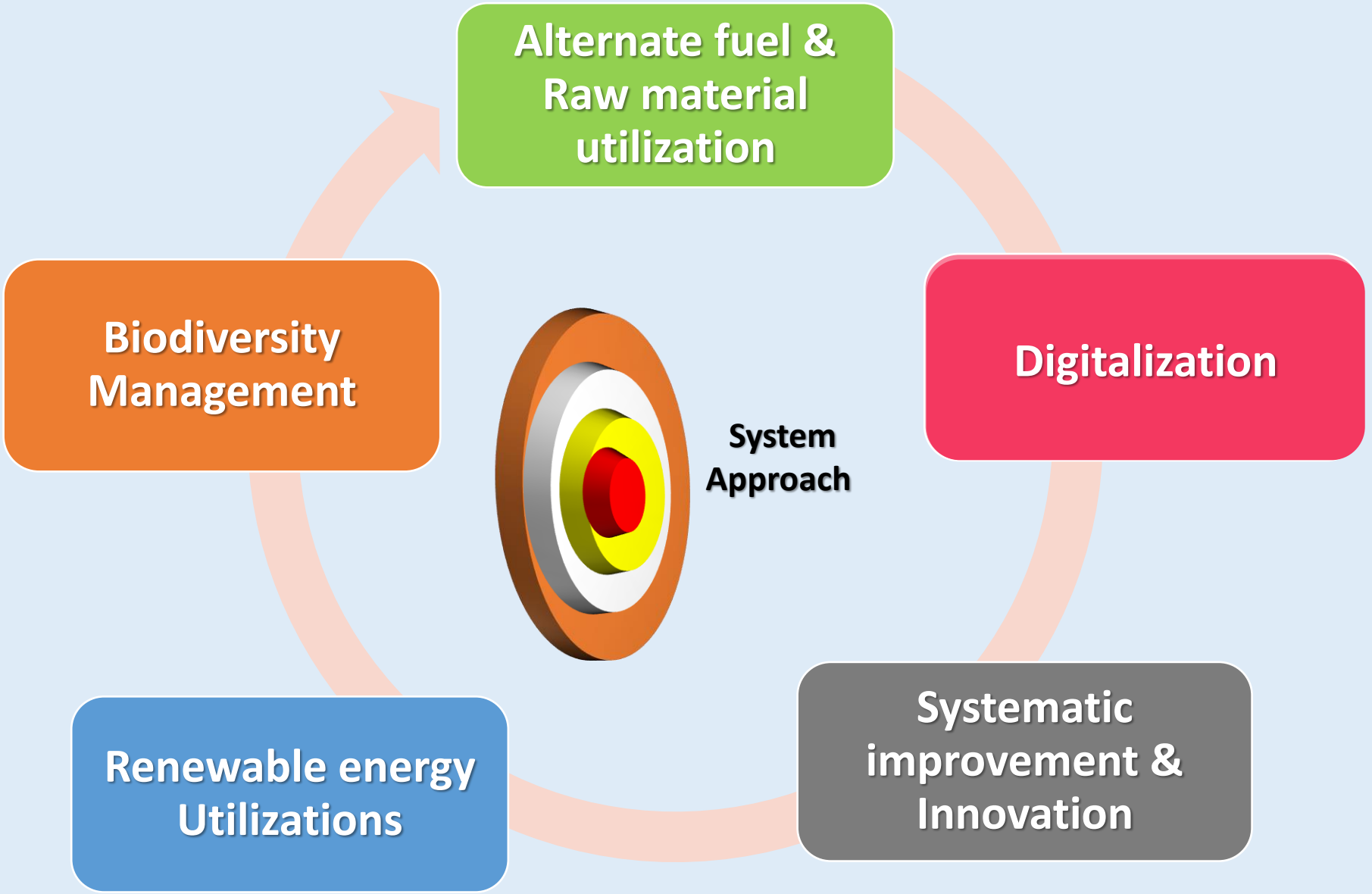

Step – 4 Alternate Fuel Feeding System

YOY CO2 Emission Data Vikram



GHG reduction targets
UTCL (FY-2032)
462
(kgCo2/tcmt)

Roadmap for Decarbonatization



Best Practices : Digitalisation to increase Kiln Productivity

Predictive AI based model for Kiln operation and Optimization

birlasoft

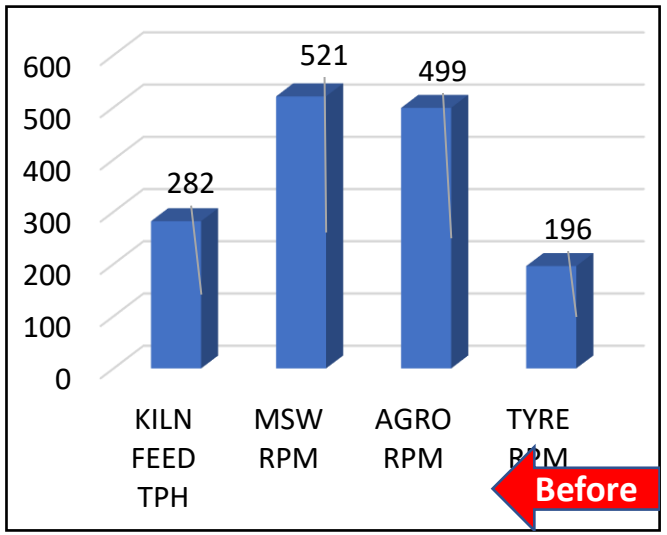
Purpose

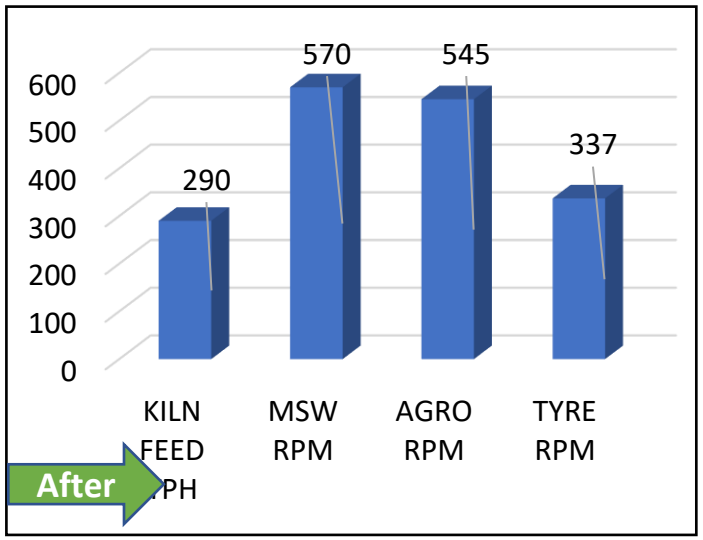
- ❑ Corrective actions are only made based on the hourly results of Lab.
- ❑ Predictive based alerts/ notifications on merit order recommendations .

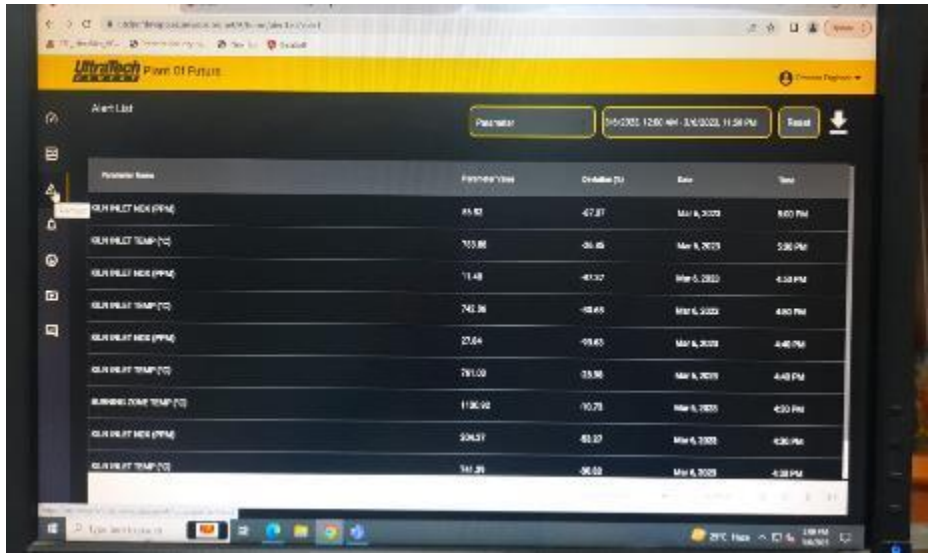
Benefits

Increased Process stabilization

- ✓ 2% gain in Kiln-3 feed tph and increment in kiln feed by 75-80 TPD.
- ✓ Optimized manual interventions
- ✓ Saving in Rs. 23 lacs/ Annum







Best Practices : Digitalisation to increase Cement Mill Productivity

AKXA Predictive control on advanced AI based system

Purpose

- ❑ Process fluctuation assessment & control system performance optimization
- ❑ Auto close loop control with predictive control

Benefits

Increased Process stabilization

- ✓ Specific power reduction has been reduced by 0.5KWh/t
- ✓ Increased in Cement mill output by 2%.
- ✓ Saving in Rs. 39 Lacs/ annum

AKXA

VCW_CM2 BMCX_Summary Table for OPC Grade

Grade	KPI Parameter	Units	BMCX OFF (170223 13:17 To 161122 13:16) When Mill Feed TPH >=110	BMCX ON (170223 13:17 To 161122 13:16) When Mill Feed TPH >=110	Remarks
PPC	Average Mill Feed TPH	TPH	130.9	133	
	Main Drive avg[kW]	kW	2937.2	2922	
	Sp. Power (MD kW/TPH)	kWH/T	22.5	22	>> 13Hrs out of 20 Hrs BMCX Operation is observed for OPC Grinding
	Mill BE Load (Amp.)		62.6	64	
	Separator Speed (RPM)	RPM	109.7	108	>>2.2 % improvement observed in Mill Main Drive Load/ Mill Feed TPH
	Separator Fan Speed (RPM)	RPM	656.0	661	>>Less Quality Variation Observed
	Reject TPH	TPH	82.8	94	>> Improvement Observed in Product side BE load.
	Average Blaine (Lab reading)	M2/Kg	287	271	
	Product Side BE (Amps)	Amps	30.6	31	

AKXA

VCW_CM2 BMCX_Summary Table for PPC Grade

Grade	KPI Parameter	Units	BMCX OFF (160223 00:00 To 161122 12:00) When Mill Feed TPH >=130	BMCX ON (160223 00:00 To 161122 23:59) When Mill Feed TPH >=130	BMCX ON (170223 13:17 To 161122 13:16) When Mill Feed TPH >=130	Remarks
PPC	Average Mill Feed TPH	TPH	144.5	147	146	
	Main Drive avg[kW]	kW	2917	2901.7	2873.7	
	Sp. Power (MD kW/TPH)	kWH/T	20.4	19.9	19.7	>> 89.5 Hrs. BMCX Operation is observed for PPC Grinding in this Week
	Mill BE Load (Amp.)		68.7	68.34	68.08	
	Separator Speed (RPM)	RPM	149	148.61	149.56	>>3.4 % Improvement observed in Mill Main Drive Load/ Mill Feed TPH
	Separator Fan Speed (RPM)	RPM	741.9	717.65	740.07	>>Less Quality Variation Observed
	Reject TPH	TPH	111.3	116.05	117.05	>> Improvement Observed in Product side BE load.
	Average Blaine (Lab reading)	M2/Kg	338.5(STDV=13.7%)	355.5(STDV=8.4%)	343.3(STDEV=7.95%)	
	Product Side BE (Amps)	Amps	32.7	33	32	

Best Practices : IoT based Vibration measurement & Analysis

IoT based Vibration measurement & Analysis

INFINITE UPTIME

Purpose:

Unable to monitor the real-time vibrations in critical drives

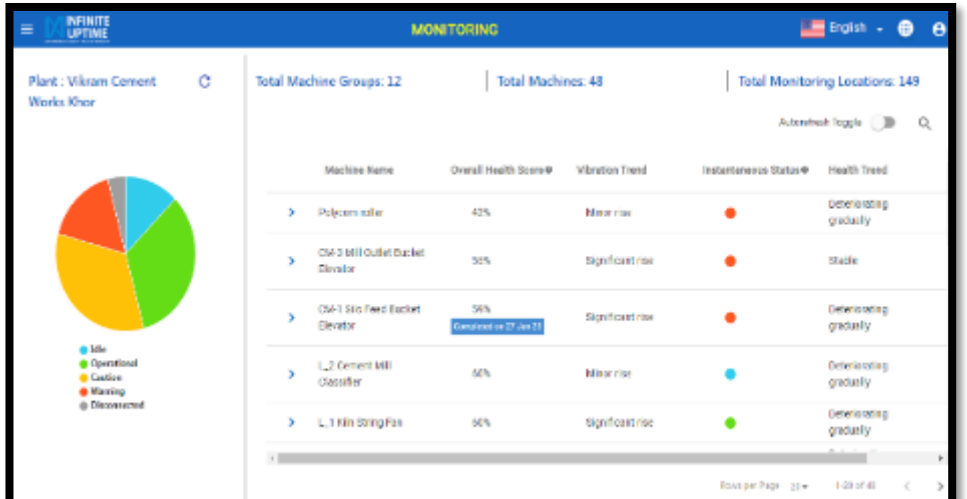
Getting alert/ notification along with root cause analysis report for avoiding any breakdown/ failure

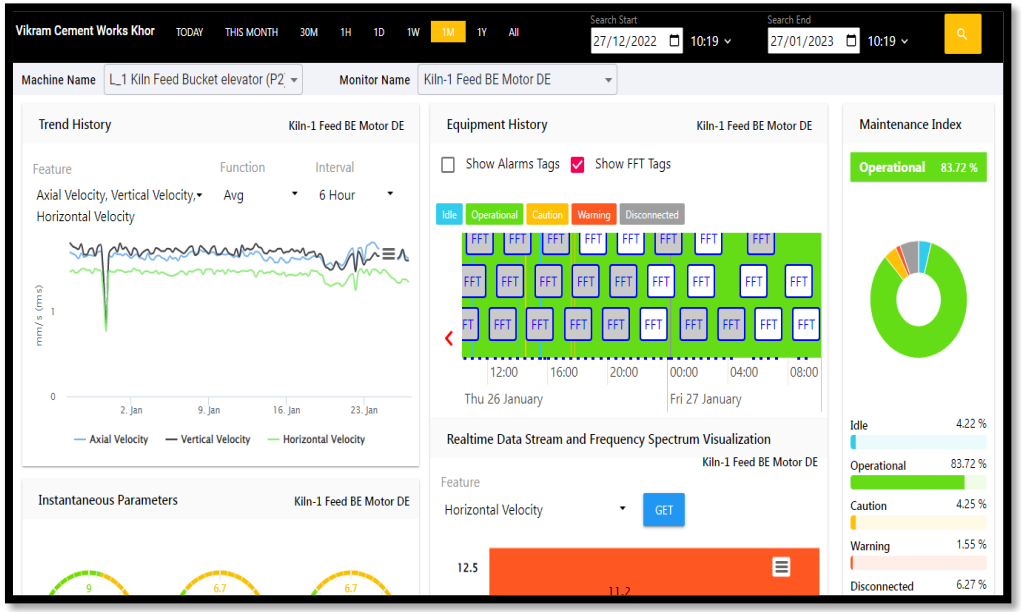
Benefits

Real-time monitoring of Vibrations in all critical drives

Avoided unplanned stoppages

Saved the production losses which impact in Rs. 75 lacs





Best Practices : Advance AI for Boiler Reliability & Performance

AI-OT based Boiler Reliability digitalization project

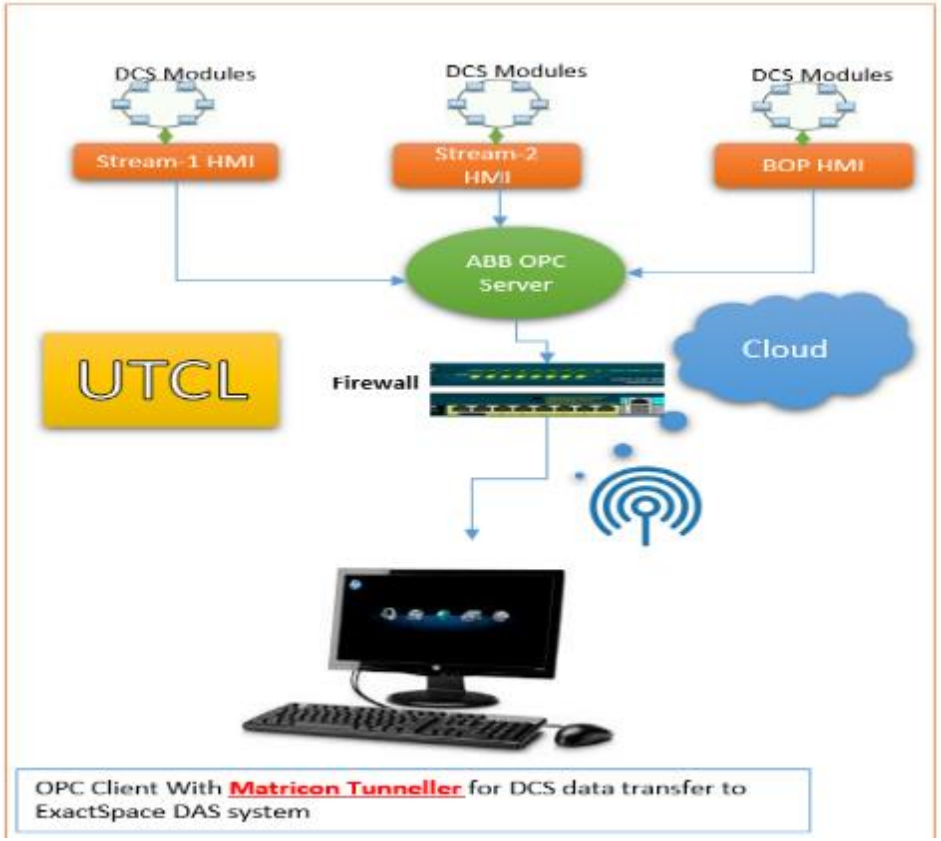
ExactSpace

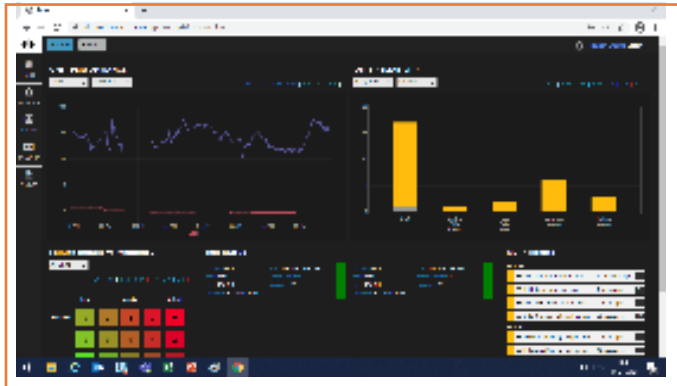
Purpose:

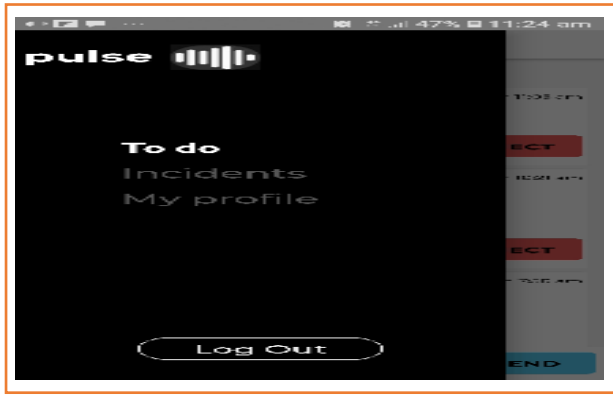
Unplanned stoppage leads to huge productivity loss
Maintenance cost became high
Variability in Plant KPI's performance due to frequent load variation

Benefits

- ✓ Reduction in Unplanned Failures by 10%
- ✓ Maintenance costs reduced by 5%.
- ✓ Improvement in Overall Heat Rate by around 10 Kcal/kWh
- ✓ Improvement in decision making through system supported advisories and discipline to maintain operating parameters **consistently**







Digital platform for Employee Engagement

Hackathon @ UltraTech

Idea repository and implementation tracker

Ideators | Implementers

Unit wise | Function wise | Category wise

No. of Ideas

Hackathon @ UltraTech

Idea repository and implementation tracker

Hackathon @ Ultratech

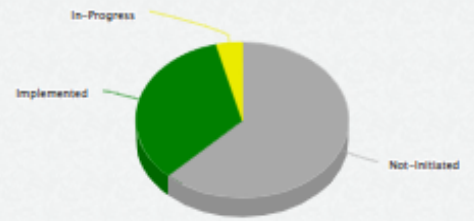
- Biggest ideation drive

46004 Ideas

50 hours - 10,000 Minds - 75 locations

Saving achieved	Saving in progress
117.77 Cr	38.41 Cr

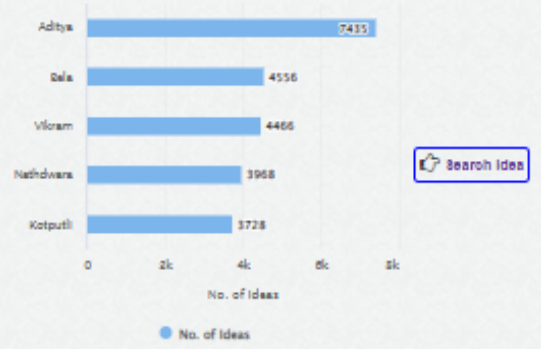
Idea Implementation Drive



Implemented	In-Progress	Not-Initiated
0015526	001806	28672

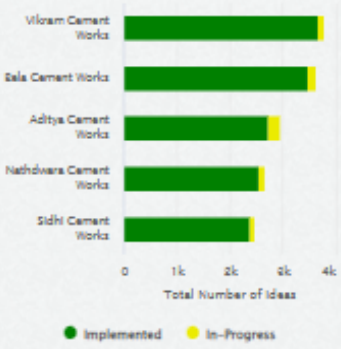
Top 5 Ideators

Unit wise | Function wise | Category wise



Top 5 Implementers

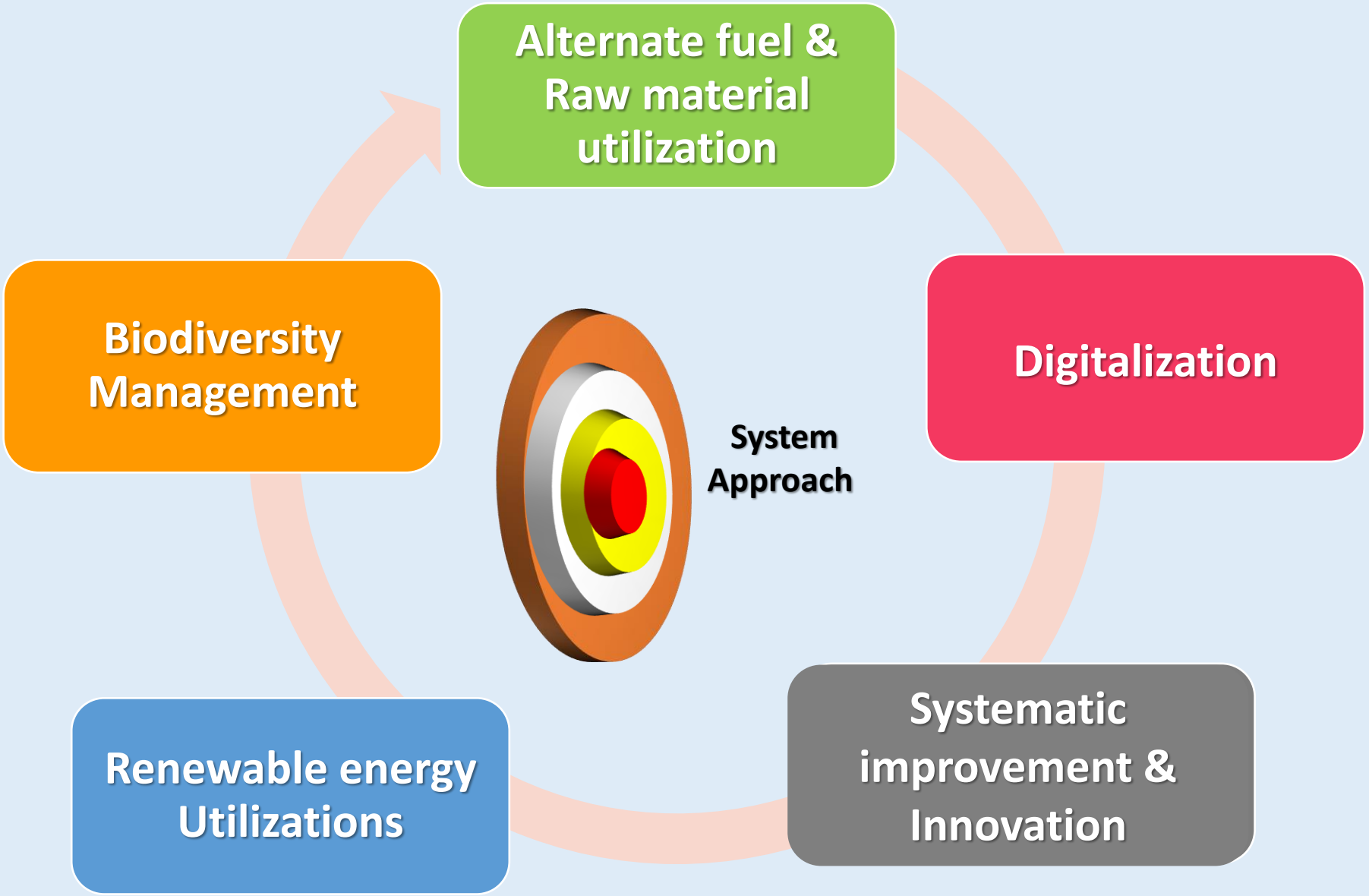
Unit wise | Function wise | Category wise



Rank	Unit/ Function/ Category	Saving achieved (Cr)
1	Nathdwara	34.94
2	Baga	17.81
3	Vikram	16.91
4	Aditya	9.70
5	Gujrat	7.96

View more

Roadmap for Decarbonatization



Heat rate optimization through ACC 1& 2 Interconnection

Purpose:

Due high fuel cost and high generation cost only single TPP has to run as grid cost is lower than TPP generation cost due to this scenario

- ✓ High Heat rate due to Low load operation
- ✓ High Auxiliary Power consumption of ACC

Benefits

- ✓ Heat Rate Improved by 21 Kcal/Kwh
- ✓ Acc Sp. power (Kwh/MW) reduced by 1.16
- ✓ Monetary Saving through reduction in PHR Rs. 7.49 Lac
- ✓ Monetary saving through power saving Rs. 1.07 Lac
- ✓ Total Saving Rs.8.56 Lac

Best Practices : Innovative Initiatives

VAM System Installation in place of Centralize AC

Purpose:

To decrease the auxiliary power consumption in AC/P&V system through technology upgradation resulted into saving of 50% saving electrical power consumption

Benefits

- ✓ **Specific Energy Consumption: 0.48 Kwh/Ton from 0.38 Kwh/Ton**
- ✓ **Saving In terms of Money : 27.66 Lac/ Annum**
- ✓ **Simple Pay back : 1.60 years**

Old System: Refrigerant central AC

New System: Vapor Absorption M/c

Best Practices : Systematic Improvement

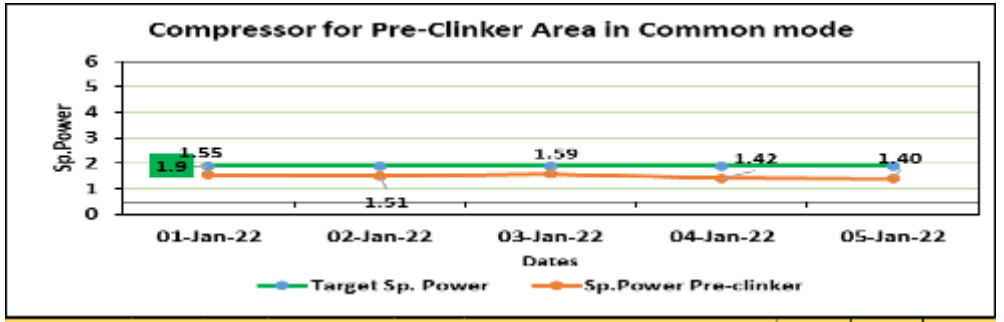
Replacement of Old non efficient Reciprocating compressor with Screw Compressor with Same Capacity

Purpose:

Old Reciprocating screw compressor replaced with New technology Screw Compressor for CFM generation at less power consumption, 4 no's Reciprocating compressor replaced with screw compressor for coal mill-3&2

Benefits

- ✓ 1852 Kwh/Day saving in compressor power consumption and 0.18 KWH/MT clinker it is observed.
- ✓ Low maintenance cost



Compressor for Pre-Clinker Area in Common Mode Operation														
Date	Line-3 Compressor			Line-2 Compressor				Line-1 Compressor				Total (KWH)	Kiln Today Production	Sp.Power Pre-clinker
	B13 (160 KW)	B-09 (150 KW)	B03/B05(90 KW) /B08	802.09/B 06/B 04 (90 KW)	800.10 (250 KW)	800.12/11 (90 KW)	800.02/01 (45 KW)	800.51 (250 KW)	800.52 (90 KW)	800.53/54 (90 KW)	802.50 (160 KW)			
01-Jan	2,001.00		2896.00		3,954.00	1118.00	217.00	5370.0				15,566.00	10013	1.55
02-Jan	3,958.00		2853.00		2,386.00	353.00	250.00	5304.0				15,104.00	10012	1.51
03-Jan	3,970.00		2865.00		3,742.00			5327.0				15,904.00	10014	1.59
04-Jan	3,946.00		2861.00		2,078.00			5303.0				14,188.00	10012	1.42
05-Jan	3,927.00		2841.00		1,402.00	626.00		5266.0				14,060.00	10013	1.40

Separate compressor running for Process air dosing and other uses												
Date	Line-3 Compressor			Line-2 Compressor				Line-1 Compressor			Total (KWH)	Remarks
		B08-160 KW	B03,B05,B04 (90KW)	802.09/B 06/B 04 (90 KW)	800.10 (250 KW)	800.12/11-90KW	802.02 (45 kw)	802.52-90KW	800.53/54 (90 KW)	802.50-160 KW		
05-Jan						626.00					626.00	

Best Practices : Innovative Initiatives

Air Dryer System through VAM

Purpose:

- Air Dryer have refrigerant-based gas R402 which is phase out due to Environmental issue due non green gas.
- Electric Compressor (7Kw) Type Air Dryer was used for Drying of Instrument Air and consuming very high auxiliary power

Benefits

- ✓ **Stopped Refrigerant Dryer with 20 TR Compressor**
- ✓ **Annual Projected Energy Saving : 0.65 Lac kwh /Annum**
- ✓ **Annual Saving in terms of money : Rs. 3.25 Lac/Annum**

Best Practices : Inhouse GRT Initiatives

Air loss trap installation in place of Electronic drain at air receivers

Purpose:

- Optimization of Air losses during auto drain operation & provide solution for Leak proof operation

Benefits

- ✓ **Discharges condensate as soon as it is formed**
- ✓ **Can handle large quantities of condensate.**
- ✓ **Avoids corrosion of compressed air lines and consumers.**
- ✓ **Power Optimisation by 455 kwh/day, saved Rs. 13.58 Lacs/ annum**
- ✓ **Reduced manpower intervention , increasing safety**
- ✓ **S&S cost reduction upto Rs 0.20 lakh per auto drain**

Before

After

Best Practices : Inhouse GRT Initiatives

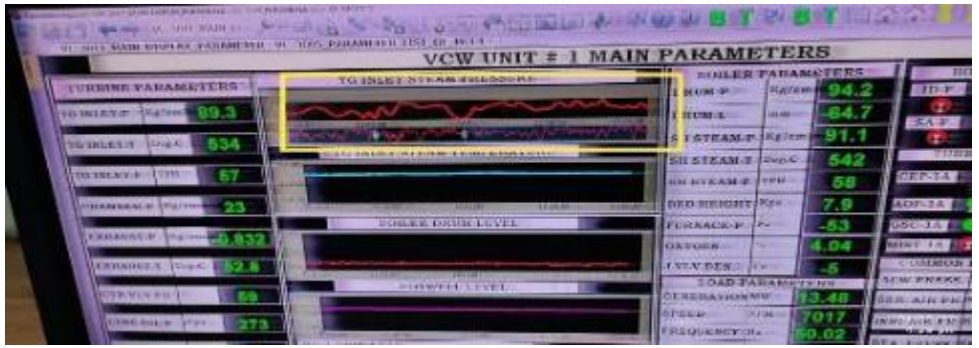
APC Predictive based logic in DCS

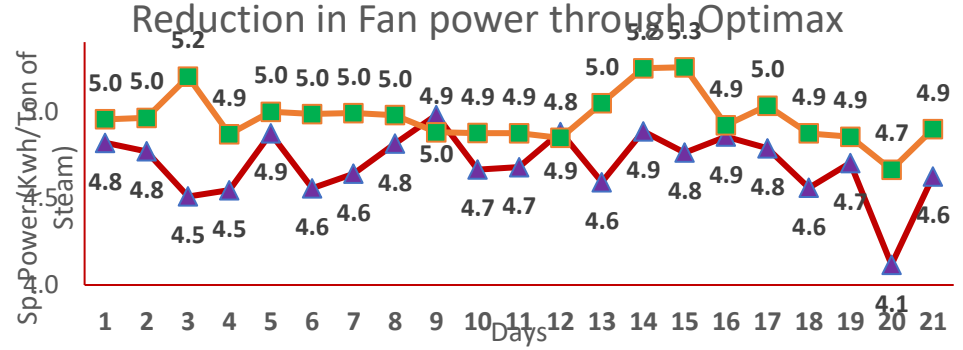
Purpose:

- Optimization of heat rate & auxiliary power consumption through predictive control

Benefits

- ✓ **TG-1 Inlet steam variation band reduced @±3Kg/cm2 earlier it was ±10Kg/cm2**
- ✓ **TG-1 Steam temp variation band reduced up to @±2 Deg.C earlier it was ±7 Deg.C**
- ✓ **PA fan power reduced upto 80 Kwh/Day this saving into RS 700/day**
- ✓ **LOI% reduced by 2%**





Best Practices : Inhouse GRT Initiatives

Astrological day light timer for Street lighting & plant buildings

Purpose:

- Optimization of plant lighting power.

Benefits

- ✓ **Reliability in proper illumination**
- ✓ **Power Optimisation by 560 kwh**
- ✓ **S&S cost reduction- 60 k /yr. (removing timer from circuit)**
- ✓ **Auto On/Off through Antilogical timer**
- ✓ **Manpower optimisation by auto operation**
- ✓ **Reduced manpower intervention , increasing safety**

Best Practices : Inhouse GRT Initiatives

Raw mill 3 Drying chamber removal work

Purpose:

Power reduction in Raw Mill-3 by removall of drying chamber.

Benefits

- ✓ **Overall saving 40 Kw**
- ✓ **Saving achieved of Rs. 17.65 Lac @ Rs. 6.78 per unit.**

Best Practices : Inhouse GRT Initiatives

Cooler fan inlet duct size reduction & conversion to bell mouthed

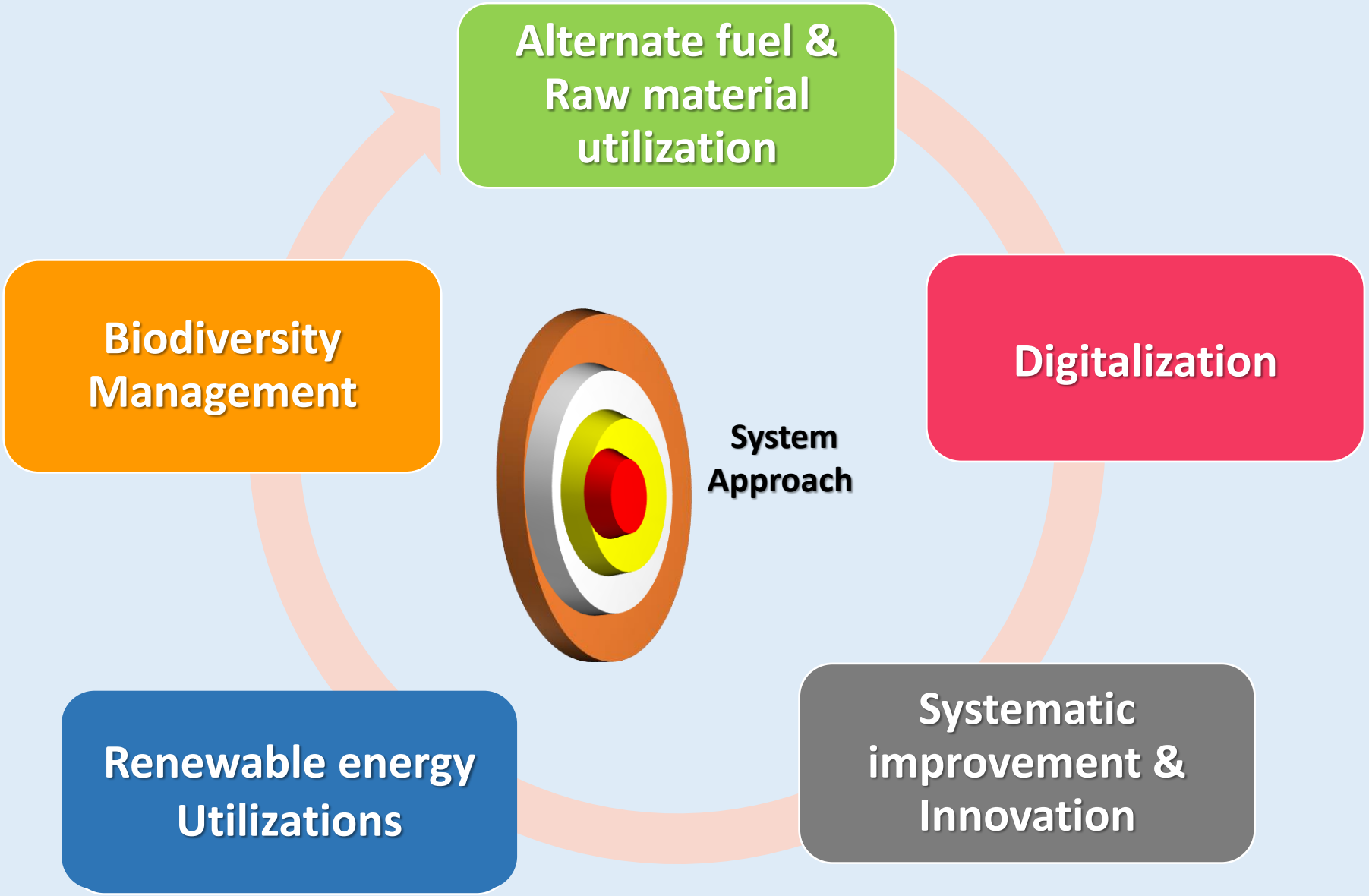
Purpose:

Energy optimization in fans

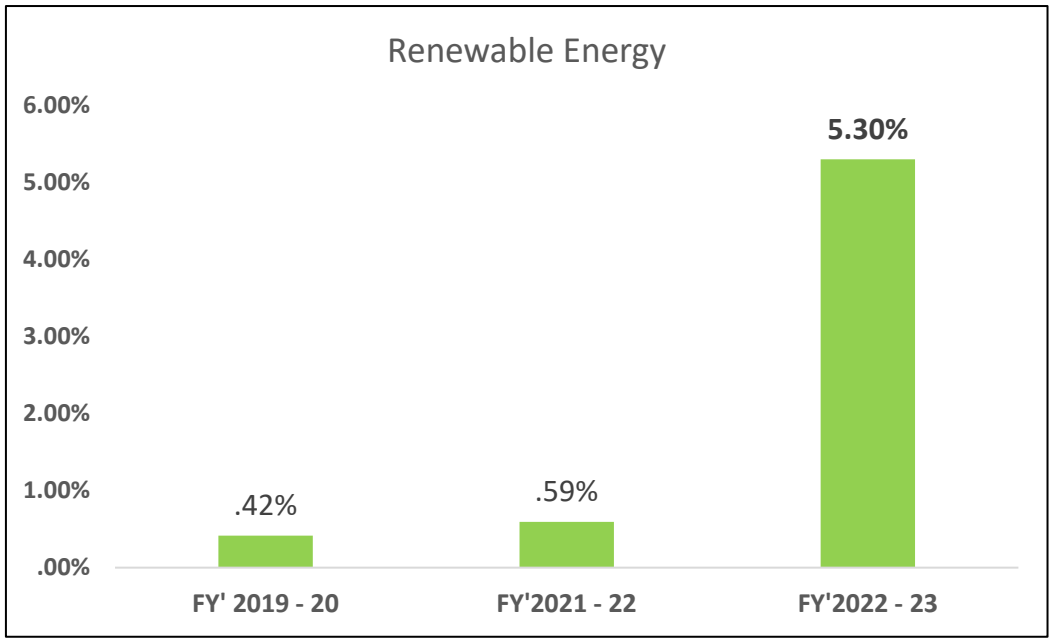
Benefits

- ✓ **After modification of cooler fan inlet duct, damper removal etc, unit achieved 40 kW saving in cooler group. Cost saving is Rs. 26.90 Lacs/annum.**
- ✓ **After modifications in wire mesh size in fans, unit achieved 25 kW/Day power saving in fans. Cost saving achieved as Rs. 0.74 Lacs/annum**

Roadmap for Decarbonatization



Renewable Energy Usage



8.9 MWp Solar power Generating 45 to 50 MW/day power

482 KWp Roof top Solar plats power Generating Power 1.5 to 2.35 MW/day

100% Green House Building :

VCW Hospital, ABPS School , ABHSS- School , e3 Cinema Hall, Shopping Complex, and young manager home buildings

Best Practices : Inhouse GRT Initiatives

Digital data analytics system for SOLAR management & performance Imp.

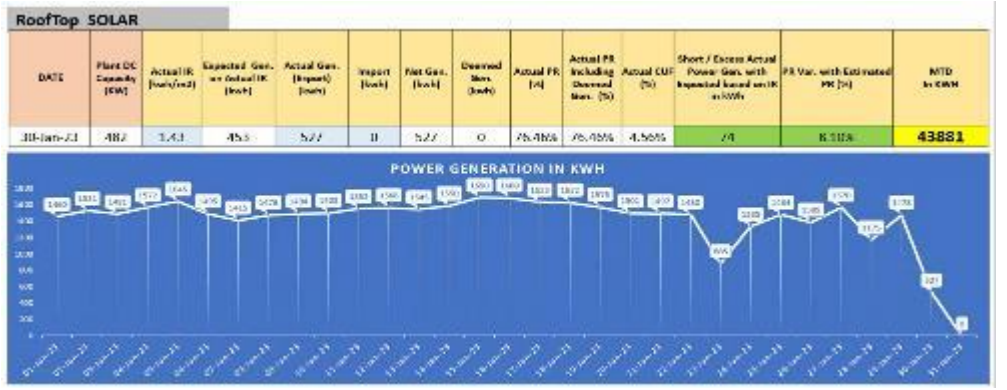
Purpose:

Improve the Solar Generation
Improve Solar performance ratio (PR%)

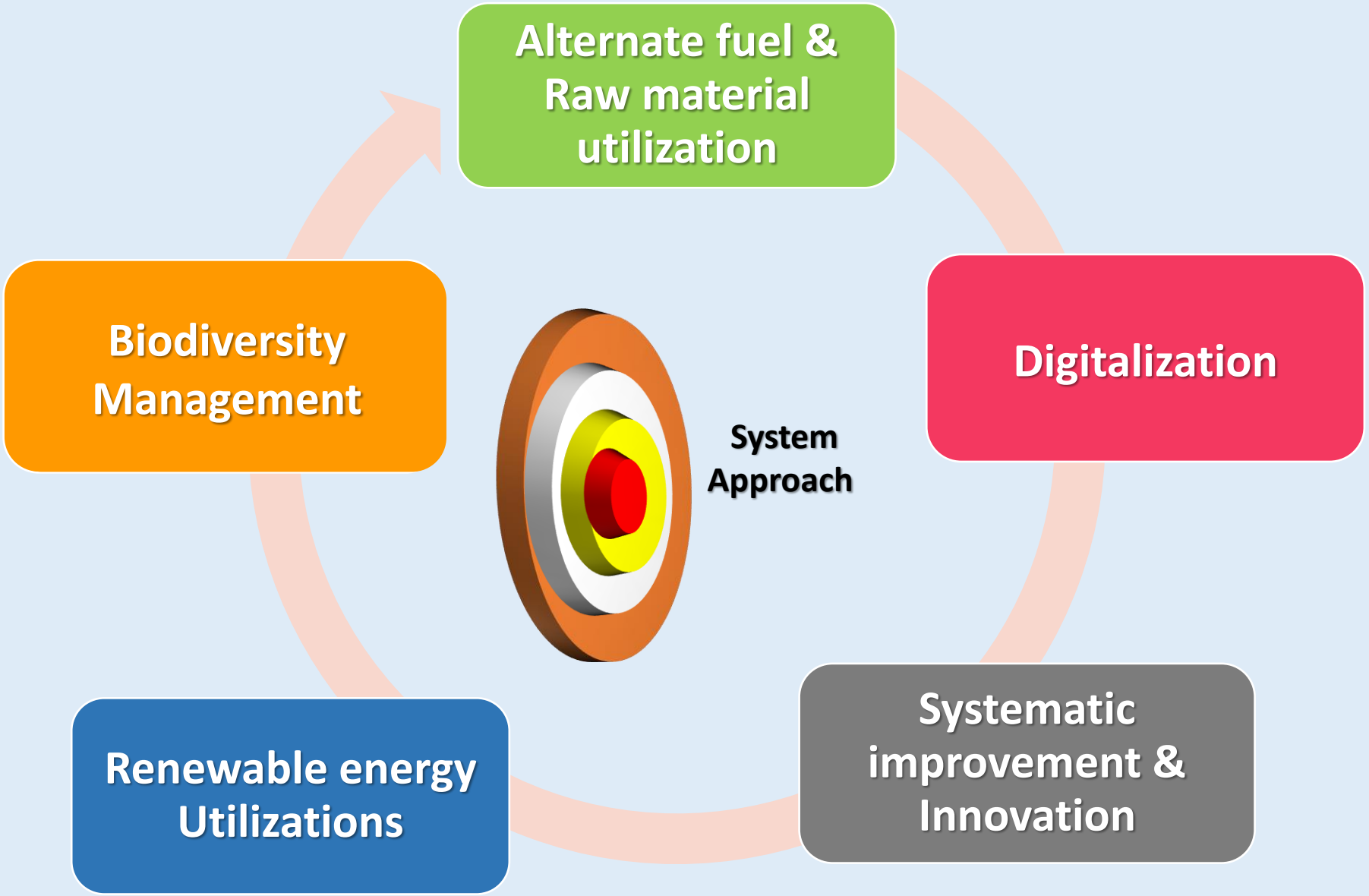
Benefits:

1. Solar performance ratio is improved by 1.96% from last four months

Months	Expected Gen. on Actual IR (kwh)	Actual Gen. (Export) (kwh)	Performance Ratio (%)
Jan-23	1114878	1135640	1.86%
Dec-22	1098110	1121840	2.16%
Nov-22	1158781	1161310	0.22%
Oct-22	1105924	1145930	3.62%
Oct22-Jan23	191977	193036	0.51%



Roadmap for Decarbonatization



Biologically Diverse

Red wattled lapwing (Com. Name : Titahi) & Rose Ringed Parakeet

Pavo cristatus (Com. Name : Mayur)

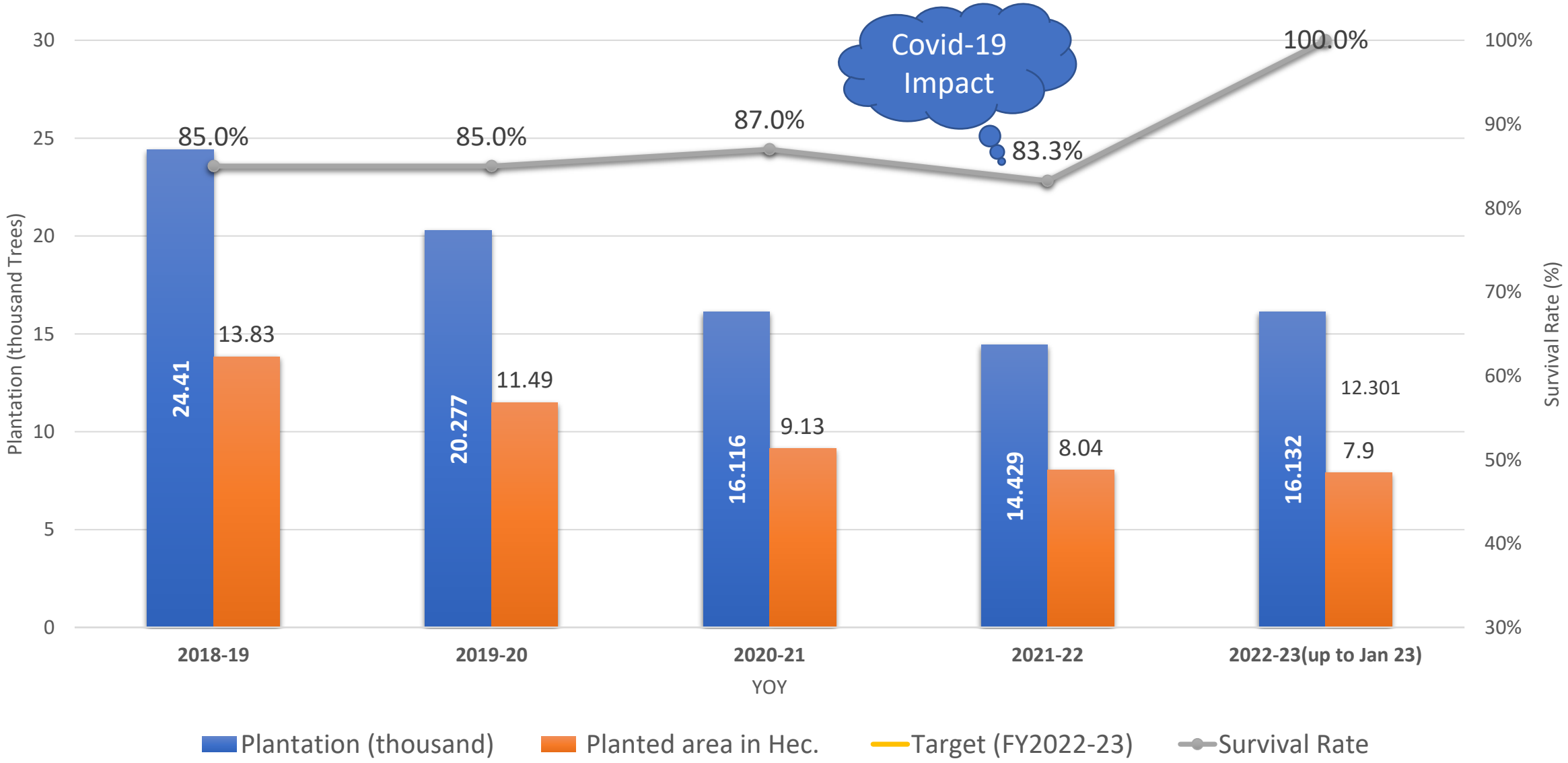
Halcyon smyrnensis(Com. Name : White breasted kingfisher)

Thomisus spectabilis (Com. Name : White Crab Spider)

Miyawaki & Beema Bamboo cultivation

Growth of Plants in 8 Months

Roadmap of Tree Plantation at VCW



Shop Floor awareness on Energy & Environment

Shop floor awareness among employees & workmen

CEMENT MILL

MPSS

Communication on Energy

TPP

COAL CRUSHER

- In-house Trainings, Seminars and External Programs on ENCON .
- Various competitions on Energy Conservation Program (Poster, Slogan, etc.) involving all Company employees, Contract employees, Housewives, School children etc.
- Poster and flex banners displayed at various plant sites
- Recognition & appreciation by distribution of Awards, token gift and Suggestion Schemes.

Saving Rain For Grain

Before

Before

After

After

Created Water Harvesting at various villages/ locations

Ownership concept of green circle at Plant area

Approach: Adopting the concept of the green circle

Sub Location –Main Switchgear Room

Sub Location –Switchyard Area

Approach: Adopting the concept of the green circle

Sub Location –DM Plant, Lab, HP & LP Dozing area

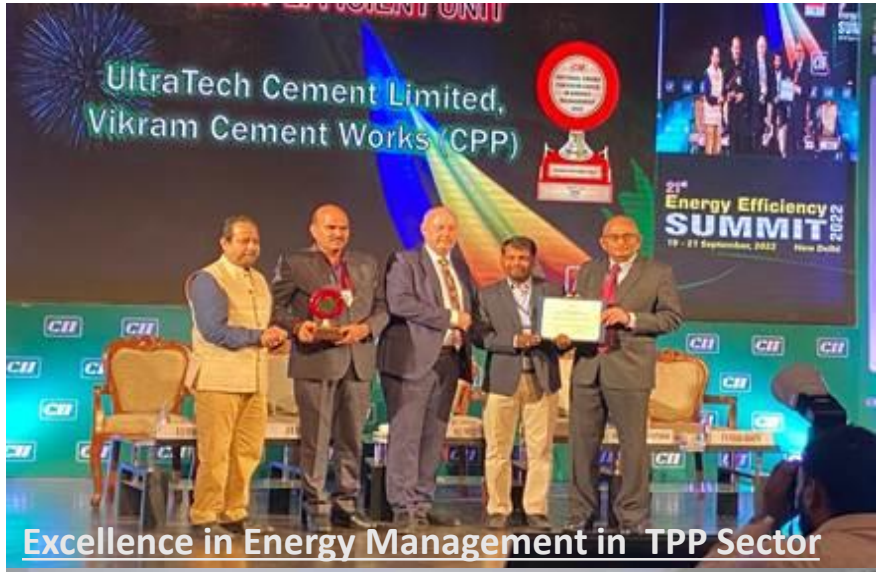



Sub Location –ACW, Fire Pump & Cooling Tower Area




CII Award- Cement Plant & Power Plant

Excellence in Energy Management in Cement Sector



Excellence in Energy Management in TPP Sector

Mines Five star rating Award

Sustainability Award

CO2 Emission Reduction – Way Forward

Usage of Green Energy

- 10 MW hybrid solar power (Solar & Wind) to meet plant demand by FY 2023
- Installation of floating Solar with 8 MWp by FY2023
- Installation of Ground mounted Solar with 1.51MWp by FY 2023
- Installation of 15 MW WHRS by FY 2024

AFR Utilizations

- Relocation of Line-3 AFR feeding point
- AFR feeding arrangement for L-1 & L-2 units.
- Capacity enhancement of existing AFR system

Reduction in Specific Power

- Upgradation of L-1& L-2 Cooler
- Installation of energy efficient LT motors.
- CAPEX –Opex initiative for energy conservation.

Mission 2032- 614 kgCO2/T cement
Considering tentatively 5 % reduction
till 2031-32 from present 2022/23
figure

ऊर्जा बचाने का करो संकल्प, पृथ्वी को बचाने का यही है विकल्प।

Our Journey Continues.....

UltraTech Cement Ltd.

Vikram Cement Works