# UltraTech Cement Limited

Maihar Cement Works

Confederation of Indian Industry

ADITYA BIRLA

UltraTech

| Team Members/ Presenter's | | | | |
|---|---|---|---|---|
| **Name** | **Mr. Sudhendu Bala** | **Mr. Balaji Hiranaik** | **Ms. Ayushi Singh** | **Mr. Ravi Gupta** |
| **Designation** | Assistant General Manager | Manager | Assistant Manager | Senior Manager |
| **Departments** | Technical Cell | Performance Monitoring | Sustainability | Process |

# Company Profile: Unit Introduction

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## Company- UltraTech Cement Ltd

24 Integrated Manufacturing Units → 33 Grinding Units → 01 Clinkerisation Unit → 08 Bulk Packaging Terminals

3rd Largest producer cement in the world (Excluding-China)

Largest manufacturer of grey cement in India

**Consolidated Capacity 154.86 MnTPA**





**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

## Company- UltraTech Maihar Cement Works

- UltraTech Cement Limited is the cement flagship company of the Aditya Birla Group.
- The unit is strategically located at a distance of about 8 Kms from the town of Maihar in Satna District of Madhya Pradesh, a hub of cement industry in India, Maihar is situated at main railway line of Howrah-Mumbai. It is one of the famous dots in the mythological map of India and also regarded as the abode of Adishakti Goddess Sharda.
- Unit has **31.4 MW** Captive Thermal Power Plant (2X15.7 MW).
- Presently the unit has a clinker production capacity of 4.0 MTPA, cement production capacity of 6.0 MTPA, and manufactures OPC 43, OPC 53, & PPC grade of cement. The original capacity of this unit was 8800 TPD, and in the year 2023 it was upgraded to 11800 TPD.

# Cement Manufacturing Process

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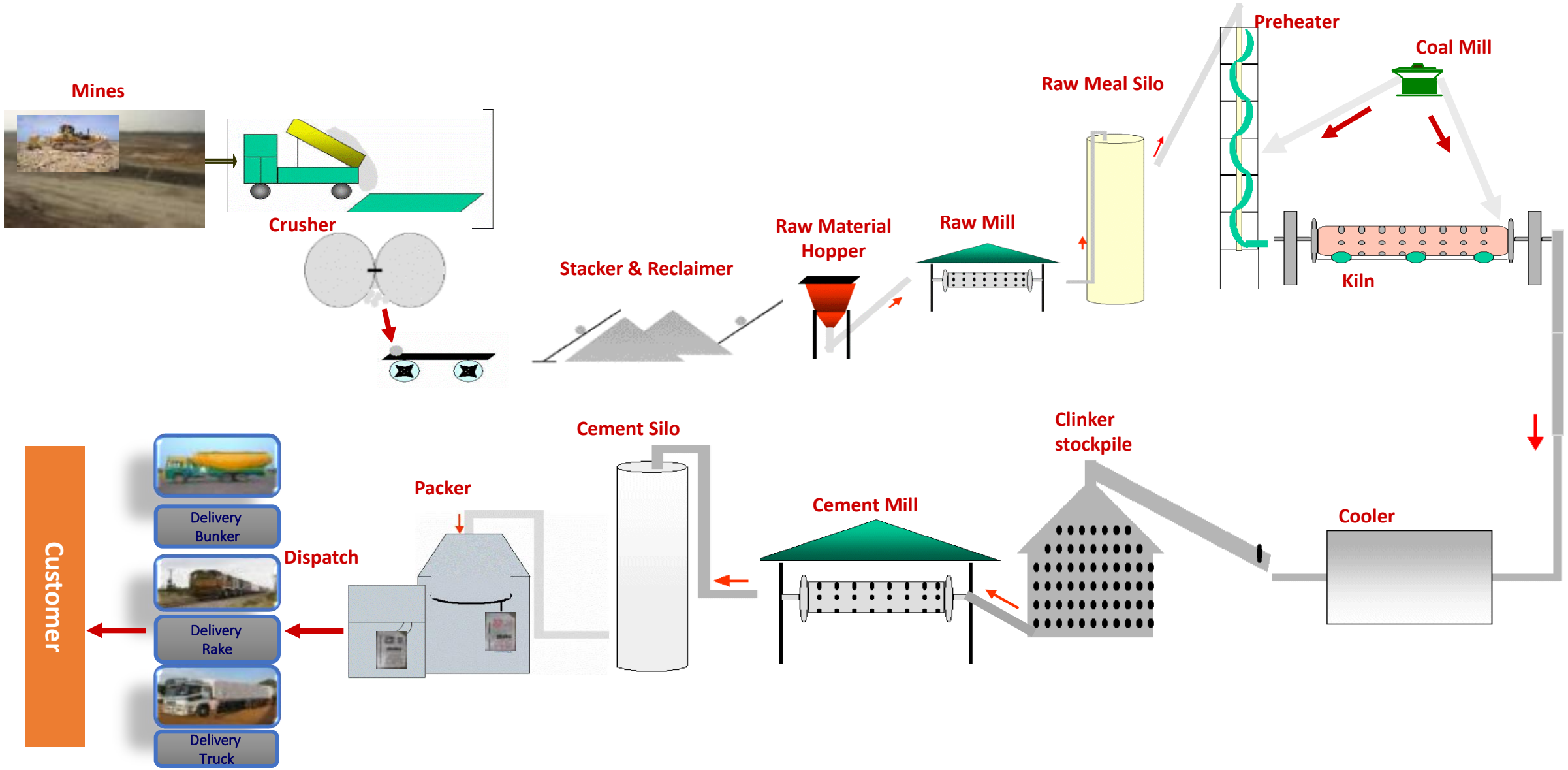
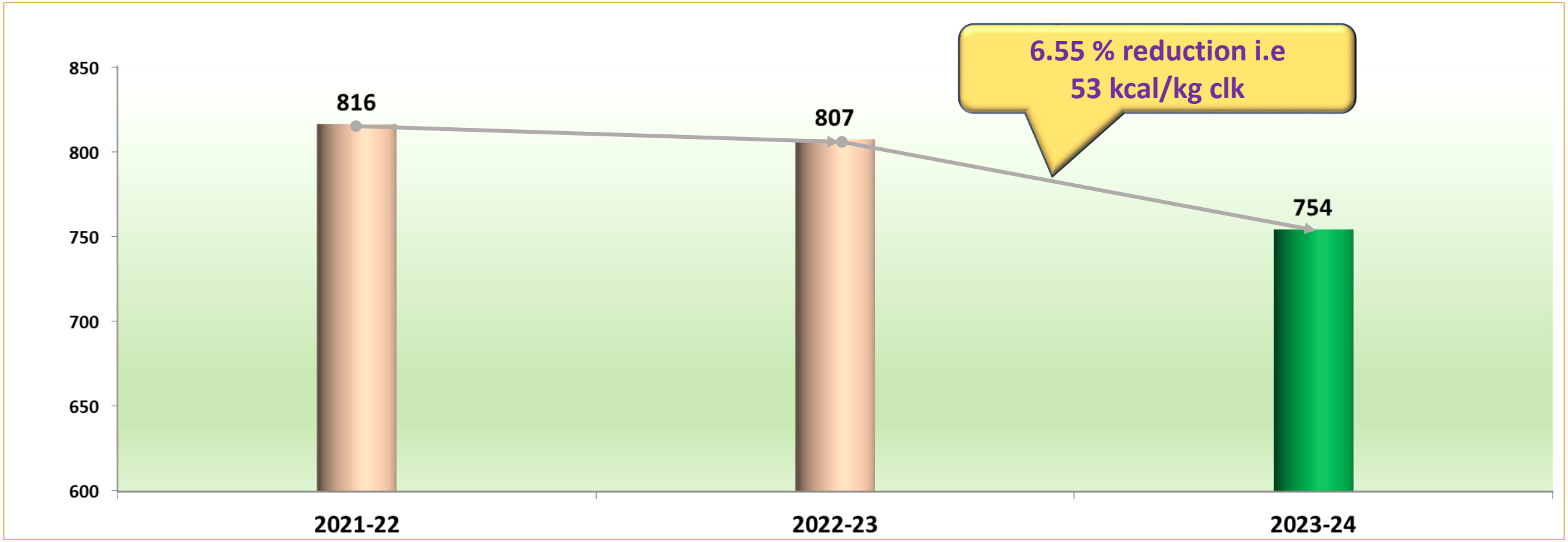


# Technology of Major Sections

| Section | Line | Mill | Make | Type | Installation Date | Present Rated Capacity | Remark |
|---|---|---|---|---|---|---|---|
| CRUSHER | Line-1&2 | Crusher-1 | FLS | Hammer Impactor | 1995 | 900 | |
| | Line-3 | Crusher-2 | L&T | Hammer Impactor | 2023 | 1200 | |
| RAW MILL | Line-1 | Raw Mill-1 | UBE | VRM | 1985 | 170 | |
| | Line-2 | Raw Mill-2 | KHD | RP-16 170/180(KHD) | 2023 | 350 | |
| | Line-3 | Raw Mill-3 | LOESCHE | VRM | 1996 | 300 | |
| COAL MILL | Line-1 & 2 | Coal Mill-1 | G Pfeiffer | VRM | 2011 | 40 | |
| | Line-3 | Coal Mill-2 | Loesche | VRM | 1995 | 42 | |
| KILN | Line-1 | Kiln-1 | FLS | Rotary Kiln | 1979 | 3750 | FLS (Upgradation year 2023) |
| | Line-2 | Kiln-2 | FLS | Rotary Kiln | 1979 | 3750 | FLS (Upgradation year 2023) |
| | Line-3 | Kiln-3 | KHD | Rotary Kiln | 1996 | 4500 | LNVT (Upgradation year 2007) |
| CEMENT MILL | Line-1 | Cement Mill-1 | L&T | Closed(Mono Chamber) | 1979 | 90(PPC) | |
| | | Cement Mill-2 | L& T | Closed(Mono Chamber) | 1979 | 90(PPC) | |
| | Line-2 | Cement Mill-3 | FLS | Closed(Bi- Chamber) | 1989 | 70(OPC) | |
| | Line-3 | Cement Mill-4 | FLS | Closed(Mono Chamber) | 1995 | 110(OPC) | |
| | | Cement Mill-5 | FLS | Closed(Mono Chamber) | 1995 | 145(PPC) | |

# Reduction in Specific Thermal consumption (kcal/kg clinker)




- *Decrease in overall Thermal energy by **53 Kcal/kg** in during **FY 23-24**, i.e. **6.5 %** reduction wrt to **FY 2022-23**.*
- During FY 23-24,Replacement of 4 stage Existing Preheater with New 6 stage ILC PH & installation of New Calciner & Jet Flex Burner with New PH Fans.

# Sp. Electrical Energy Consumption (FY 22 to FY 24)

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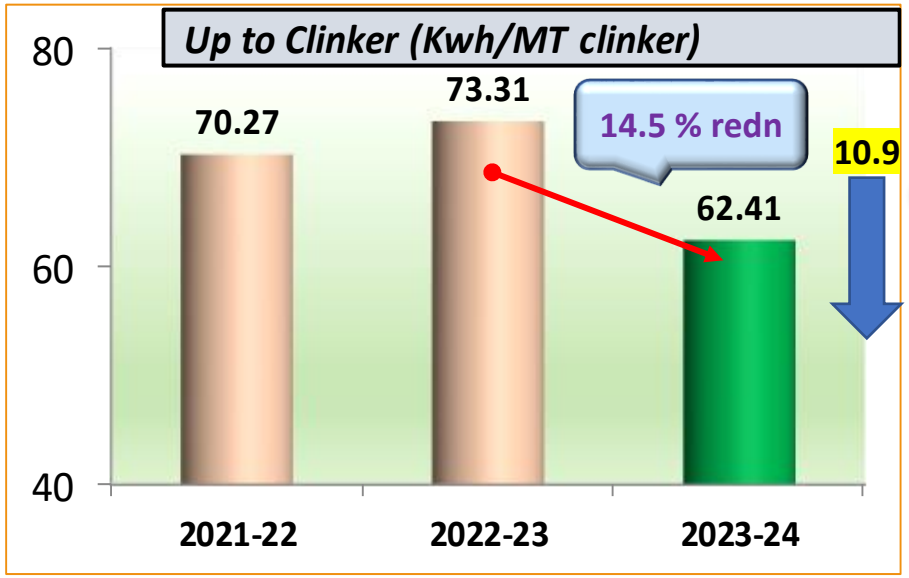
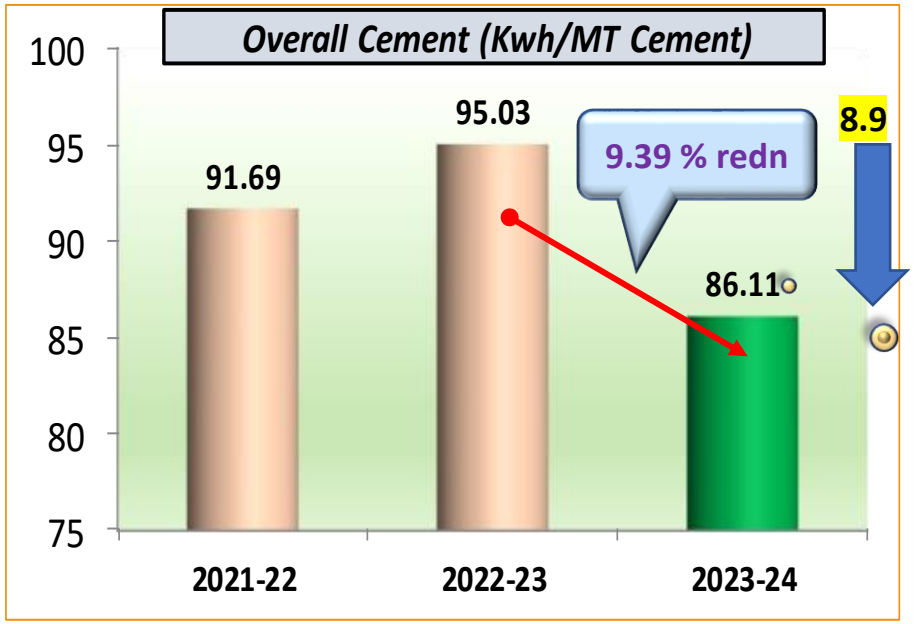
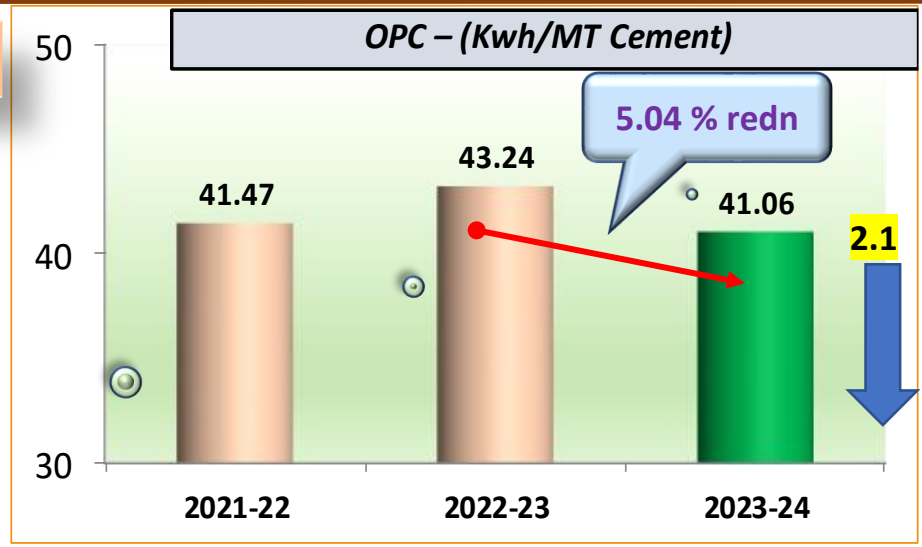
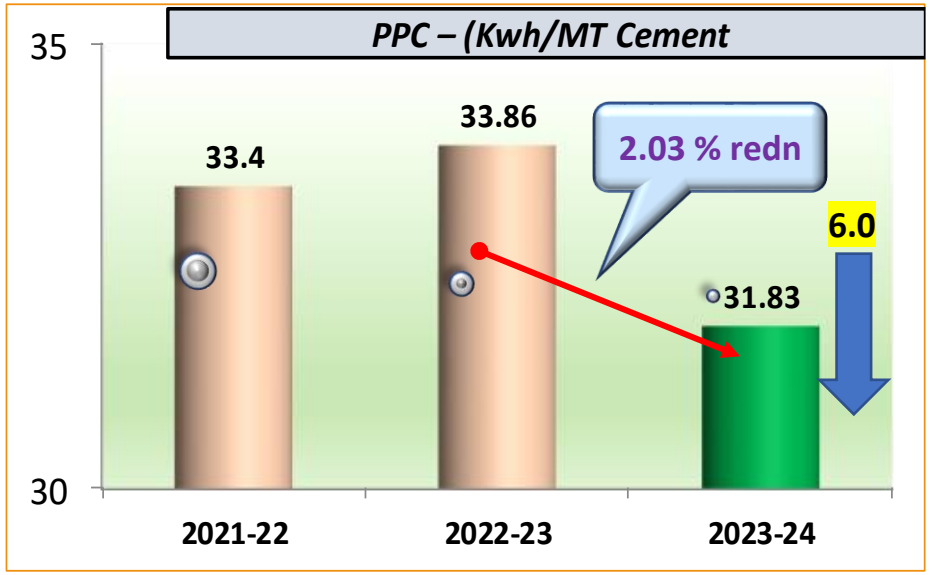



## Milestones Achieved- FY-24

- *Ever Lowest overall YTD clinkerization SPC **i.e 62.41 Kwh/MT Clk***
- *Ever Lowest YTD OPC grinding SPC **i.e 41.06 Kwh/T Mat.***
- *Ever Lowest YTD OPC grinding SPC i.e **31.83 Kwh/T Mat**.*
- *Ever Lowest Overall YTD Plant SPC i.e **86.11 Kwh/T Mat**.*



# Fly Ash Consumption (FY 22 to FY 24)

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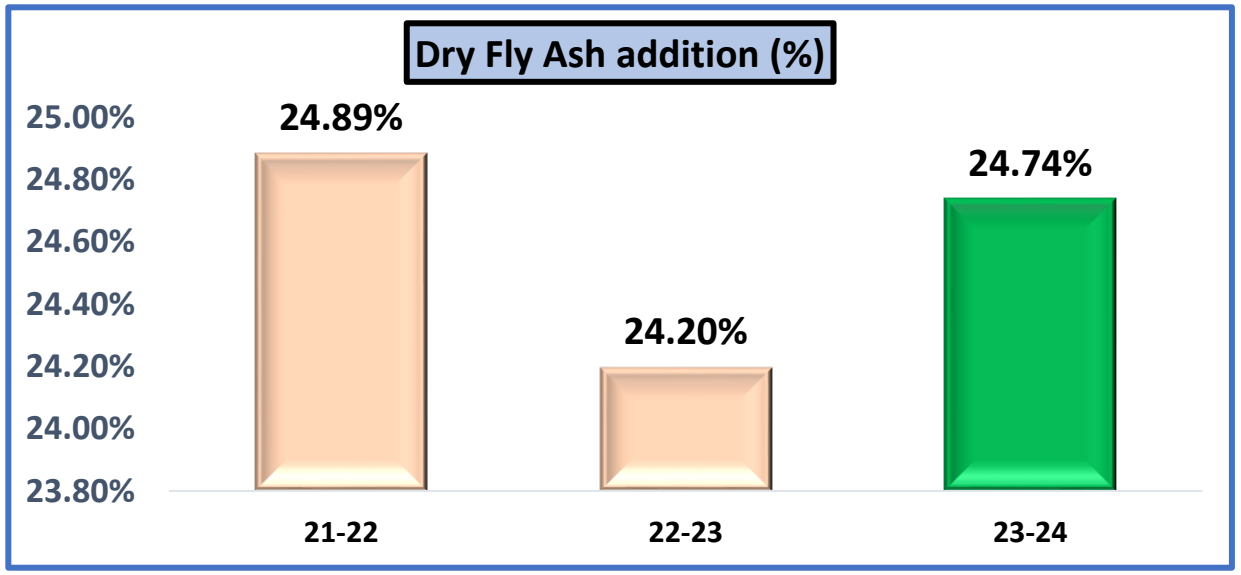


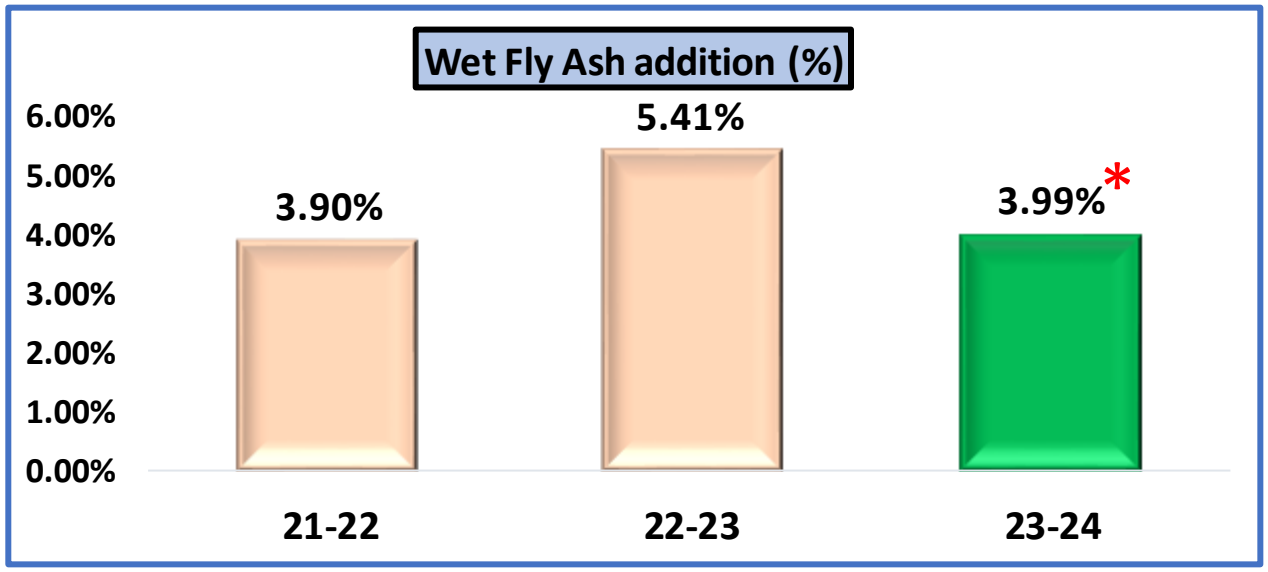


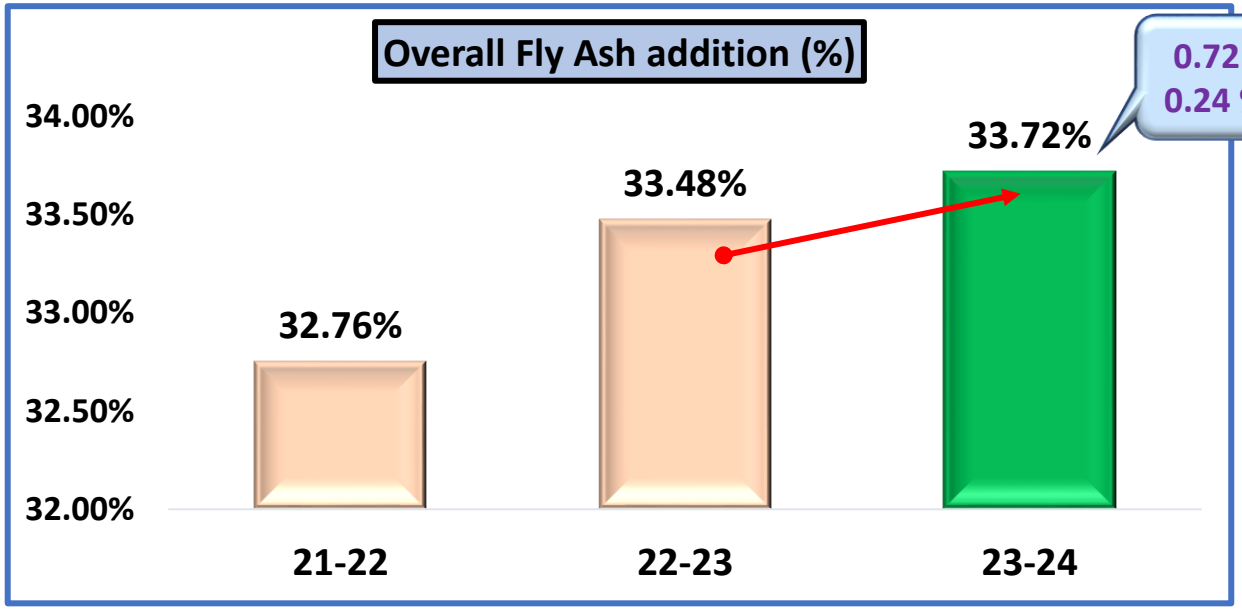


0.72 % gain and
0.24 % Improved

Ever Highest Flyash addition in PPC **i.e 33.72 %.**

***Wet Flyash Addition reduced during FY 24 Due to Wet FA handling system upgradation.***

# Benchmarking for SEC with best in class cement plants

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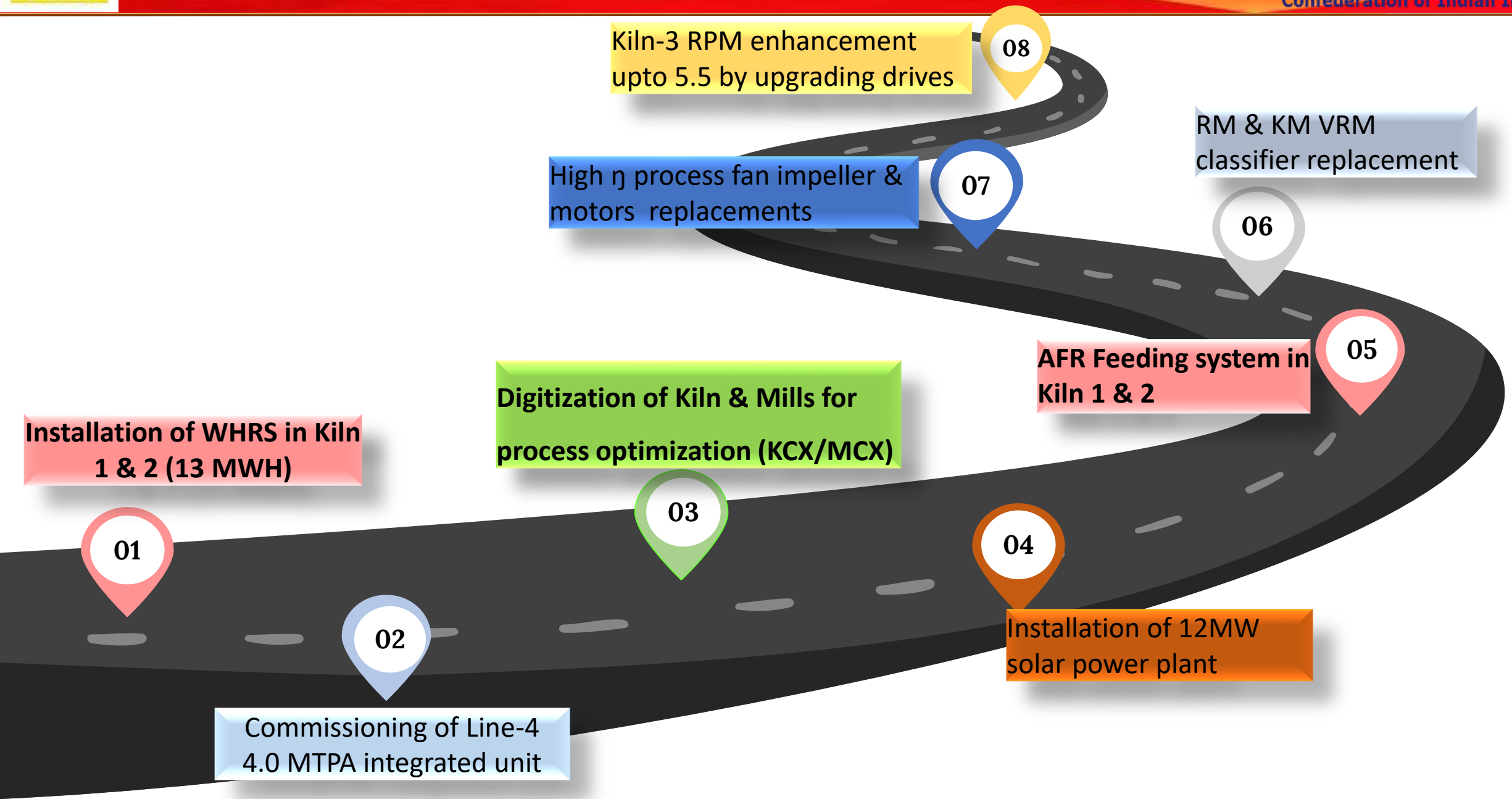
| | |
|---|---|
| Global benchmark | 670 kcal/kgclk |
| India Benchmark | 683 kcal/kgclk |
| MCW FY 23-24 | 754 kcal/kgclk |
| MCW Target FY 25 | 730 Kcal/kgclk |
| Global benchmark | 65 kWh/t cement |
| India Benchmark | 56.14 kWh/t cement |
| MCW FY 23-24 | 86.11 kWh/t cement |
| MCW Target FY 25 | 82.00 kWh/t cement |

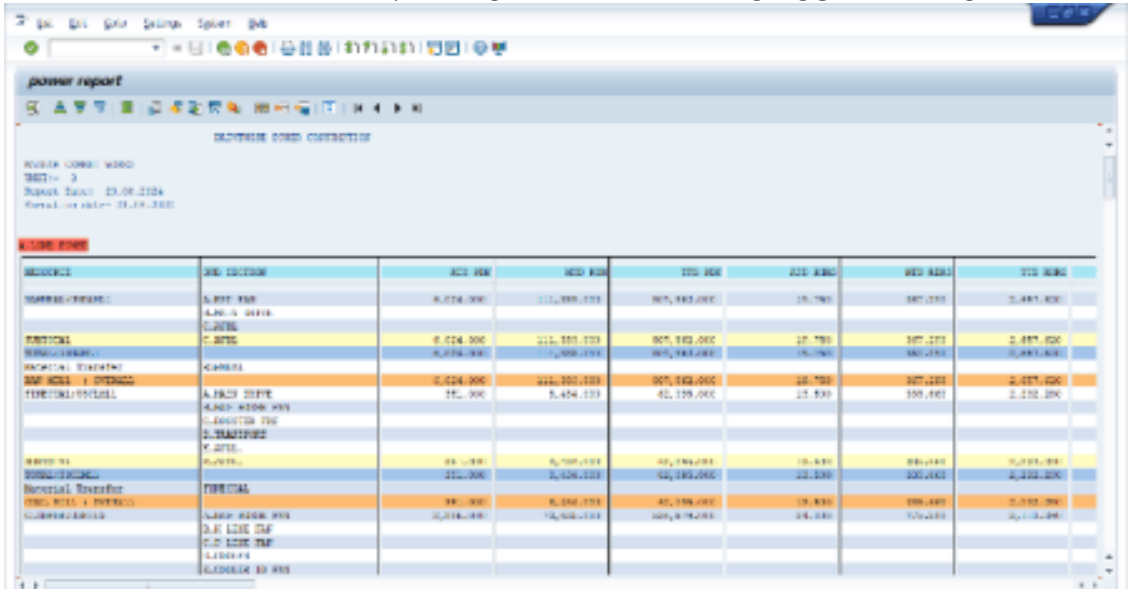
Data source : CII Energy benchmarking for Cement Industry May 2023 Version 6.0

# Road Map to achieve target

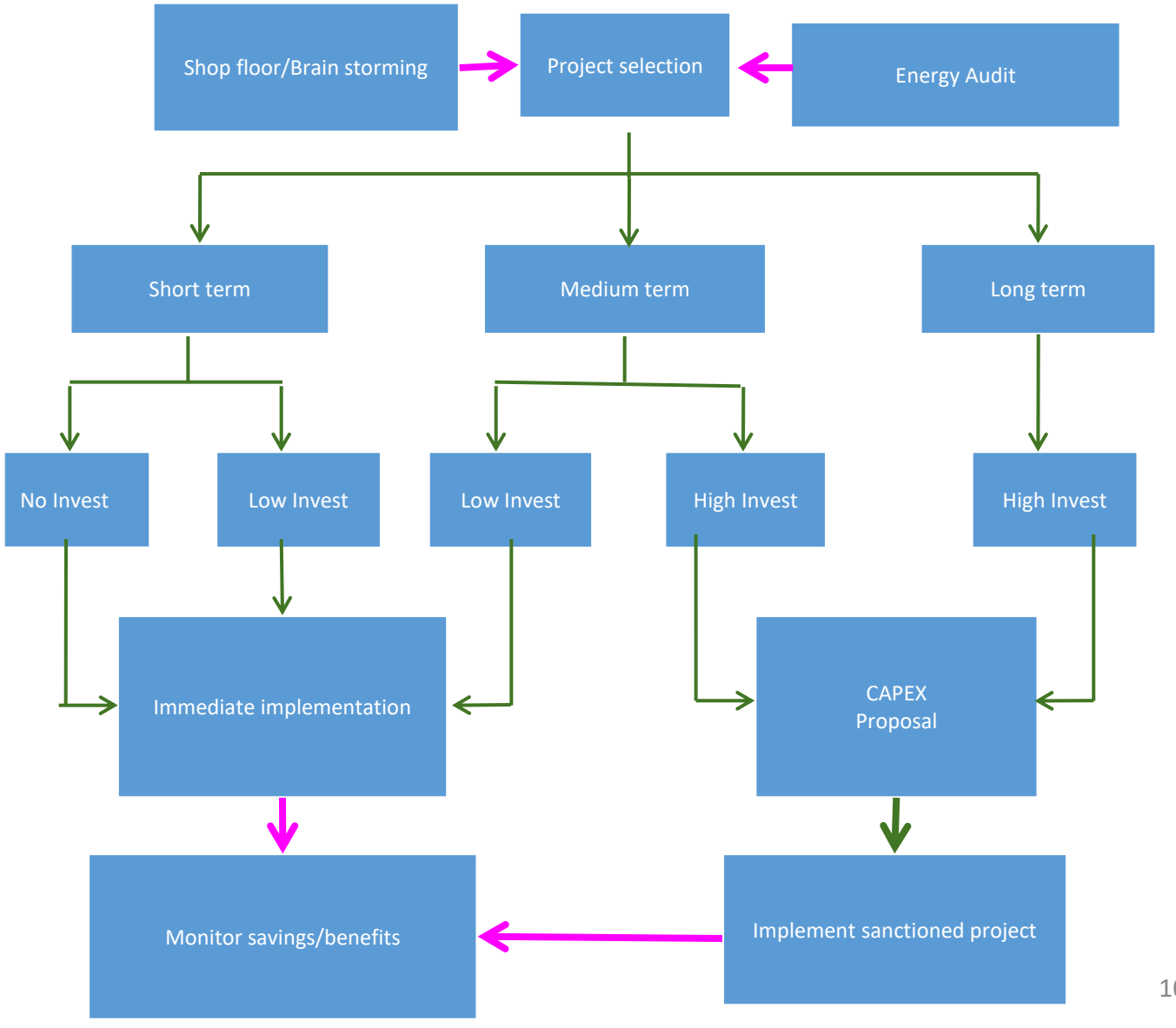


**MONITORING SPECIFIC ENERGY CONSUMPTION PER TON OF PRODUCT**

1) **PRODUCT**
   - **A) DAILY**
     - ❖(DPR) DAILY PRODUCTION REPORT
     - ❖DAILY POWER REPORT
   - **B) MONTHLY**
     - ❖(MPR) MONTHLY PERFORMANCE REPORT
     - ❖EXCEPTIONAL REPORT
     - ❖MIS-REPORT
   - **HALF**
   - **C) YEARLY**
     - ❖MIS REPORT
   - **D) ANNUALLY**
     - ❖ANNUAL MIS REPORT
     - ❖ANNUAL BALANCE SHEET
2) **REVIEW OF TARGETS**
   - **A) ANNUAL**
     - ❖ANNUAL BUDGET MEETING
     - ❖ANNUAL MAINTENANCE CONFERENCE




## Energy Projects Implementation- Methodology



# Roadmap for Continuous Improvement

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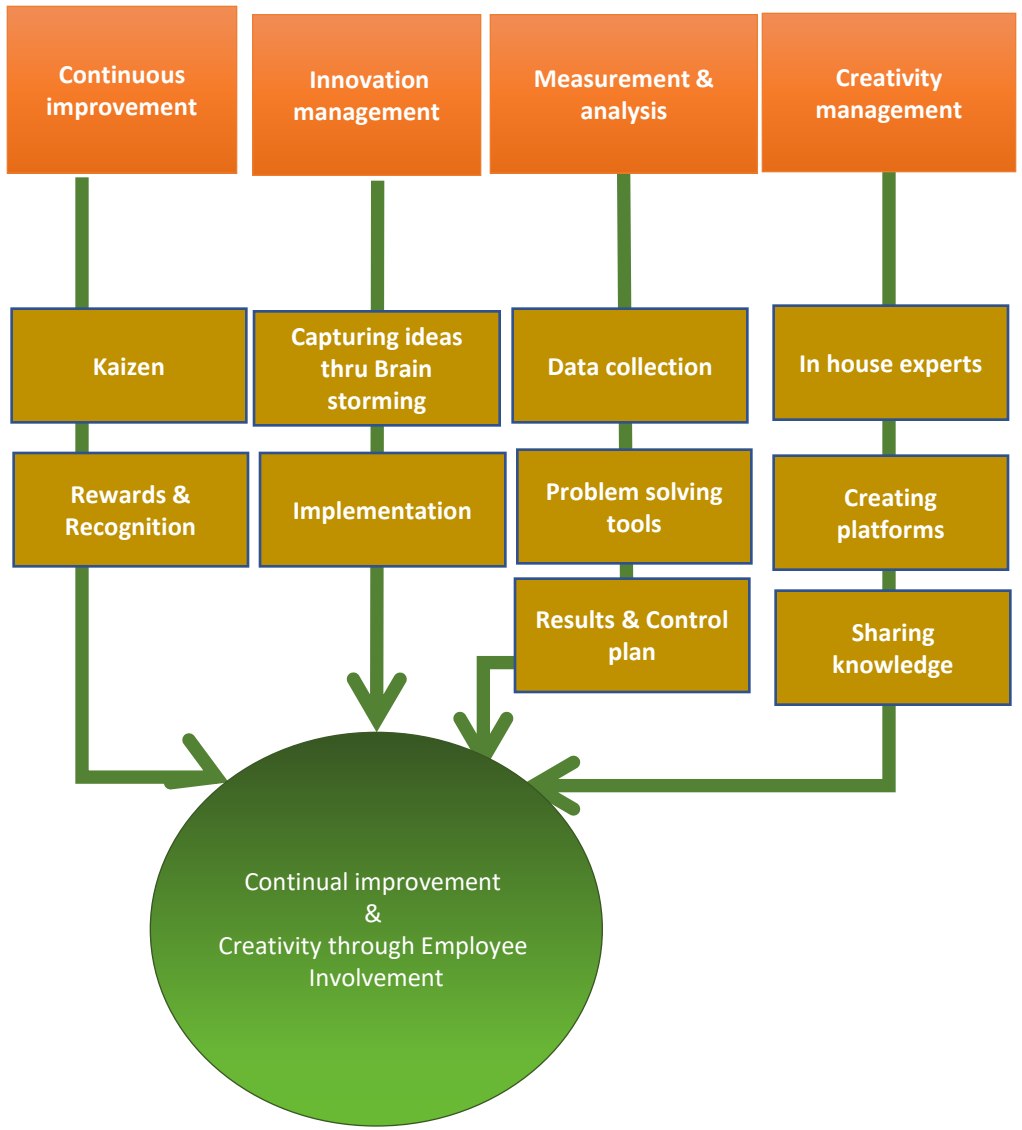


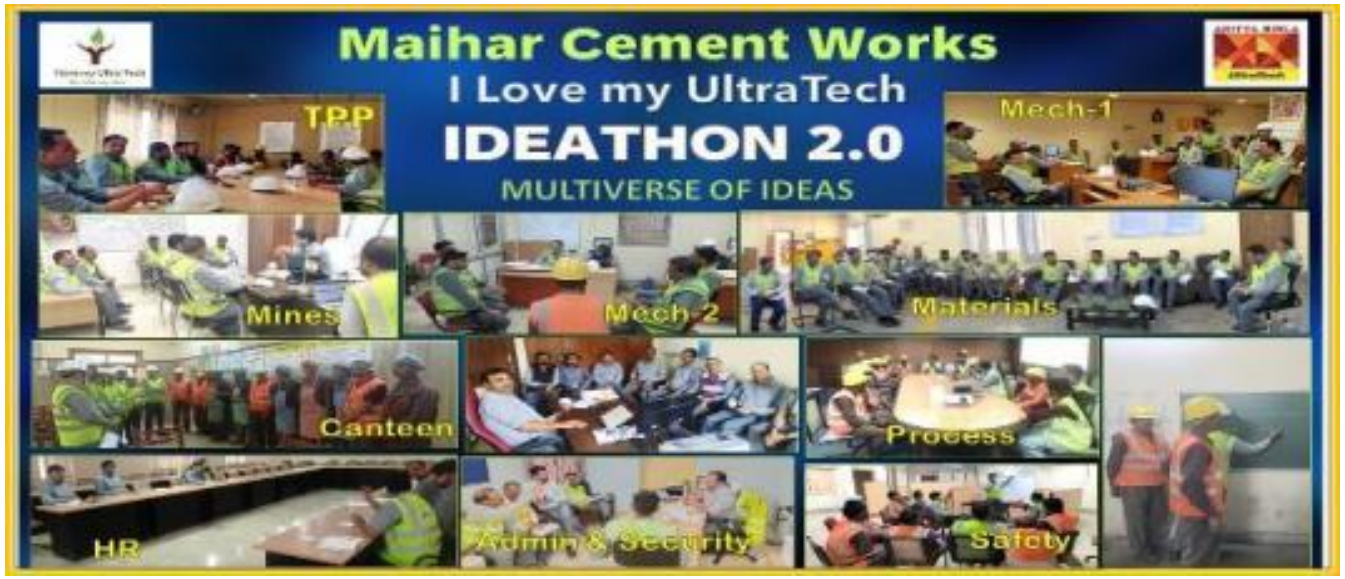


# Approach For Energy Savings Projects Implementation

- *Opportunity identification*
- *Energy mapping*
- *Bench marking*
- *Loss cost matrix*

- *Suggestion*
- *Idea generation*
- *Idea screening*
- *Feasibility study*
- *Ideathon 2.0*
- *Kaizen Implementation*

- Team formation and allocation of project team

- *Project Execution & review of progress*

- *Result Achieved*
- *Reward & Recognition*

# EnCon projects – Last Three Years

| Year | No of Energy saving projects | Investments (INR Million) | Electrical savings (Million kWh) | Thermal savings (Million Kcal/ MTOE) | Savings ( INR Million) |
|---|---|---|---|---|---|
| **FY -2021-22** | 12 | 26.94 | 6.54 | 0 | 35.84 |
| **FY -2022-23** | 10 | 25.72 | 4.21 | 0 | 29.25 |
| **FY -2023-24** | 08 | 6037.80 | 656.38 | 352067 | 1530.86 |
| **Total** | 30 | 6090.46 | 667.13 | 352067 | 1595.95 |

# Energy Saving projects implemented in FY 2021-22

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| Name of Energy saving projects | investments (INR Million) | Electrical savings (Million kWh) | Thermal savings (Million Kcal) | Total Savings (INR Millio)n | Impact on SEC (kWh /MT cmt) |
|---|---|---|---|---|---|
| Replace Conventional lights with energy efficient LED lights. | 0.3 | 0.07 | 0.00 | 0.07 | 0.02 |
| Temperature of Air conditioners in plant & colony premises to be maintained at 25 Deg. Centigrade | 0.0 | 0.16 | 0.00 | 0.16 | 0.06 |
| Installed IR sensors in all substations and offices. | 0.2 | 0.07 | 0.00 | 0.07 | 0.02 |
| **Installed smart street light controllers for street lights in plant and colony premises.** | **0.3** | **0.20** | **0.00** | **0.20** | **0.07** |
| Energy saver sensor to be installed in 1.5/2 Ton Split AC | 0.0 | 0.03 | 0.00 | 0.03 | 0.01 |
| Procurement of A.C. inverter split A.C. | 0.3 | 0.02 | 0.00 | 0.02 | 0.01 |
| **Installation of solar water heaters in colony buildings and guest house.** | **0.3** | **0.02** | **0.00** | **0.02** | **0.01** |
| Increase power factor of MDB by installing group compensator with APFC. | 1.2 | 0.40 | 0.00 | 0.40 | 0.14 |
| **Installation of SPRS in U1 Raw Mill Exhaust Fan** | **5.5** | **0.98** | **0.00** | **0.98** | **0.34** |
| Cement Mill-3 thin liner replacement | 4.4 | 1.42 | 0.00 | 1.42 | 0.49 |
| **Cement Mill-4 thin liner, choke feed and Hexadaur Roller installation** | **7.0** | **2.04** | **0.00** | **2.04** | **0.70** |
| **Cement Mill-5 thin liner and choke feed Installation** | 7.4 | 1.14 | 0.00 | 1.14 | 0.39 |
| Total | 26.9 | 6.55 | 0 | 6.55 | 2.26 |

# Energy Saving projects implemented in FY 2022-23

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| Name of Energy saving projects | investments (INR Million) | Electrical savings (Million kWh) | Thermal savings (Million Kcal) | Total Savings (INR Million) | Impact on SEC (kWh /MT cmt) |
|---|---|---|---|---|---|
| Installation of Energy Saver for AC units in CPP 2 | 0.4 | 0.13 | 0.00 | 0.13 | 0.04 |
| Replace low efficiency coal mill fan with high efficiency fan | 1.2 | 0.12 | 0.00 | 0.12 | 0.04 |
| Optimize the operation of raw mill silo top bag filter | 0.0 | 0.07 | 0.00 | 0.07 | 0.02 |
| Optimise packer bag filter pressure drop in identified packer bag filters | 0.1 | 0.03 | 0.00 | 0.03 | 0.01 |
| **Replacement of reciprocating compressor by screw compressor for Cement mill L-1&2 and L-3.** | **8.8** | **1.95** | **0.00** | **1.95** | **0.63** |
| **Installation of new Slip power recovery system for Raw Mill Fan 3500KW in Line-3** | **8.5** | **1.43** | **0.00** | **1.43** | **0.46** |
| Replacement of triple gate by Rotary Air Lock for Raw Mill L-1 | 0.9 | 0.06 | 0.00 | 0.06 | 0.02 |
| Replacement of tripple gate by Rotary Air Lock | 0.9 | 0.07 | 0.00 | 0.07 | 0.02 |
| Installation of Energy Saver for AC units in CPP 2 | 0.4 | 0.13 | 0.00 | 0.13 | 0.04 |
| **Replace low efficiency RABH fan with high efficiency fan** | **2.1** | **0.23** | **0.00** | **0.23** | **0.07** |
| **Total** | **23.3** | **4.22** | **0** | **4.22** | **1.35** |

# Energy Saving projects implemented in FY 2023-24

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| Name of Energy saving projects | investments (INR Million) | Electrical savings (Million kWh) | Thermal savings (Million Kcal) | Total Savings (INR Million) | Impact on SEC (kWh /MT cmt) |
|---|---|---|---|---|---|
| **New screw compressor Installation for CM-4 & 5 Cement Mill operation** | **0.76** | **0.40** | **0.00** | **2.78** | **0.13** |
| Reduction in OPC 43 cost & CO2 Emission by increasing the PI addition from 2 to 5% | 1.45 | 0.0 | 0.00 | 67.9 | 0.00 |
| Replacement of Old Conventional Light with LED Fitting | 32.14 | 0.76 | 0.00 | 5.34 | 0.25 |
| Replacement of Old rewound HT & LT motors with HE motors | 14.45 | 1.58 | 0.00 | 11.12 | 0.51 |
| **Upgradation of pyro system of Kiln-1:<br>1. Enhancement of capacity from 2250 to 3750 tpd<br>2. Addition of 2 pre-heater stages<br>3. Installation of crossbar cooler<br>4. Replacement of kiln outlet seal with graphite seal** | **2100.00** | **12.25** | **177241.58** | **492.94** | **3.95** |
| **Upgradation of pyro system of Kiln-2:<br>1. Enhancement of capacity from 2250 to 3750 tpd<br>2. Addition of 2 pre-heater stages<br>3. Installation of crossbar cooler<br>4. Replacement of kiln outlet seal with graphite seal** | **2100.00** | **13.95** | **174825.50** | **499.31** | **4.50** |
| Upgradation of electrical systems and drives of Kiln-1 & 2 | 89.00 | 11.41 | 0.00 | 80.11 | 3.68 |
| **Installed roller press in place of 02 Nos old Ball mills.** | **1700.00** | **21.00** | **0.00** | **371.36** | **6.77** |
| **Total** | **6037.80** | **61.35** | **352067** | **1530.86** | **19.79** |

# Innovative Project 1:-Pyro Technology Upgradation

**Project Title:-**

Technological Upgradation of Kiln 1 & Kiln 2 to increase the manufacturing capacity from 2250 TPD to 3750 TPD of each Line.

**Importance of the Project: -**

- Power Cost (22.5 %) and Thermal cost (33 %) are Major cost driver in cement manufacturing,
- Reduction in power and heat consumption will improve the profitability and Business sustainability.

**Project Description:**

Improvement of the performance of Maihar cement to increase in clinker productivity & improvement in output rate (TPH) with lowering in electrical and Thermal energy consumption.

# Pyro upgradation : Before & After

## Conversion of 4 Stage Preheater to 6 stage single ILC Preheater Line-1&2

Before

- 6 stage ILC PH with TAD & Jet Flex Burner
- Single String Pre-heater
- Bucket Elevator Line-1&2– 311 TPH
- Calciner Line-1&2 – 6.5 Ø x 70 m Height
- Preheater Fan Line-1&2 - 177 M3/Sec.

After

# Major Upgradations Areas

## New Preheater

Replacement of 4 stage Existing Preheater with New 6 stage ILC PH & installation of New Calciner & Calciner Outlet Duct done with New PH Fans

## New Raw Mill

Upgradation of Raw Mill Capacity by installing new 350 TPH roller press in finish mode for raw material grinding.

## New Belt Conveyors

Belt conveyors from existing surge bin (TT6) to New Stacker (01Nos).

Belt conveyors from New Reclaimer to existing raw mill hoppers along with transfer tower (02Nos).

## Existing OLBC

Upgradation of existing OLBC (06 Nos) from 1000 TPH to 1200 TPH

## Stacker and Reclaimer

Installation of new limestone stacker of capacity 1200 TPH and reclaimer of capacity 700TPH.

## Coal Firing

100% Replacement of Existing Coal Dozing System with New Coal Dozing System of FLS Make Pfister

## Kiln feed system

Installed Kiln Feed Bin with PFISTER Roto Scale & Transport Conveyors.

## New Substation

Pyro Substation for new drives

# Business Impact after Line1&2 pyro up-gradation:

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- Thermal consumption reduced from **855Kcal/kg to 714Kcal/kg**. i.e. Gain of Rs. 246/ton of clinker produced.
- Pyro power reduction for each line:

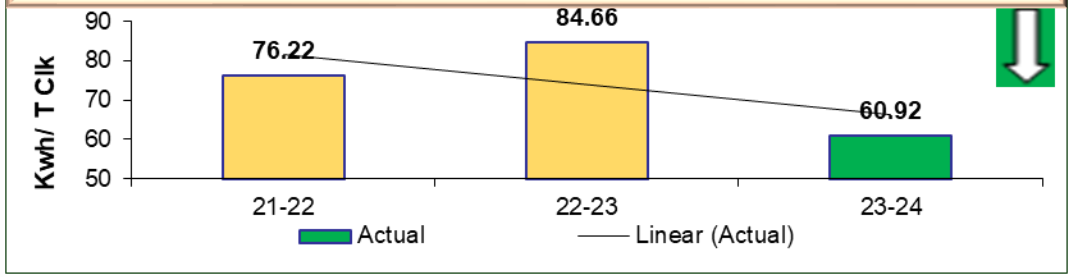
Line-1 pyro power reduced from **84.66 kWh/T clinker (YTD 2022-23)** to **54.01 kWH/T clinker**

Line-2 pyro power reduced from **76.12 kWh/T clinker (YTD 2022-23)** to **52kWH/T clinker**

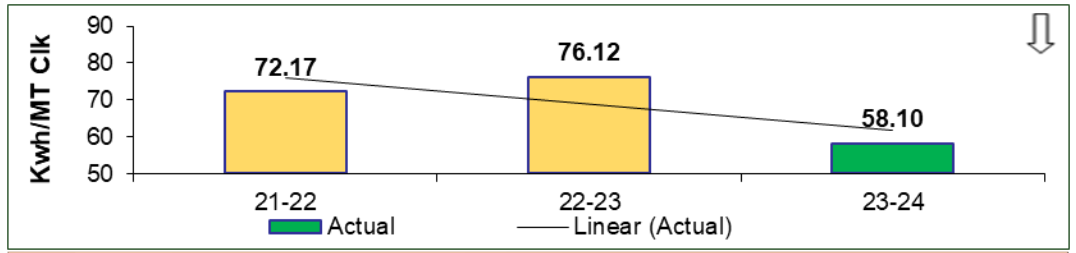
- SOX Emission- Less than **100mg/Nm3**
- Emission of NOx without **SNCR-740@,1.6%N2-mg/Nm3**

**Total savings post upgradation of Line 1 & 2 achieved:- 992.25 (INR Million)**

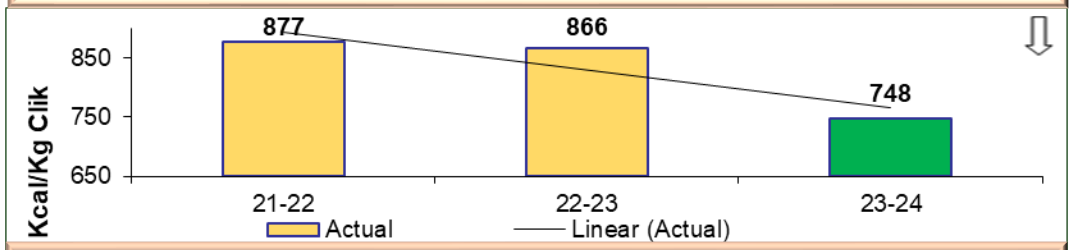
**K-1 clinkerisation Power (Kwh/MT Clinker**



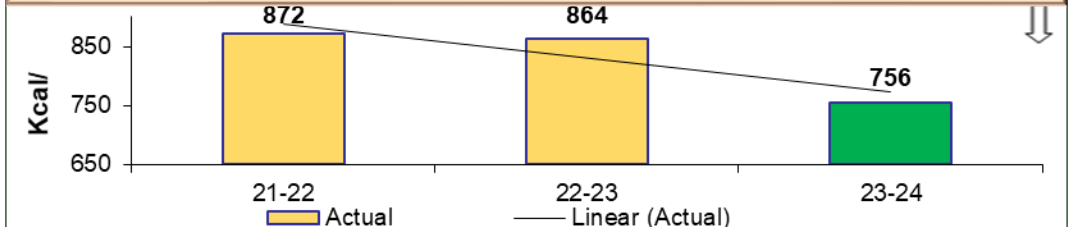

**K-2 clinkerisation Power (Kwh/MT Clinker**




**K-1 Heat Consumption (Kcal/Kg of Clinker)**




**K-2 Heat Consumption (Kcal/Kg of Clinker)**



# Innovative Projects-3

**Theme** – Reduction in OPC 43 cost & CO2 Emission by increasing the PI addition from 2 to 5%

**Problem**

- Crude system for PI feeding, mixed in yard manually resulting quality variation beyond 2%
- Higher cost of OPC 43 grinding

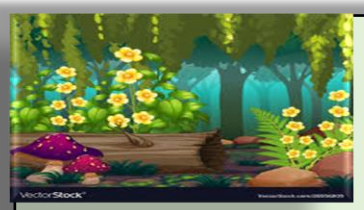
**Solution**

- Installation of PI feeding system with weigh feeders for utilization to 5% of OPC43

**Benefit**

- Saving due to 3% clinker substitution 6.79 crores
- Reduction in CO2 emission = 27360 MT in a year

# Innovative Projects-4



**Theme** – Process optimization through digitization in mills

## Problem

- Operational inefficiency due to manual intervention

## Solution

- MCX implementation in Cement mill, L/S & coal VRM

## Benefit

- Increase in throughput in CM4&5 by 3 TPH
- Increase in throughput in L/S VRM by 5 TPH
- Saving in power -11.2 kwh/annum, **Rs 55.6 Lacs/Annum**

# Innovative Projects-4 MCX implementation



## UTCL :: Malhar Cement Works
### COAL MILL (Line - 3) MCX Model

Manipulated Variables

| Parameters | Unit | PV_Actual | SP_New | Min | _LCL | UCL | Max | Step | Selection |
|---|---|---|---|---|---|---|---|---|---|
| Mill Feed | TPH | 22.05 | 34.00 | 15.0 | 30.0 | 35.0 | 60.0 | 1.0 | |
| Seperator Speed | % | 66.19 | 50.24 | 30.0 | 50.0 | 55.0 | 70.0 | 0.1 | |
| Booster Fan Speed | % | 44.66 | 47.71 | 30.0 | 10.0 | 70.0 | 85.0 | 1.0 | |

Target Variables

| Parameters | Unit | PV_Actual | Target | LCL | UCL | OK Status | |
|---|---|---|---|---|---|---|---|
| Mill Load KW Avg | KW | 328.23 | 455.0 | 320.0 | 490.0 | MILL LOAD OK | MCX On / Off |
| Mill Vibration | MM/S | 0.76 | 1.5 | 0.5 | 2.5 | VIBRATION OK | |
| Mill O/L Temp | Deg C | 58.49 | 65.0 | 55.0 | 75.0 | MILL O/L TEMP OK | |
| Mill DP | mmWc | 556.32 | 455.0 | 350.0 | 570.0 | MILL DP OK | MCX Ready MCX OK |
| Mill I/L Pressure | mmWc | -24.73 | 55.0 | -70.0 | -20.0 | MILL I/L PRESS OK | |
| Seperator Load | Amp | 50.01 | 45.0 | 30.0 | 60.0 | SEP LOAD OK | |
| Residue (Predicted) | M2/KG | 4.16 | 5.0 | 1.0 | 9.0 | | Scan Time 30 |
| Residue (Intercept) | 4.0 | | | | | | |
| Residue (QCX) | 5.0 | | | | | | |

## UTCL :: Malhar Cement Works
### RAW MILL (Line - 3) MCX Model

Manipulated Variables

| Parameters | Unit | PV_Actual | SP_New | Min | LCL | UCL | Max | Step | Selection |
|---|---|---|---|---|---|---|---|---|---|
| Mill DP | MMWC | 745.40 | 734.60 | 690.0 | 730.0 | 742.0 | 800.0 | 0.2 | |
| Seperator Speed | % | 53.49 | 54.00 | 45.0 | 49.0 | 54.0 | 65.0 | 0.1 | |

Target Variables

| Parameters | Unit | PV_Actual | Target | LCL | UCL | OK Status | |
|---|---|---|---|---|---|---|---|
| Mill Load KW Avg | KW | 2070.55 | 2070.0 | 1850.0 | 2150.0 | MILL LOAD OK | MCX On / Off |
| Mill Vibration | MM/S | 4.49 | 4.5 | 3.5 | 6.5 | VIBRATION OK | |
| Mill O/L Temp | Deg C | 80.45 | 70.0 | 55.0 | 85.0 | MILL O/L TEMP OK | |
| | | | | | | | MCX Ready MCX OK |
| Mill Reject | TPH | 28.32 | 25.0 | 15.0 | 35.0 | MILL REJECT OK | |
| Residue (Predicted) | M2/KG | 5.68 | 5.3 | 4.0 | 5.5 | | Scan Time 30 |
| Residue (Intercept) | 3.1 | | | | | | |
| Residue (QCX) | 5.4 | | | | | | |

## UTCL :: Malhar Cement Works
### Cement Mill 5 (Line - 3) MCX Model

Manipulated Variables

| Parameters | Unit | PV_Actual | SP_New | Min | LCL | UCL | Max | Step | Selection |
|---|---|---|---|---|---|---|---|---|---|
| Mill Feed | TPH | 139.53 | 130.00 | 60.0 | 130.0 | 160.0 | 250.0 | 8.0 | |
| Seperator Speed | % | 66.98 | 57.00 | 50.0 | 62.0 | 67.0 | 85.0 | 1.0 | |
| Seperator Fan Speed | % | 90.68 | 90.00 | 70.0 | 90.0 | 95.0 | 100.0 | 1.0 | |
| Feed Regulating Pump | % | 16.32 | 18.31 | 0.0 | 2.0 | 25.0 | 70.0 | 2.0 | |

Target Variables

| Parameters | Unit | PV_Actual | Target | LCL | UCL | OK Status | |
|---|---|---|---|---|---|---|---|
| RP Load KW Avg | KW | 1023.56 | 1100.0 | 800.0 | 1200.0 | RP LOAD OK | MCX On / Off |
| BM MD Load KW Avg | KW | 1797.03 | 1800.0 | 1600.0 | 2000.0 | BM MD LOAD OK | |
| RP Bin Level | MT | 5.22 | 5.5 | 1.0 | 9.0 | RP BIN LVL OK | |
| BM Discharge BE Load | KW | 21.13 | 20.0 | 10.0 | 30.0 | BM BE LOAD OK | MCX Ready MCX OK |
| Seperator Fan Load | KW | 350.77 | 380.0 | 340.0 | 420.0 | SEP FAN LOAD OK | |
| Blain (Predicted) | M2/KG | 250.54 | 300.0 | 290.0 | 310.0 | | |
| Blain (Intercept) | 300.0 | | | | 1.60 | 0.00 | Scan Time 35 |
| Blain (QCX) | 300.0 | | | | 28.00 | 4.00 | |

## UTCL :: Malhar Cement Works
### Cement Mill 4 (Line - 3) MCX Model

Manipulated Variables

| Parameters | Unit | PV_Actual | SP_New | Min | LCL | UCL | Max | Step | Selection |
|---|---|---|---|---|---|---|---|---|---|
| Mill Feed | TPH | 103.40 | 120.00 | 30.0 | 100.0 | 135.0 | 160.0 | 5.0 | |
| Seperator Speed | % | 55.28 | 54.00 | 40.0 | 54.0 | 60.0 | 65.0 | 1.0 | |
| Seperator Fan Speed | % | 92.22 | 93.47 | 70.0 | 90.0 | 94.0 | 110.0 | 1.0 | |
| Feed Regulating Gate | % | 6.05 | 6.00 | 0.0 | 4.0 | 15.0 | 100.0 | 1.0 | |

Target Variables

| Parameters | Unit | PV_Actual | Target | LCL | UCL | OK Status | |
|---|---|---|---|---|---|---|---|
| RP Load KW Avg | KW | 822.64 | 800.0 | 600.0 | 1000.0 | RP LOAD OK | MCX On / Off |
| BM MD Load KW Avg | KW | 1861.84 | 1900.0 | 1700.0 | 2100.0 | BM MD LOAD OK | |
| RP Bin Level | MT | 5.81 | 6.0 | 1.0 | 9.0 | RP BIN LVL OK | |
| BM Discharge BE Load | KW | 19.22 | 22.0 | 8.0 | 28.0 | BM BE LOAD OK | MCX Ready MCX OK |
| Seperator Fan Load | KW | 408.48 | 410.0 | 400.0 | 440.0 | SEP FAN LOAD OK | |
| Blain (Predicted) | M2/KG | 296.95 | 290.0 | 270.0 | 310.0 | | |
| Blain (Intercept) | 195.0 | | | | -1.30 | -0.65 | Scan Time 35 |
| Blain (QCX) | 295.0 | | | | 26.00 | 2.00 | |

# Innovative Projects-4 Savings

| Parameters (CM4) | Units | MCX OFF | MCX ON |
|---|---|---|---|
| | | OPC | |
| Fresh feed TPH | TPH | 103 | 106 |
| RP MD kW | kW | 798 | 843 |
| BM MD kW | kW | 1939 | 1956 |
| Specific Power (RP MD kW +BM MD kW/Feed) | KWH/ton | 26.57 | 26.32 |
| Product BE Load | kW | 20.73 | 21.33 |
| RP BE Load | Amps | 43 | 45 |
| BM BE Load | Amps | 17 | 14 |
| Separator Speed | RPM | 53 | 51 |
| Separator Fan Speed | RPM | 92 | 92 |
| Blaine Target | M2/kg | 300 | |
| Blaine (Lab reading) | M2/kg | 299 | 297 |

| Parameters (CM5) | Units | MCX OFF | MCX ON |
|---|---|---|---|
| | | PPC | |
| Fresh feed TPH | TPH | 146 | 150 |
| RP MD kW | kW | 865 | 806 |
| BM MD kW | kW | 1756 | 1798 |
| Specific Power (RP MD kW +BM MD kW/Feed) | KWH/ton | 17.9 | 17.36 |
| Product BE Load | kW | 31.7 | 33.1 |
| RP BE Load | Amps | 87 | 67 |
| BM BE Load | Amps | 17 | 16 |
| Separator Speed | % | 67 | 66 |
| Separator Fan Speed | % | 95 | 95 |
| Blaine Target | M2/kg | 350 | |
| Blaine (Lab reading) | M2/kg | 352 | 353 |

# Fly Ash generation & Utilisation

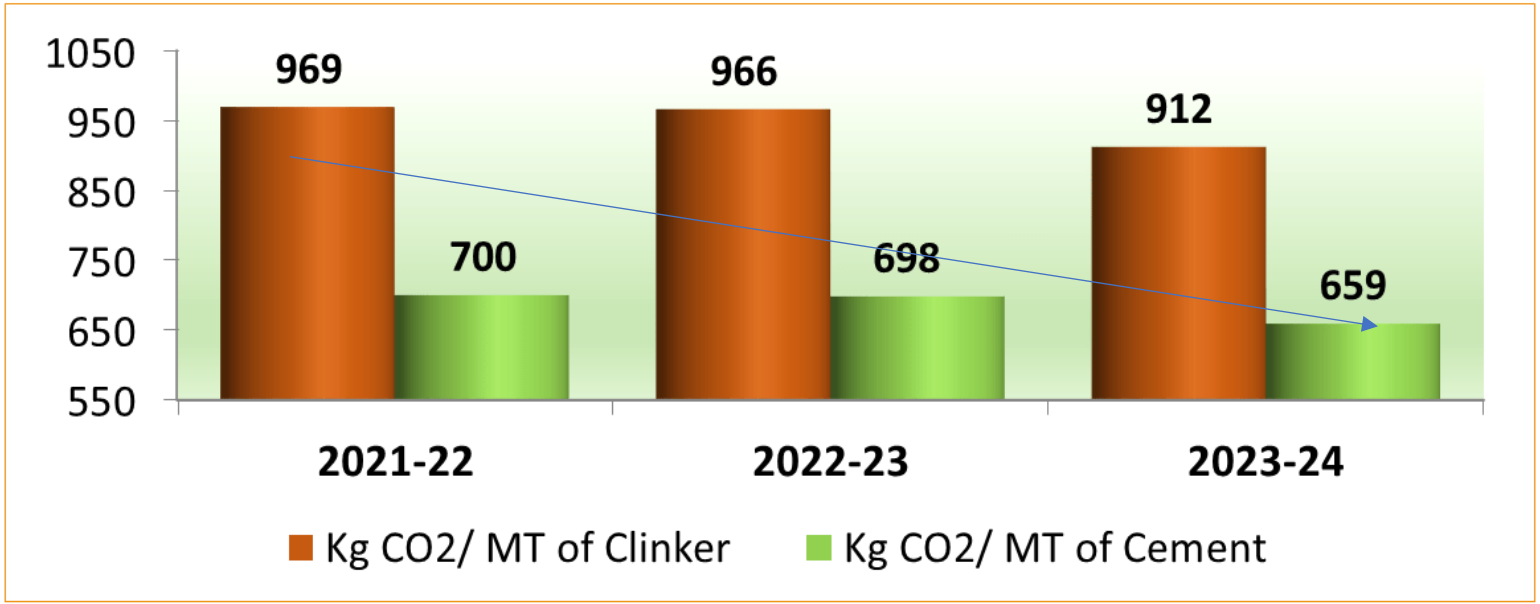
| Parameters | UOM | 2021-22 | 2022-23 | 2023-24 |
|---|---|---|---|---|
| **Ash Generated** | Tons | 55549 | 55976 | 62252 |
| **Ash Utilization** | % | 100 | 100 | 100 |
| **Ash Utilized in manufacturing of cement/concrete –other similar products** | % | 100 | 100 | 100 |
| **Total CO2 per MT Clinker** | kg/MT Clk | 969 | 966 | 912 |
| **Reduction in Co2 emission** | t Co2/Yr | 53,827 | 54,073 | 56,774 |

100 % fly ash utilization in cement plant

# Green House Gases - Inventorization

Confederation of Indian Industry

## Specific $CO_2$ Emission




### Steps undertaken for Reducing Carbon Footprint

- 7.6 MW Waste Heat Recovery System at Line-3.
- Increase Fly ash percentage in PPC manufacturing.
- Increase in production share of Blended Cement.
- Heat rate reduction by 53 kcal/kg clinker.( earlier )
- Biogas plant at colony for gasification by using kitchen waste.( 500KG )
- Use of hazardous waste / Alternate fuels in kilns.
- 100 KW Solar panels at Township.
- Planted around 4.93 lacs trees till 2024.

### Action Plan to achieve < 400 kg /MT of cement:-

**Short Term:**

- **Increase the AFR utilization from 1.3 % to 10 %**
- **Increase of PPC product ratio from 55 % to 75 %**

**Long Term:**

- **Negative carbon footprint on 2040**
- **Carbon Capturing & Utilization**
- **By introducing Composite cement**
- **100% AFR utilization in PC**

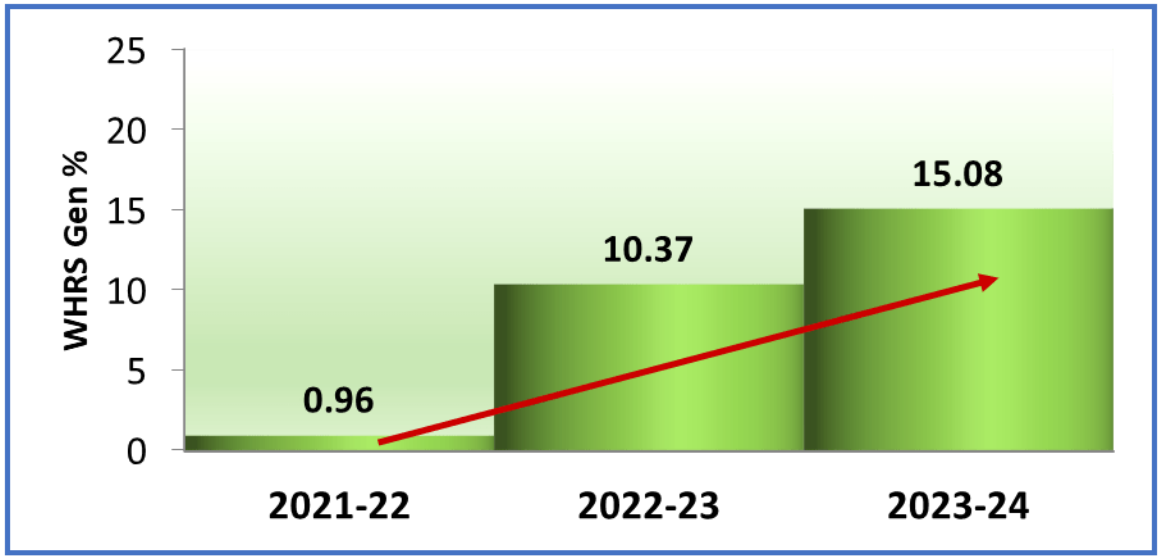
# Utilization of renewable energy sources

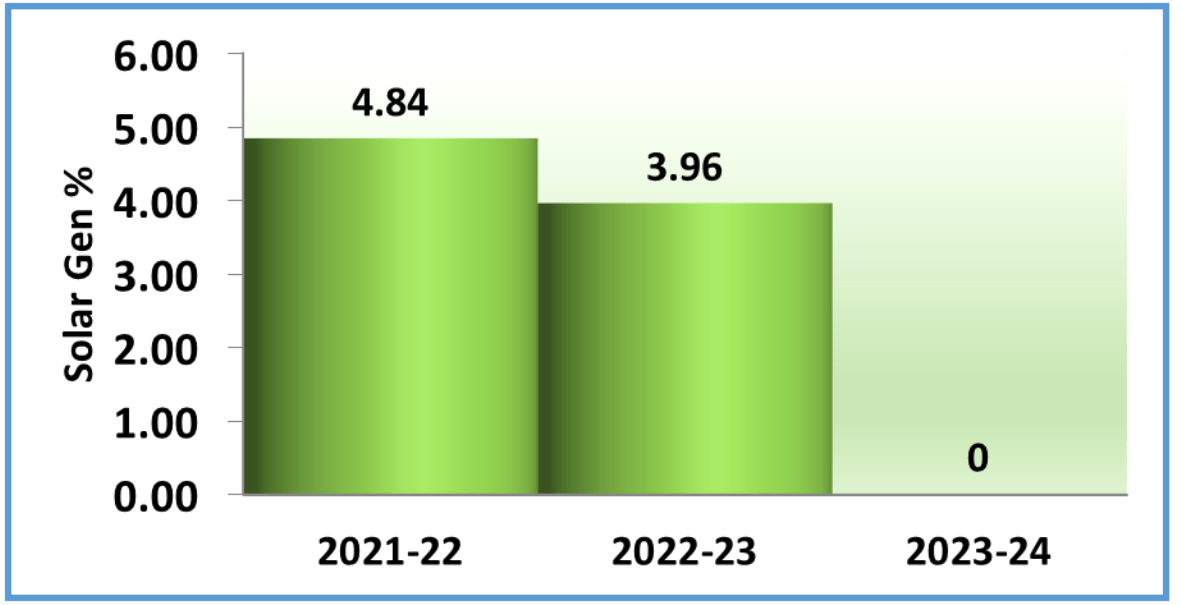
12MWH Solar panels


Bio gas plant at colony

7.6 MW WHRS

Solar pipe lights




**Reduction in solar generation during FY 24 due to replacement of Old solar panels with new 12 MWH solar panel installation**

# Water Conservation Measures

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## Measure initiatives:-

- Rainwater harvesting reservoir of capacity 5.75 La M3
- Sewage Treatment Plant (STP) with Activated sludge process.
- Treated waste water utilization for Process, Greenbelt & Water Spray.
- Zero waste water Discharge from Plant & Colony.
- Rain water harvesting & collection at Mines pit.
- Air Cooled Condensers (ACC) at TPP Line 1& 2.

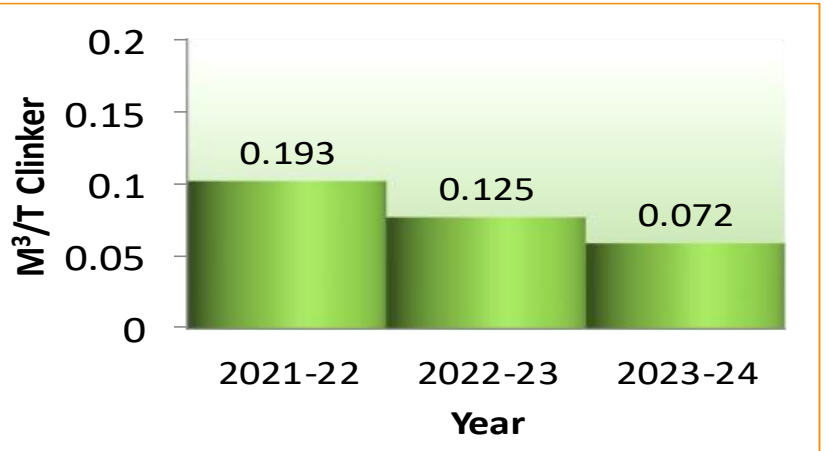
Air Cooled Condensers - TPP

Rain Water harvesting Mines

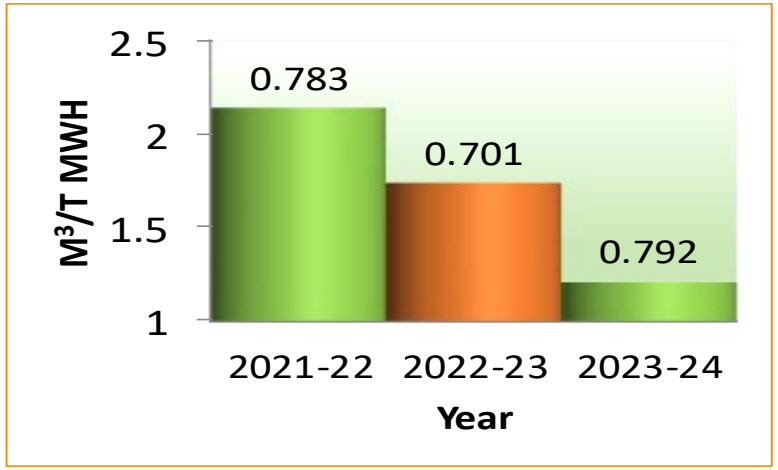
New clarifier - STP

Waste water utilization Pond

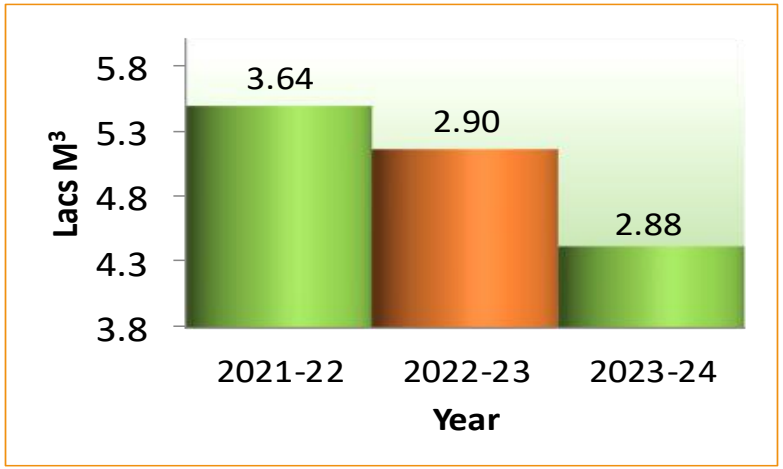
### Plant Water Consumption




### CPP Water Consumption




### Colony Water Consumption



# Water Conservation Measures

Check Dam
(Tamus River)

Total Beneficieries

*16 NO's Villages & 26,000 Peoples*

**Rain Water Harvesting**

**Rain water collection channel to Reservoir & Recharge Shaft**

# Public disclosure of GHG emissions

Confederation of Indian Industry

We are committed to proactively addressing environmental degradation by integrating sustainability into our business strategy. Our ESG long-term targets are set, and we regularly monitor our progress. Additionally, our executives' compensation is linked to our well-defined sustainability and safety targets, reassuring effective implementation and execution of our ESG strategy.

## Climate change, and emissions

**27%**
Reduction in net specific Scope 1 carbon emission

**34%**
Electricity to be met through a combination of RE+WHRS by 2024

**12%**
Reduction of net specific Scope 1 carbon emission

**19.27%**
Of electrical consumption met through green energy

## Water management

**5 times**
Water positive by 2024

**4.17**
Times water positive

## Biodiversity

**Biodiversity assessment**
At all our integrated Units by 2024

**No Net Loss**
by 2050

**12**
Integrated Units undertaken for comprehensive assessments

**100%**
Assessment of all Units under EIA

## Health & safety

**Zero**
Fatality

**<0.25**
Lost Time Injury Frequency Rate (LTIFR)

**86%**
Reduction in fatality from last year

## Sustainable supply chain

New suppliers to be screened for ESG criteria every year

Coverage of 25% Tier 1 suppliers through sustainable supply chain awareness sessions by 2025

**100%**
Suppliers screened for ESG criteria

**100%**
Assessment of critical suppliers

**20%**
Tier-1 supplier training completed

## Product stewardship

Complete IGBC Greenpro certification of all blended cements

Complete Life Cycle Assessment studies

Complete Environment Product Declaration (EPD)

**5**
Cement products awarded GreenPro certification

**4**
types of cement received complete Life Cycle Assessments

**4**
types of cement received Environment Product Declaration

# Net Zero Commitment

## Energy transition

**Increased Capacity**: RE capacity up by 77% to 612 MW; WHRS up by 32% to 278 MW since FY23.

**RE100 Goal**: Targeting 100% renewable electricity by 2050; interim goal of 85% by 2030.

**EP100 Milestone**: Doubled energy productivity by FY24, well ahead of our 2035 target.

## Circular Economy

**Recycled Inputs:** Utilized 33.64 million tonnes of recycled materials, 20.84% of total inputs in FY24.
**Alternative Fuels**: Achieved 5.12% TSR using 1.59 million tonnes of waste, reaching 3.4 times plastic-negative.
**Zero Waste Goal**: Integrated circular economy, using industrial waste like fly ash to produce blended cement, aiming for “zero waste and no landfill.

## Decarbonization

**Net Zero by 2050**: Committed to achieving 'Net Zero' by 2050, aligned with the GCCA's roadmap.
**Green Fleet Expansion**: Pledging to deploy 500 electric trucks and 1,000 CNG/LNG vehicles by June 2025.
**Reducing Scope 3** Emissions: These efforts support India's 'e-Fast initiative' and aim to cut Scope 3 emissions.

# Road Map to achieve Net Zero by 2050 ( MCW)

ADITYA BIRLA UltraTech

Confederation of Indian Industry

## 2023 — PHASE - 1 — INITIAL ACTIONS

- Reduced Coal Consumption by Co-firing of Alternative fuels in Kilns (22%) and in CPP (10%)
- Use of Beneficiated Coal (ash content ≤ 34%) in CPP
- Solar Plants of 2.7 MW within the Industry and 100 MW for Carbon Offsetting
- Carbon Capture for Kiln 3 (0.5 Million tons $CO_2$/y)
- Plantation of 2 lakh trees within the Industry in 2023 and 1.5 lakh trees/year for Carbon Offsetting
- Biogas plants for Carbon Offsetting using MSW (60 t/d × 2) and Cow dung (4.2 t/d × 1)
- Replacing Fossil fuel-based vehicles with Electric vehicles or vehicles using Bio-fuel (20%)

**29%**
**Reduction in Net $CO_2e$**

## 2030 — PHASE - 2 — ACCELERATING ACTIONS

- Reduced Coal Consumption by Co-firing of Alternative fuels in Kilns (43%) and in CPP (30%)
- Additional Solar Plants of 5 MW within the Industry and 150 MW for Carbon Offsetting
- Additional Carbon Capture for Kilns 1 & 2 (1.0 Million tons $CO_2$/y)
- Increase the Clinker Substitution in Cement – replacing 25% OPC with $LC^3$-50 cement and reduce the clinker factor for PPC to 0.58
- Additional Plantation of 2 lakh trees/year outside the Industry for 10 years for Carbon Offsetting
- Additional Biogas plants for Carbon Offsetting using MSW (60 t/d × 4) and Cow dung (4.2 t/d × 4)
- Replacing Fossil fuel-based vehicles with Electric vehicles or vehicles using Bio-fuel (Additional 20%)

**35%**
**Reduction in Net $CO_2e$**

## 2040 — PHASE - 3 — ADVANCING ACTIONS

- Reduced Coal Consumption by Co-firing of Alternative fuels in Kiln 4 (43%) and in CPP (30%): Electrification of Kiln 3 and Green Hydrogen in Kilns 1 & 2
- Additional Solar Plants of 5 MW within the Industry and 250 MW for Carbon Offsetting
- Additional Carbon Capture for Kiln 4 (1.5 Million tons $CO_2$/y)
- Increase the Clinker Substitution in Cement – replacing 50% OPC with $LC^3$-50 cement and reduce the clinker factor for PPC to 0.52
- Additional Plantation of 3 lakh trees/year outside the Industry for 10 years for Carbon Offsetting
- Additional Biogas plants for Carbon Offsetting using MSW (60 t/d × 4) and Cow dung (4.2 t/d × 8)
- Replacing Fossil fuel-based vehicles with Electric vehicles or vehicles using Bio-fuel (Additional 30%)

**51%**
**Reduction in Net $CO_2e$**

## 2050 — TARGET

**CARBON NEGATIVE BY 2050**

CARBON NEGATIVE

# Learnings from CII energy awards

- Reduction of Radiation losses by applying heat resistant paint
- Daily monitoring of process parameter with graphical method to improve KPI.
- Daily monitoring of process parameter with graphical method to improve KPI.
- Establishment of benchmarking figures to achieve the targeted KPIs.
- Horizontal replications of projects that can be implemented across the Units.
- Various events and training programs conducted by CII are extended learning and knowledge sharing platforms where we can unearth the best practices, latest technologies and future roadmaps to achieve Excellence in energy efficiency.

# Awards & Recognitions

Maihar Unit wins the prestigious National Energy Conservation Award on 14th Dec'2023 2023


Maihar Cement Works received Special Jury Award and 5 Star Rating for Energy Conservation at 16th CII-ENCON Award-2023


Maihar Unit wins 2nd prize in the " World Water Week" Celebration Contest-2023 organized by Corporate Sustainability Cell in Aug'2023

Mr Jagdish Tiwari (FH-Project , Technical) facilitated with ABG Achievers award at ABG Award function, Atlanta


Successfully upgradation of Pyro project

CSR : Construction of Check Dam under CSR on 20th Jul'23, benefitting over 25,000 villagers by providing a sustainable source of water for household and agricultural purposes.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UltraTech
THANK YOU!