CII National Award for Excellence in Energy Management 2023

Chettinad cement

Chettinad Cement

- Kallur Works

Mentor : Shri. K Saikumar
(Unit Head)

Team Members :
Mr. PR Ganesan (AGM-Operations)
Mr. Sandeep Reddy (Dy.Mgr, Operation)
Mr. Rama Krishna Raju (Manager, Operation)

Chettinad Cement- Kallur works

Plant Overview

Group Installed Capacity (Clinker)	**14.0 MTPA**
Plant Installed Capacity (Clinker)	2.0 MTPA
Installed Capacity (Cement)	**2.5 mMTPA**
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 8000 TPD Clinker and 2.5 MTPA Cement by various in-house modifications

Chettinad Kallur Works: History Time Line

2024

SOLAR PLANT

5.0 MW SOLAR PLANT.

2023

LINE-2

Line-2 with 3.2 MTPA with additional 12 MW WHR

(*Under Construction*)

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

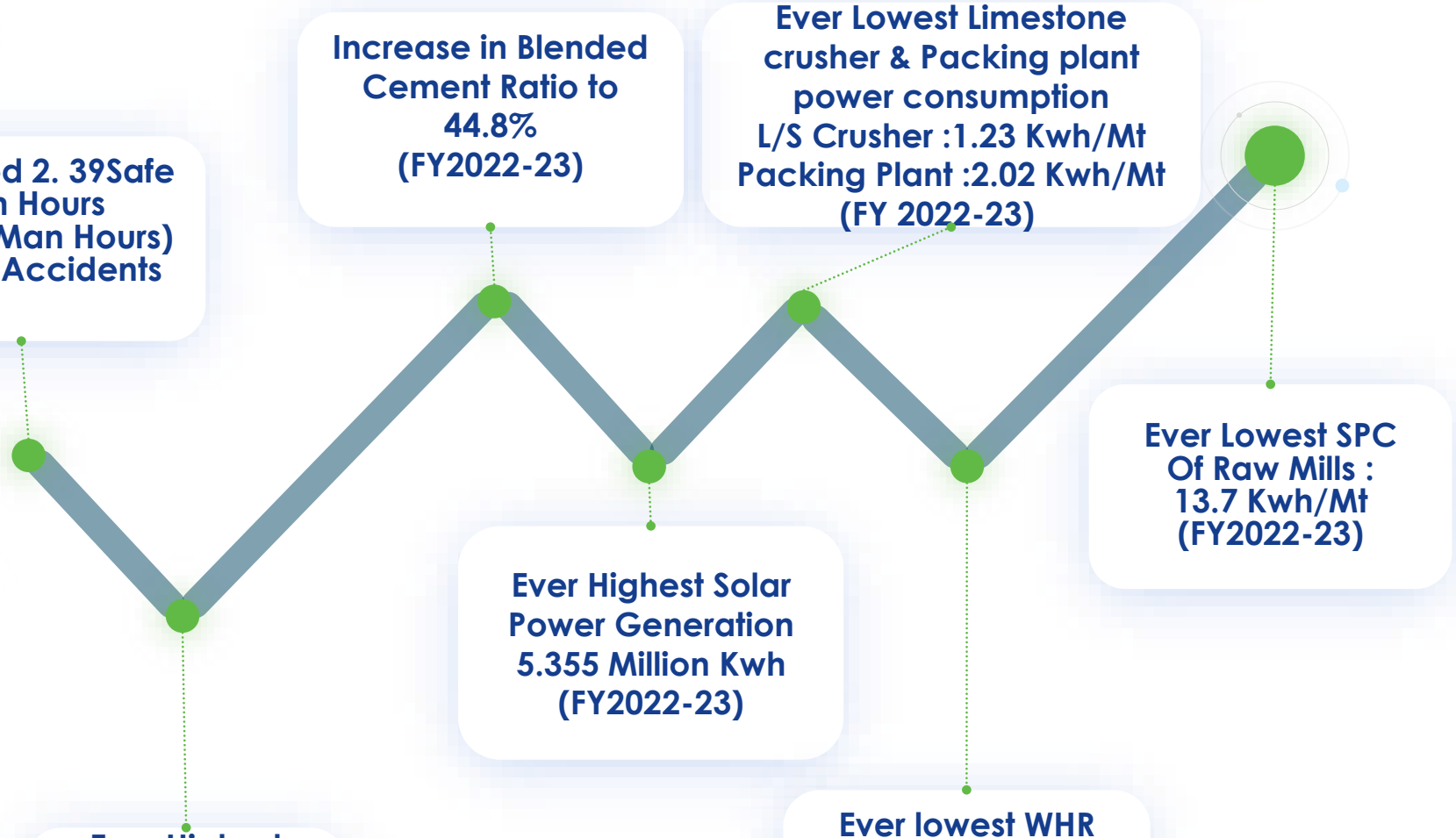
Continuous monitoring of plant equipment & analyzing the overall equipment effectiveness

07

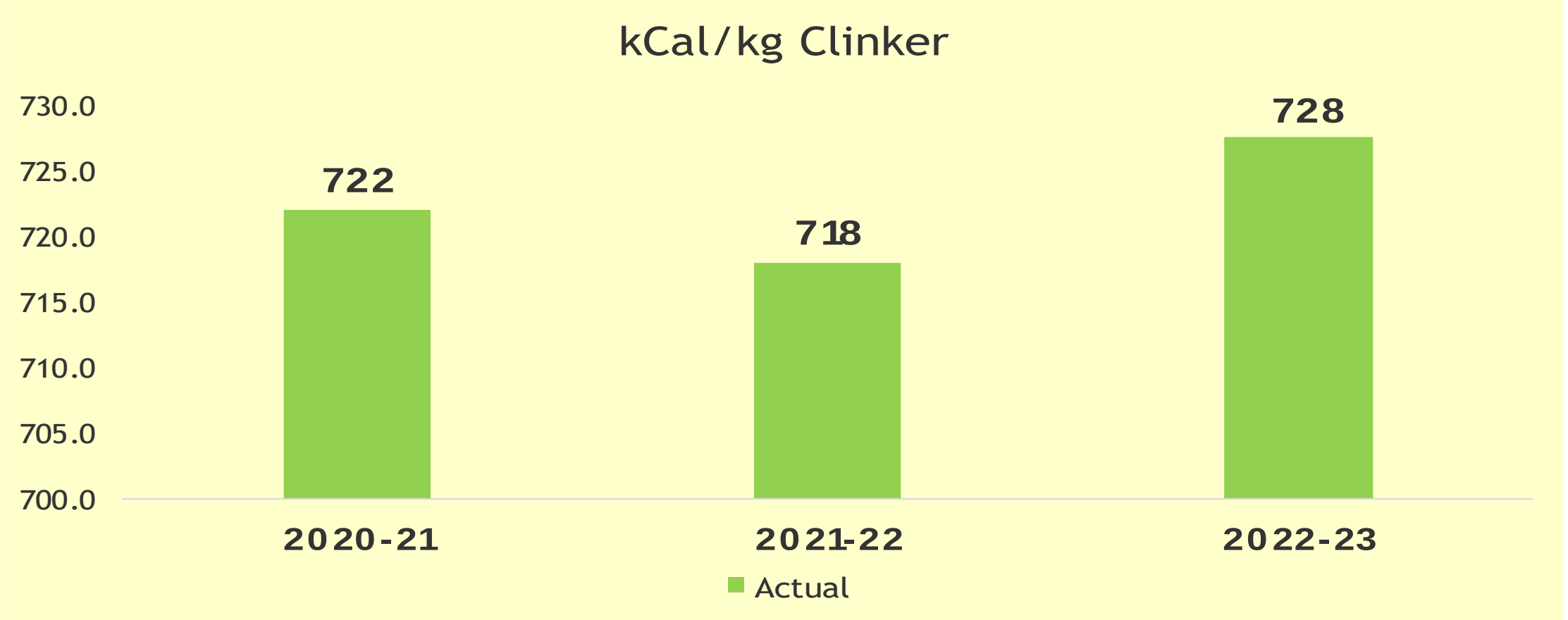
Lean Manufacturing

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

KALLUR WORKS ACHIEVEMENTS



Thermal SEC (kCal/ kg clinker)



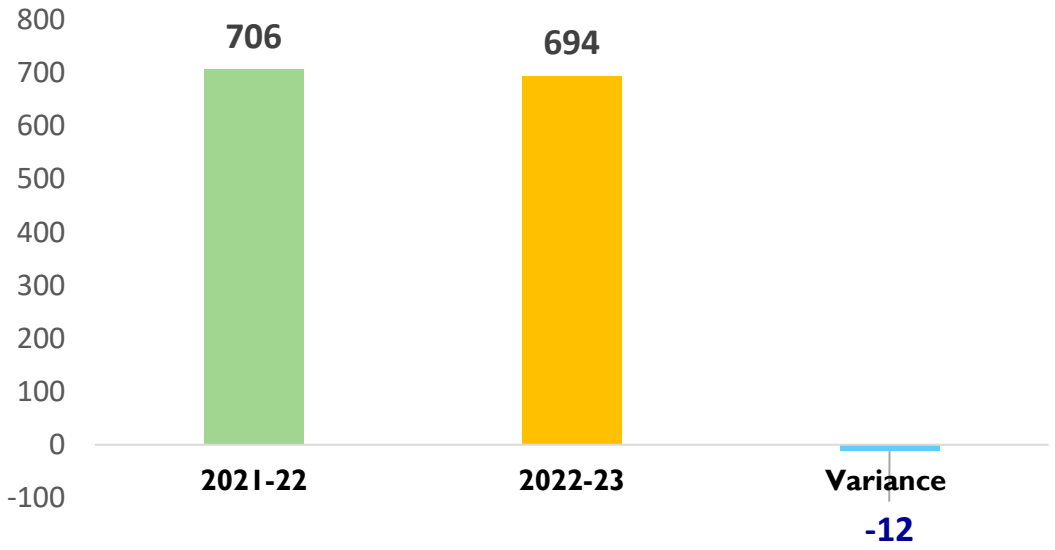
Increase in thermal energy consumption by:

- ✓ Started Using Solid AFR In Pyro Operations.
- ✓ Increase In pet coke usage

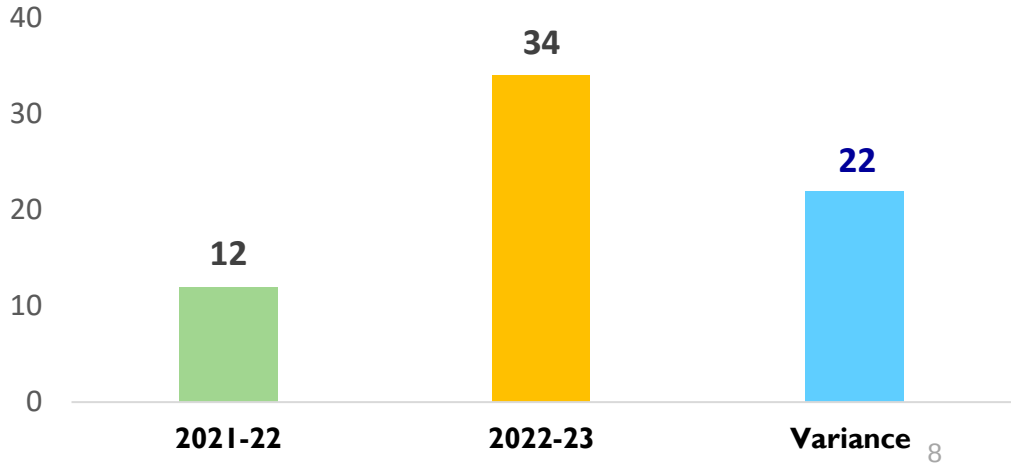
Y-O-Y Prod. KPIs & AFR Usage ,Heat Break up

Indices	2020-21	2021-22	2022-23
Clinker Prod.	1835788	2104312	1876467
Imp Coal	144698	210093	133165
Indian Petcoke	10551	15230	47962
Imported Petcoke	49655	24687	17589
Ind Coal	0	0	768
Total Coal	**204904**	**250010**	**199483**
AFR Dolachar	113	416	2145
AF SWM (37.3)	0	0	159
AF WASTE MIX LIQUID	0	0	281
AF PHARMA LIQUID	907	292	358
AF MULTILAYER PLASTIC WASTE	0	0	1910
AF PLASTIC WASTE	0	0	633
AF PAPER MILL PLASTIC WASTE	0	0	1410
RICE HUSK	0	0	625
RDF	0	0	2016
AR DISTILLATION RESIDUE (36.1)	0	0	32
AFR- HGCV Fly Ash	16207	16971	6308
Pharma solid	0	0	120
rubber form waste	0	0	15
BIO FUEL	0	0	13363
Total AFR	17227	17678	29376
Heat Consumption-Kcal/kg. Clk.	**722**	**718**	**728**
Imp+Petcoke+ Indian Coal	1299336560	1486519106	1302267822
AFR	25430808	24995645	63058858
%TSR	1.92	1.65	4.62
Avg NCV of Coal	6341	5946	6528
Avg NCV of AFR	1476	1414	2147
Coal Heat Consumption-Kcal/kg. Clk.	708	706	694**
AFR Consumption-Kcal/kg. Clk.	14	12	34**

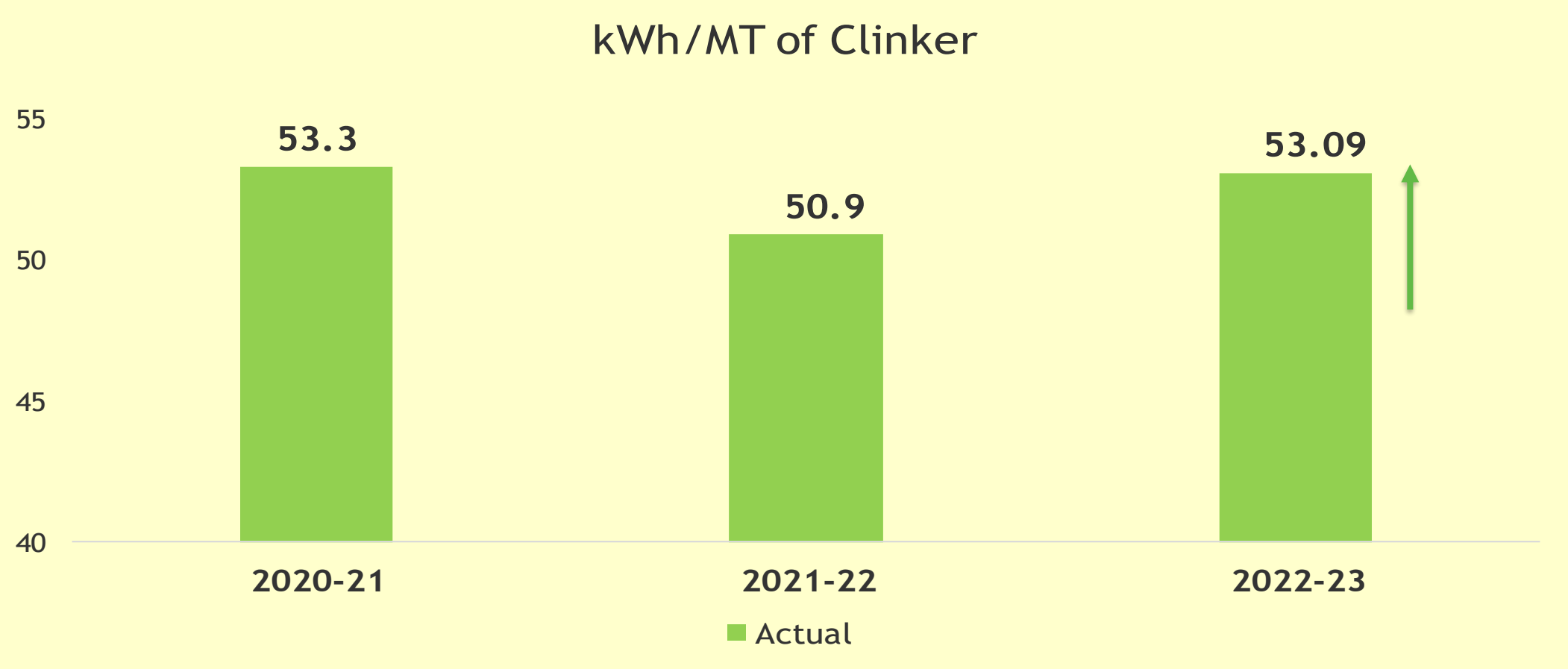
Specific Heat Through Coal (Fossil Fuel) (K Cal/ Kg.Clk.)



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



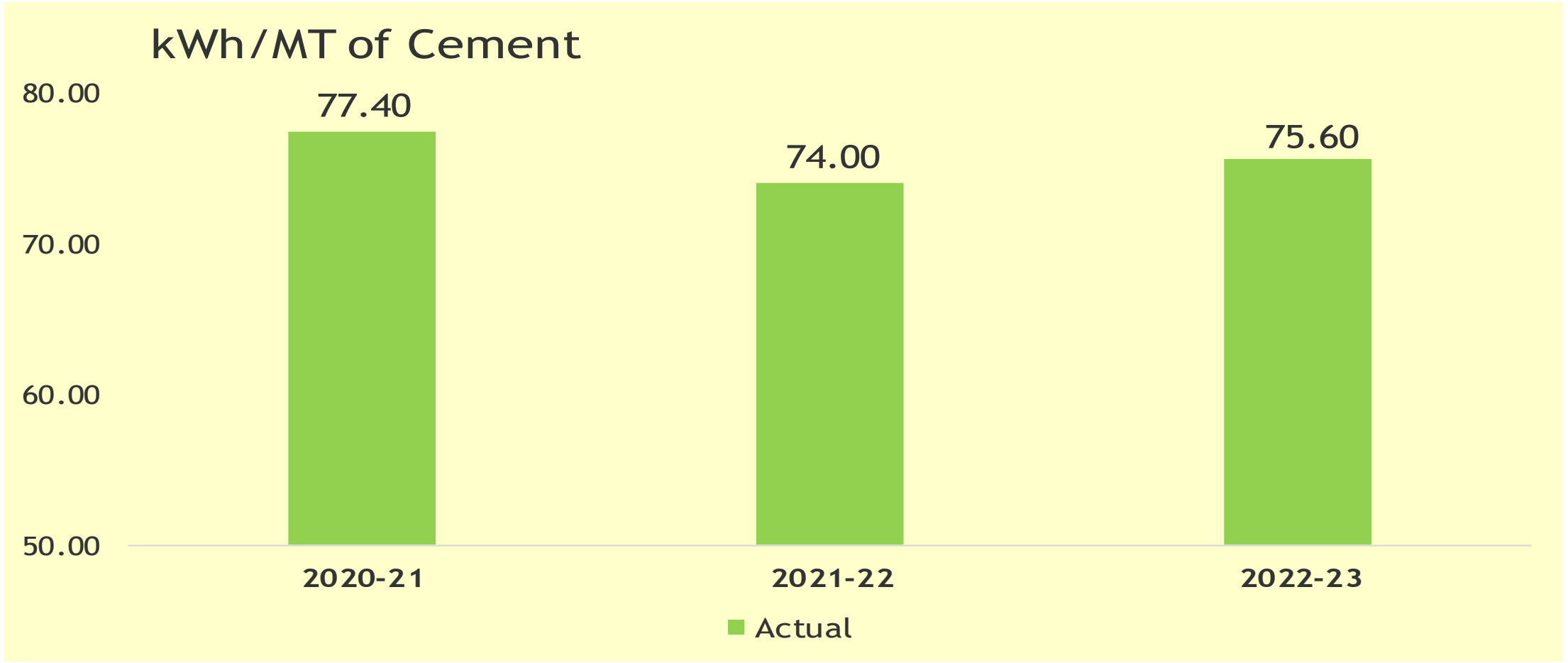
Up to clinkerization (kWh / MT clinker)



Achieved Increase in Specific energy consumption by:

- ✓ Increase in usage of Pet coke demands Higher PH fan Flow
- ✓ AFR Usage In Pyro Operations

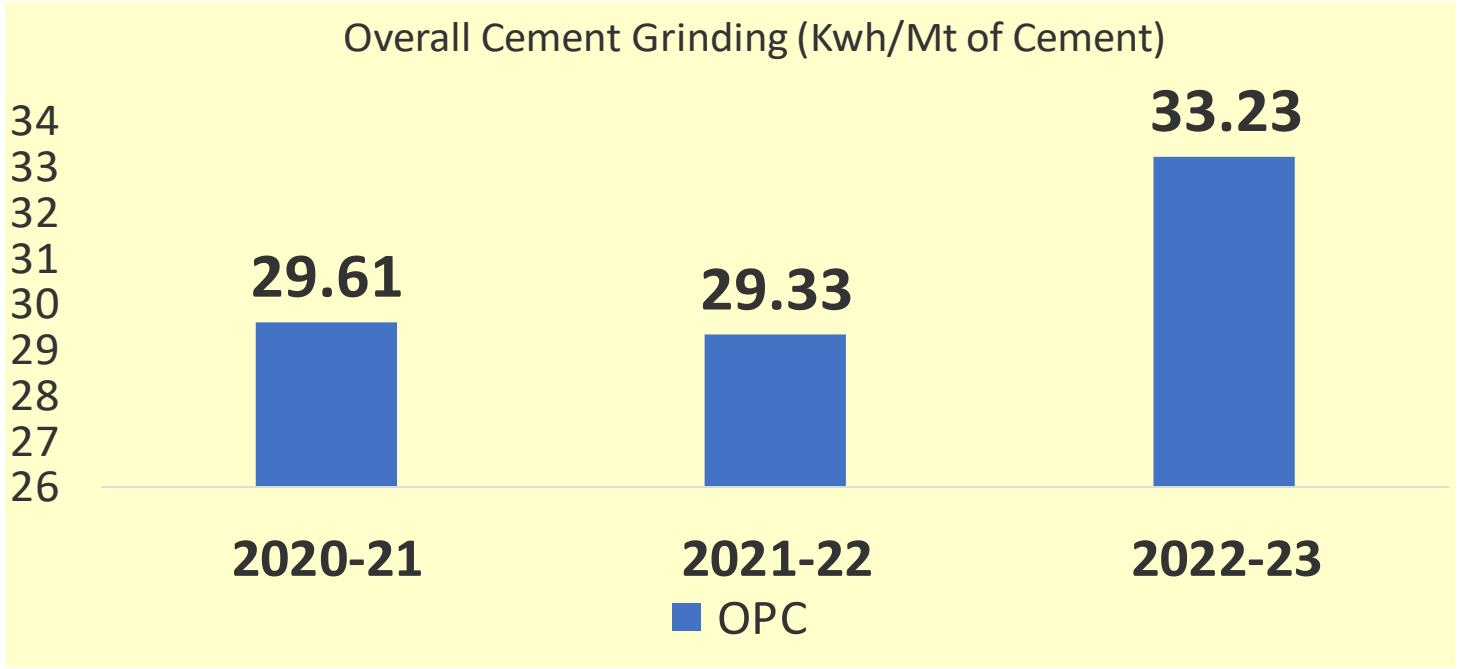
Overall cement (kW / MT Cement)



Increase in overall specific energy consumption by:

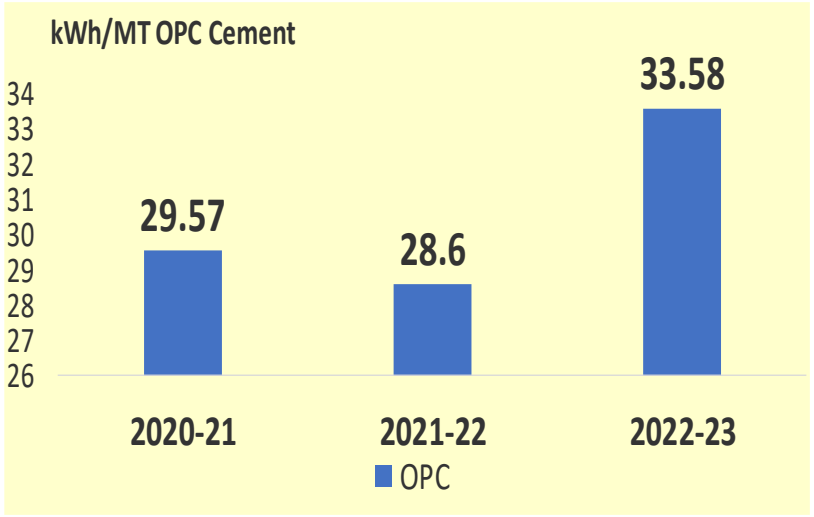
- ✓ Cement grinding power SPC
- ✓ Increase in Pre-clinkerisation SPC

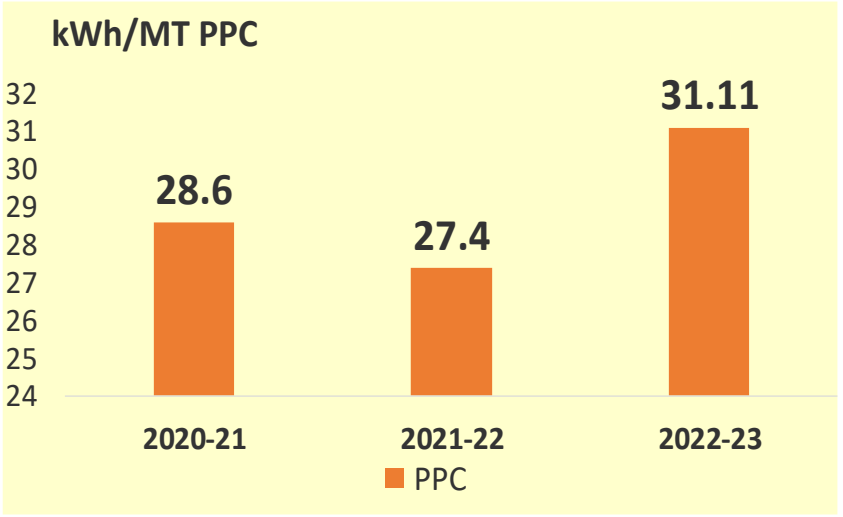
Cement grinding –Variety wise, OPC, PPC, and Maxcrete (kWh / MT cement)

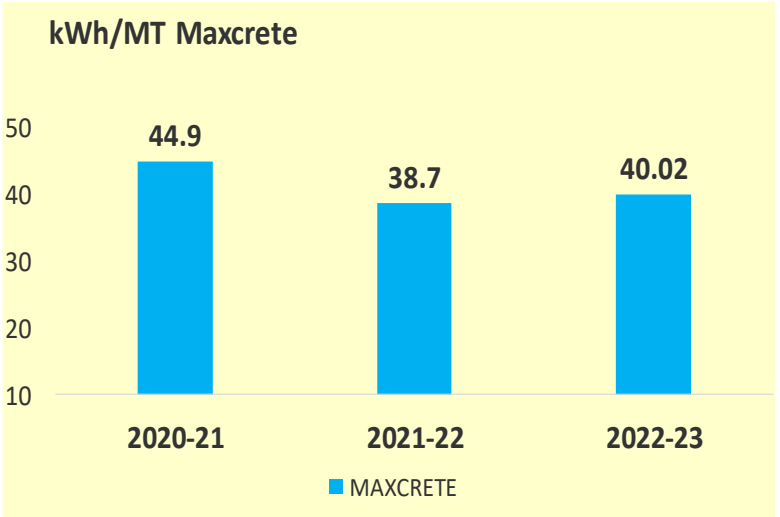


Increase in overall specific energy consumption by:

- ✓ Ball Mill Girth Gear Issue.
- ✓ Operated In Finish mode.







Specific Energy Consumption

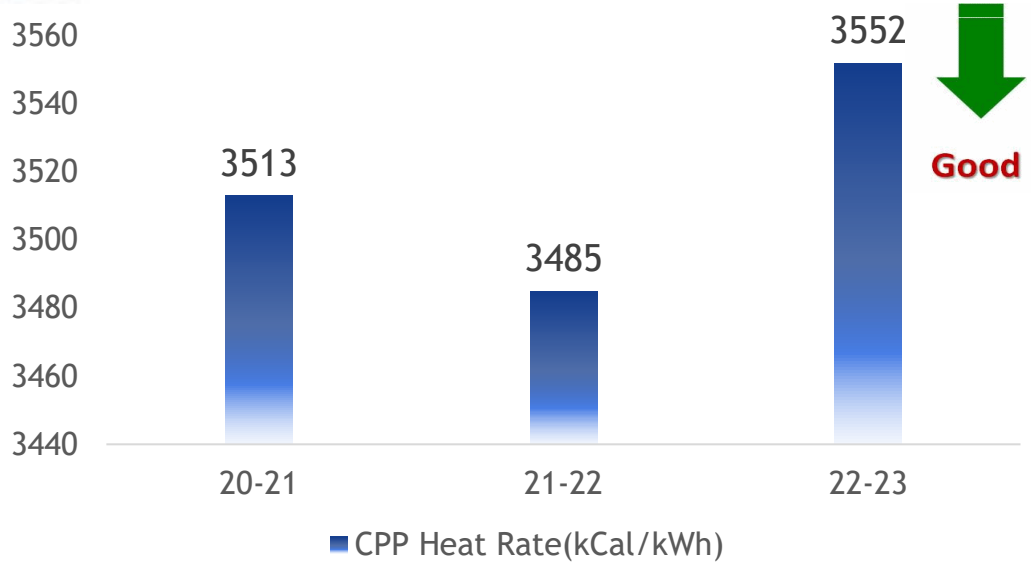
Section	UOM	FY 20-21	FY 21-22	FY 22-23
Crusher	KWH/MT Material	1.23	1.27	1.23
Raw Mill	KWH/MT Material	14.80	14.24	13.70
Coal Mill	KWH/MT Material	37.39	33.96	41.00
Kiln	KWH/MT Material	20.97	19.96	20.11
Clinker	KWH/MT Clinker	49.07	47.13	47.96
Services	KWH/MT Clinker	3.63	3.46	4.94
Total Clinker	KWH/MT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

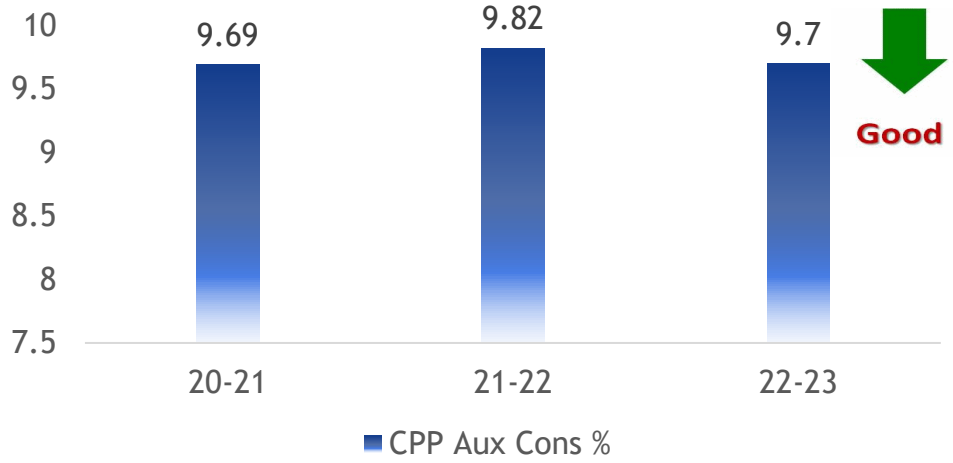
Section		FY 21-22 Inc / Dec	Value	FY 22-23 Inc / Dec	Value
Material	Crusher	↑	0.03	↓	(0.04)
	Raw Mill	↓	(0.56)	↓	(0.54)
	Coal Mill	↓	(3.42)	↑	7.04
	Kiln	↓	(1.01)	↑	0.15
Clinker	Clinker	↓	(1.94)	↑	0.83
	Services	↓	(0.17)	↑	1.48
	Total Clinker	↓	(2.11)	↑	1.31
Cement	Cement Mill	↓	(0.05)	↑	3.66
	Packing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

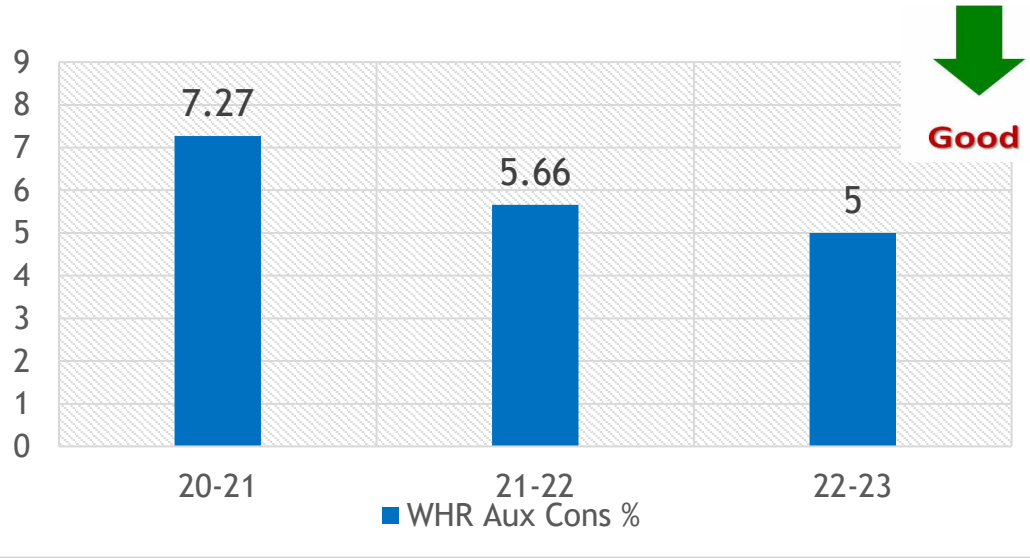
Increase in overall specific energy consumption by:

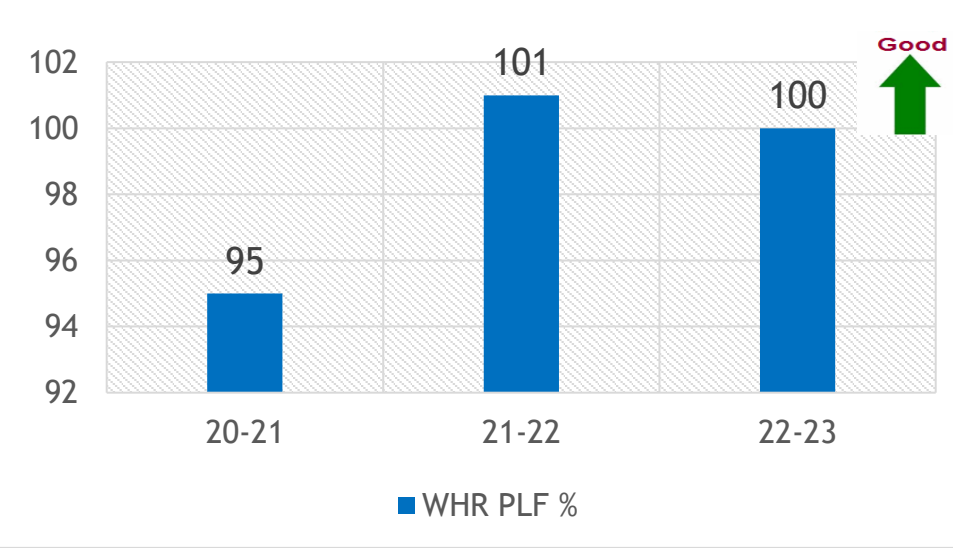
- ✓ Line-2 Construction Power part for services
- ✓ Petcoke grinding leaded to high SEC In Coal Mill.
- ✓ Cement Mill section Operated In Hybrid Mode due to Ball Mill Girth Gear issue Contributed for High SPC

CPP & WHR ENERGY PERFORMANCE

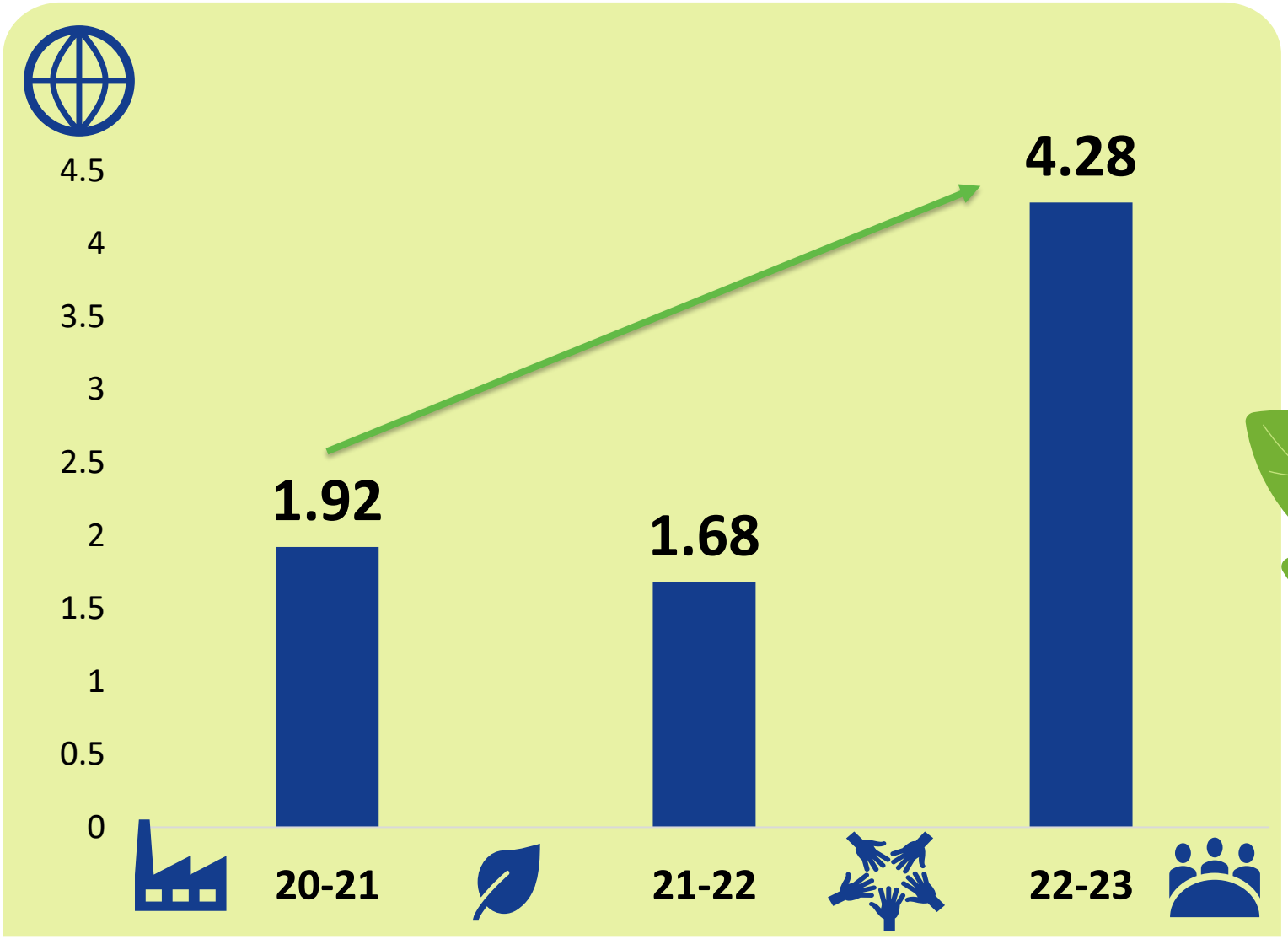






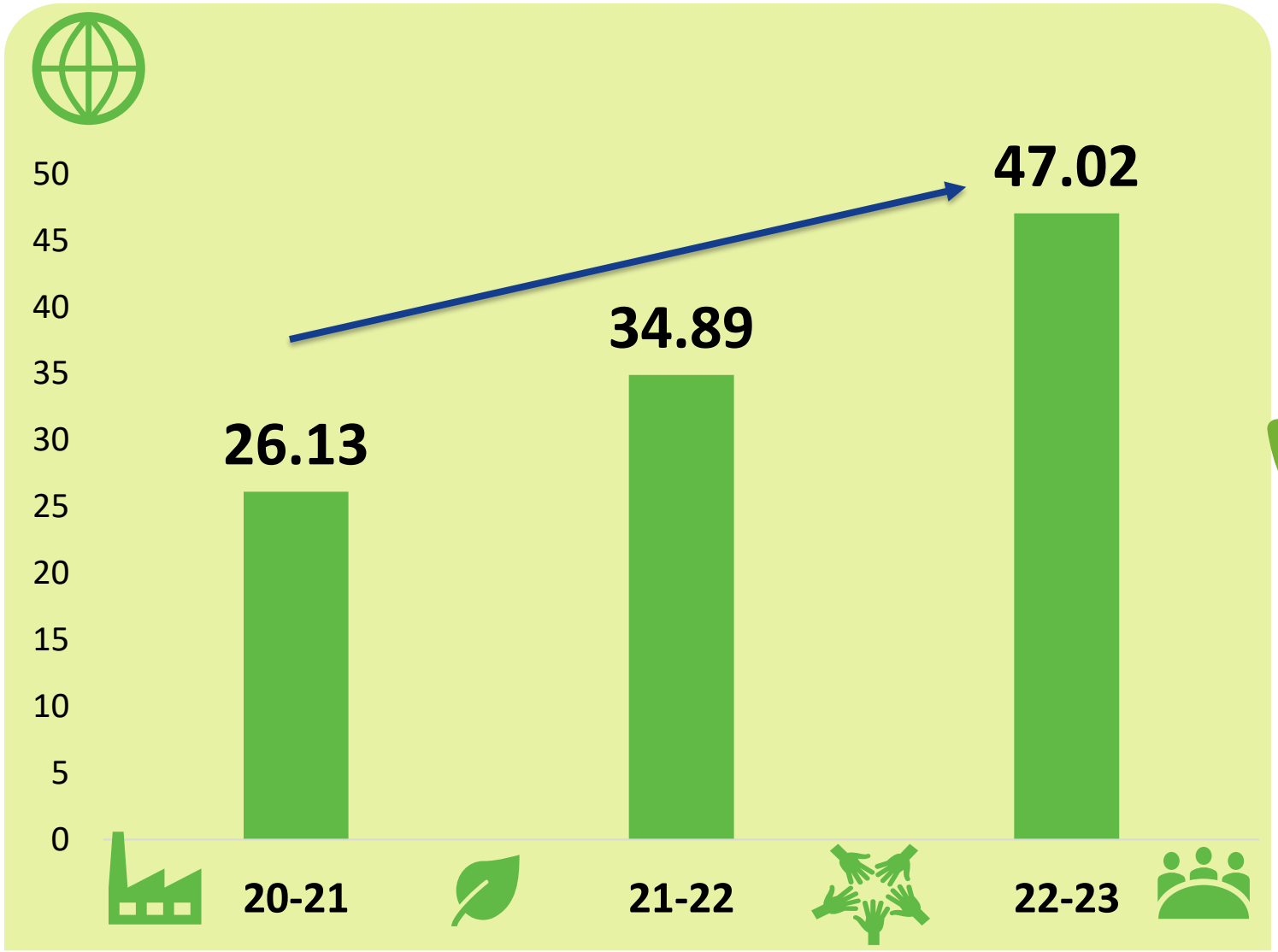


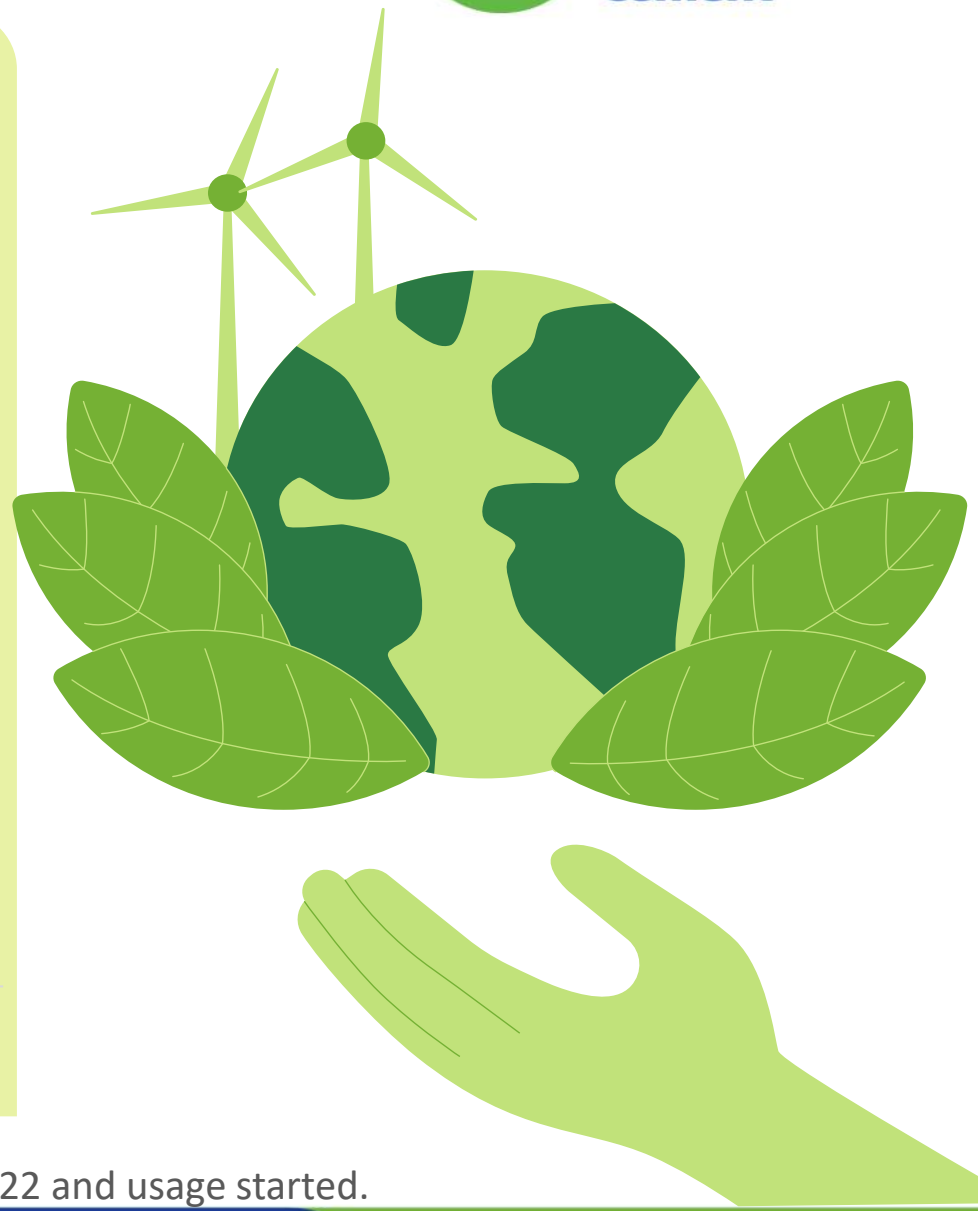
Thermal Substitution Rate (TSR%)



Note: AFR solid feeding system commissioned on 15th August'2022 and usage started.

Blended Cement (PPC + Maxcrete) %





Note: AFR solid feeding system commissioned on 15th August'2022 and usage started.

Comparison on Competitors, National & Global benchmark

Bench marking	Plant	Electrical (kWh/ Ton of Cement)	Thermal (kCal / kg of clinker)
Achieved	Chettinad – Kallur	75.6	727.5
Internal benchmarking	Puliyur works	62.5	820
External benchmarking	Orient Cement	61.5	685
	Vicat Sagar	76.8	730
	The India cement Ltd	88.6	810
	*National level	56.1(Plant#1)	683(Plant#1)*5 STAGE

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

Encon Projects Planned
FY2022-24 (CAPEX Approved)

Sl.No.	Title of Project	Annual Electrical Saving (Million kWh)	Annual Thermal Saving (Million Kcal)	Investment (Rs in Million)
1	Installation of VFD for LS crusher Compressor	0.025	-	0.35
2	Installation of VFD for Cooler section Compressor	0.105	-	12.7
3	MV AC drive for coal mill separator fan	0.416	-	75.0
4	Conversion of conventional light fitting to power saving LED fittings in street lighting (150 nos of 120watts fitting)	0.099	-	1.0
5	Replacement of existing belt driven motor(5nos.) with BLDC direct drive motors in AHU as recommended by CII	0.057	-	0.864
6	Conversion of intermetent under loaded belt drives(4nos.) to Auto Star delta star starters for Energy saving .		-	0.3
7	Installation of Low Capacity Boiler Feed Pump	0.13	-	1.2
8	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	0.038	-	4.5
9	Solar Power Plant at kallur- 5MW		-	

Chettinad cement

Energy Saving Projects for Next Three Years

Confederation of Indian Industry

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**

Encon Projects Planned
FY2022-24

Sl.No.	Title of Project	Annual Electrical Saving (Million kWh)	Annual Thermal Saving (Million Kcal)	Investment (Rs in Million)
1	Replace re winded motors with Energy efficient Motors	0.01	-	0.23
2	Replace existing AHU motors with direct driven BLDC AHU	0.06	-	0.86
3	Install AC energy savers for Split ACs	0.08	-	0.96
4	Replace conventional ceiling fans with BLDC fans	0.01	-	0.11
5	Replace existing Light fixture with LED	0.29	-	3.96
6	Interlock operation of compressor in LS crusher area with operation of the Limestone Crusher operations	0.004	-	0.01
7	Reduce the generation pressure for the identified compressors	0.41	-	0.10
8	Avoid usage of compressed air for cleaning applications by using Transvector Nozzle or LP blowers	0.01	-	0.05
9	Install auto drain valves for the receiver at the wagon unloading section	0.003	-	0.02

Encon Projects Planned FY2022-24

Sl.No.	Title of Project	Annual Electrical Saving (Million kWh)	Annual Thermal Saving (Million Kcal)	Investment (Rs in Million)
10	Replace Timer-based purging with DP-based purging for Auxiliary Bag Filters in the plant	0.03		0.15
11	Avoid the unloading of the identified compressors by installing VFD	0.18	40.6	2.15
12	Replace existing BFP with Energy Efficient BFP for the present operating conditions	1.23	778.6	7.50
13	Improve the insulation of identified areas of the boiler		1299	0.02
14	Replace existing CEP Pump with Energy Efficient Pump in WHR	0.13	5195	1.20
15	Optimize coal conveying phase density in kiln coal conveying pipeline by reduce pipeline size		5715.	1.50
16	Reduce radiation heat loss by applying insulation paint on outside surface of kiln surface	0.57	10910.	2.50
17	Improve preheater top stage cyclone efficiency by conducting CFD study and modifying the cyclone internals as per CFD suggestions	0.73	40.6	3.00

Encon Projects Planned FY2022-24

Sl.No.	Title of Project	Annual Electrical Saving (Million kWh)	Annual Thermal Saving (Million Kcal)	Investment (Rs in Million)
18	Improve cooler recuperation efficiency by modification and installation of high efficiency inlet grate systems	3.90	778.6	10.00
19	Reduce head loss across damper in identified auxiliary bag filters by opening damper 100% and controlling fan capacity by other energy efficient methods in identified bag filter fans	0.36		2.60
20	Reduce bag filter pressure drop by optimizing purging and replacing old bags in identified dedusting bag filters	0.15		1.00
21	Reduce radiation heat loss across preheater cyclones by applying insulation paint on the outside surface of preheater cyclones		7790	3.00
22	Arrest false air across coal mill circuit and reduce mill fan power consumption	0.44		0.00
23	Reduce pressure drop across cement mill main bag house by optimizing purging cycle and replacing old bags	0.09		0.50
	Total	**8.67**	**31728**	**41.42**

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

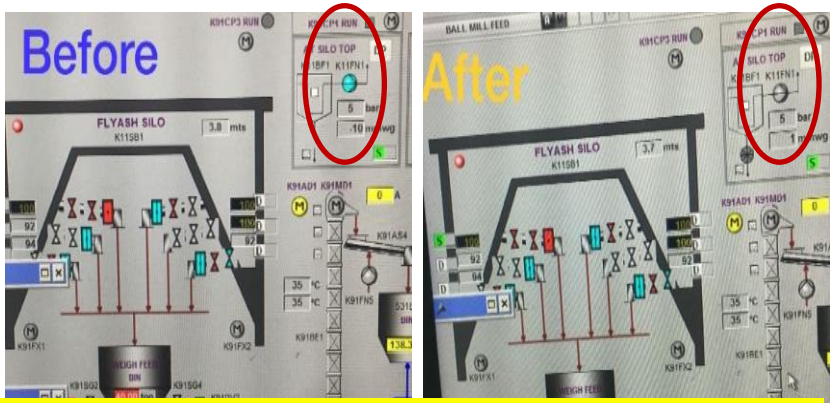
Energy Saving projects implemented 2022-23

Cooler exit temperature thermocouple relocation done

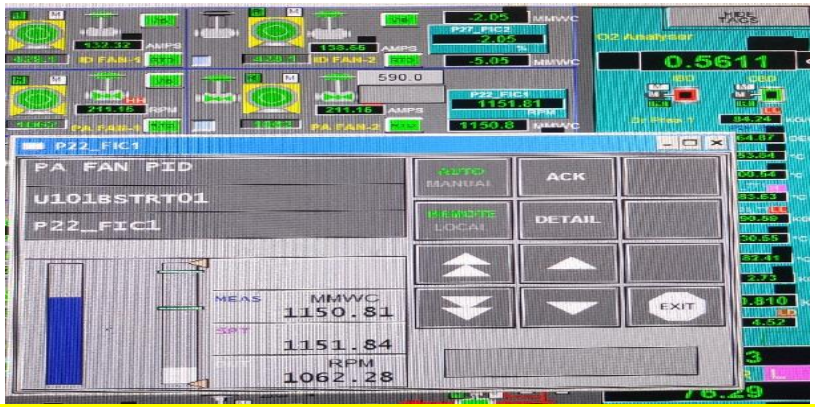
Reduced ACW pump discharge pressure from is 4.5 kg/cm² to 3.5 kg/cm²(CPP)

Damper removed & installed distance piece

Installation of BLDC fans



FA silo vent BF ON/OFF with FA unloading LP compressor



PA fan speed regulation with PA header pressure(CPP)

Packer video jet bag printing with packer operation(Compressor No load hours reduction)

Energy Saving projects implemented 2022-23

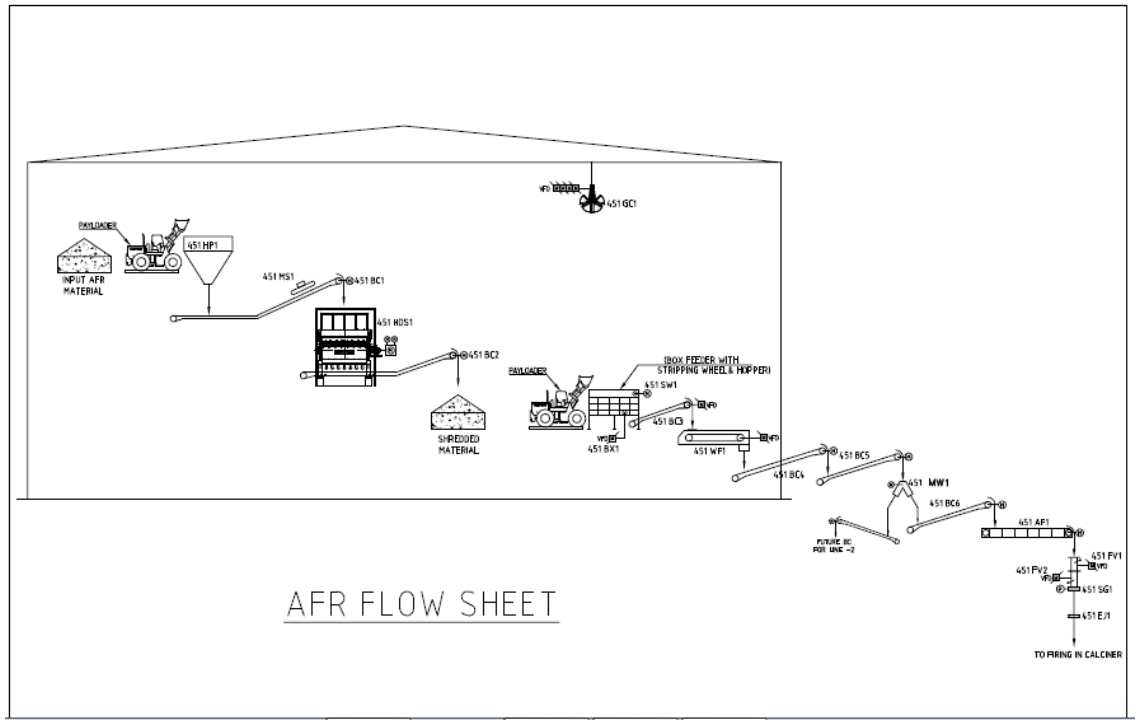
Installation of new reversible belt conveyor in place of vib. Screen.

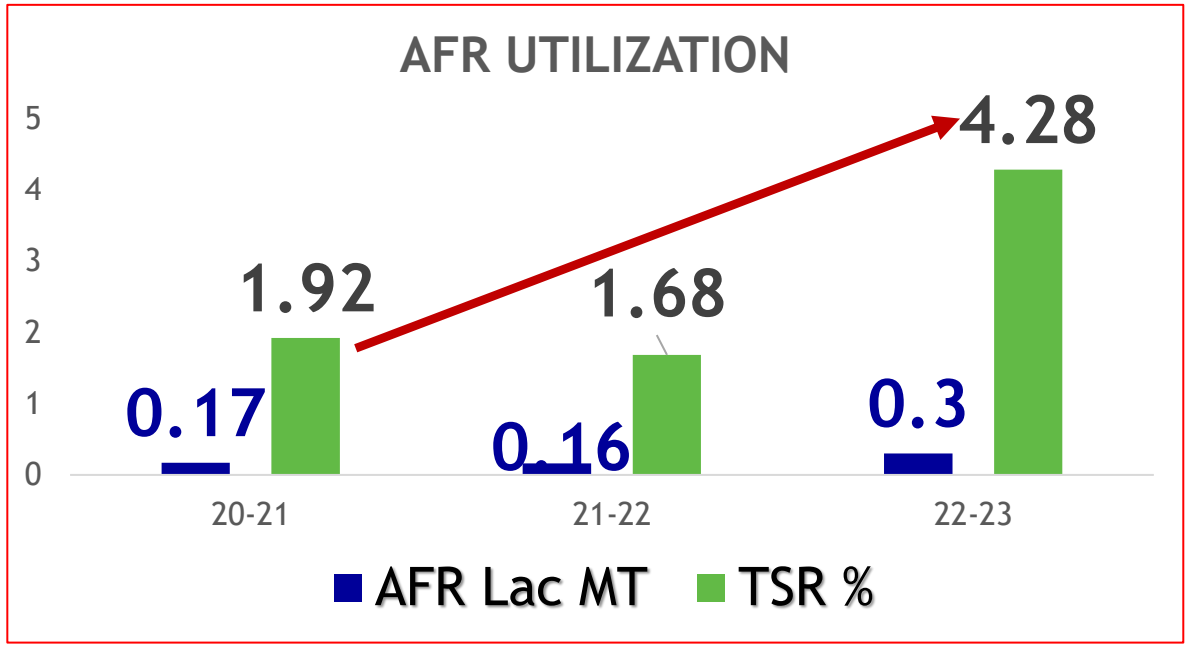
Voltage reduction at AFR section

361 RA3 discharge material diverted from 361 BC5 to 331 BC2

Installed MVAC drive for both RM separator fan-1& 2

AFR UTILIZATION





AFR PROJECT INVESTMENT
Rs 211.9 Million

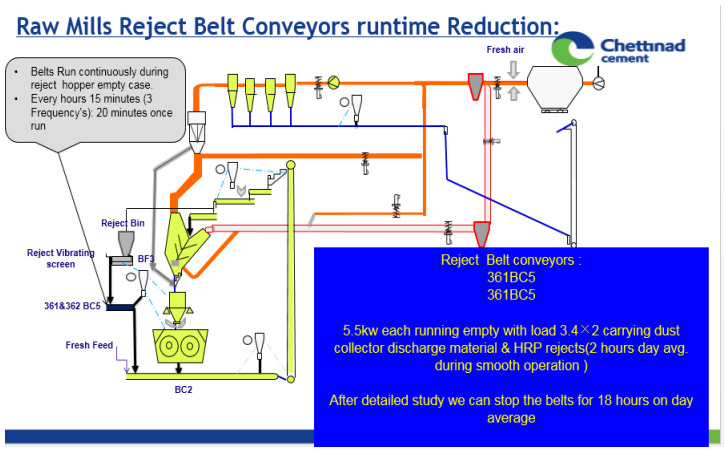
Commissioned in August2022

Energy Saving projects implemented 2021-22

INSTALLATION OF LOW PRESSURE COMPRESSOR FOR FA UNLODING

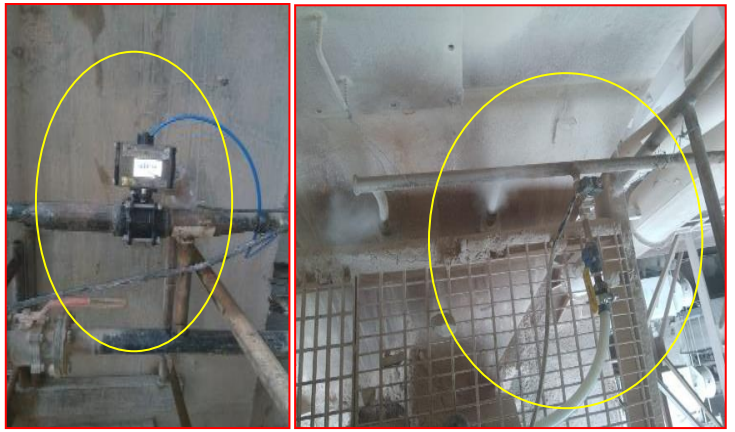
VFD INTALLED FOR 5nOS BAG FILTER FANS AT CM & PP

Universal Controller Kit for Package AC units at various location in plant area



361BC5 & 362BC5 belt idle running avoided by PLC interlock in both raw mills

Avoided running of belt conveyor 362BC4 by providing direct chute modification at separator discharge



Water spray system provided for both raw mills.

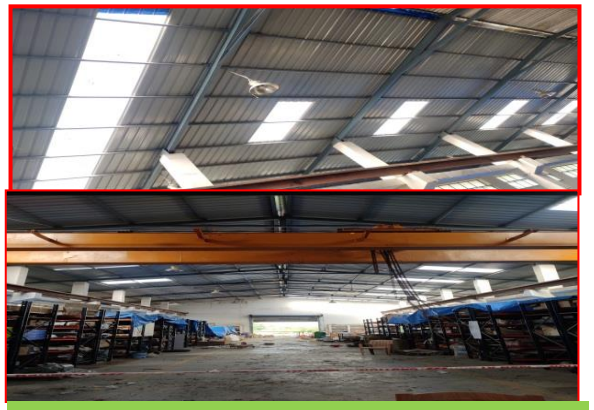
Energy Saving projects implemented 2021-22

Replacement FRP Blades in ACC Fans-CPP (5062 kW/day saving, Invest 16.5 L)

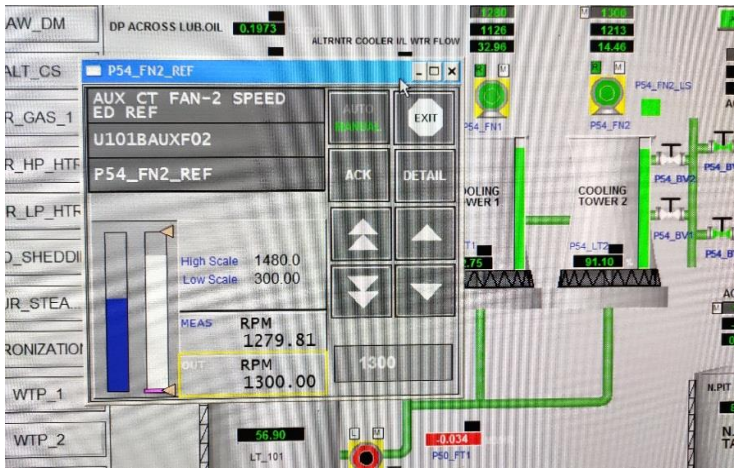
Replacement FRP Blades in ACC Fans-WHRP (1745 kW/day saving, Invest 12 L)

VFD INTALLED FOR CEP PUMP AT WHRPP

VFD INTALLED FOR RO WATER PUMP AT WTP



Roof GI sheets replaced with transparent GI sheets at main store



CPP CT tower fans running with fixed RPM and provision made in DCS manual changing of RPM w,rto discharge temp of Aux. cooling water line.

Innovation Projects FY 2022-23

ISSUE

1. Frequent stoppages of Raw mills on account of HG hopper empty & minor reclaimer stoppage.
2. AQC Boiler Inlet temperature Fluctuations leads to poor Power generation & High Water Consumption
3. ACW pump High Energy Intake

RESOLUTIONS

1. Team has decided existing LG hopper utilization for HG limestone by correcting raw mix at reclaimer pile itself, have parallel line HG LS circuit and additive circuit for feeding the hopper. Interconnected both the circuit by installing the belt conveyor and provided chute at 311BC4 discharge
2. Cooler exit temperature, thermocouple relocated to ESP inlet after WHR booster fan air dilution. Now the water pump is ON/OFF with this temperature fluctuations reduced and Generation improvement in WHR
3. Reduced the pump discharge pressure from is 4.5 kg/cm² to 3.5 kg/cm²(2443 rpm)

.

OUTCOMES

1. Improved MTBF & Stoppage frequency Reduced
2. Resulting by the above measure, power saving of 8.25 kw/hr. & water saving of 5.4m3/hr. achieved. An overall savings of 4.41 Lacks / annum
3. Achieved Savings of 110250 units per annum

Innovative Projects Implemented

1) Problem definition : Frequent stoppages of Raw mills on account of HG hopper empty & minor reclaimer stoppage.

2) Data collection : Stoppage data collected for both raw mills on account of HG hopper empty – 60 Nos(Apr-Dec)

3) **Analysis :** Analyzed for each stoppage power consumption 1.0 units/MT & rate loss which will impact on mill performance

4**) Countermeasures identified along with validation :** Brainstorming session conducted by CFT to overcome the issue. Finally, team has decided existing LG hopper utilization for HG limestone by correcting raw mix at reclaimer pile itself.

5**) Solution implemented :** We have parallel line HG LS circuit and additive circuit for feeding the hopper. Interconnected both the circuit by installing the belt conveyor and provided chute at 311BC4 discharge.

Installed new belt conveyor and interconnected HG LS to additive circuit

No.of stoppages per month due to HG hopper empty : 7 Nos
Reduction in Sp.Power consumption : 1.0 Units/MT
Power saved by avoiding stoppages/month : 1050 kWh
Total Power saving per year: 88200 kWh
Cost saving: Rs 6.17 Lacs

Innovative Projects Implemented

Innovative project # 1:
Upgrade of Cooler MFRs Pattern in Fourth chamber

Contribution and efforts:

- To reduce the clinker temperature (Heat losses reduction) from 190’c to 180’c
- Reduced Cooler water spray frequency & quantity (6 m3/hr to 4 m3/hr)
- Smooth operation
- Contributed for WHR AQC generation.

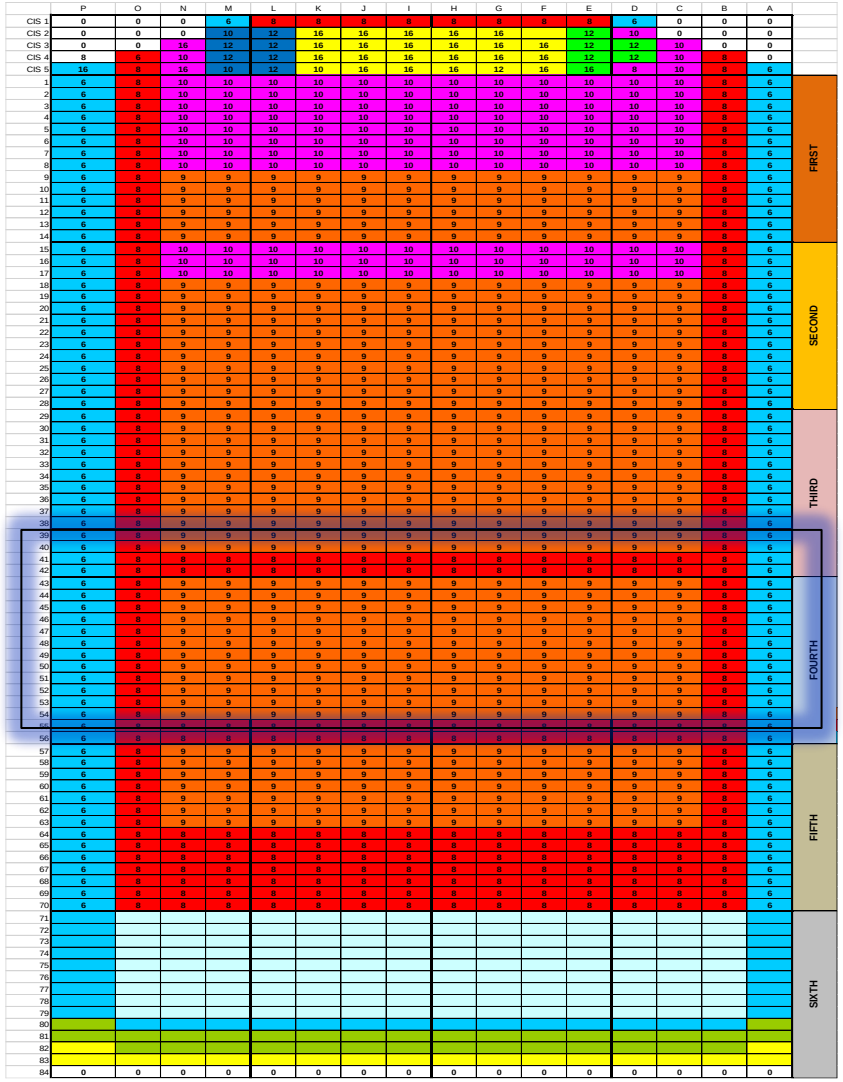
Project details and replication potential:

- Upgrade size of MFR in fourth chamber, MFR Size : **90,80,60** Changed to **100,90,60** MFR Size.
- Reduction in pressure drop from 820mmwc to 780mmwc.
- Improvement in Air mass flow rate from 1690 kg/min. to 1850 kg/min.

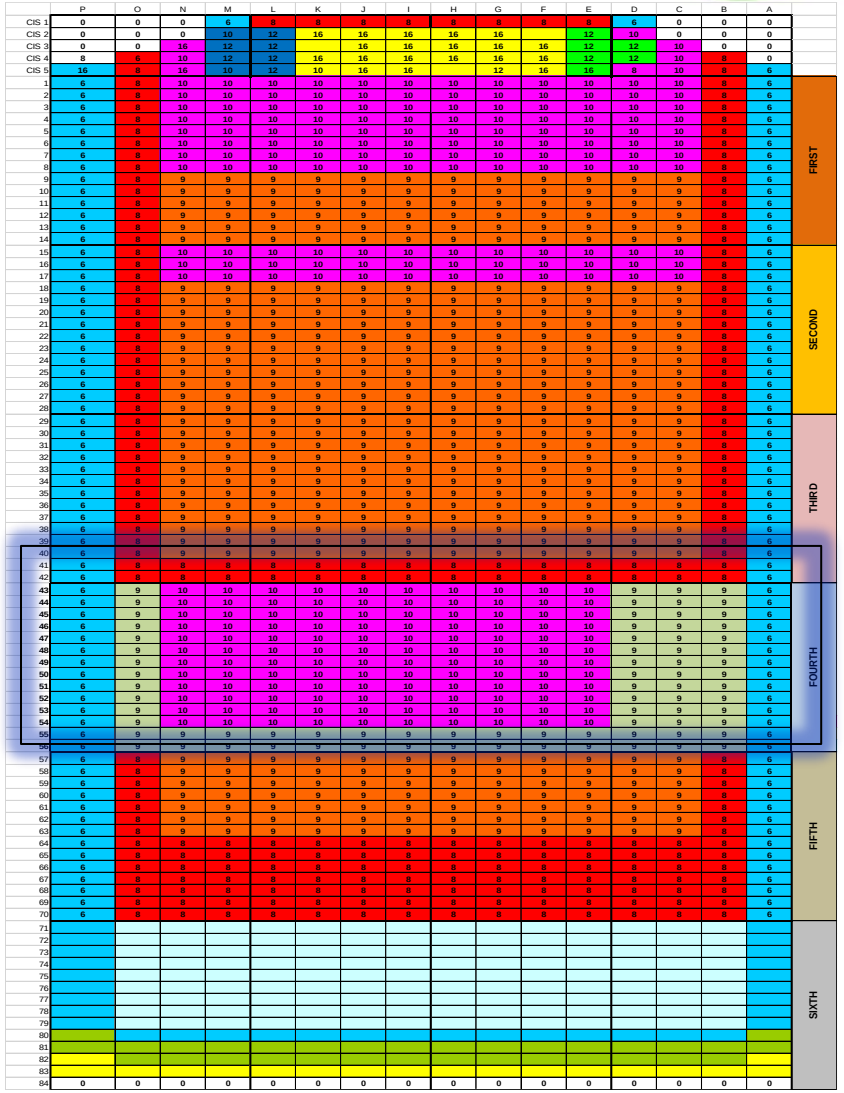
Impact:

- Reduction in cooler heat losses 2.0 Kcal /Kg. Clk. With saving per year 68 lakh INR.
- Rise in 0.1 MWH in AQC Boiler generation With saving per year 42 lakh INR.
- Enhanced life of belt conveyors at Post Clinkersation section due to reduced clinker temperature

Cooler MFR Recondition Before & After :

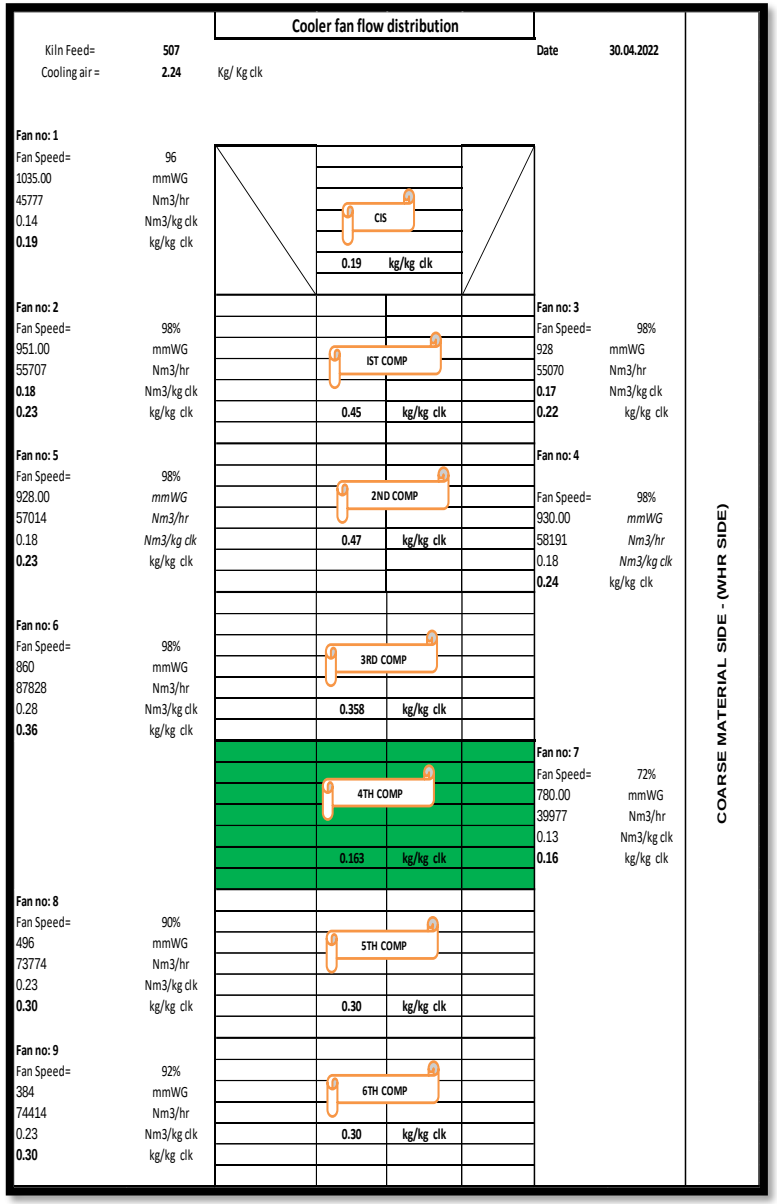


Before



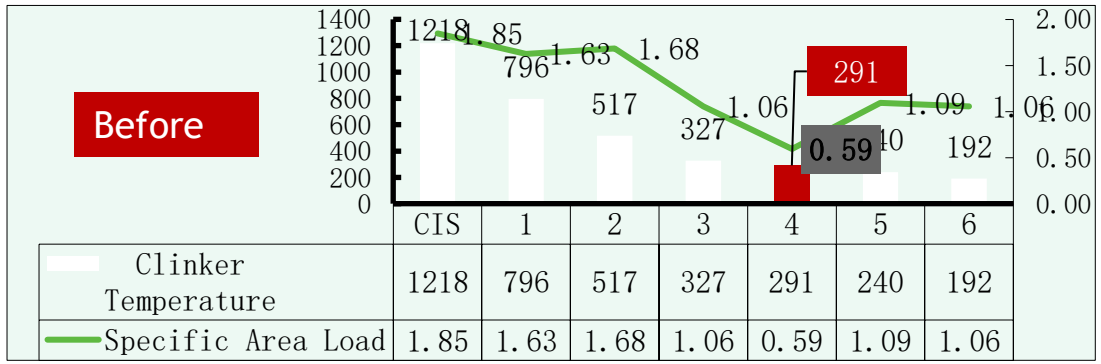
After

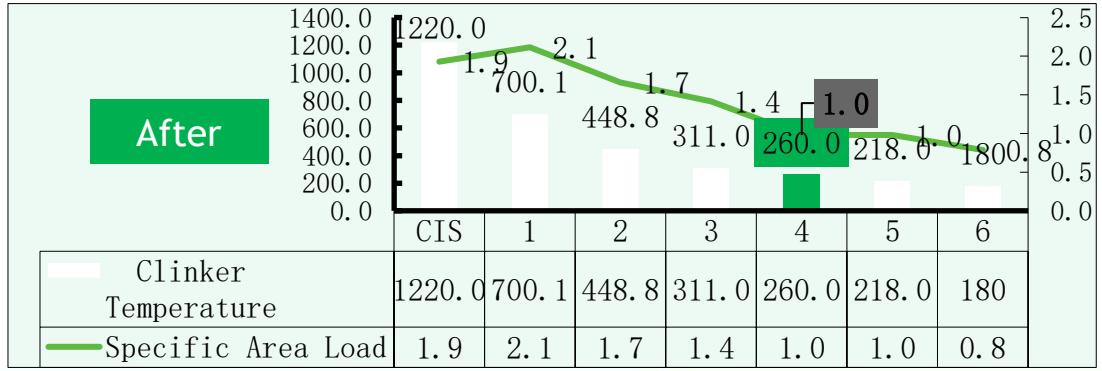
Cooler MFR Recondition Before & After :



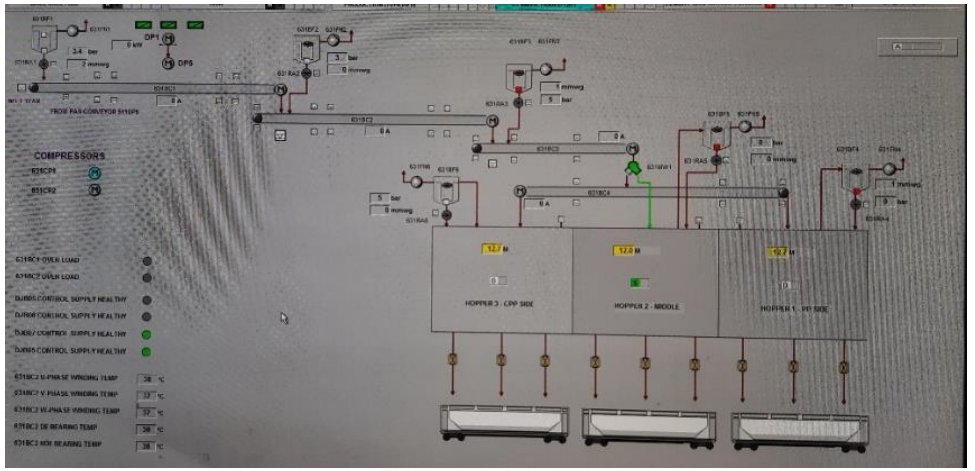
Fourth Compartment- Before MFR			
Size	numbers	%	kg/min
90	144	64.3	1166.4
80	52	23.2	374.4
60	28	12.5	151.2
	224		1692

Fourth Compartment - Changed MFR			
Size	numbers	%	kg/min
100	120	53.6	1080
90	76	33.9	615.6
60	28	12.5	151.2
	224		1846.8





Innovative Projects Implemented



Innovative project # 2:
Optimization of Clinker loading transport operation

Contribution and efforts:

- Wagon loading group started once informed by site Technician /Engineer after placing of wagon.
- Number of times found, clinker wagon loading hopper level getting down after clinker extraction (after loading started) of 15 to 20 minutes.
- Observed during this time, all belts and bag filters running in Idle

Project details and replication potential:

- SOP made and informed to all the CCR staff, group being started immediately after hopper level get start to down/reduce. There by energy saving 19kWh achieved by optimized operation.
- Auto change over of gate by providing logic with hopper level.

Impact:

- Energy saving achieved 44kWh per wagon loading by optimized operation and total saving of 9750 kWh per year.

Innovative Projects Implemented

Innovative project # 3:
Optimization of RABH Reverse Air fan operation

Contribution and efforts:

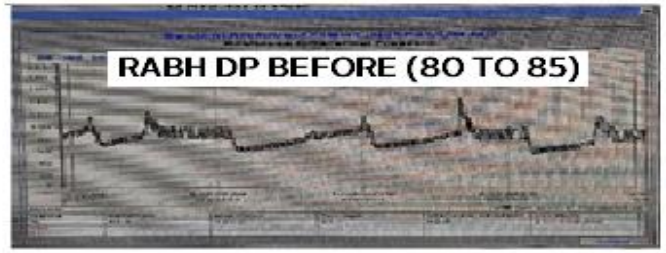
- Previous RA fan run hours 5 to 6 hours per day
- Optimization of RABH RA fan internal timer to operate the puppet valve in between two chambers was reduced from 600Sec to 120Sec.

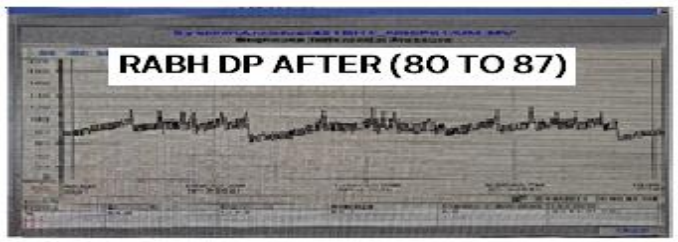
Project details and replication potential:

- Internal timer setting reduced from 600Sec to 120Sec
- RABH DP in with in the control i.e 80 to 90 mmWC

Impact:

- RA run hours reduced from 6 hours to 3 hours per day
- Energy saving achieved 350kWh per day





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

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

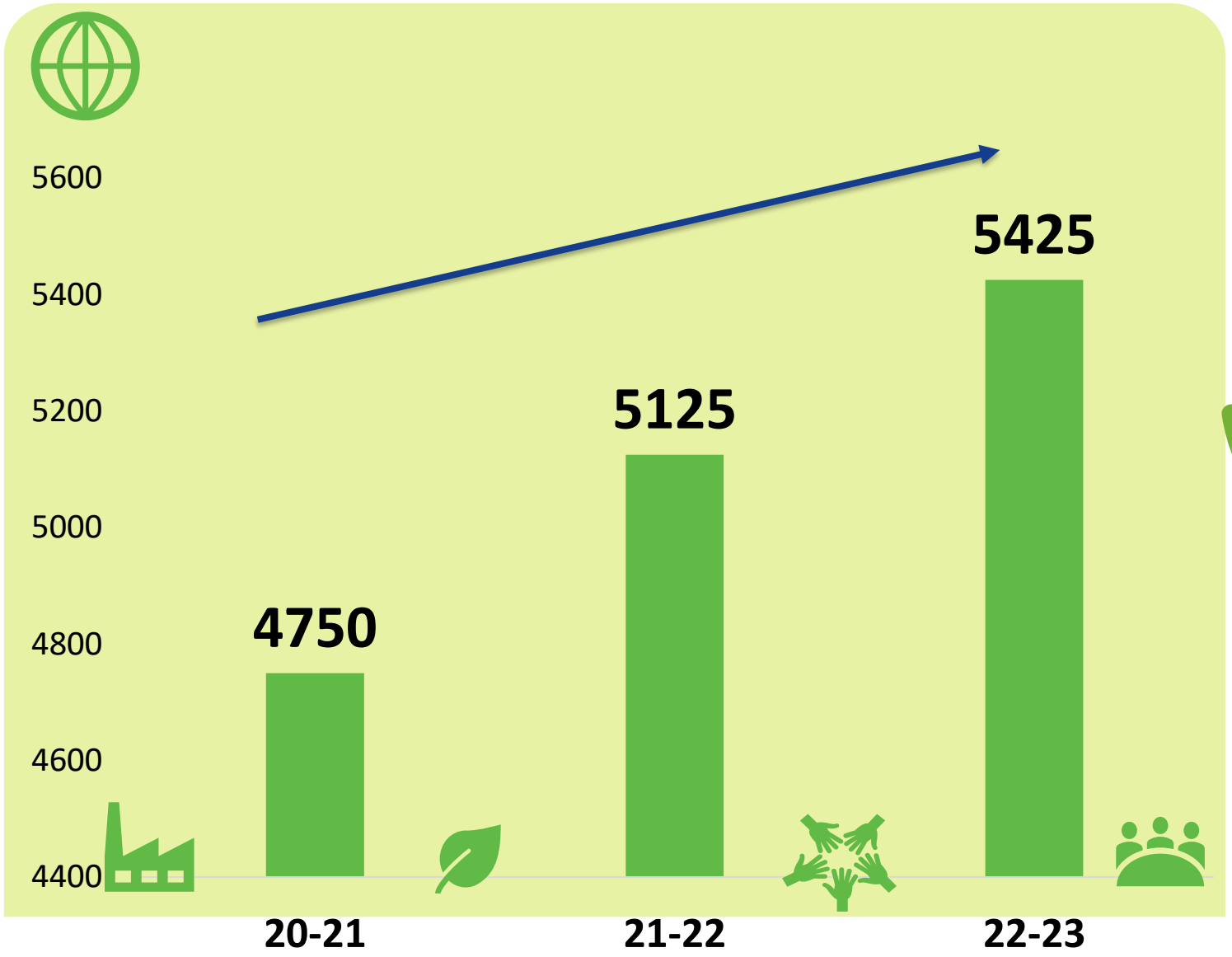
Waste Utilization Management

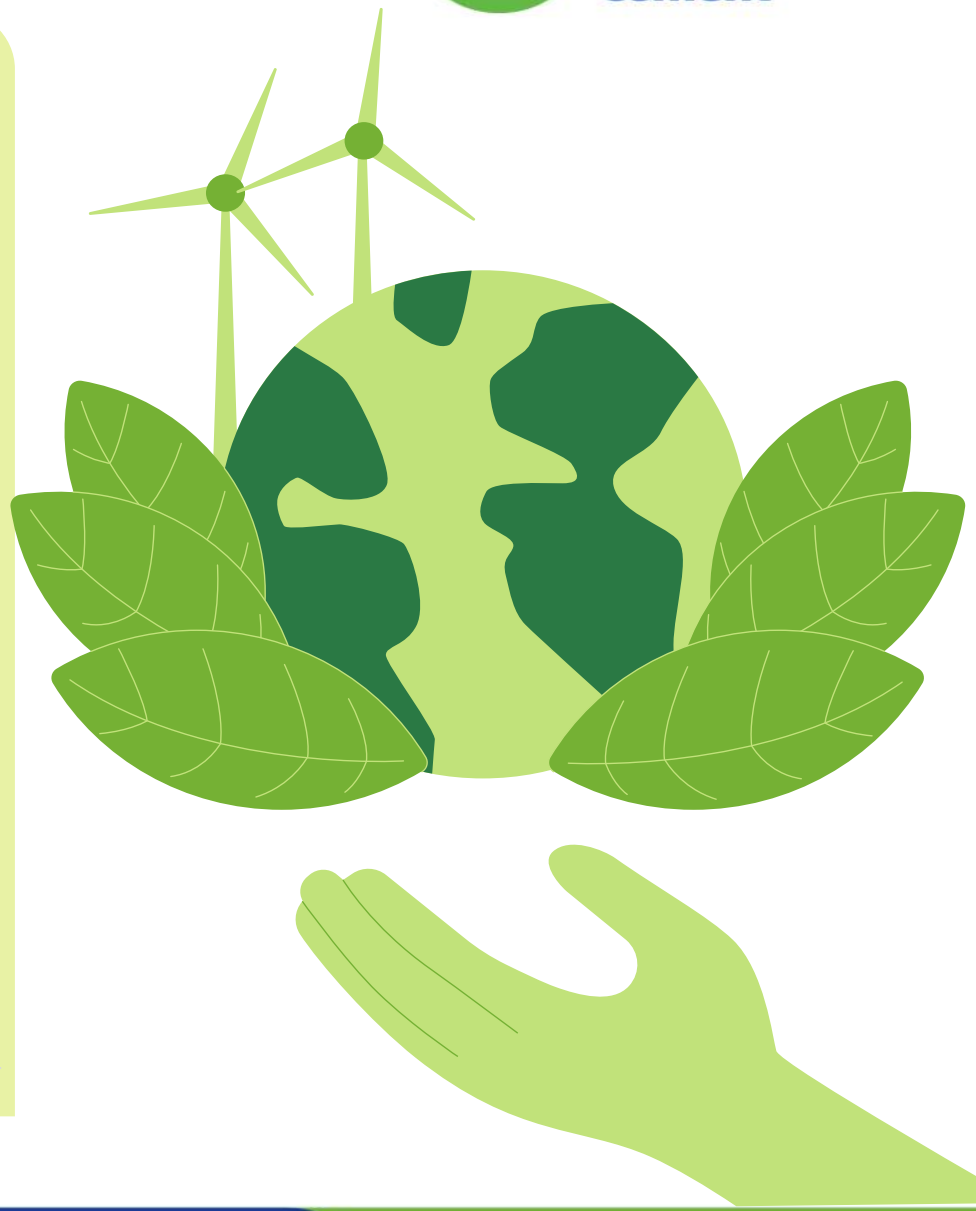
Year	Waste as fuel	Quantity (MT)	GCV (kCal/kg)	Waste as percentage of total fuel
2020-21	High CV Flyash, Solid & liquid waste(pharma), Dolochar	17281	1515	1.86
2021-22	High CV Flyash, & liquid waste(pharma)	17263	1534	1.68
2022-23	High CV Flyash, & Solid & liquid waste(pharma)	29376	2147	4.62

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

Green Development – Plantation in Nos






REDMI NOTE 9 PRO MAX
AI QUAD CAMERA


Kattur Works

GHG Inventorization

Target (short term/long term) action plan :

1 Flyash Enhancement

To Maintain fly ash addition 35% in PPC & 20% in Maxcrete

2 Improve In AFR

To Increase AFR(Alternative Fuel Reduction) consumption from 4.62% to12% (TSR) on phased manner

3 Switch to ARM

To Increase ARM(Alternative Raw Material) addition from 0.64% to 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

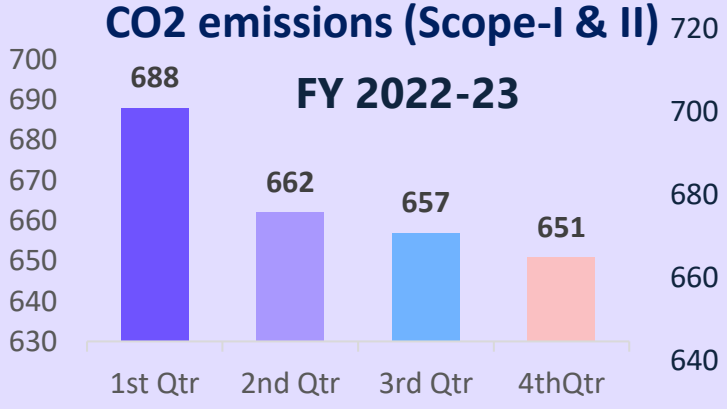
Green supply Chain-Back Hauling of Flyash tankers with cement

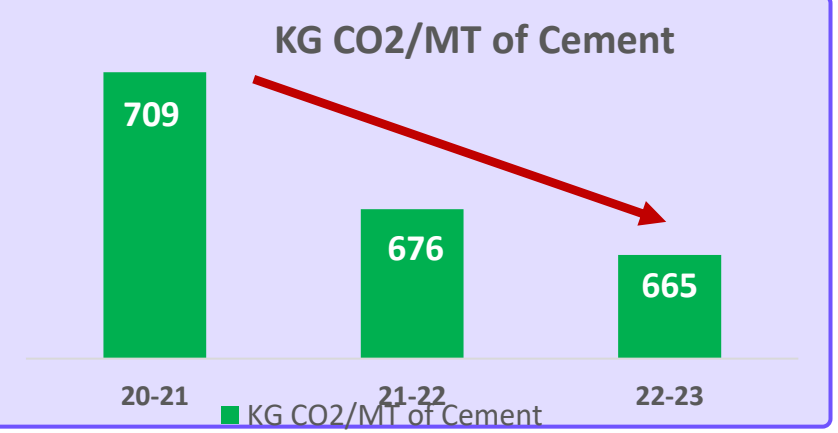
Green Purchase Policy

Green Purchasing Policy & in Purchase order

AFR SYSTEM

Solid & Liquid waste feeding system installation work completed with a investment of Rs. 243 million and commissioned on 15th August.2022.





Green Supply Chain Management

- Coal and Gypsum unloaded wagons using for clinker bulk loading
- Outside flyash 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.

Team work, Employee Involvement & Monitoring

1

KPIs Review

Review of production and power -Daily (Unit Head)

- Cross functional team(CFT) – Daily (HOD)
- Encon Team – Weekly (Unit Head)
- Head Office - Daily/Monthly (COO).
- KPIs Deviation Report

2

CAPEX

Separate budget Allocated for Encon activities Rs.7.62 Millions and Rs 243 Millions for AFR project..

3

Energy Cell

Energy efficiency / Awareness training on energy conservation being conducted monthly once.

4

Cross Functional

Conducting regular Section meeting with Executives & CFT meeting with Teams

5

Energy Audits

Energy Audits (Internal and external).

PAT Cycles Review

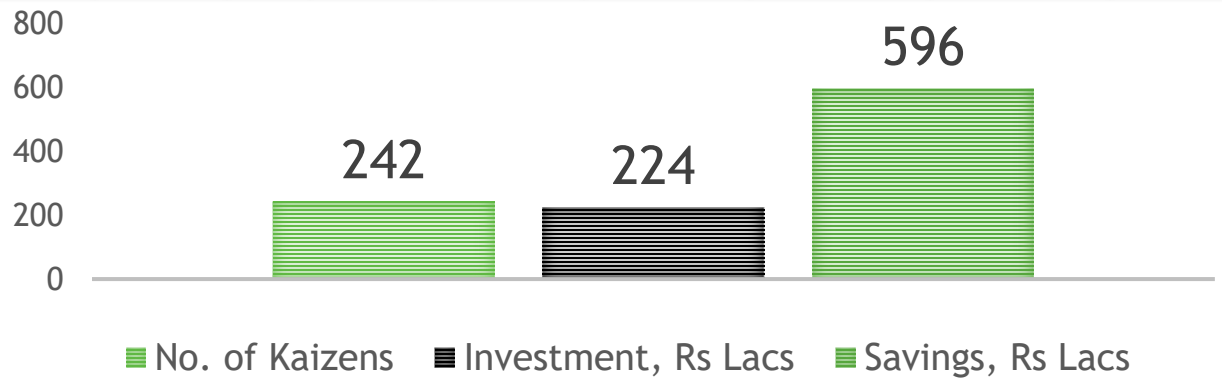
6

KAIZEN

Kaizen portal for new innovation & suggestions

Team work, Employee Involvement & Monitoring (Kaizens)

Department	Total Nos	Cost Benefit			Benefits in								Saving Potential				
		Investment (L.Rs.)	Energy Saving (L Kwh)	Cost Save (L Rs.)	Quality	Cost	Delivery	Innovation	Productivity	Environment	Health	Safety	Tangible	In tangible	Recurring	Onetime	Horizontal replication
CIVIL	7	1.37	0	8.8	0	7	0	1	0	1	0	1	0	0	0	7	0
CPP	27	1.82	4.565	43.67	0	10	9	0	3	4	0	11	5	21	3	27	25
ELECTRICAL	35	186418.1	1889.211	114662.6	30	17	21	23	20	26	23	33	33	4	24	31	30
INSTRUMENTATION	26	2.65	16.5	15.84	3	7	2	16	16	5	0	10	4	22	0	24	9
MECHANICAL	119	35011.78	141061.6	279249.9	37	11	14	29	32	20	5	92	34	83	10	109	60
MINES	15	3201.36	0	158410.6	0	6	2	2	6	2	0	15	6	8	5	8	14
OPERATION	12	0.25	3.88	26.82	0	8	2	8	2	0	0	0	5	7	4	7	5
PACKING PLANT	1	1.32	5400	43200	0	1	0	1	0	0	0	1	1	0	0	0	1
Grand Total:	**242**	**224639**	**148376**	**595618**	**70**	**67**	**50**	**80**	**79**	**58**	**28**	**163**	**88**	**145**	**46**	**213**	**144**



Kallur Works Achievements FY 2022-23

S.No	Achievement	Achieved figure	YTD
1	Ever highest TSR % achieved	4.27	2022-23
2	Ever Highest blended Cement Production- %	47.2	2022-23
3	Ever Highest Blended Cement Dispatch - %	47.1	2022-23
4	Ever Highest Solar Gross Generation, Lac kWh	53.6	2022-23
5	2nd Ever Highest WHR Gross Generation, MWH	7.32	2022-23
6	2nd Ever Highest WHR Gross Generation, Lac kWh	468	2022-23
7	Ever lowest WHR Aux. Power Consumption -%	5.0	2022-23
8	2nd Ever Highest WHR Plant Load Factor (PLF) -%	100	2022-23

Kallur Works Achievements FY 2022-23

S.No	Achievement	Achieved figure	MTD
1	Ever lowest Upto Clinkerisation specific power consumption achieved kWh/MT Clinker	48.9	Dec'22
2	Ever lowest Kiln specific power consumption achieved kWh/MT Clinker	18.06	Dec'22
3	Ever lowest Raw Mill#1 specific power consumption achieved kWh/MT Material	13.67	Dec-22
4	Ever highest Raw Mill#1 productivity rate achieved (TPH)	326	Dec-22
5	Ever lowest Raw Mill#2 specific power consumption achieved kWh/MT Material	13.34	Sept-22
6	Ever highest Raw Mill#2 productivity rate achieved (TPH)	325	Dec-22
7	Ever highest TSR % achieved	9.45	Jan-23
8	Ever highest blended cement production achieved-%	74.03	Nov-22
9	Ever highest blended cement dispatch achieved-%	65.19	Nov-22

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.

bsi.

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, Bhakthampalli (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 Effective Date: 2022-07-08
Latest Revision Date: 2022-06-30 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, Bhakthampalli (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 Effective Date: 2022-07-22
Latest Revision Date: 2022-06-30 Expiry Date: 2025-07-21

Page: 1 of 1

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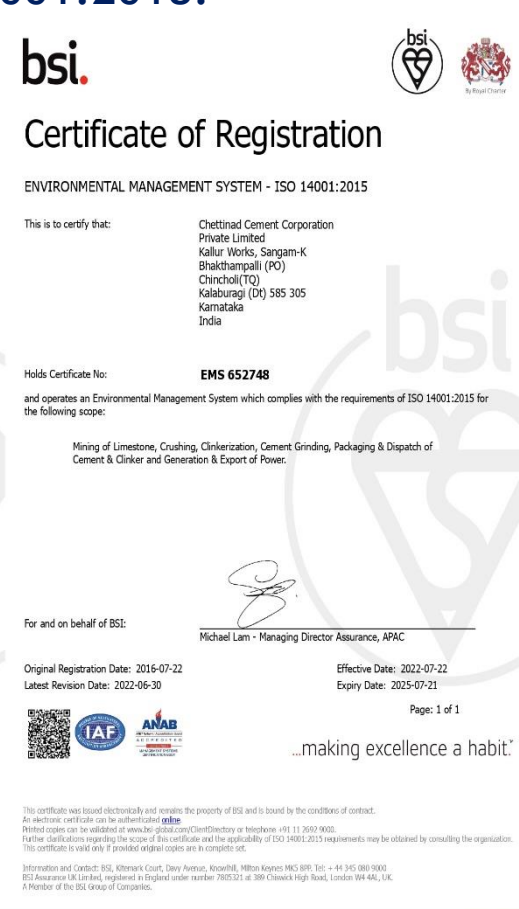

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Certificate of Registration

ENVIRONMENTAL MANAGEMENT SYSTEM - ISO 14001:2015

This is to certify that: Chettinad Cement Corporation Private Limited, Kallur Works, Sangam-K, Bhakthampalli (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 Effective Date: 2022-07-22
Latest Revision Date: 2022-06-30 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, Bhakthampalli (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 & Despatch 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 Effective Date: 2022-03-22
Latest Revision Date: 2022-02-22 Expiry Date: 2025-03-21

Page: 1 of 1

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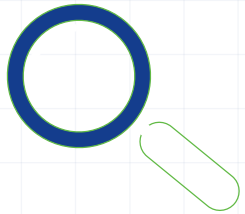
Awards Learning !!



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

Kallur works

Awards & Accolades

CII Energy Efficiency Unit (FY2021-22)

CII Best Energy Efficient Designated Consumer

MEMC week 2021-2022 prizes list (Group-1)

Kallur Limestone Mine has bagged two prizes for Mines Environment & Mineral Conservation(MEMC)-2019-20 chaired by Indian Bureau of Mines(IBM) for the following categories:

1) Mineral Conservation - First Prize,

2) Energy Conservation - Second prize.

Unit has received awards during **52th National Safety Week celebrations – 2023 on various categories i.e**

BEST HEALTH SERVICE IN PLANT , BEST SAFE MALE WORKER
BEST SAFETY OFFICER, BEST SAFE FEMALE WORKER -
BEST SAFETY SKIT - 1ST PRIZE, SAFETY ESSAY ENGLISH - 1ST PRIZE
BEST SAFE CONTRACTOR – SSSMA, SAFETY SLOGAN ENGLISH - 1ST PRIZE

which was organized by Kalaburgi Region Industrial Safety Committee


Congratulations
ENERGY EFFICIENT UNIT
Chettinad Cement Corporation Pvt Limited,
Kallur
CII
NATIONAL AWARD FOR EXCELLENCE IN ENERGY MANAGEMENT 2022
ENERGY EFFICIENT UNIT
Kallur
21st Energy Efficiency SUMMIT 2022
19 - 21 September, 2022 New Delhi
23rd National Award for Excellence in Energy Management 2022
CII
Confederation of Indian Industry
23rd National Award for
Excellence in Energy Management 2022
This is to certify that
Chettinad Cement Corporation Pvt Limited, Kallur
has been recognized as
"Energy Efficient Unit"
This acknowledgement is based on the evaluation by the panel of judges at the
"National Award for Excellence in Energy Management" held during 23 - 25 August 2022

Bagged 2nd Runner Up in Best energy efficient designated consumer Under BEE PAT Scheme for the year 2022-23

CII
Centre of Excellence
for Competitiveness for SMEs

Certificate of Award

This is to certify that
Chettinad Cement Corporation Private Ltd,
Kallur Works
has been awarded as the 2nd Runner Up
in Best Energy Efficient Designated Consumer
(Under BEE PAT Scheme) Category in the 7th Edition of
CII National Energy Efficiency Circle Competition
held on 20-21 July 2023.

Mr Shreekant Somany
Chairman,
CII – Centre of Excellence for
Competitiveness for SMEs

Dr Sudhir Kapur
Chief Jury,
CII National Energy Efficiency
Circle Competition

Mr Pikender Pal Singh
Executive Director
Confederation of Indian Industry

Date: 21-07-2023

CII
Confederation of Indian Industry

7th Edition
NATIONAL
ENERGY
EFFICIENCY
CIRCLE
COMPETITION
20-21 July 2023
Hybrid Mode
Chandigarh
& Online

7th Edition of CII National
Energy Efficiency Circle
Competition

Certificate No. EC23/A31

Thank You...!

ganesan.pr@chettinadcement.com

9110483048