



Chettinad Cement

**Mentor : Shri. K Saikumar
(Unit Head)**

Team Members :

**Mr. PR Ganesan (DGM-Operations)
Mr. Siddaling (DGM-Mech)
Mr. Raj Ganesh Pandian (Dy.Mgr, Operation)**

Chettinad Cement- Kallur works

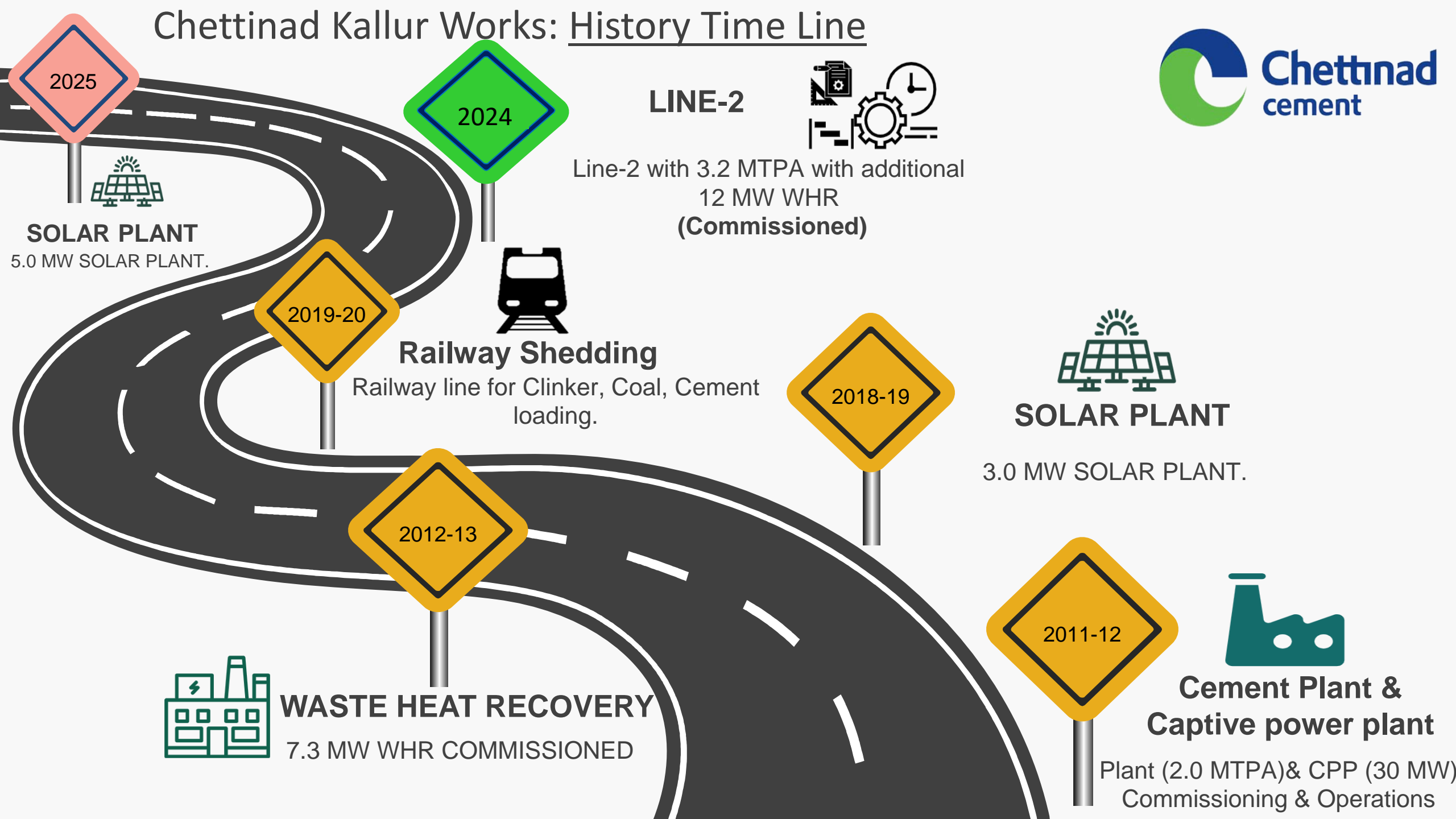
Plant Overview



Group Installed Capacity (Clinker)	16.4 MTPA
Plant Installed Capacity (Clinker)	2.0 MTPA
Installed Capacity (Cement)	2.5 MTPA
Captive Power Plant	30MW
WHR Power Plant	7.3 MW
Solar Power Plant	3.0 MW
Product Range	OPC, PPC & Max Crete

Chettinad Kallur works is the first green field cement manufacturing unit with a capacity of 2.0 MTPA at Kallur works, Chincholi Taluk, Gulbarga district during the year 2011-12. The plant was commissioned in Sept'2012 with a designed capacity of 6000TPD. Over a period of time, the plant capacity is enhanced to 7500 TPD Clinker and 2.5 MTPA Cement by various in-house modifications

Chettinad Kallur Works: History Time Line



2025



SOLAR PLANT
5.0 MW SOLAR PLANT.

2024

LINE-2



Line-2 with 3.2 MTPA with additional
12 MW WHR
(Commissioned)

2019-20



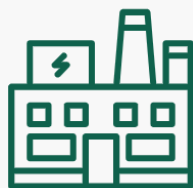
Railway Shedding
Railway line for Clinker, Coal, Cement
loading.

2018-19



SOLAR PLANT
3.0 MW SOLAR PLANT.

2012-13



WASTE HEAT RECOVERY
7.3 MW WHR COMMISSIONED

2011-12



**Cement Plant &
Captive power plant**
Plant (2.0 MTPA)& CPP (30 MW)
Commissioning & Operations



Technology/specifications of major sections



**Crusher Thysen krupp
1200 TPH**



**Stacker/Reclaimer Takraf.
LS pile Cap 23000 MT x 2**



**Raw Mill 1&2 (RP) FLS -
2* 240 TPH**



**Coal Mill
VRM Attox30 - 75 TPH**



**Design: 6000 TPD; Operating 8000 TPD; 5 Stage ,2 String ILC
Kiln 4.75 mØ x 74m L
Cooler SF 4x6 F**



**HRP with Ball Mill, FLS
270 TPH (OPC)**



**Packing Plant Conweigh 3No x 180
TPH, Fls : 1No x 120 TPH**



Clinker Wagon Loading



Cement Truck Loading



Cement Wagon Loading



Coal /GYP Wagon Tippler



Kallur Works : Core Objectives



01

Safety & Environment

Giving first priority to safety & environment , developing operation in more sustainable & responsible way

02

Clinker Cost Reduction

Plant operation excellency by reducing the clinker variable cost by optimizing the fuel & raw mix design considering quality

03

Power Cost Reduction

Reducing the power cost by focusing on power mix adopting latest advancements

04

AFR - %TSR Improvement

To achieve target Substitute of thermal energy which given financial and sustainable benefit

05

Green Focus

Green focus by clinker reduction by blended substitute ,WHR,SOLAR, AFR ,Power saving

06

Plant diagnosis

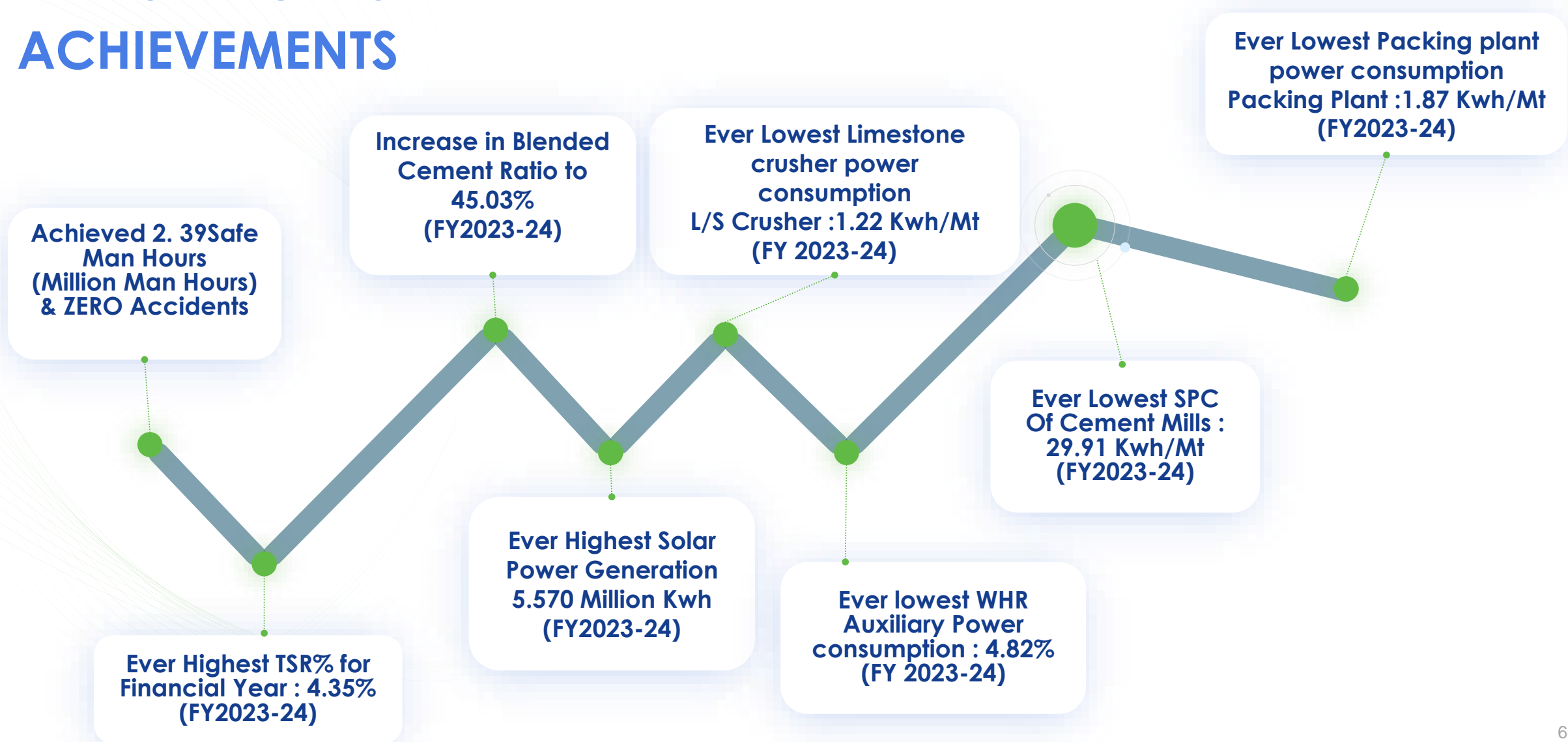
Continuous monitoring of plant equipment & analyzing the overall equipment effectiveness

07

Lean Manufacturing

KAIZENS,5S, Why-why Continuous learning , Skill development

KALLUR WORKS ACHIEVEMENTS





Implementation of ISO 50001:2018

- ❖ Kallur works has been certified ISO 50001 by BSI.
- ❖ Quality Management System ISO 9001:2015.
- ❖ Environment Management System ISO 14001:2015.
- ❖ OHSAS Management System ISO 45001:2018.



Certificate of Registration

OCCUPATIONAL HEALTH & SAFETY MANAGEMENT SYSTEM - ISO 45001:2018

This is to certify that: Chettinad Cement Corporation Private Limited
Kallur Works, Sangam-K
Bhaktampalli (PO)
Chincholi(TQ)
Kalaburagi (Dt) 585 305
Karnataka
India

Holds Certificate No: **OHS 652749**

and operates an Occupational Health and Safety Management System which complies with the requirements of ISO 45001:2018 for the following scope:

Mining of Limestone, Crushing, Clinkerization, Cement Grinding, Packaging & Dispatch of Cement & Clinker and Generation & Export of Power.

[Previously certified to BS OHSAS 18001:2007 since 22/07/2016]

For and on behalf of BSI:


Michael Lam - Managing Director Assurance, APAC

Original Registration Date: 2021-03-11
Latest Revision Date: 2022-06-30

Effective Date: 2022-07-08
Expiry Date: 2025-07-07

Page: 1 of 1

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Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that: Chettinad Cement Corporation Private Limited
Kallur Works, Sangam-K
Bhaktampalli (PO)
Chincholi(TQ)
Kalaburagi (Dt) 585 305
Karnataka
India

Holds Certificate No: **FM 652747**

and operates a Quality Management System which complies with the requirements of ISO 9001:2015 for the following scope:

Mining of Limestone, Crushing, Clinkerization, Cement Grinding, Packaging & Dispatch of Cement & Clinker and Generation & Export of Power.

For and on behalf of BSI:


Michael Lam - Managing Director Assurance, APAC

Original Registration Date: 2016-07-22
Latest Revision Date: 2022-06-30

Effective Date: 2022-07-22
Expiry Date: 2025-07-21

Page: 1 of 1

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Certificate of Registration

ENVIRONMENTAL MANAGEMENT SYSTEM - ISO 14001:2015

This is to certify that: Chettinad Cement Corporation Private Limited
Kallur Works, Sangam-K
Bhaktampalli (PO)
Chincholi(TQ)
Kalaburagi (Dt) 585 305
Karnataka
India

Holds Certificate No: **EMS 652748**

and operates an Environmental Management System which complies with the requirements of ISO 14001:2015 for the following scope:

Mining of Limestone, Crushing, Clinkerization, Cement Grinding, Packaging & Dispatch of Cement & Clinker and Generation & Export of Power.

For and on behalf of BSI:


Michael Lam - Managing Director Assurance, APAC

Original Registration Date: 2016-07-22
Latest Revision Date: 2022-06-30

Effective Date: 2022-07-22
Expiry Date: 2025-07-21

Page: 1 of 1

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Certificate of Registration

ENERGY MANAGEMENT SYSTEM - ISO 50001:2018

This is to certify that: Chettinad Cement Corporation Private Limited
Kallur Works, Sangam-K
Bhaktampalli (PO)
Chincholi(TQ)
Kalaburagi (Dt) 585 305
Karnataka
India

Holds Certificate No: **ENMS 701049**

and operates an Energy Management System which complies with the requirements of ISO 50001:2018 for the following scope:

Mining of Limestone, Crushing, Clinkerization, Cement Grinding, Packing & Dispatch of Cement & Clinker and Generation of Power through Captive Power Plant and Solar Power Plant.

For and on behalf of BSI:


Michael Lam - Managing Director Assurance, APAC

Original Registration Date: 2019-03-22
Latest Revision Date: 2022-02-22

Effective Date: 2022-03-22
Expiry Date: 2025-03-21

Page: 1 of 1

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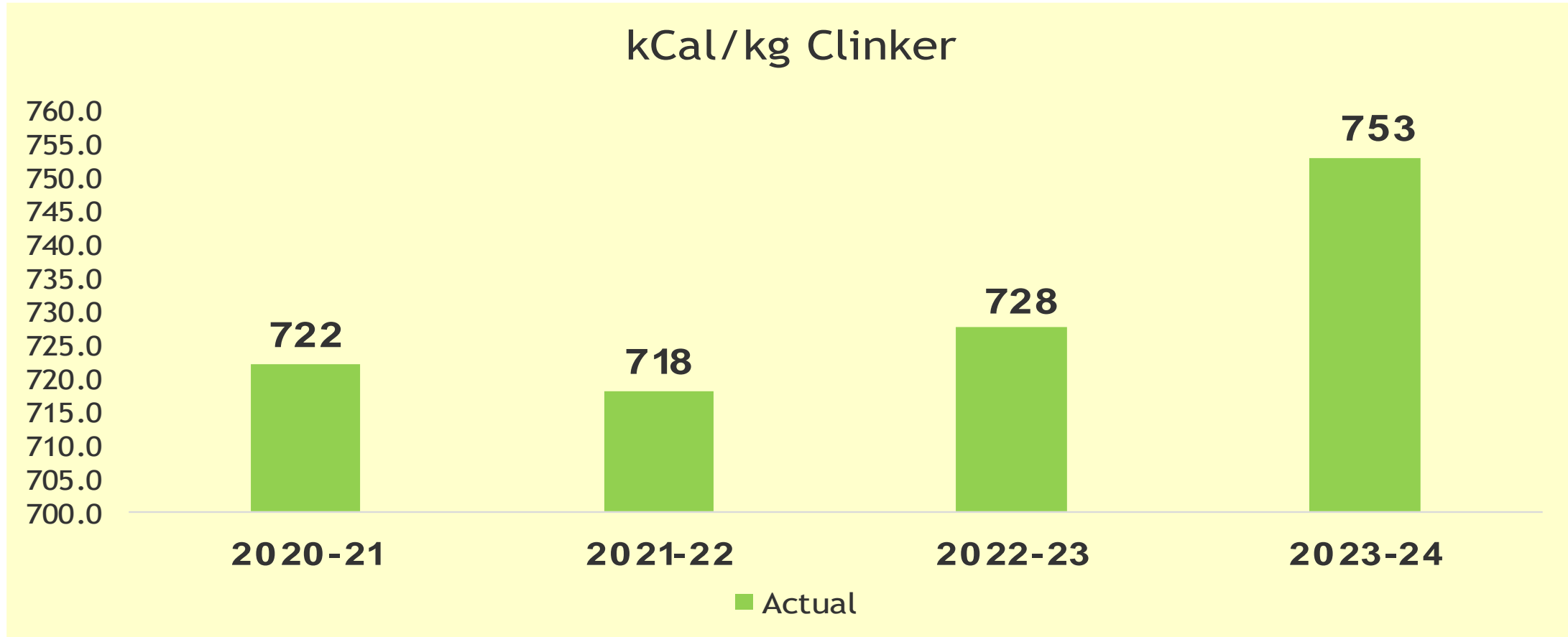


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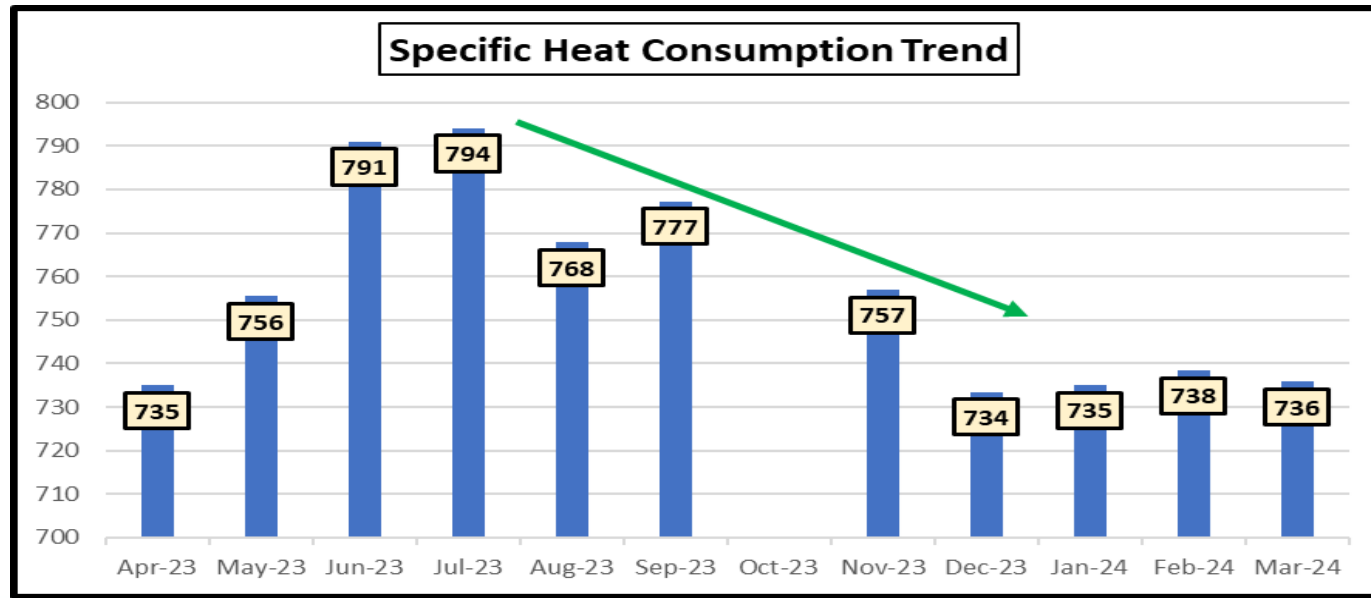
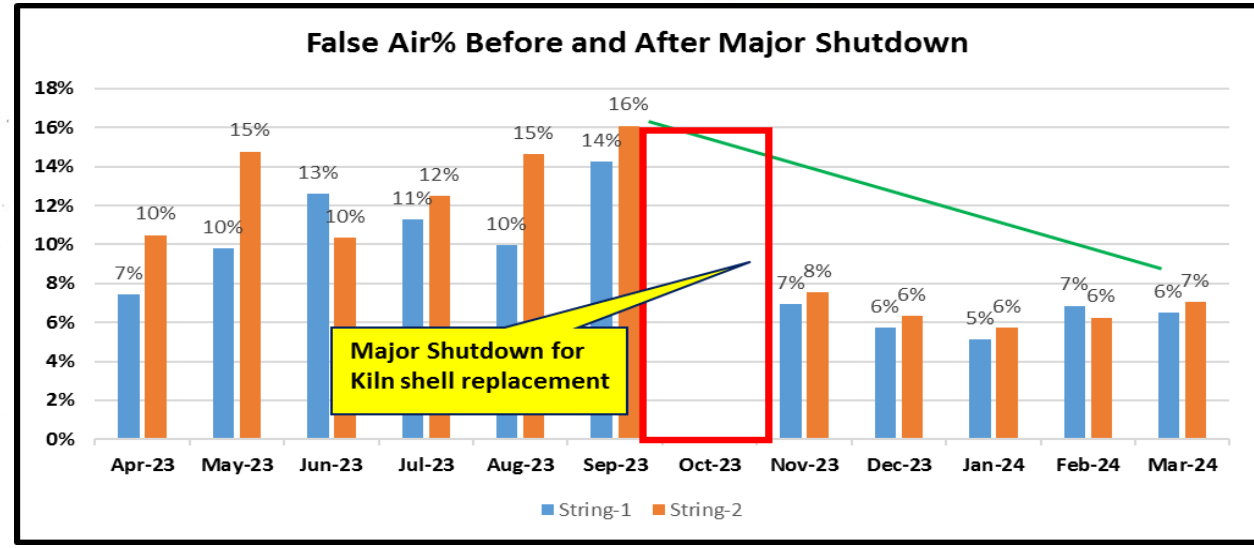
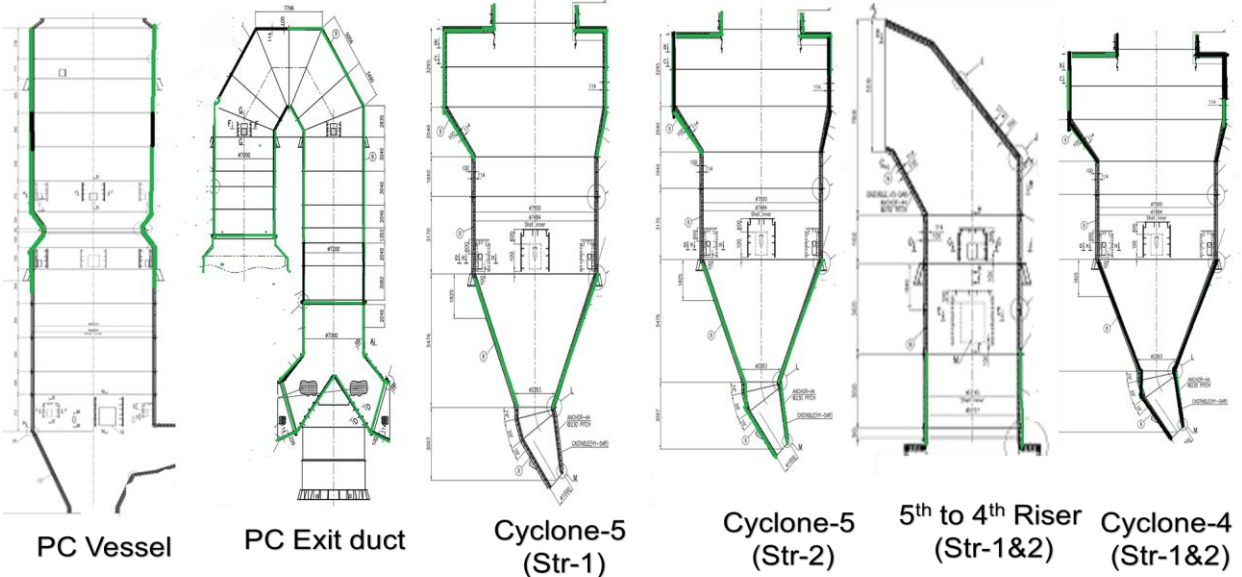
Thermal SEC (kCal/ kg clinker)



Increase in thermal energy consumption by:

- ✓ Kiln Shell Replacement was done – Major Shutdown
- ✓ Increase In pet coke usage

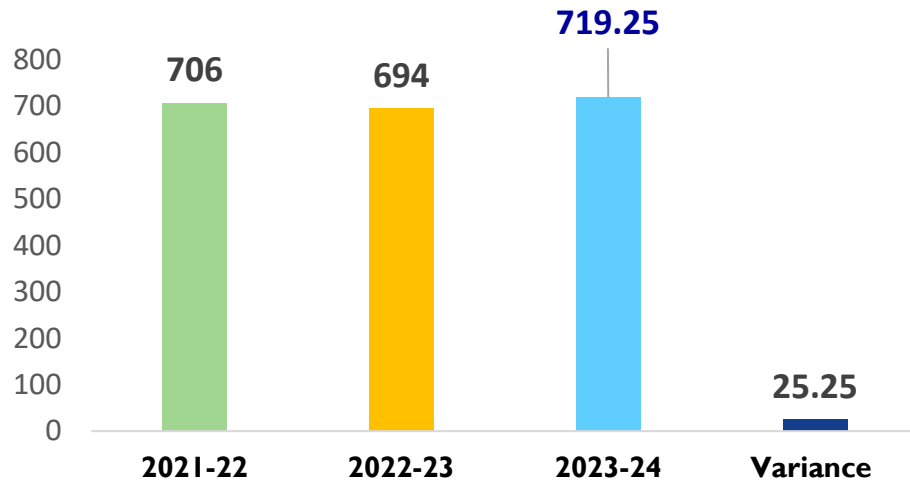
Shutdown activities and False Air Impact in SHC



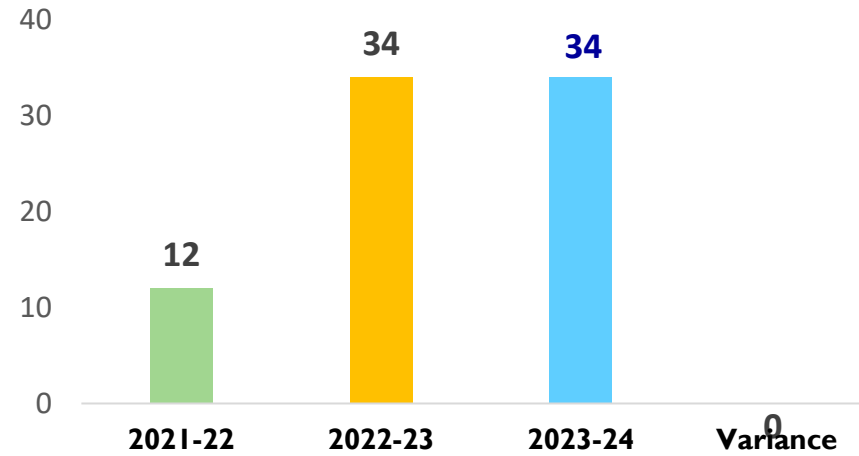
Heat Break up



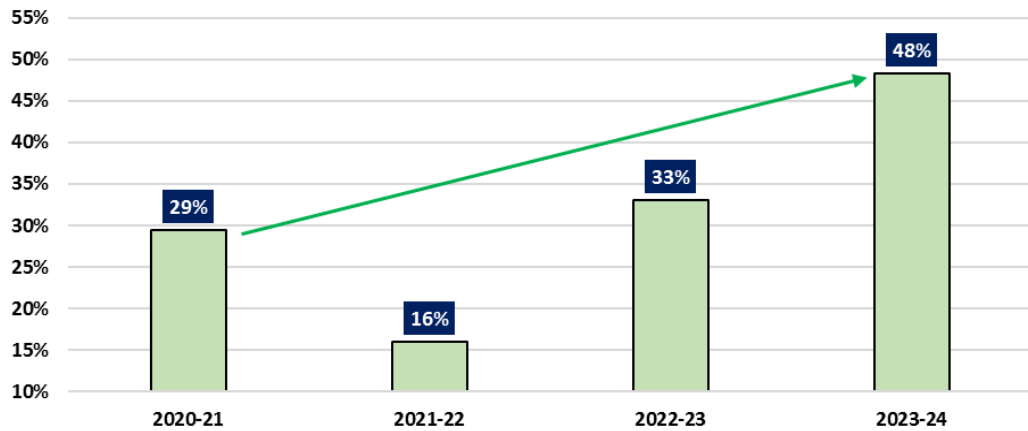
Specific Heat Through Coal (Fossil Fuel) (K Cal/ Kg.Clk.)



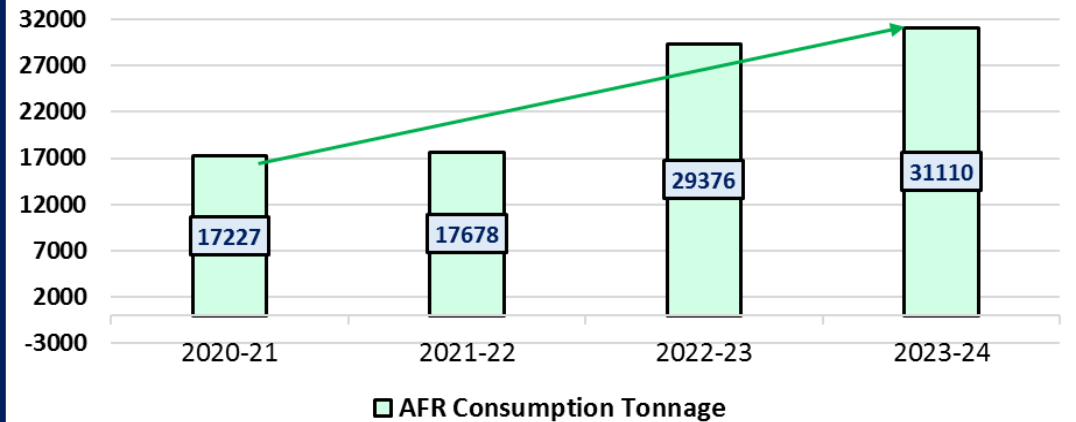
Specific Heat Through AF Materials (K Cal/ Kg.Clk.)



Petcoke% in Total Prime Fuel



AFR Consumption Tonnage



Specific Energy Consumption



Section	UOM	FY 20-21	FY 21-22	FY 22-23	FY 23-24
Crusher	KWH/MT Material	1.23	1.27	1.23	1.22
Raw Mill	KWH/MT Material	14.80	14.24	13.70	14.55
Coal Mill	KWH/MT Material	37.39	33.96	41.00	39.60
Kiln	KWH/MT Material	20.97	19.96	20.11	21.41
Clinker	KWH/MT Clinker	49.07	47.13	47.96	48.75
Services	KWH/MT Clinker	3.63	3.46	4.94	4.35
Total Clinker	KWH/MT Clinker	52.71	50.59	51.90	53.71
Cement Mill	KWH/MT Cement	29.61	29.57	33.23	29.91
Packing	KWH/MT Cement	2.46	2.13	2.015	1.87
Cement Overall factor		0.852	0.831	0.802	0.7837
Total Cement	KWH/MT Cement	77.40	74.00	75.60	74.49

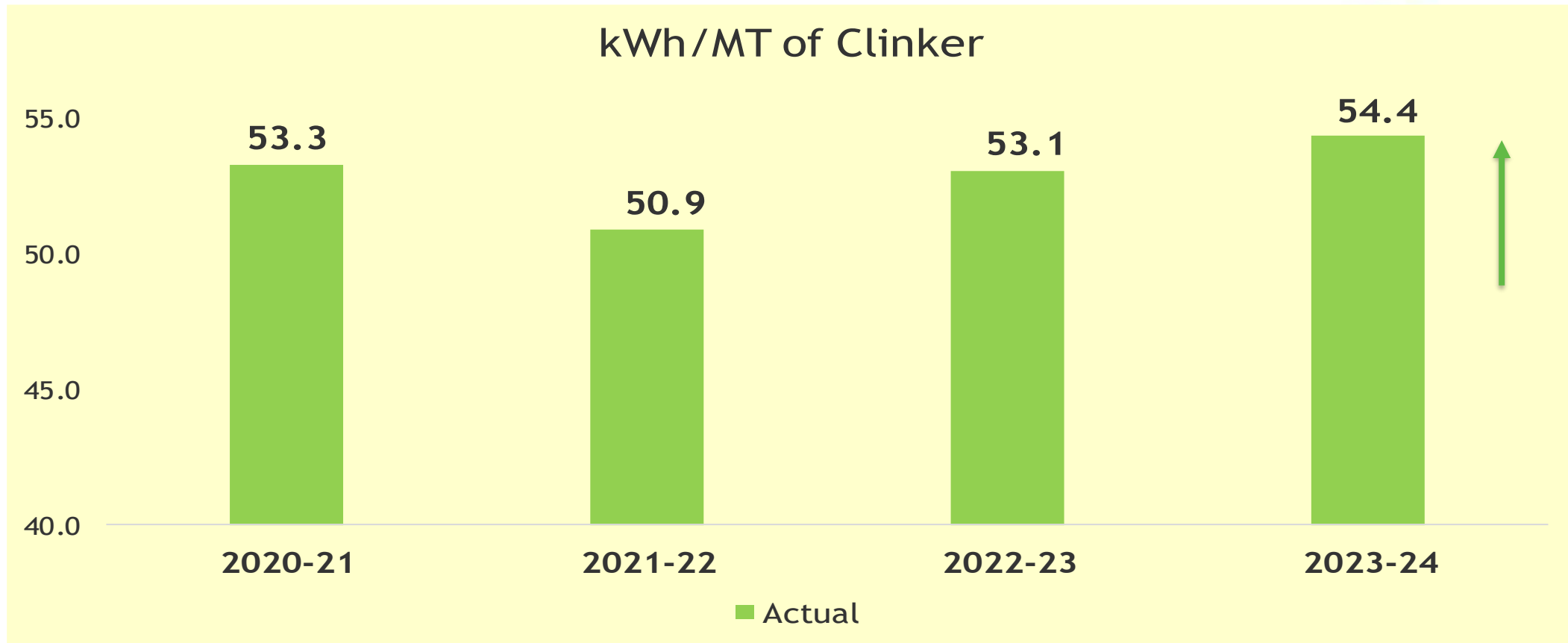
Section		FY 21-22 Inc / Dec	Value	FY 22-23 Inc / Dec	Value	FY 23-24 Inc / Dec	Value
Material	Crusher	↑	0.03	↓	(0.04)	↓	(0.01)
	Raw Mill	↓	(0.56)	↓	(0.54)	↑	0.85
	Coal Mill	↓	(3.42)	↑	7.04	↓	(1.40)
	Kiln	↓	(1.01)	↑	0.15	↑	1.30
Clinker	Clinker	↓	(1.94)	↑	0.83	↑	0.79
	Services	↓	(0.17)	↑	1.48	↓	(0.35)
	Total Clinker	↓	(2.11)	↑	1.31	↑	1.81
Cement	Cement Mill	↓	(0.05)	↑	3.66	↓	(3.32)
	Packing	↓	(0.33)	↓	(0.11)	↓	(0.15)
	Total Cement	↓	(3.25)	↑	1.40	↓	(1.11)

Increase in overall specific energy consumption by:

✓ Major Job - Kiln shell replacement



Up to clinkerization (kWh / MT clinker)



Achieved Increase in Specific energy consumption by:

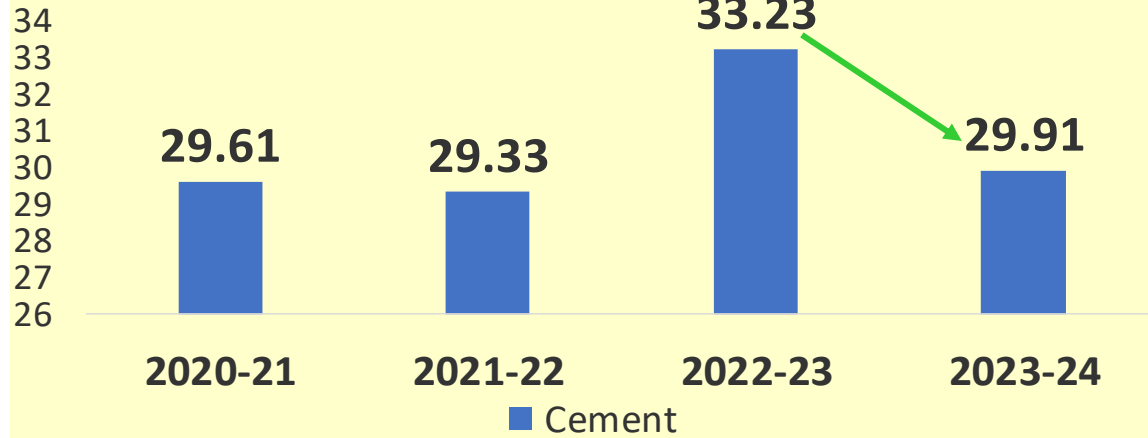
- ✓ Major Job - Kiln shell replacement
- ✓ Increase in usage of Pet coke demands Higher PH fan Flow
- ✓ AFR Usage In Pyro Operations



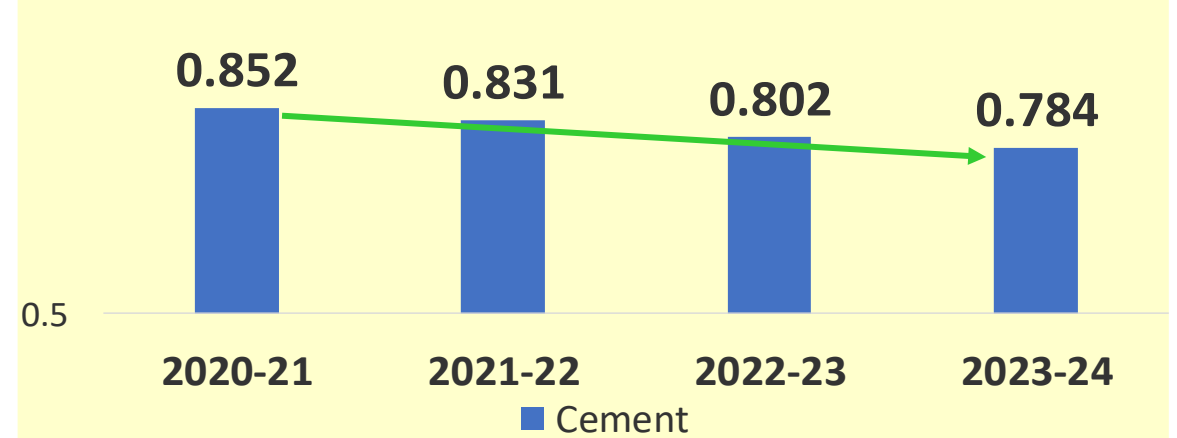
Cement grinding – Variety wise, OPC, PPC, and Maxcrete (kWh / MT cement)



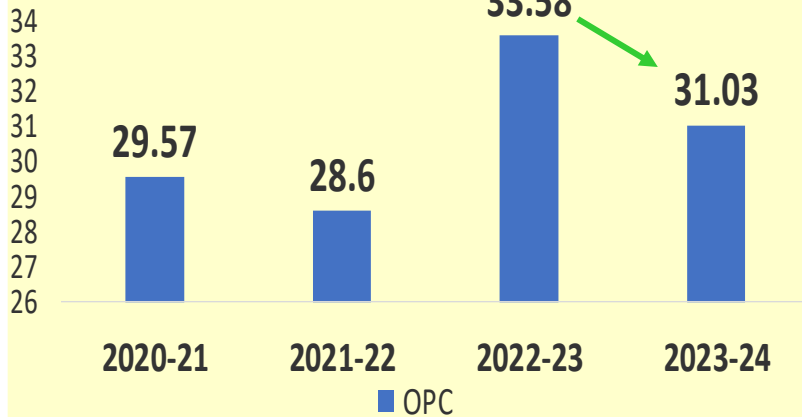
Overall Cement Grinding (Kwh/Mt of Cement)



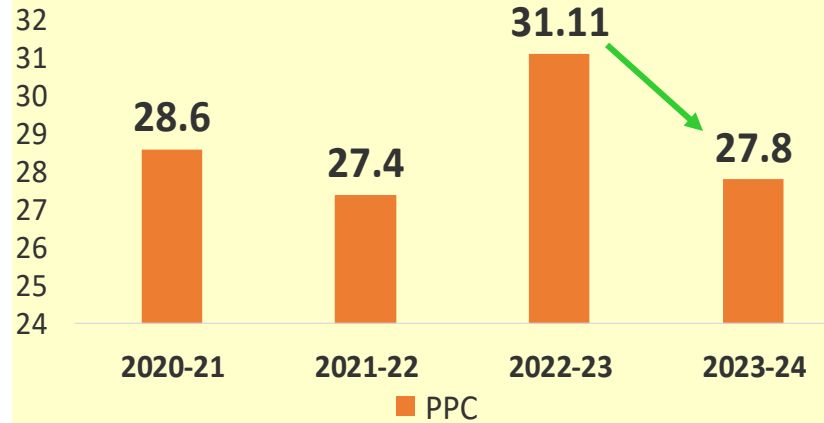
Overall Clinker Factor



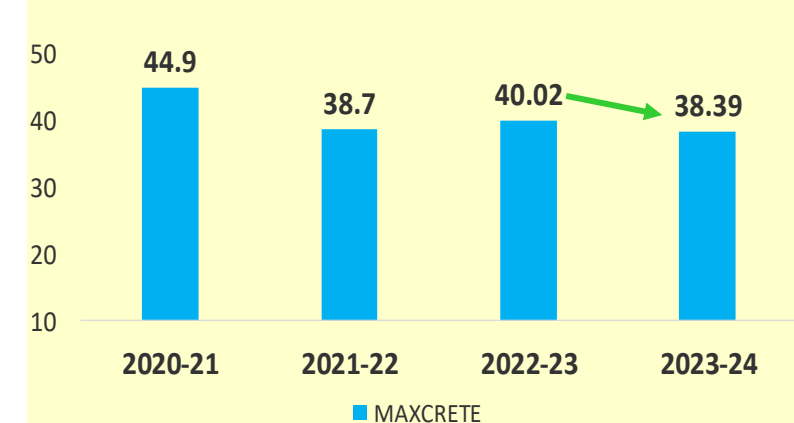
kWh/MT OPC Cement



kWh/MT PPC



kWh/MT Maxcrete

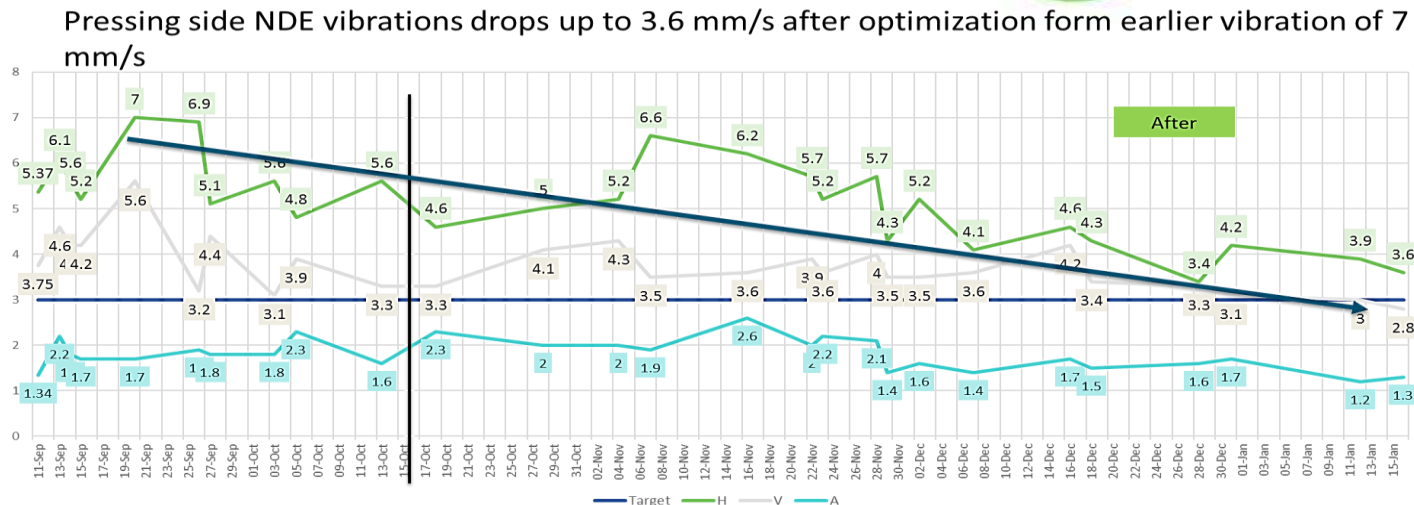


Cement Mill Case Study



Problem Definition

- Pressing side pinion vibration was in increasing trend up to 9 mm/sec both on DE & NDE side.
- ΔT of pressing side pinion was in higher side up to 13 deg C and also observed humming sound of girth gear and pinion during the contact at repaired tooth.
- Contact pattern between girth gear and pinion is on lower side .i.e. less than 30%.
- These leads vibration transferred to gear box and went up to 6 mm/sec



- CCCPL Explored the vendor for supplying high viscosity fluid grease in the Market and found M/s Klueber supplying the same type of lubricant.
- As per the suggestion of OEM & Klueber engineers it was recommended to use running-in grease for improving existing patch contact in both pinions and the girth gear.
- Grafloscon B-SG 00 Ultra was put in operation at 7 PM of 31/08/23 at the consumption rate of 16.5 Kg/Day with the cycle time of 11 Sec (3 Sec on & 8 Sec off).

Cause of the problem

- Misalignment of girth gear with Pinion
- Operated with repaired girth gear
- Uneven contact pattern

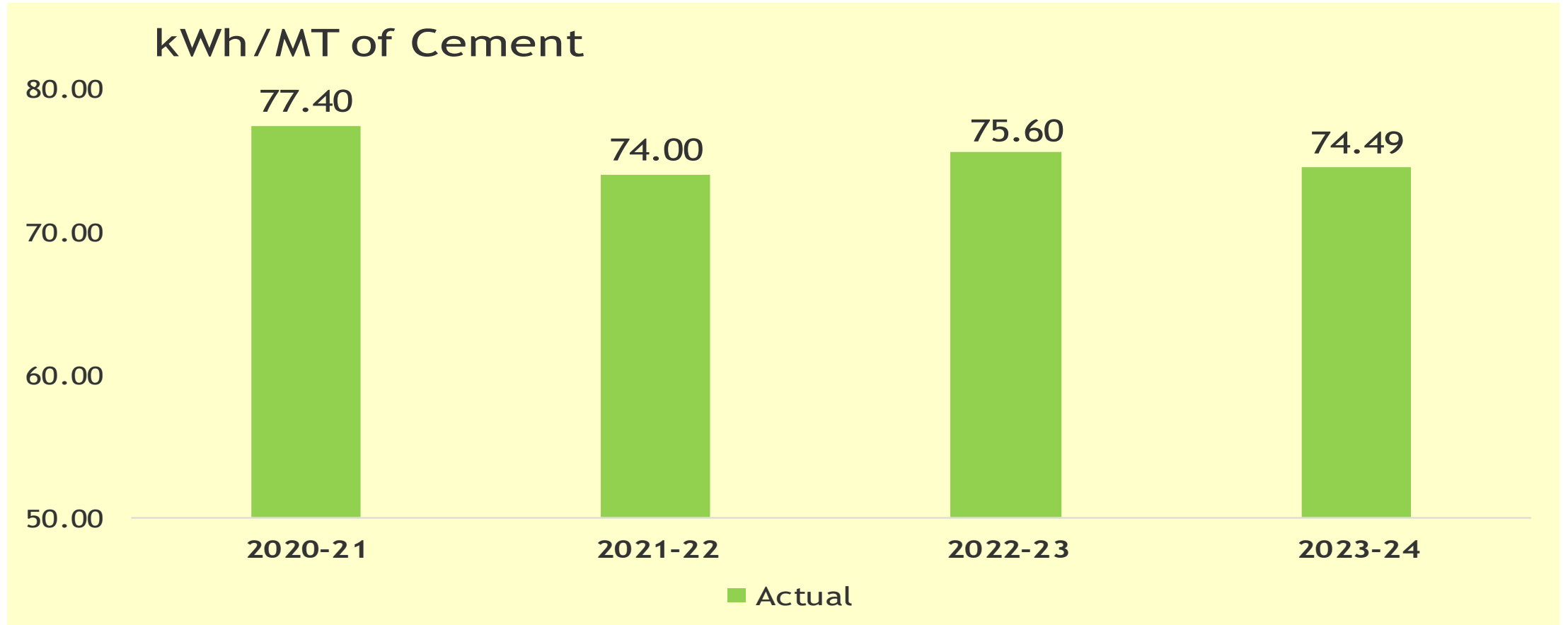
CHALLENGE

OUTCOME

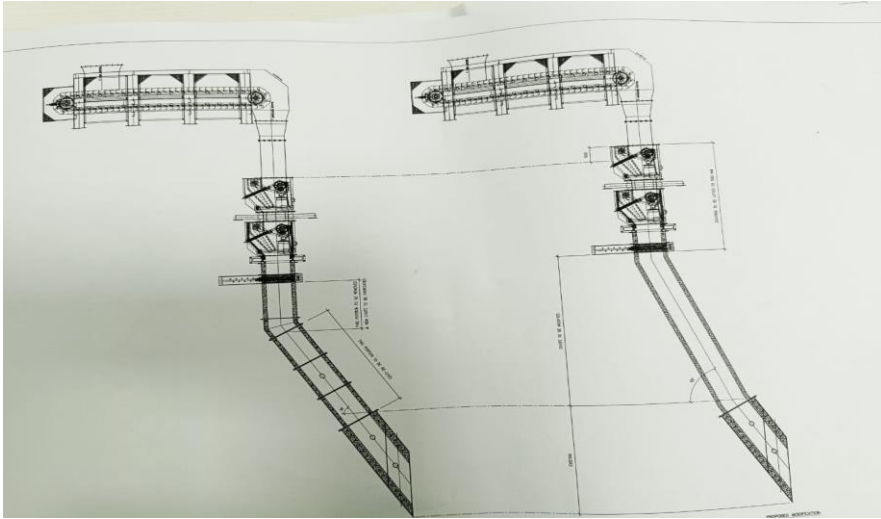
Delta T is on high side in Pressing pinion @13°C max	Reduced to 2.3°C
Delta T in Lifting Pinion @ 4.4°C	Reduced to 3.7°C
Lesser contact between pinion and GG @ 25%	Improved to more than 85%
Uneven Load Distribution	Stabilized due to contact improvement
Petron Grease consumption @ 15.5 kg/Day	Reduced to 12 kg/day with Kluber Fluid CF3 Ultra
Pressing side DE vibration increased up to 8.8 mm/s	Vibration reduced to 4.1 mm/sec
Pressing side NDE vibration increased up to 7 mm/s	Vibration reduced to 3.6 mm/sec



Overall cement (kW / MT Cement)

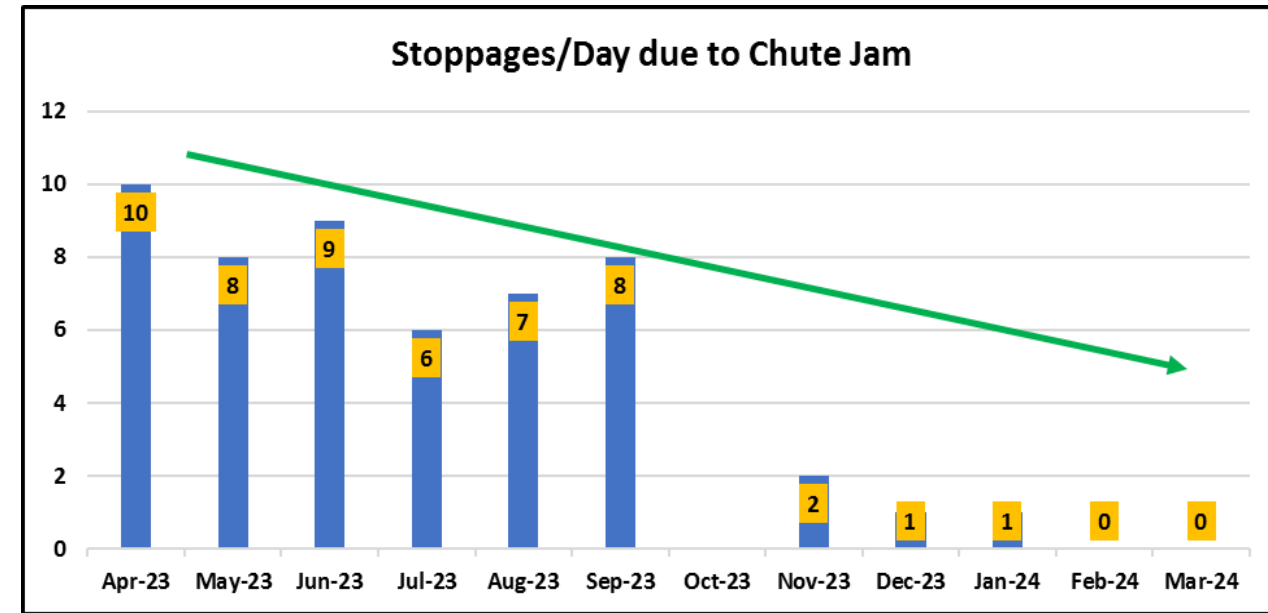
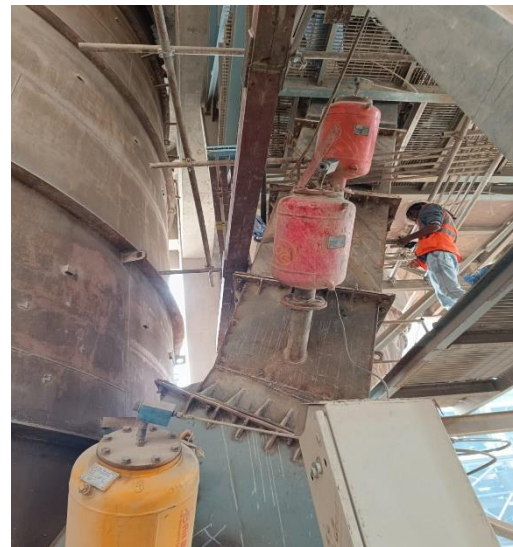


AFR Chute modification



Before

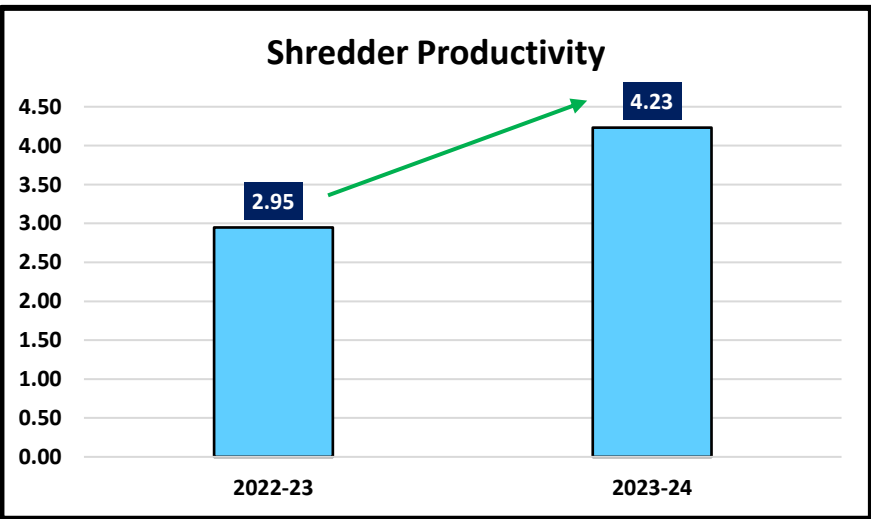
After



- * SAFR discharge chute angle modified from 60 deg to 70 deg to avoid jamming and for better performance
- * Additional chute doors have been provided to clear the jammed material frequently
- * No. of stoppages per day due to Chute Jam: 8 Nos/day
- Reduction in TSR% : 0.3% /day
- * AFR (MT) saved by avoiding stoppages/day : 11 MT
- Increase in Total AFR (MT) consumed per year: 3667 MT
- *Cost saving: Rs 34.83 Lacs



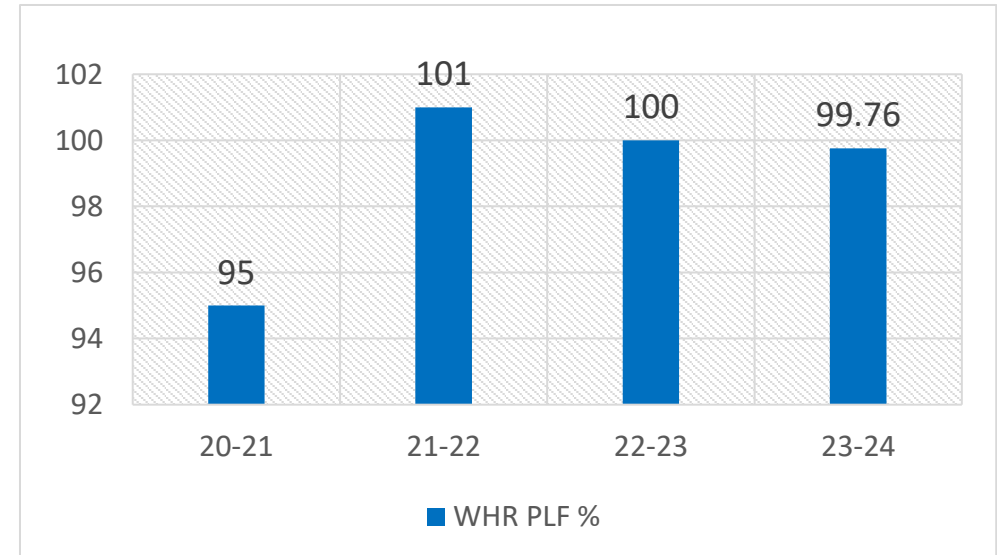
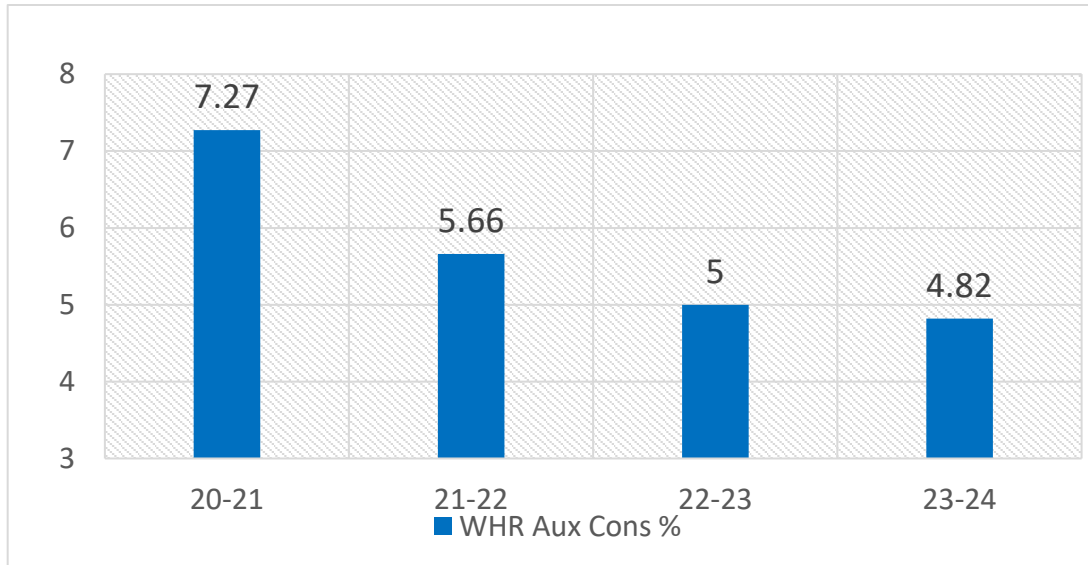
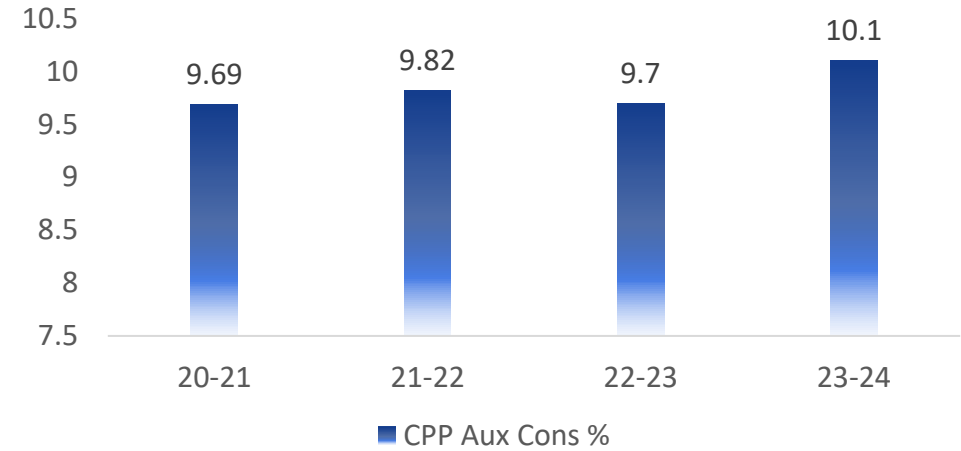
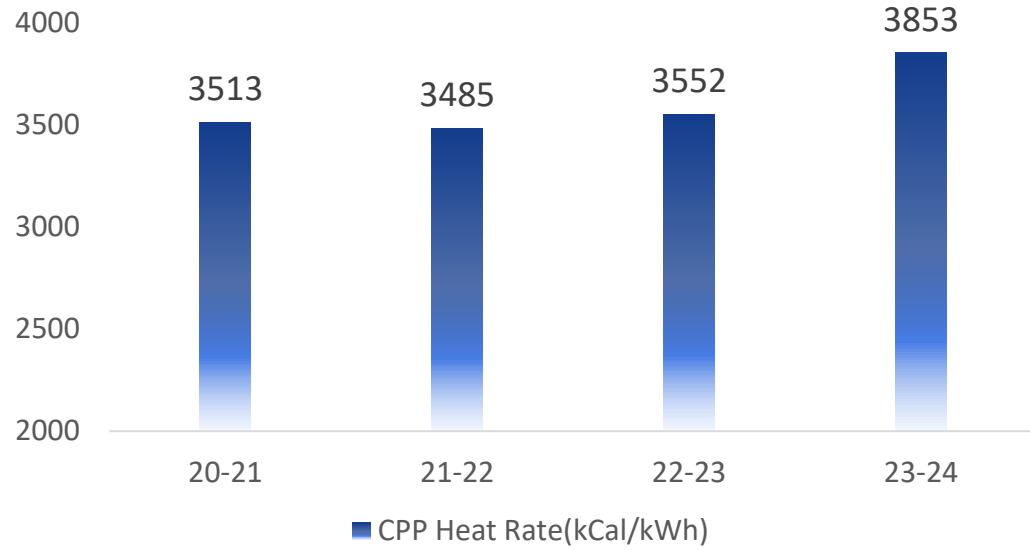
Shredder Productivity Improvement



- Shredder Productivity increased from 2.95 to 4.23 TPH.
- Primary Filtration of Shredder feed by perforated circular filter.
- Shredder Jam is automatically cleared by reverse rotation of blades.
- The AFR material is feed in a controlled constant flow manner by installation of simple counter weight controller baffle.



CPP & WHR ENERGY PERFORMANCE





CPP APH Tubes Replacement



Before



After





Renewable Energy Sources



Year	Technology (Electrical)	Type of Energy	Onsite/Offsite	Installed Capacity (MW)	Generation (million kWh)	% of overall electrical energy
FY 2020-21	Solar PV Module	Solar	Onsite	3	5.02	3.64
FY 2021-22	Solar PV Module	Solar	Onsite	3	5.29	3.55
FY 2022-23	Solar PV Module	Solar	Onsite	3	5.355	3.70
FY 2023-24	Solar PV Module	Solar	Onsite	3	5.553	3.96

Note: Solar power plant commissioned in Dec'2019 & planned additional 5MW power plant with line-2 project



Waste Utilization Management



Year	Waste as fuel	Quantity (MT)	GCV (kCal/kg)	Waste as percentage of total fuel
2020-21	High CV Flyash, Solid & liquid waste(pharma), Dolochar	17281	1515	1.86
2021-22	High CV Flyash, liquid waste(pharma)	17263	1534	1.68
2022-23	High CV Flyash, Solid & liquid waste(pharma), Plastic and Municipal Waste	29376	2147	4.28
2023-24	High CV Flyash, Solid & liquid waste(pharma), Plastic and Municipal Waste	31110	2167	4.35



Waste Utilization Management



Year	Waste as raw material	Quantity (MT)	Replaced material	Waste as percentage of total raw material
2020-21	Redmud & Fly Ash (CPP)	22842	Laterite	0.42
2021-22	Redmud & Fly Ash (CPP)	20107	Laterite	0.64
2022-23	Redmud & Fly Ash (CPP)	18299	Laterite	0.649
2023-24	Redmud & Fly Ash (CPP)	23819	Laterite	0.876



Comparison on Competitors, National & Global benchmark



Bench marking	Plant	Electrical (kWh/ Ton of Cement)	Thermal (kCal / kg of clinker)
Achieved	Chettinad – Kallur	74.5	752
Internal benchmarking	Dachapalli works	75.9	734
	Vicat Sagar	76.8	738
	The India cement Ltd	96	820
	*National level	56.1(Plant#1)	683(Plant#1)*5 STAGE

* Source of Information : CII Energy Bench marking data May'2023

Energy Saving Projects for Next Three Years

Title of Project	Year	Annual Electrical Saving (Million kWh)	Annual Thermal Saving (Million Kcal)	Investment (Rs in Million)	CO2 Reduction (MT)
VFD for coal firing blowers	2023-24	0.08		0.1	
FRP fan blade for kiln shell cooling fan	2023-24	0.06		0.55	
VFD for ACW pump at WHRP	2023-24	0.12		0.7	
FRP blade for cooling tower fan at CPP	2023-24	0.14		0.26	
VFD provision for CEP pump	2023-24			0.7	
Replace existing BFP with Energy Efficient BFP for the present operating conditions	2023-24	1.23		7.5	455
Improve the insulation of identified areas of the boiler	2023-24		40.6	0.02	10
Replace existing CEP Pump with Energy Efficient Pump in WHR	2023-24	0.13	778.6	1.2	305
Improve cooler recuperation efficiency by modification and installation of high efficiency inlet grate systems	2024-25	3.9	10910	10	6034
Energy savings by installing energy efficient technologies(IE3 motors, AC,Fans,Pumps,BLDC fans)	2024-25	0.2		2.5	74
Installation of VFD for LS crusher Compressor	2024-25	0.025		0.34	9
Installation of VFD for Cooler section Compressor	2024-25	0.105		0.12	39
MV AC drive for coal mill separator fan	2024-25	0.416		7.5	154
Pfister for kiln feed	2024-25		3216	12	1213
Conversion of intermetent under loaded belt drives(4nos.) to Auto Star delta star starters for Energy saving .	2024-25			0.3	
321BC7 Belt conveyor drive capacity up gradation from 300tph to 600tph. (CC45mtr).	2024-25	0.322		1.5	102912
Liquid AFR pump station and pipe line	2025-26		3984	5	1502
Replacement of existing belt driven motor(5nos.) with BLDC direct drive motors in AHU as recommended by CII	2024-25	0.057		0.864	18080
Conversion of conventional light fitting to power saving LED fittings in street lighting (150 nos of 120watts fitting)	2024-25	0.099		1.0	31536
Installation of dump hopper for CPP	2025-26	0.282		2.2	90240
Load shedding panel with separate high speed PLC is required to isolate the cement plant load with in 1ms to hold the WHRPP TG & CPP TG	2024-25	0.038		4.5	12288
Total		7.20	37629.20	58.85	264851



Energy Saving projects implemented in last three years



Year	No of Energy saving projects	Investment (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million kCal)	Savings (INR Million)	Impact on SEC (Electrical kWh /MT cement, thermal)
2020-21	18	0.77	11.95	-	58.08	1.61
2021-22	45	7.62	8.82	73.65	48.59	3.4
2022-23	10	0.43	0.71	40.9	4.52	1.4
2023-24	8	2.86	0.91	23.37	6.42	0.72



110 KW CEP VFD drive - installed for CEP pump



110 KW ACW VFD drive - installed for ACW pump



70 W LED fitting in place of 250 W Sodium vapor fitting (65 no's)



38 W LED fitting in place of 70 W Sodium vapor fitting (140 no's)



200 W LED fitting in place of 400 W Sodium vapor fitting (48 no's)

TREND: FEED RATE Vs SEP FAN SPEED Vs BAG HOUSE DP



Before

Note: Baghouse DP increases over the time after mill starting



After

Replacement of cement mill bag house solenoid coil kits leads reduction in bag house DP



Installation of Pressure Regulation in Cement mill Bag house header line

GREEN BELT DEVELOPMENT

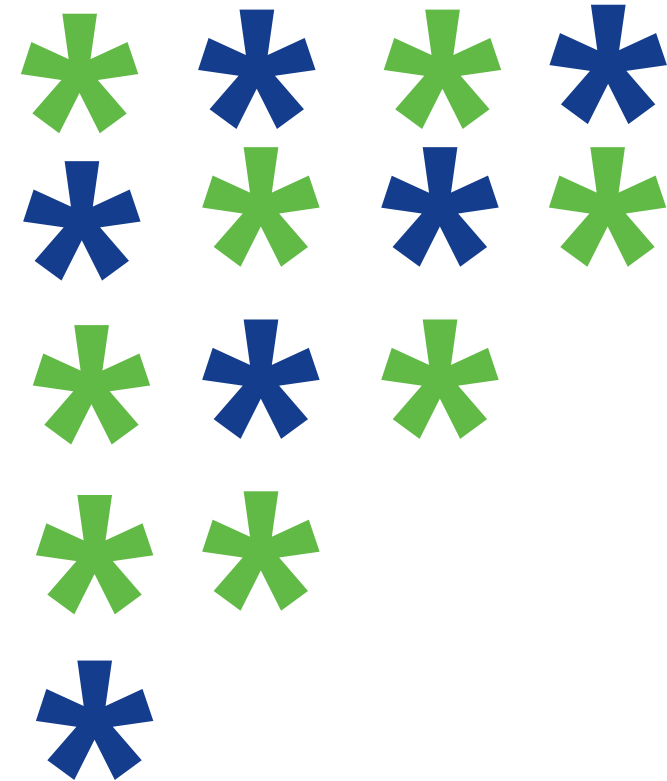




Green Supply Chain Management



- ❖ Coal and Gypsum unloaded wagons using for clinker bulk loading
- ❖ Outside fly ash unloading bowsers are using for cement bulk loading
- ❖ Incoming raw materials Laterite/Iron Ore trucks return loading with cement bags
- ❖ Procuring laterite near by source Vikarabad instead of long source.
- ❖ To improve the rail dispatch instead of road dispatch through trucks.
- ❖ To increase dispatch through bulk loading instead of cement bags.
- ❖ Focusing on scope -3 GHG emissions apart from scope-1& 2 GHG emissions.
- ❖ Creation of awareness about green supply policy to our suppliers and stakeholders.





GHG Inventorization



Target (short term/long term) action plan :

1 Flyash Enhancement

To Maintain fly ash addition 35% in PPC & 25% in Maxcrete

2 Improve In AFR

To Increase AFR(Alternative Fuel Reduction) consumption from 4.35% to 15% (TSR) on phased manner

3 Switch to ARM

To Achieve ARM(Alternative Raw Material) upto 3% on phased manner.



Green Focus

The overall CO2 reduction can be achieved by 75508 MT per year



Green Energy

Installing Additional **5MW** Solar Power Plant inside the boundary.



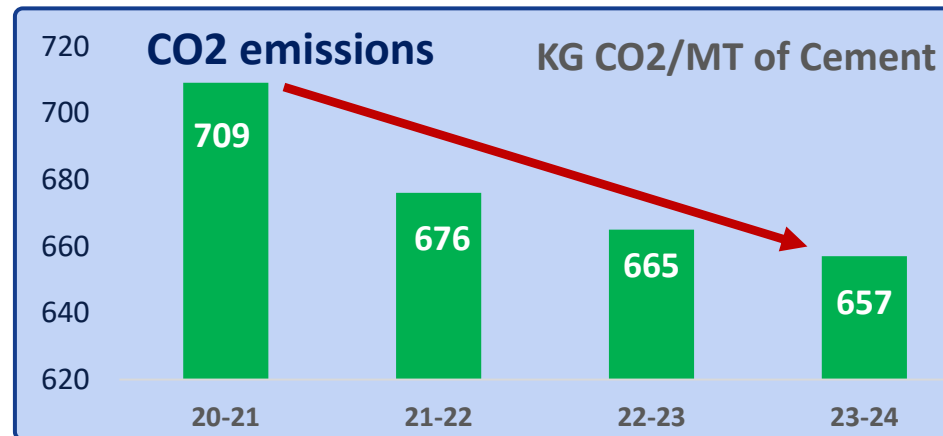
Green Supply Chain

Green supply Chain-Back Hauling of Flyash tankers with cement



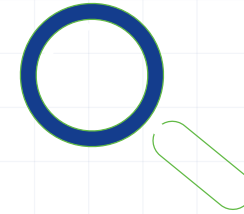
Green Purchase Policy

Green Purchasing Policy & in Purchase order



■ KG CO2/MT of Cement

Awards Learning !!



- * We have great learning from CII awards program, by sharing of best practices across other cement plants.
- * Installed MV drive for both raw mill separator fan.
- * Installed low pressure compressor for fly ash unloading system.
- * BFP operation optimized by providing PID loop, drum pressure Vs BFP pressure at CPP
- * Good platform for knowledge exchange and implementing best practices from other units.
- * Bench mark values across cement industries & Recognition from CII when perform better than other plant.

Prizes received towards Mines Safety Week Inspection chaired by DGMS for the year – 2023

1. Crusher, Electrical Installations and Illuminations -	Ist Prize
2. Occupational Health and Welfare amenities, Silicosis awareness, preparation of SOP's and Implementation.	II nd prize
3. Safety Management System	II nd Prize
4. Publicity, Propaganda and Innovation	II nd Prize
5. Loading and transportation	II nd Prize
6. Mine Workings	II nd Prize
7. Overall performance in Gulbarga sector, Zone - IV, Group B	II nd Prize

Note : Since from Inception First time we have received Second over all in Gulbarga Cluster Major Mine





2022



Awarded as Energy Efficient Cement Unit by CII for the year 2023

2023



Thank You...!



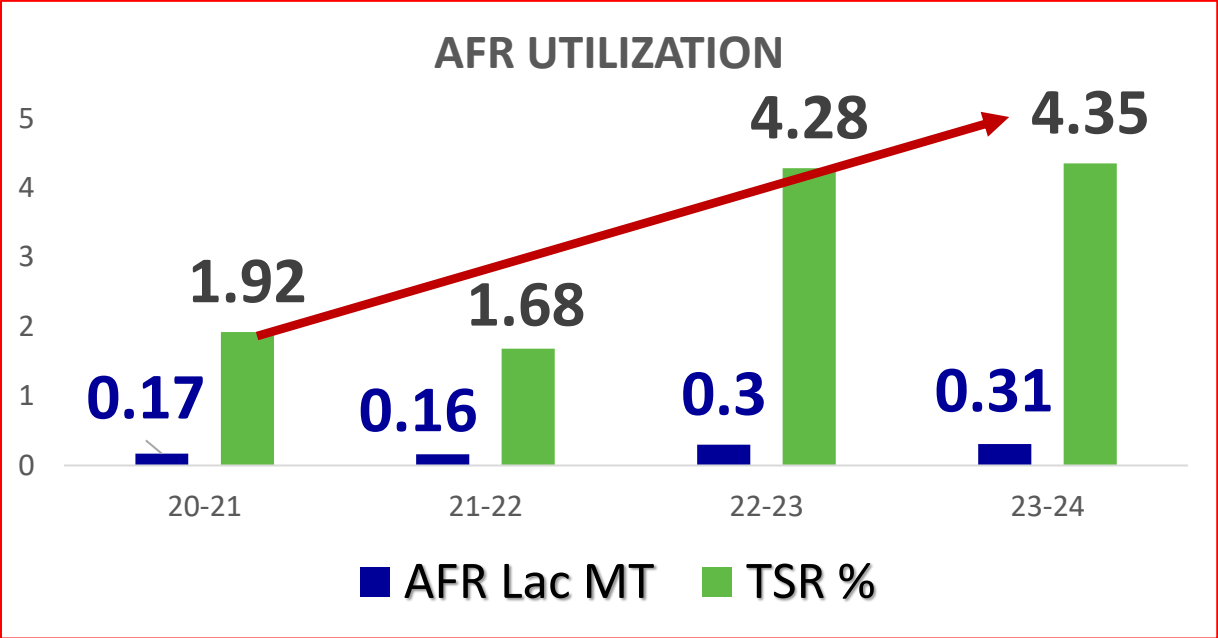
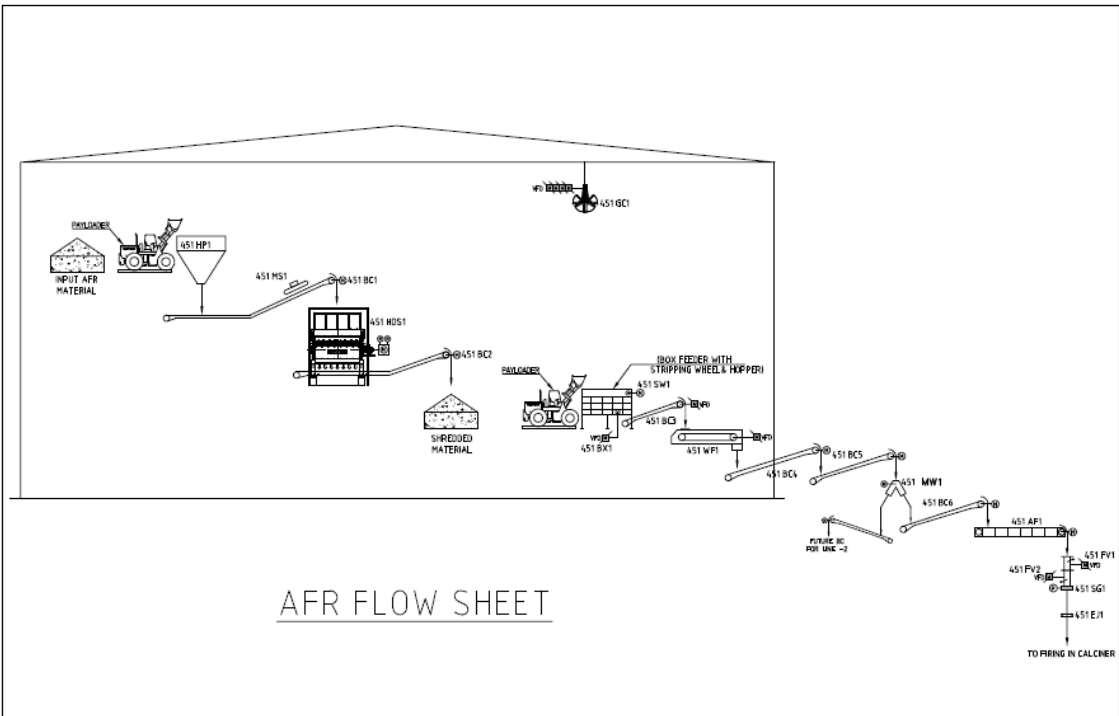
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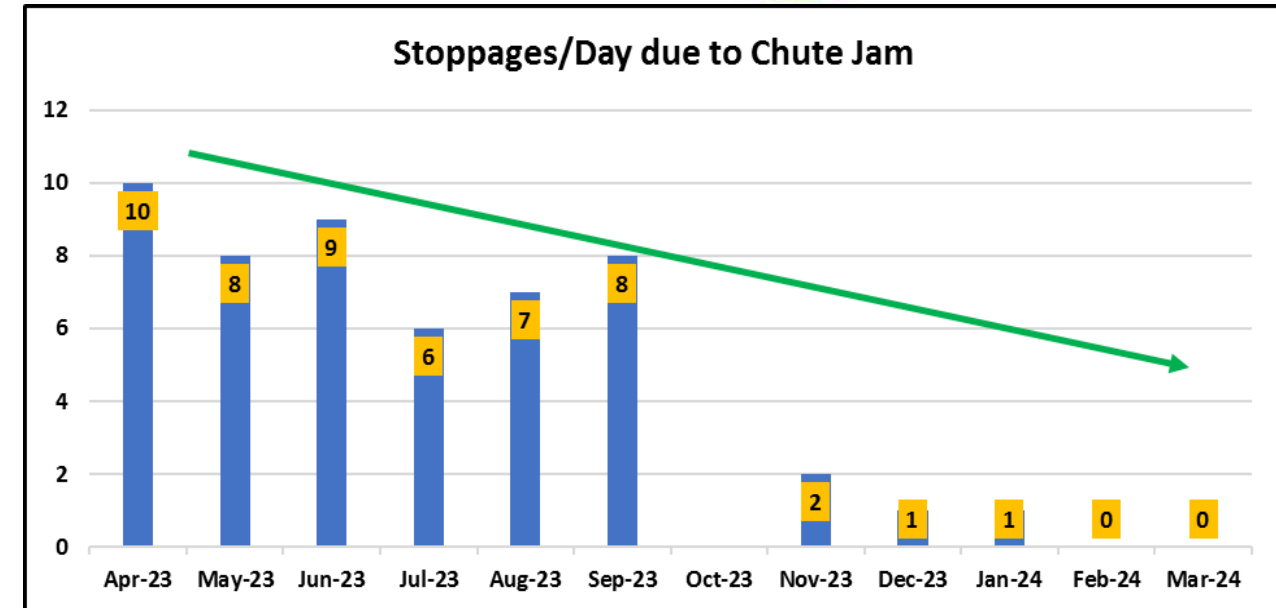
AFR UTILIZATION



**AFR PROJECT INVESTMENT
Rs 211.9 Million**

AFR Chute modification

- * SAFR discharge chute angle modified from 60 deg to 70 deg to avoid jamming and for better performance
- * Additional chute doors have been provided to clear the jammed material frequently



No. of stoppages per day due to Chute Jam: 8 Nos/day
Reduction in TSR% : 0.3% /day

AFR (MT) saved by avoiding stoppages/day : 11 MT
Increase in Total AFR (MT) consumed per year: 3667 MT

Cost saving: Rs 34.83 Lacs