THE RAMCO CEMENTS LIMITED,JAYANTHIPURAM

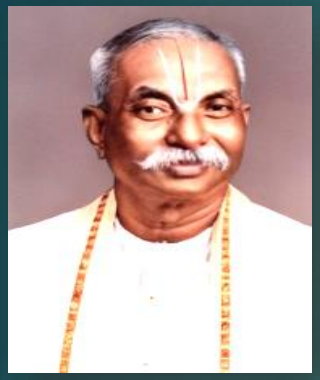
Team Members:

SVRK Murthy Rao – SVP (Works)
P. Raghuram – (SDGM – E&I)
G. Hanumath Prasad (Manager – Process)

24th CII - National Energy Award for Excellence in Energy Management - 2023

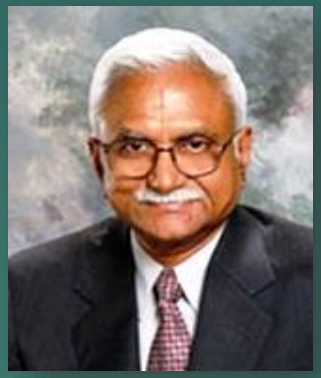
THE RAMCO CEMENTS LIMITED

FOUNDER



Sri P.A.C.RAMASAMY RAJA

FORMER CMD



Sri P.R.RAMASUBRAHMANEYA RAJHA

MANAGING DIRECTOR

Sri.P.R.VENKETRAMA RAJA

"Do Not look at Productivity as a game in numbers. Try to learn from others and never compromise on quality and always stay ahead in terms of technology. In the long run, they will pay off "

- Shri P.A.C Ramasamy Raja, Founder Ramco Group

The Ramco cements limited is a flag ship company of Ramco Group with interests in:

1) Cement
2) Cotton Yarn
3) Software System
4) Fiber Cement Products and
5) Wind Energy

1.THE RAMCO CEMENTS LTD

- The Ramco Cements limited is the 5th largest and one of the fastest growing cement companies in India, with a production capacity of 21 million tonnes per Annum.
- The Company operates 6 Integrated Cement plants and 7 Cement grinding Units across the country.
- The Ramco Cements limited is known for introducing many new technologies first time in the Indian cement industry.

1.THE RAMCO CEMENTS LTD , Jayanthipuram Works

- Jayanthipuram Cement Works, located in the NTR District of Andhra Pradesh, Commissioned in the year 1986.
- Presently the plant is operating with a production capacity of

  Clinker – 4.685 MTPA

  Cement – 3.65 MTPA
- With support of

  Coal based Captive Power plant – 42 MW (2*18 + 1*6 MW)

  Waste Heat recovery System – 27 MW (3 * 9 MW)

The manufacturing Products are OPC,PPC and RSC

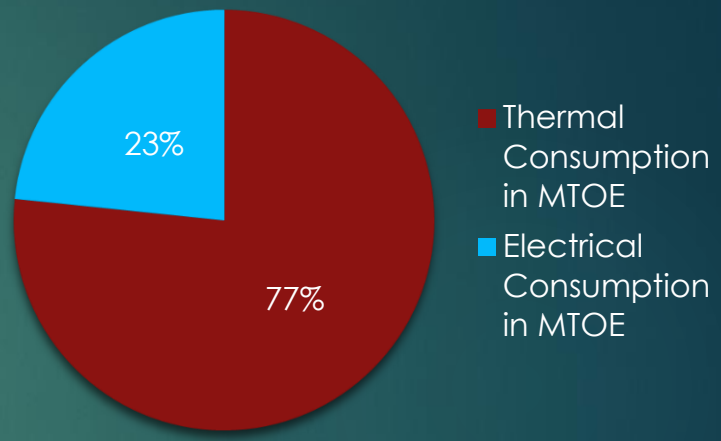
Plant Capacity at a Glance

Year	Milestone	Cumulative Clinker Capacity	Cumulative Cement Capacity
		Million TPA	Million TPA
1986	Line-1 commissioned	0.75	0.75
1995	Line-1 Up-gradation	1.10	1.10
1999	Slag Cement	1.10	1.60
2008	Line-2 commissioned	2.80	2.60
2010	Expansion (Installation of VRPM)	2.80	3.65
2016	Line-1 Upgradation	3.185	3.65
2020	Phase-1 WHRS in Line-2 Commissioned	9 MW	
2021	Phase-2 WHRS in Line-1 Commissioned	9 MW	
2021	Line-3 Commissioned	4.685	3.65
2021	Phase-3 WHRS in Line-3 Commissioned	9 MW	

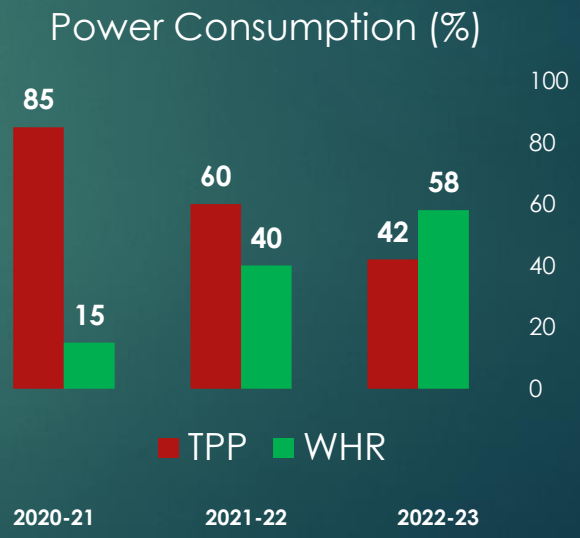
2 . Energy Consumption Details

Overall Energy Consumption - 2023

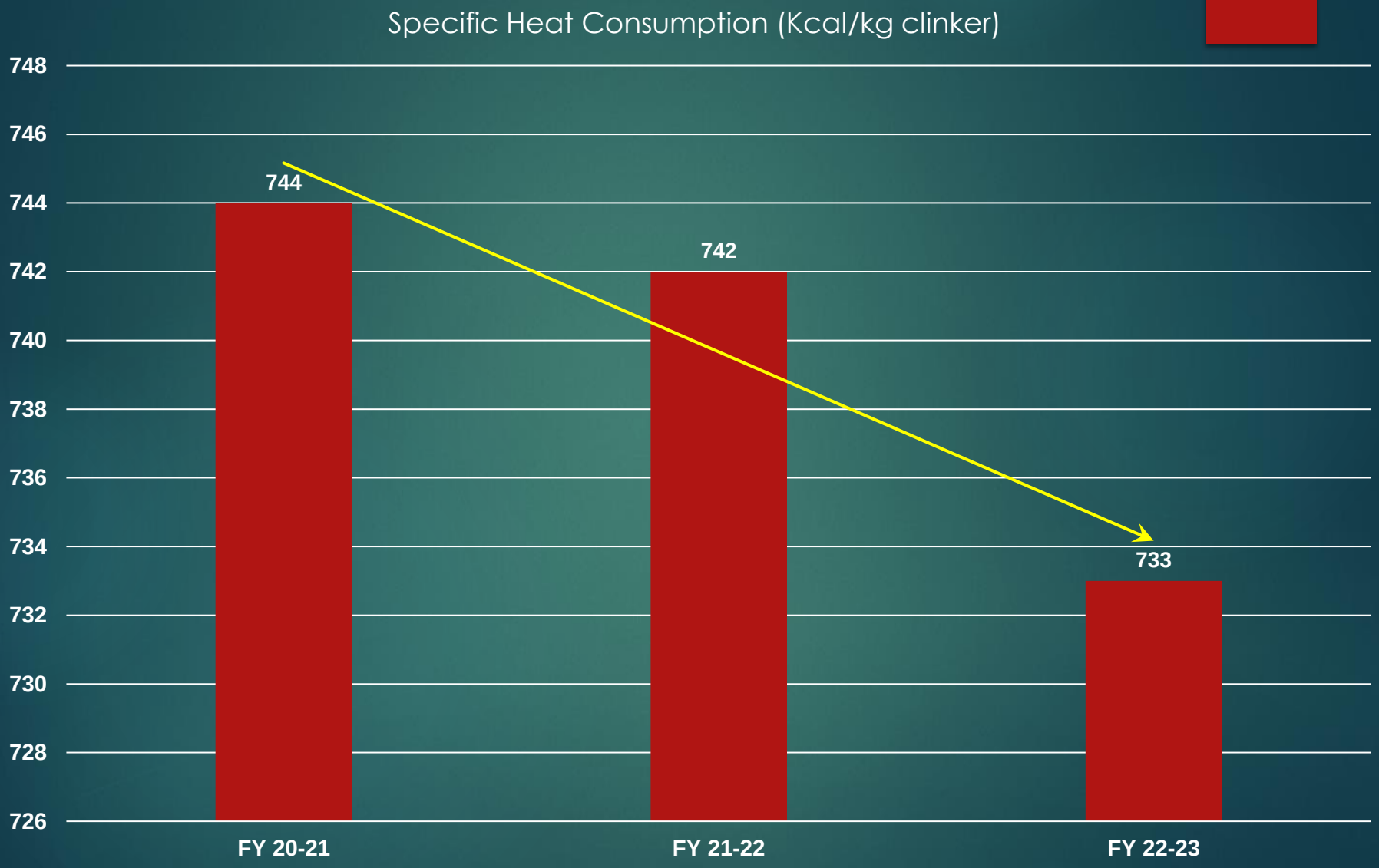
Thermal Consumption in MTOE	313465
Electrical Consumption in MTOE	95586
Total Consumption in MTOE	409051



Power Source in (%)	2020-21	2021-22	2022-23
TPP	85	60	42
WHR	15	40	58
Total	100	100	100

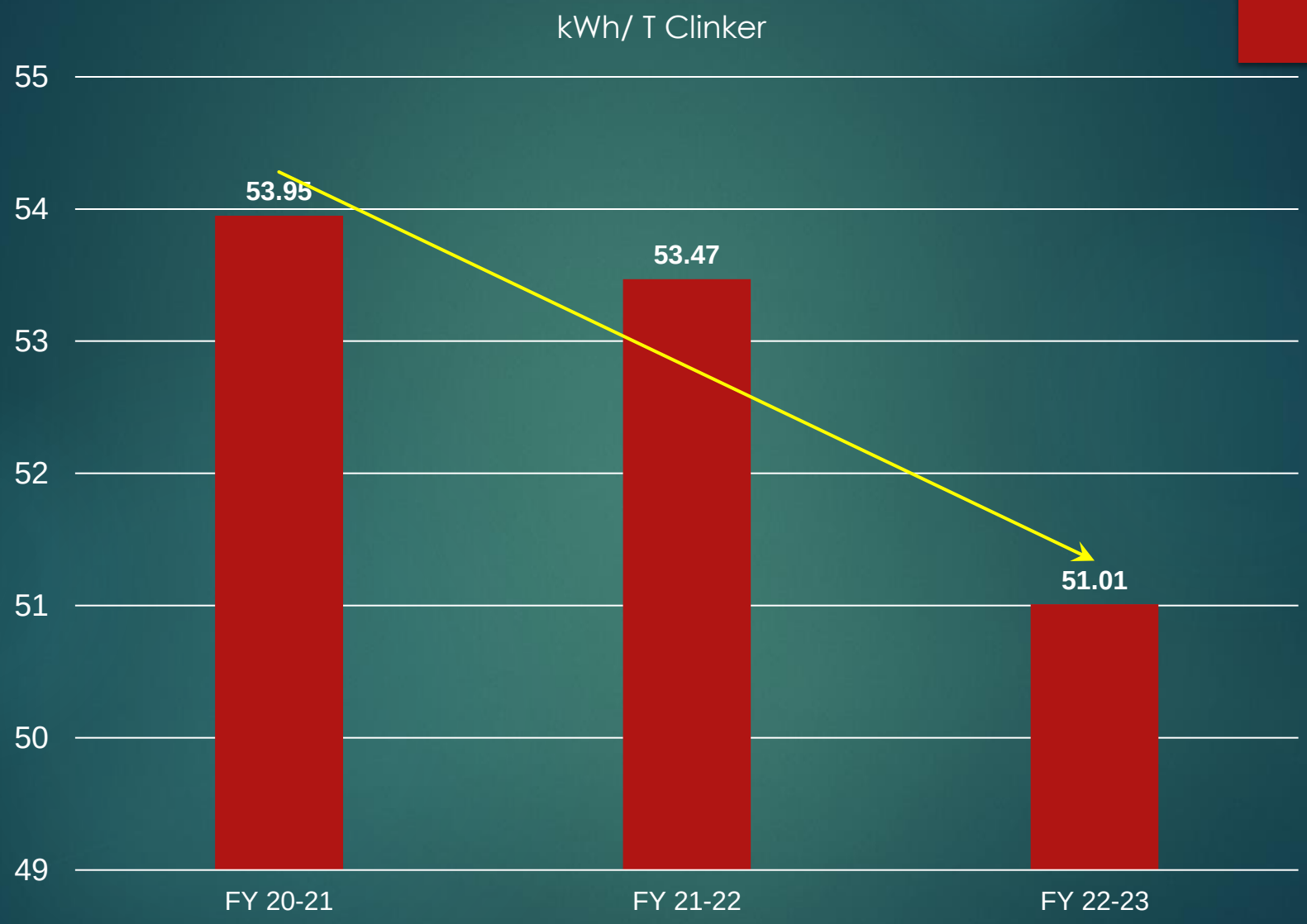


2.Thermal Energy Consumption



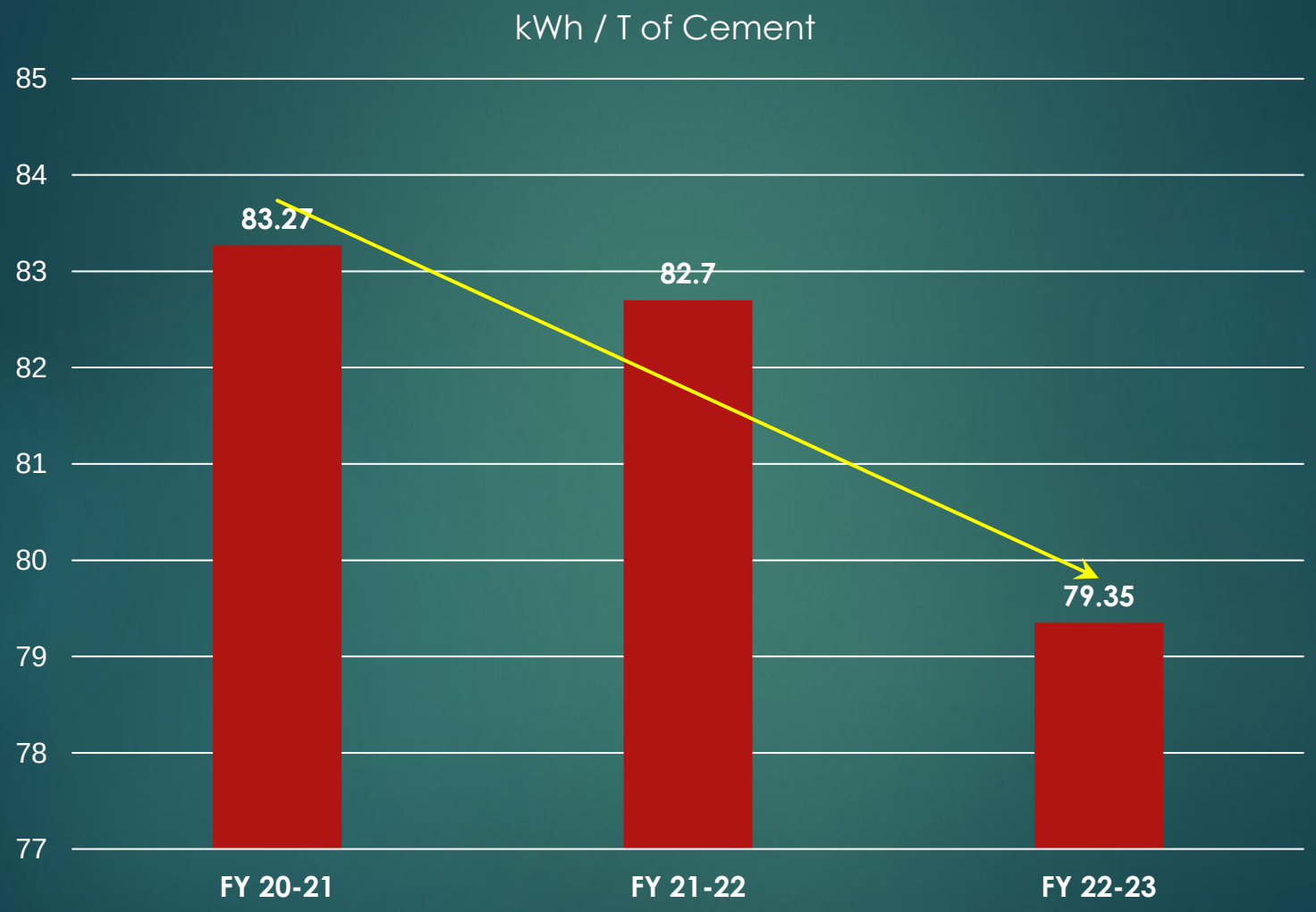
Specific Heat Consumption reduced by 1.5%

2.Electrical Energy Consumption – Up to Clinker



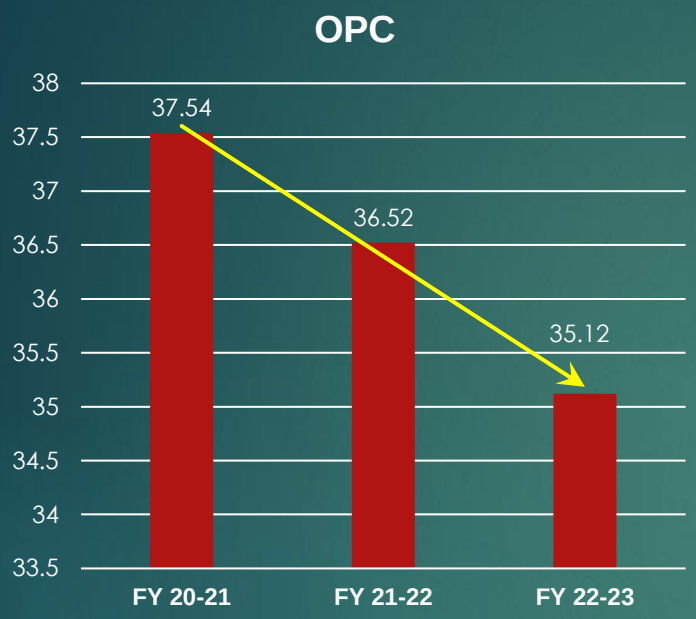
Specific Power consumption reduced by 5.44%

2.Electrical Energy Consumption – Overall Cement

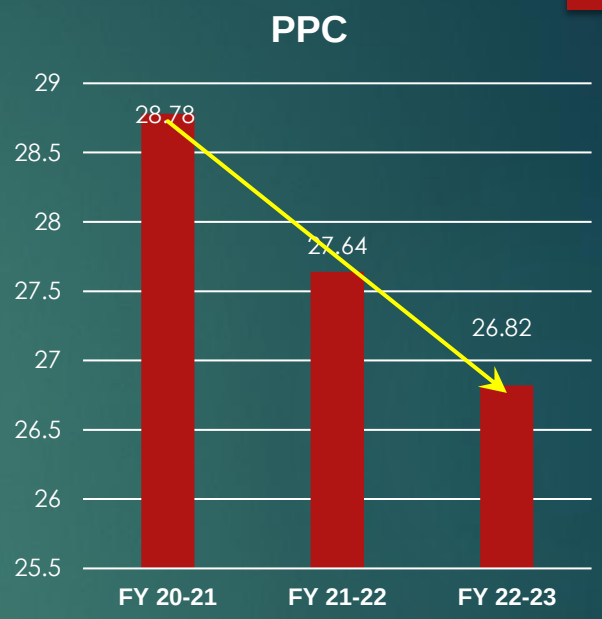


Specific Power consumption reduced by 4.7%.

2.Electrical Energy Consumption – Cement Product



SEC reduced by 6.44%



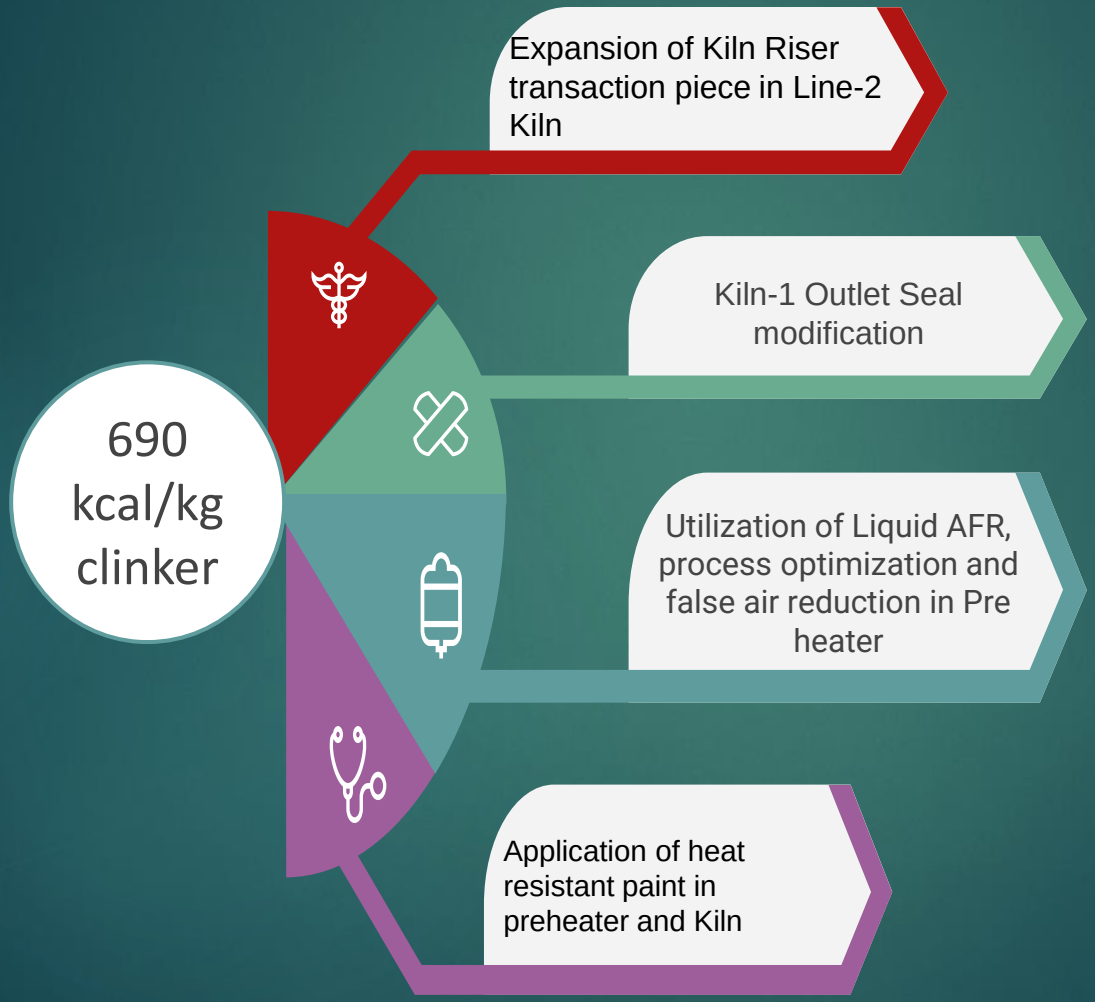
SEC reduced by 6.81%

3.Information on National and Global benchmark

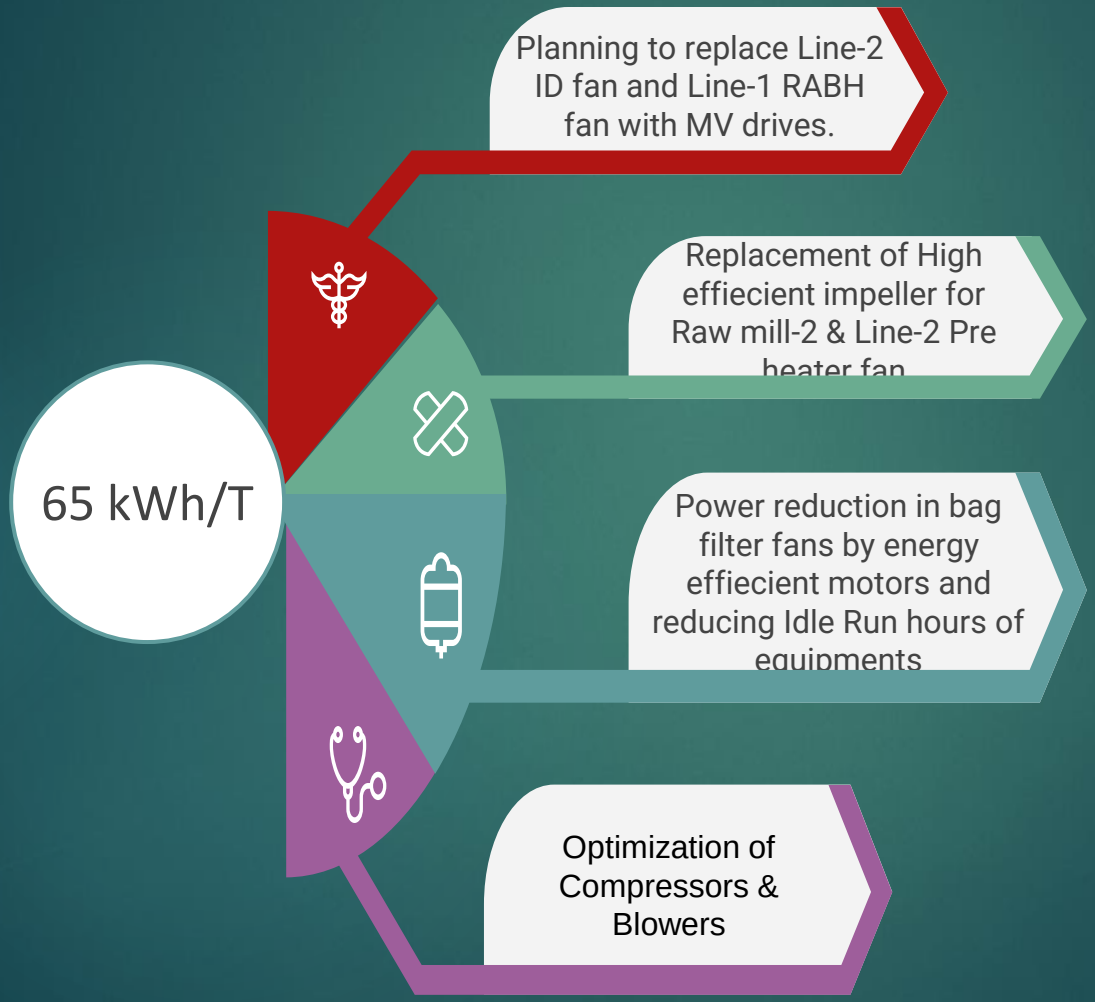
International Benchmark	• SHC-665 Kcal/Kg Clk • SEC-65 Kwh/T Cem
National Benchmark	• SHC-690 Kcal/Kg Clk • SEC-65 Kwh/T Cem
TRCL Jayanthipurm	• SHC-733 Kcal/Kg Clk • SEC- 79.5 Kwh/T Cem

Reference:
National Benchmark: Energy Bench Marking For Cement Industry Version 5
International Benchmark : Indian cement and construction industries-global competitiveness-NCB-CMA special publication presented in 8th NCB International Seminar

3.Roadmap to achieve national/Global benchmark-Thermal Energy



3.Roadmap to achieve national/Global benchmark-Electrical Energy



4. **Energy Conservation Projects Implemented in the years 2020-21, 2021-22 & 2022-23**

No of Projects – 32

Projects with Nil investment - 07

Total Amount Invested – 165.8 Crores

Cost savings achieved – 105.50 crores

Electrical Energy Saved – 1783.40 Lakh kWh

Thermal Energy Saved – 41000 MT of coal

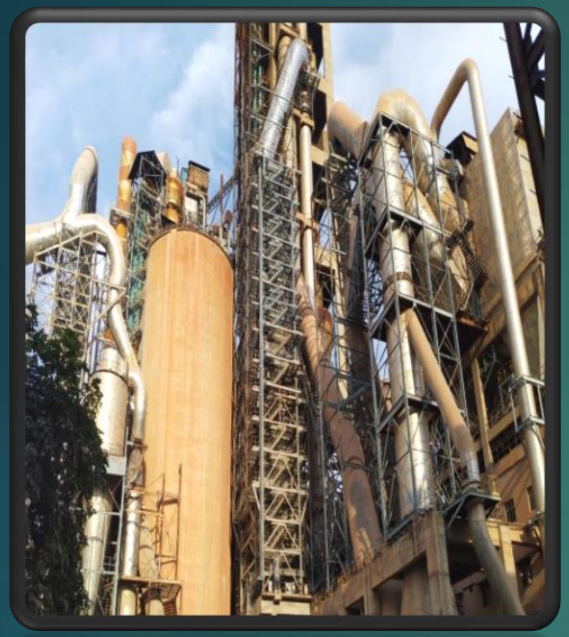
Major ENCON Projects during years 2020-21,22 and 23

Sno.	Team / Section	Project details	Annual savings (INR Lakh)	Investment (INR Lakh)
1	Phase-1 WHR	Installation Waste heat recovery system in kiln-2 (9 MW)	245	8500
2	Phase-2 WHR	Installation Waste heat recovery system in kiln -1 (9 MW)	7	8200
3	Phase-3 WHR	Installation Waste heat recovery system in kiln -3 (9 MW)	7	8200
4	Mines Auto, LOCO & DGPP	Plant water pump replaced with high discharge pump (400Cubic M/Hr water discharge instead of 285Cubic M/Hr discharge @ 175kw power.	12.4	6
5	TPP	Replacing Encon blades with Parag blades in ACC fans for STG -6	17.24	30.5
6	WHRS	Installing VFD for Condensate Extraction pump in WHRB steam Turbine	3.46	10
7	L.S.Crusher	Optimization of power consumption through idle running of B Conveyor,Secondary screen, Spillage BC-1 & 2 conveyors,A conveyor,C conveyor,CBA BC-1, Stacker feed belt, Stacker Boom conveyor by eliminating frequent overload tripping of B1 Conveyor by replacing existing 3.7kw motor & drive units with 7.5kw capacity.	0.625774	0.16
8	Coalmill-1 & Coal Handling	Optimization of Coal Mill-1 output material transport (grinding circuit) screw pumps operation for saving energy.	5.2416	Nil

Major ENCON Projects during years 2020-21,22 and 23

Sno.	Team / Section	Project details	Annual savings (INR Lakh)	Investment (INR Lakh)
9	TPP	Elgi Service air compressor New VFD installation.	7	6.5
10	Mines	Power reduction in North Band Mines dewatering system by replacing the under efficiency old pumps with high efficiency pumps.	38	22.57
11	Kiln-2	Optimization of Line -2 ID Fan Specific Power (operation in SPRS mode) -by installing ID Fan SPRS to recover the power loss in slip Power	11	4.12
12	Kiln-1	Interconnected the pipe lines between these three blowers area and stopped the KF1AB07 blower as standby for remaining blowers.	1	Nil
13	TPP	STG-3 CEP-2 Spare VFD was installed, pump discharge pressures were reduced depend up on the Deareator pressure. Auxiliary power consumption reduced.	0	Nil
14	TPP	While 30MW power generation, operating one 260 KW (18MW) plus one 132 KW (6MW) Main cooling water pumps instead of two 260 KW pumps. Auxiliary power consumption reduced.	2	Nil
15	Kiln-2	Optimization of Kiln-2 ID fan & Bag house fan after WHR	10	Nil
16	Kiln-1	Optimization of Kiln-1 ID fan for New tower Pre heater after WHR	4	Nil

Waste Heat Recovery System In Line-2 (9 MW)



PH-2 Boiler

AQC-2 Boiler

Phase -1 WHRS in Line-2 was commissioned on 13/09/2020

Units Generated in
2020-21 : 27,114,350 kWh
2021-22 : 46,931,618 kWh
2022-23 : 53,024,170 kWh

Waste Heat Recovery System In Line-1(9 MW)

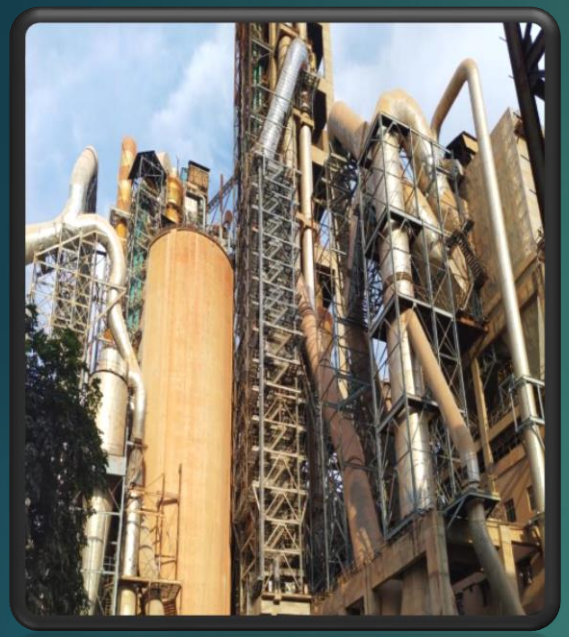
AQC-1

PH-1B

PH-1A

Phase -2 WHRS in Line-1 was commissioned on 25/02/2021
Units Generated in
2020-21 : 43,38,520 kWh
2021-22 : 45,742,539 kWh
2022-23 : 50,740,900 kWh

Waste Heat Recovery System In Line-3 (9 MW)



PH-3 Boiler

AQC-3 Boiler

Phase -3 WHRS in Line-3 was commissioned on 13/11/2021

Units Generated in
2020-21 : Nil
2021-22 : 13,877,100 kWh
2022-23 : 59,278,031 kWh

LRS Speed Reduction in Coal Mill-2&3

- After commissioning WHR in all preheaters ,the mill inlet temperature got reduced from 250 to 150 due to this fine coal moisture increased.
- When fine coal moisture increases, it affects the fine coal conveying systems and also increased the heat for evaporation of excess fine coal moisture
- We decided to reduced the water spray in coal mill which is used for grinding bed stabilization.
- Without affecting mill grinding process we reduced the water spray by running the table with lower speed
- Reduction of mill table speed has achieved by LRRS.
- By doing so, the mill outlet temperature has increased from 45 deg C to 60 deg C and the fine coal moisture got reduced from 3.5% to 0.7%

Heat Savings: 1.5 Kcal/kg clinker

TPP ENERGY SAVING PROJECTS

- Installed VFD to 1 no ACW Pumps with 90 Kw motor and saved 328 kwh/day. Total cost Savings Rs. 4.98 lakhs (328 kwh*365*4.16).

- Installed VFD to 3 no's of Cooling Tower Fans, each with 75 kw motor and saved 327 kwh/day. Total cost Savings Rs. 4.97 lakhs (327 kwh*365*4.16).

- Installed VFD to BFP Pump each with 425 kw motor and saved 730 kwh/day. Total cost Savings Rs. 10.93 lakhs (730 kwh*365*4.16).

- Installed VFD to 3 nos CEP Pumps each with 55 kw motor and saved 990 kwh/day. Total cost Savings Rs. 11.12 lakhs (990 kwh*270*4.16).

Total savings-32 lakhs

WHRS - Encon Blades for STG -6

- Energy Saving and Payback calculation in ACC Fans after Changing Parag Blades to Encon Blades (STG-6 unit). These are light weight blades with better aero foil section.

Parameter	Uom	Before	After
TG Load	MW	>8.5	>8.5
Average Power Consumed (4 Fans)	Kwh/Day	3259.45	1578.5
Average Power Consumed /Fan	kwh	33.95	16.44
Net power saving(4 Fans)	Kwh/Day	1681	
Power Savings (4 Fans)	Kwh/hr	70	
Run hours (250 Days)	Hours	6000	
Power saving	Kwh/Annum	420200	
Power cost	Rs/Kwh	3.74	
Cost saving/STG Unit	Rs /Annum	15,71,735	
Investment cost/Unit	Rs	30,25,480	
ROI	Months	23 months	
Angle for Fans	Deg	16-17	4-5

Total savings-15.72 lakhs

5.Innovative Project-1

Cooler DPC Tail end return spillage collection conveyor

Issue:

Heavy return spillage at clinker cooler discharge DPC tail end area.

Modification done

Conveyor installed at the DPC tail end to collect & carry back the spillage material into the same DPC.

Advantages of modification

- ✓ Spillage at dpc tail end area avoided.
- ✓ Housekeeping improved.

5.Cooler DPC Tail end return spillage collection conveyor (Before)

5.Cooler DPC Tail end return spillage collection conveyor (After)

INNOVATIVE PROJECT-2

Hot air Duct tapping from TPP to Coal mill-2

- Coal Mill-2 is required to run during Line-2 shutdown also to avoid the production loss in Line-1.

- During Line-2 shutdown, we have taken the trial of Coal Mill-2 running without hot air. But, due to insufficient air and temperature the mill was not able to run even with the reduced feed and reduced table speed.

- Hence, to run the Mill during Line-2 shutdown, it is proposed to tap the hot air from TPP to Coal Mill Hot ESP Fan inlet. The temperature at the TPP ID Fan outlet is maintaining around 150°C and 85000 m3/hr gas flow, which can be utilized for the Coal grinding.

Hot gas duct from TPP

Hot gas duct joining coal mill-2 inlet duct

6.Utilization of Renewable Energy sources

Type of Res	2020-21 Energy Generated (kWh)	2021-22 Energy Generated (kWh)	2022-23 Energy Generated (kWh)
Solar	10724	10764	10736
WHRS	31452870	106551257	163043101
% RE Utilization	15	40	58

Technolgy (Electrical)	Type of Energy	Onsite/Off site	Installed Capacity (MW)	Generation (lakh kWh)	Year	Capacity addition & Investment made	Share Considered for plant
Renewable	Wind	Off site	166	327.06	2020-21	Nil	Nil
Renewable	Wind	Off site	166	333.65	2021-22	Nil	Nil
Renewable	Wind	Off site	166	331.27	2022-23	Nil	Nil

6.Utilization of Renewable Energy sources – Solar Energy

200 Kg/day Capacity Bio-gas plant

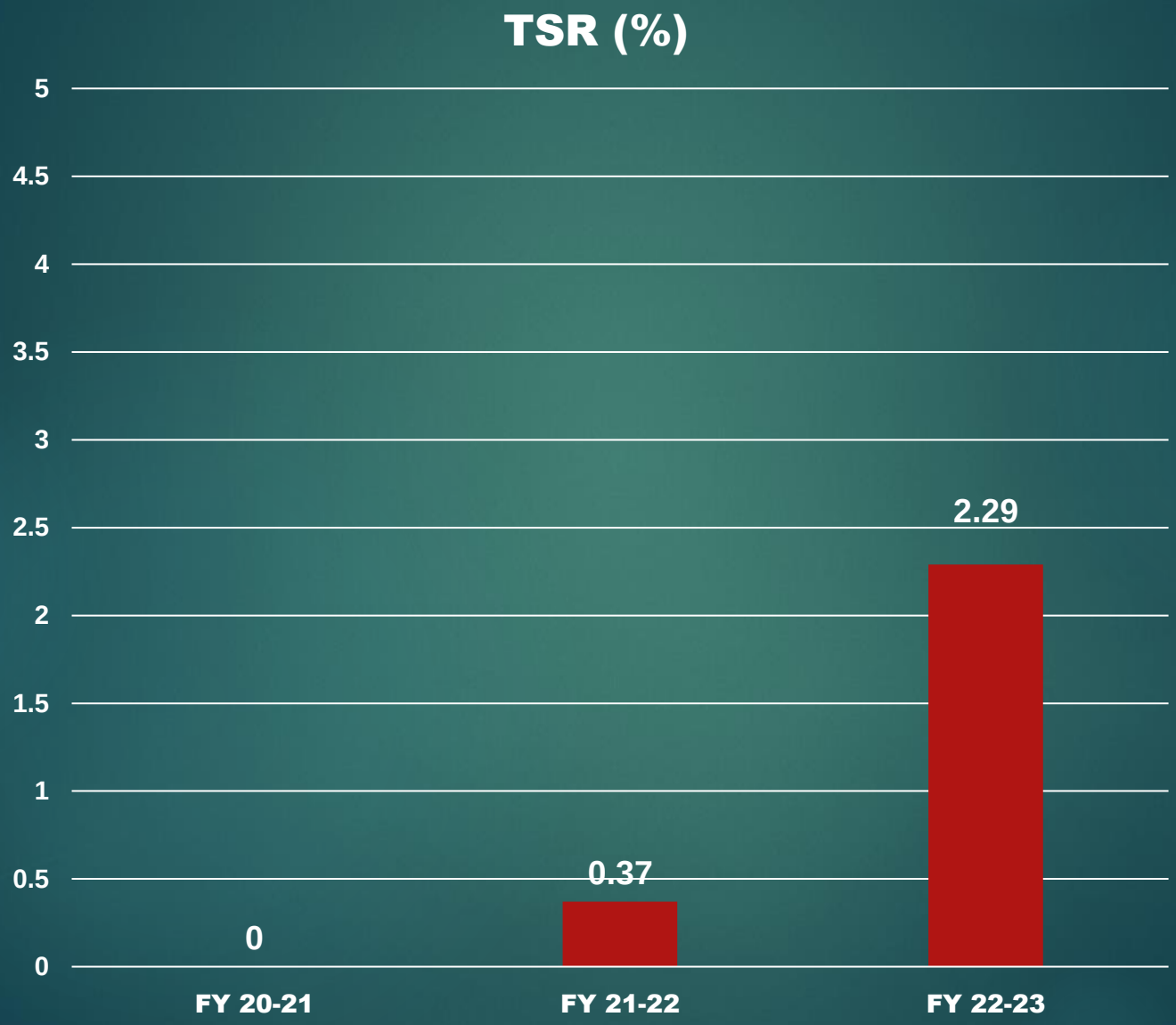
Type of Res	2020-21 Energy Generated (kcal)	2021-22 Energy Generated (kcal)	2022-23 Energy Generated (kcal)
Bio Gass Plant	77000	102070	90500

7. Waste utilization and management – AFR Usage

S.No	Year	Name of Aletrnate raw material used	Name of Material gets replaced	Quantity Used (MT/Year)
1	2020-21	Slag	IR Laterite	15002
2	2021-22	Slag	IR Laterite	78481
3	2022-23	Slag	IR Laterite	115699

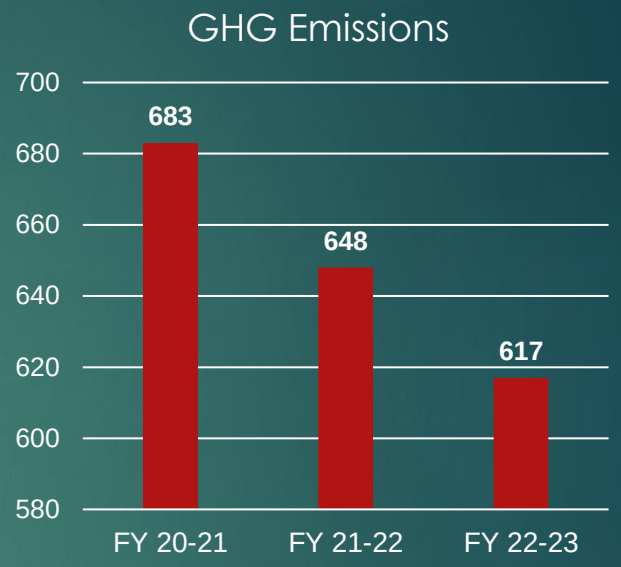
FUEL TYPE	UOM	QUANTITY
ALTERNATE FUEL - BLACK GRAM HUSK	MT	77.96
ALTERNATE FUEL - BRIQUETTE	MT	468.75
ALTERNATE FUEL - BURNT MAIZE STICK	MT	573.07
ALTERNATE FUEL - CHILLI SPENT	MT	174.38
ALTERNATE FUEL - COAL DUST	MT	0.00
ALTERNATE FUEL - COC FEED	MT	12.32
ALTERNATE FUEL - CORN WASTE	MT	28.52
ALTERNATE FUEL - GREEN MAIZE STICK	MT	2.85
ALTERNATE FUEL - MAIZE OIL EXTRACTED STICKS	MT	202.39
ALTERNATE FUEL - ORGANIC WASTE LIQUID	MT	9,855.35
ALTERNATE FUEL - PALM FIBRE	MT	12.22
ALTERNATE FUEL - PALM NUT SHELL	MT	23.49
ALTERNATE FUEL - PP WASTE	MT	4.58
ALTERNATE FUEL - PRODUCTION ASH WASTE - SPENT CARBON	MT	10,901.64
ALTERNATE FUEL - TYRE FIBRE	MT	8.04
ALTERNATE FUEL - WOOD BARK	MT	459.27
ALTERNATE FUEL - WOOD CHIPS (SRSM)	MT	12.70
ALTERNATE FUEL - WOOD SHIVES	MT	535.65
ALTERNATE FUEL BENGAL GRAM DUST	MT	172.85
ALTERNATE FUEL CARBON BLACK	MT	35.84
ALTERNATE FUEL GROUND NUT DUST	MT	300.44
ALTERNATE FUEL RICE HUSK .	MT	2,830.87
ALTERNATE FUEL SAW DUST .	MT	12.86
ALTERNATE FUEL WOODCHIPS .	MT	3,283.80

7. Waste utilization and management – TSR



8.GHG Inventorisation

Year	Total CO_2e (MT)/T Cement
2020-21	683
2021-22	648
2022-23	617



Scope 1 emissions	Calcination, Fuel for kiln & CBPP, owned vehicle, Refrigeration & AC
Scope 2 emissions	Power consumption
Scope 3 emissions	Raw Material Supply & Product delivery

9.EMS System and other requirements – ISO 50001

bsi.

Certificate of Registration

ENERGY MANAGEMENT SYSTEM - ISO 50001:2018

This is to certify that:

The Ramco Cements Limited
Kumarasamy Raja Nagar,
Jaggayyapet Mandal,
Krishna District,
Andhra Pradesh 521 457
Andhra Pradesh
India

Holds Certificate No: **ENMS 616875**

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

The Manufacture of clinker and cement, Generation & utilization of thermal/ DG/ WHRB captive power, bio-gas and sale of power, Utilization of fuel for material handling/ industrial canteen within the premises.

For and on behalf of BSI:

Chris Cheung, Head of Compliance & Risk - Asia Pacific

Original Registration Date: 2014-10-30
Latest Revision Date: 2020-10-29

Effective Date: 2020-10-16
Expiry Date: 2023-10-15

Page: 1 of 1

...making excellence a habit.™

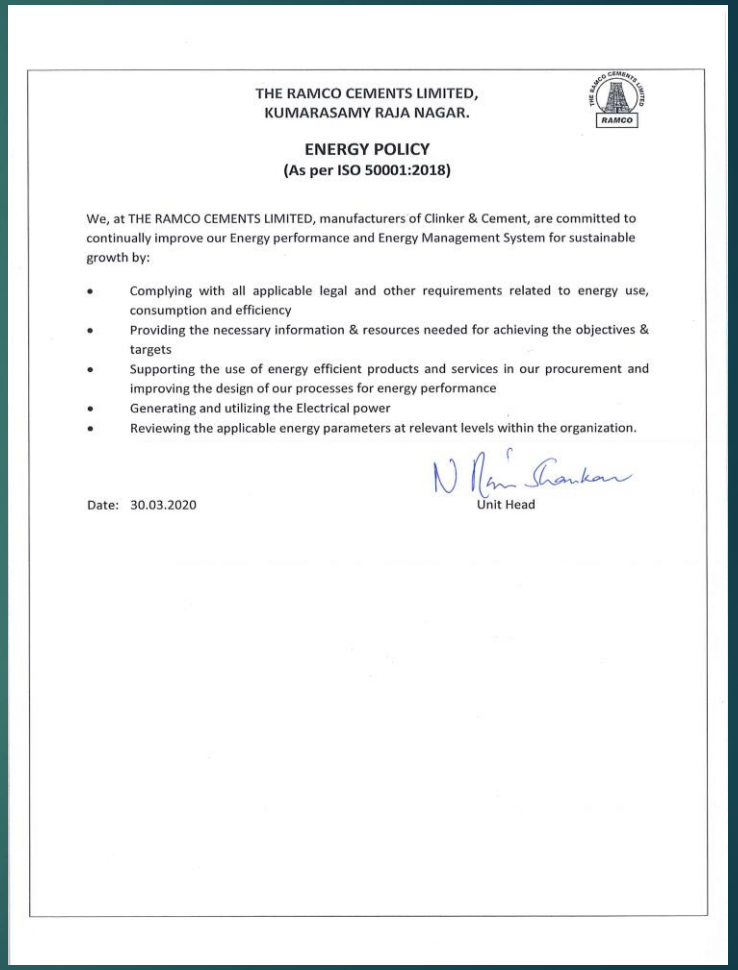
This certificate was issued electronically and remains the property of BSI and is bound by the conditions of contract.
An electronic certificate can be authenticated online.
Printed copies can be validated at www.bsi-global.com/ClientDirectory or telephone +91 11 2692 9000.

9.EMS System and other requirements – Green Supply chain management & Energy Policy

- We are communicating the message of “Energy Efficiency” & “Technical specifications for Energy Efficiency on purchase equipment to supplier
- Awareness on green purchase policy for suppliers to evaluate.
- Going to environment friendly evaluation during product evaluation.
- Reverse logistics from Kakinada & Vizag port for Coal & Gypsum ,Same rake transferring clinker to Vizag grinding unit

Projects :

- All lights are replaced by LED fittings entire plant
- Procuring high efficient motors & fans for Line-3 project
- Air cooled condenser instead of Water cooled condenser for WHRS



THE RAMCO CEMENTS LIMITED,
KUMARASAMY RAJA NAGAR.

ENERGY POLICY
(As per ISO 50001:2018)

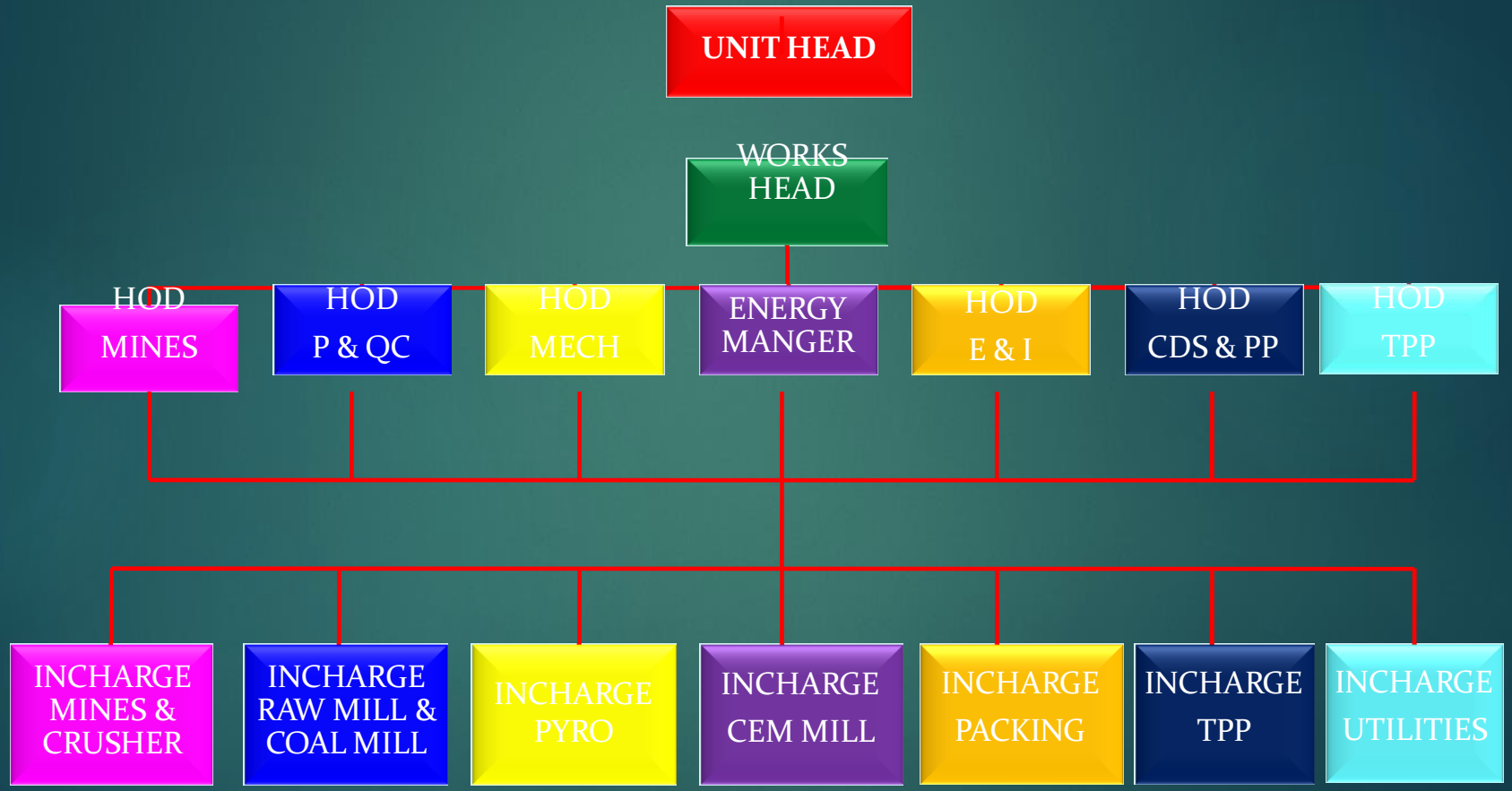
We, at THE RAMCO CEMENTS LIMITED, manufacturers of Clinker & Cement, are committed to continually improve our Energy performance and Energy Management System for sustainable growth by:

- Complying with all applicable legal and other requirements related to energy use, consumption and efficiency
- Providing the necessary information & resources needed for achieving the objectives & targets
- Supporting the use of energy efficient products and services in our procurement and improving the design of our processes for energy performance
- Generating and utilizing the Electrical power
- Reviewing the applicable energy parameters at relevant levels within the organization.

Date: 30.03.2020

Unit Head

Core Committee Team – Energy Cell



Energy Reporting Format

Power Report on

Equipment	R.Hrs.			Production			TPH			Parameter	KWH			KW			Kwh/ T of Material			Kwh/ T of Clinker			Kwh/ T of Cement		
	OTD	MTD	YTD	OTD	MTD	YTD	OTD	MTD	YTD		OTD	MTD	YTD	OTD	MTD	YTD	OTD	MTD	YTD	OTD	MTD	YTD	OTD	MTD	YTD
Mines Water works										JPM															
										Ravirala															
										Sub Total															
LS Crusher										Auxilliaries															
										Main Drive															
										Lighting															
										Maintenance															
										Sub total															
Crusher Laterite										Crusher Laterite															
Raw mill -1										Additives															
										Auxilliaries															
										Raw Mill Fan															
										Latrite Crusher															
										Main Drive															
										Maintenance															
										Sub total															
Raw mill -2										Additives															
										Auxilliaries															
										Raw Mill Fan															
										Latrite Crusher															
										Main Drive															
										Maintenance															
										Sub total															
Coal mill -1										Auxilliaries															
										Coal Mill Fan															
										Main Drive															
										Maintenance															
										Sub total															
Coal mill -2										Auxilliaries															
										Coal Mill Fan															
										Main Drive															
										Maintenance															
										Sub total															
Coal mill -2-1										Auxilliaries															
										Coal Mill Fan															
										Main Drive															
										Bin Transport															
										Maintenance															
										Sub total															
Kiln -1										Auxilliaries															
										Clinker Crusher															
										Cooler Fans															
										Bag House Fan															
										ID Fan -1															
										ID Fan -2															
										Kiln Feed															
										Maintenance															
										Kiln Stoppage															
										Sub Total															
Kiln -2										Auxilliaries															
										Bag House Fan															
										Cooler Fans															
										ID Fan															
										Kiln Feed															
										Maintenance															
										Kiln Stoppage															
										Sub Total															
Pre Clinker Service										AC															
										Dist. Losses															
										Lighting															
										Water Pump															
										Workshop															
										Sub Total															
Line1 Clinker										Up to clinker Line-1															
Line2 Clinker										Up to clinker Line-2															
Up to clinker Combined										TOTAL Upto Clinker															
Cement mill										Auxilliaries															
										Main Drive															
										Maintenance															
										Sep Fan															
										VRPM Auxilliaries															
										VRPM CA Fan															
										VRPM Main Drive															
										Sub Total	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!						
Slag mill										Auxilliaries															
										Main Drive															
										Maintenance															
										Sep Fan															
										VRPM Auxilliaries															
										VRPM CA Fan															
										VRPM Main Drive															
										Sub Total	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!						
Post Clinker Services																									
Packing plant																									
										Paddle Mixture															
Clinker Export	0	0	0	4012	92378	629966				Clinker Export															
										Flyash to Silo															

9.EMS System and other requirements – Learning From CII Award

- Great Platform to explore our company art of technology used and results achieved
- We have analyzed the plant performance of ours with respect to other competitors
- Innovative ideas for actions to reduce Energy
- Specific Electrical & Thermal consumption in Global level

10. NET ZERO Commitment

A Way Forward to :

1) Installation of 2*4 MW On Site Solar Power Plant
2) Increase in AFR Utilization
3) Logistics & Reverse Logistics through Rail
4) Green Belt Development

Green Belt Development

Year	No of Saplings Planted	Area covered (acres)
2020-21	18496	12.33
2021-22	22354	17.55
2022-23	25670	19.85
% of Green belt area (1986- March 2023)		**48.11 %**

Environmental Projects- Green Development

Colony Ground

Main Gate Entrance

Plant top view

Consumer stores

Environmental Projects- Green Development

Health center

Guest house

Park

Environmental Projects- Green Development

Mines area

Reclaimer Area

TPP Area

Colony Bird View

CII – 21st National Award for Excellence in Management - 2020

CII

Confederation of Indian Industry

125 Years - Since 1895

21st National Award for Excellence in Energy Management 2020

This is to certify that

The Ramco Cements Limited, Jaggayyapet

has been recognized as

"Energy Efficient Unit"

This acknowledgement is based on the evaluation by panel of judges at the "National Award for Excellence in Energy Management" held during 25 - 28 August 2020.

K S Venkatagiri
Executive Director
CII - Godrej GBC

Ravichandran Purushothaman
Chairman, Energy Efficiency Council
CII - Godrej GBC

Environmental Excellence Award in WHRS Category (Southern region) at cemWHR – 2023 by Mission Energy Foundation, New Delhi


Save
energy
Save planet

Thank You

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Coal Mill-2 requirement during Line-2 Shutdown			
Parameters	Additional Fuel required	Coal Mill-2 Productivity	Coal Mill to be run for Line-1
	MT	TPH	hrs
Petcoke	113	15	8
Coal	152	19	8
Petcoke & Coal (50:50)	127	17	7

The adequacy of existing Hot ESP Fan was checked and found that the fan can run with the available hot air from TPP.

The new duct (of diameter 1.60 m) has been laid for connecting the TPP ID Fan outlet to Coal Mill-2 Hot ESP Fan inlet.

Benefit :- **Kiln-1 running with normal feed at 295 TPH.**

Production loss Avoided – 35 TPH of kiln feed (21 MT clinker / hour)