UltraTech Cement Limited

Unit :Reddipalayam Cement Works

W E L C O M E

23rd National Award for Excellence in Energy Management 2022:Virtual Meet

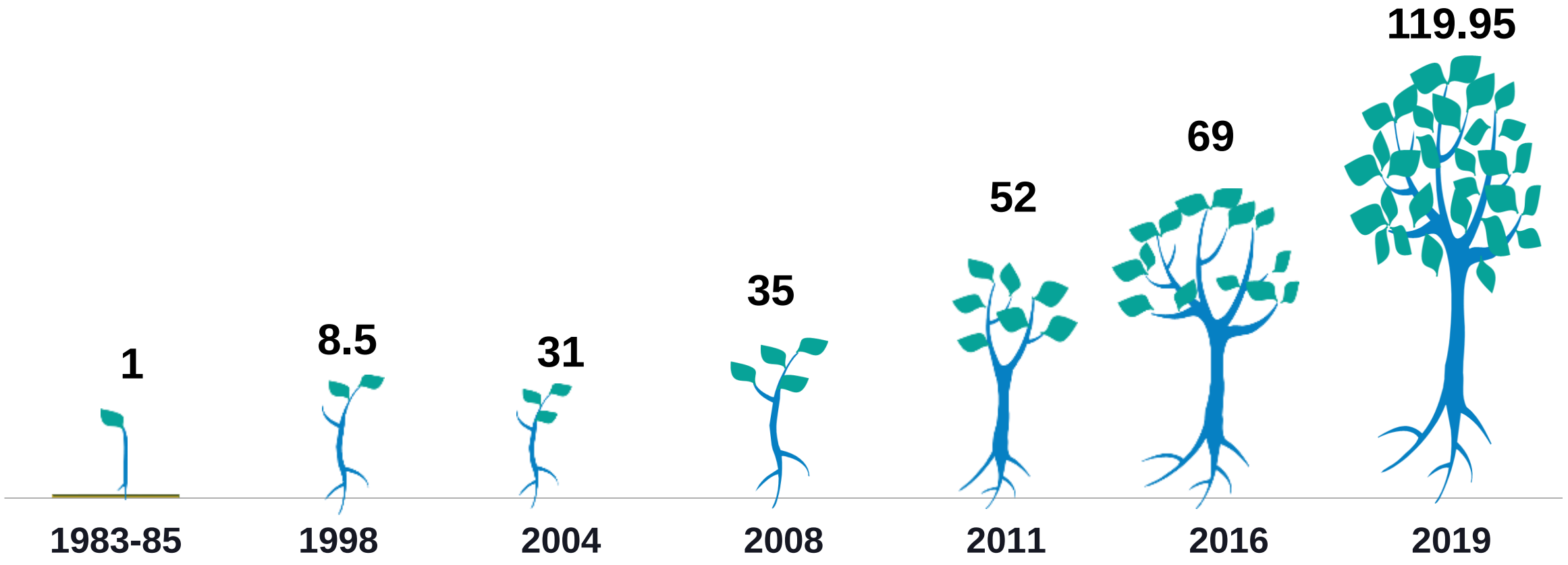
Presenters

Mr. Ganesha Jayavelu	FH Technical
Mr. S.Saravanan	DH – Projects /Technical Services & WCM
Mr. Ranjeet Desai	SH – Process
Mr. A.G.Narasimmalu	SH – WCM

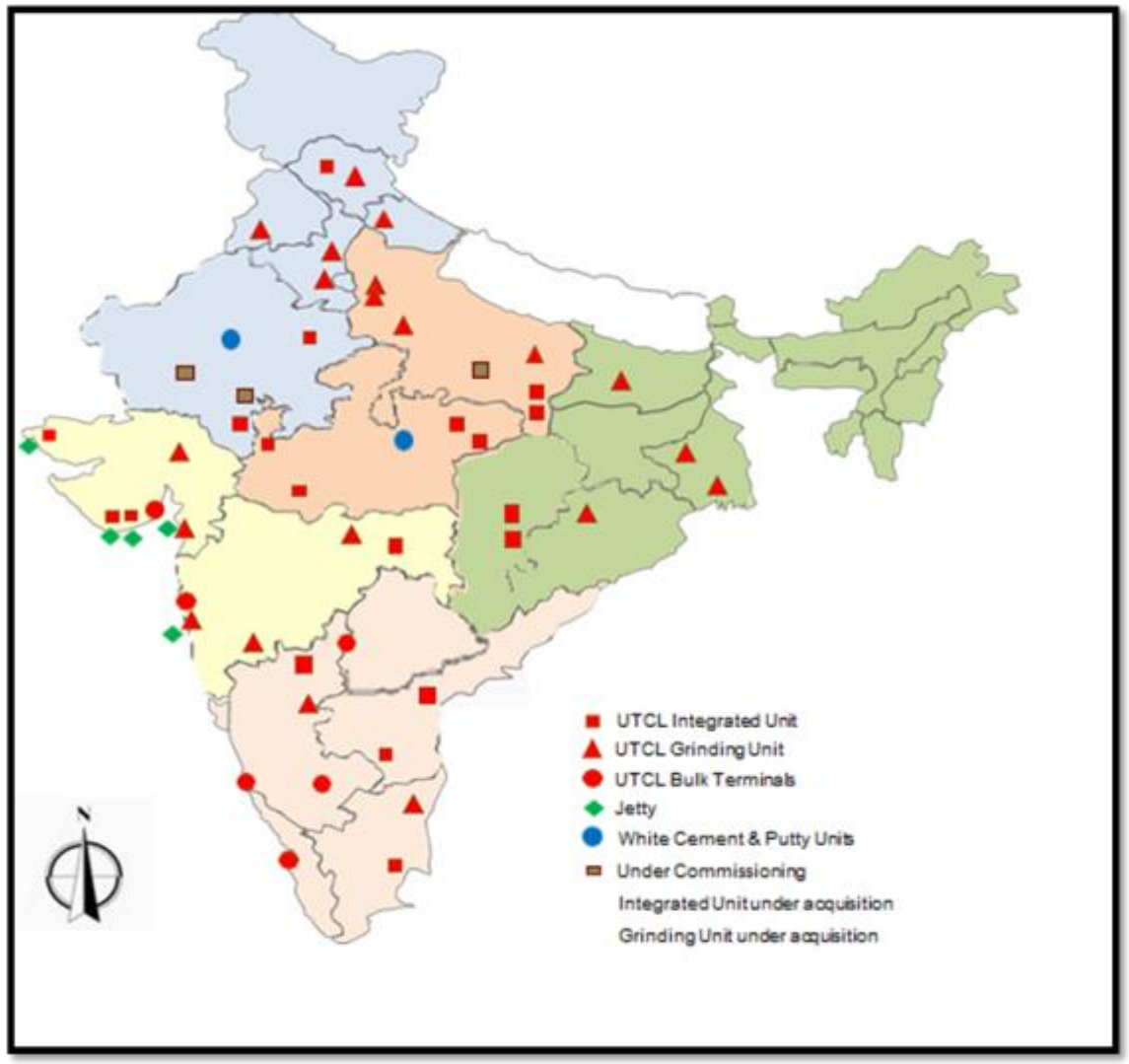
Contents

UltraTech Journey

Cement Capacity Growth in MTPA



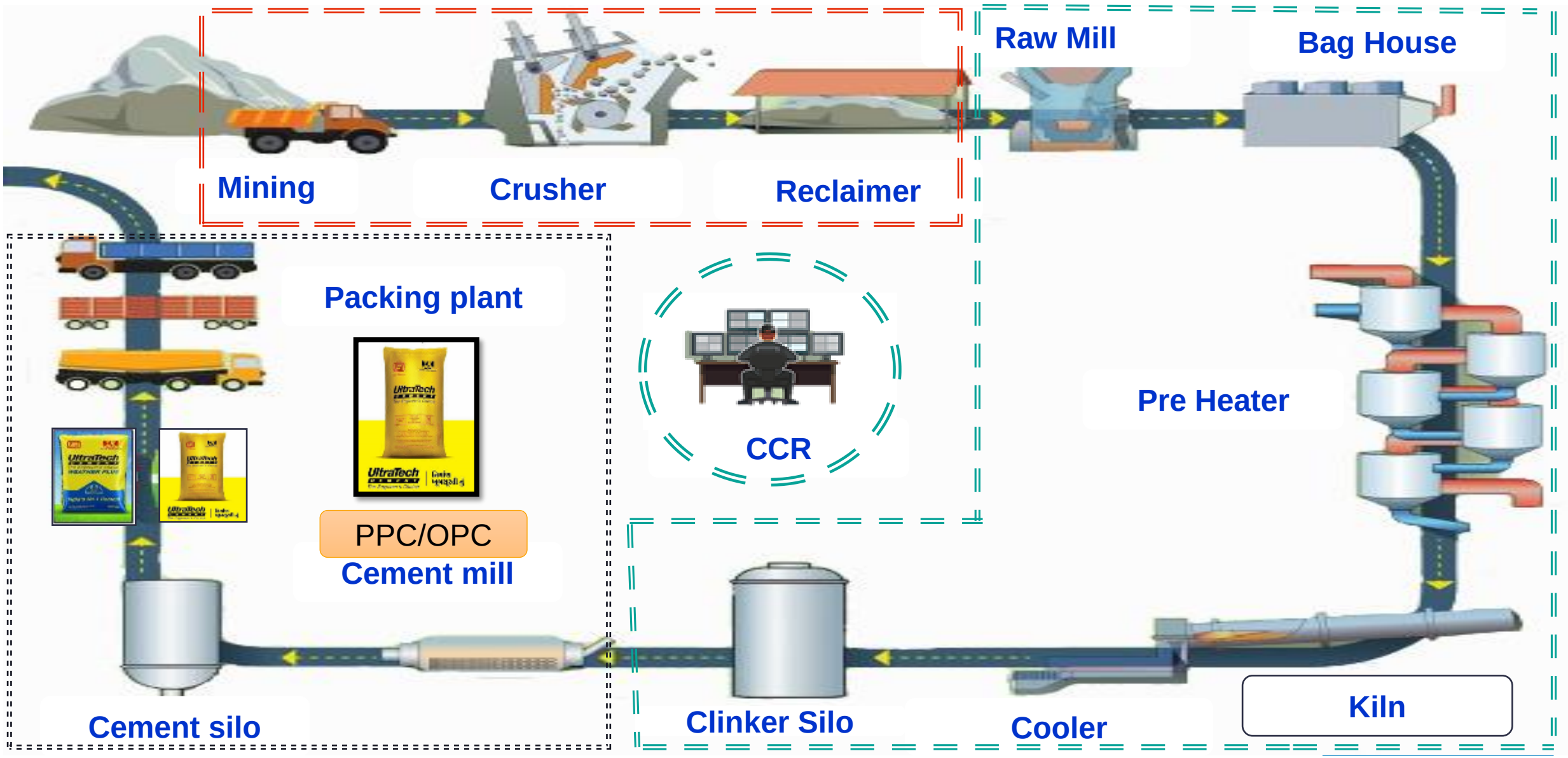
UltraTech Journey



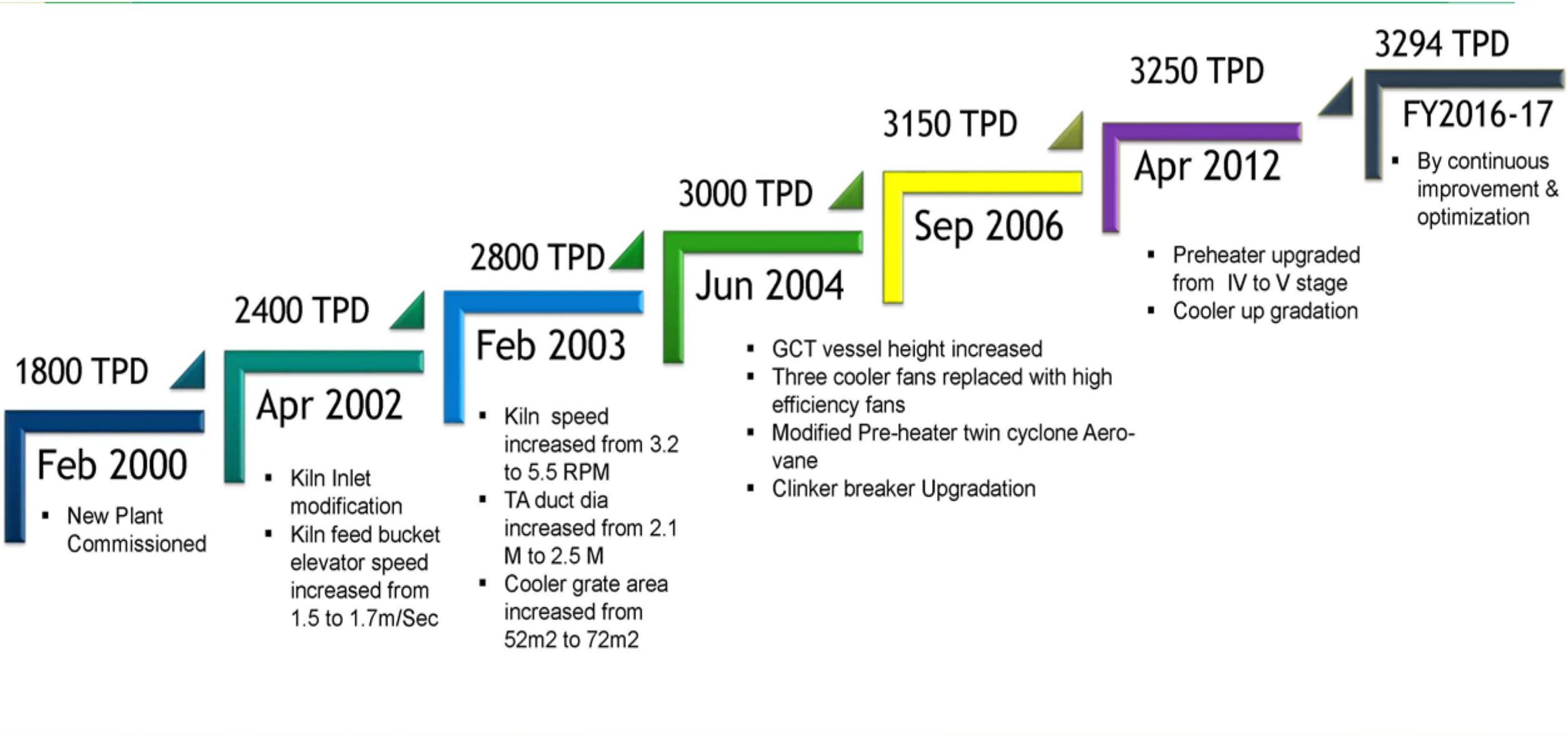
UltraTech in Numbers	
MTPA of Grey Cement	119.95
Ready Mix Concrete plant	170+
UBS stores in India	3000+
Integrated Units	22
White Cement Unit	1
Grinding Units	27
Clinkerisation unit	1
Bulk Terminals	8
Captive Jetties	5

Area of spread (RDCW)	RDCW Unit
Plant capacity	1.6 MTPA
Area of mines	188.62 Ha
Area of plant	125 Ha
Nearest air port	Trichy (75 km)

Manufacturing Process



Unit Mile stones



Unit Overview

State of the art Cement Plant commissioned in the millennium year

- 1st Unit in UTCL having Robo lab for total quality control from sampling to analysis
- State of art testing laboratory for Alternative fuels
- Designed for using multiple fuels
- Pioneer in using alternate fuel with pre-processing system
- Pioneer in Using alternate raw material (ETP Sludge)
- First Plant in the World to get CDM credit for use of Argo waste alternate fuel
- Packing facility with Centralized discharge from cement silo

Management Systems

DNV

MANAGEMENT SYSTEM CERTIFICATE

Certificate no.: 138967-2013-AQ-IND-RvA | Initial certification date: 18 July 2001 | Valid: 18 July 2022 – 17 July 2025

This is to certify that the management system of

UltraTech Cement Limited

Reddipalayam Post, Ariyalur District - 621704, Tamil Nadu, India

has been found to conform to the Quality Management System standard:

ISO 9001:2015

This certificate is valid for the following scope:

Manufacture of cement and generation of power for captive purpose

Place and date: Chennai, 15 July 2022

For the issuing office: DNV - Business Assurance, ROMA, No. 10, GST Road, Alandur,Chennai - 600016, India

Sivadasan Madiyath, Management Representative

Lack of fulfilment of conditions as set out in the Certification Agreement may render this Certificate invalid.

ACCREDITED UNIT: DNV Business Assurance B.V., Zwolseweg 1, 2994 LB, Barendrecht, Netherlands - TEL: +31 (0)102922689, www.dnv.com/assurance

DNV

MANAGEMENT SYSTEM CERTIFICATE

Certificate no.: 138966-2013-AE-IND-RvA | Initial certification date: 06 October 2001 | Valid: 18 July 2022 – 17 July 2025

This is to certify that the management system of

UltraTech Cement Limited

Reddipalayam Post, Ariyalur District - 621704, Tamil Nadu, India

has been found to conform to the Environmental Management System standard:

ISO 14001:2015

This certificate is valid for the following scope:

Manufacture of cement and generation of power for captive purpose

Place and date: Chennai, 15 July 2022

For the issuing office: DNV - Business Assurance, ROMA, No. 10, GST Road, Alandur,Chennai - 600016, India

Sivadasan Madiyath, Management Representative

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DNV

MANAGEMENT SYSTEM CERTIFICATE

Certificate no.: 10000372066-MSC-RvA-IND | Initial certification date: 13 February 2003 (based on OHSAS 18001) | Valid: 18 July 2022 – 17 July 2025

This is to certify that the management system of

UltraTech Cement Limited

Reddipalayam Post, Ariyalur District - 621704, Tamil Nadu, India

has been found to conform to the Occupational Health and Safety Management System standard:

ISO 45001:2018

This certificate is valid for the following scope:

Manufacture of cement and generation of power for captive purpose

Place and date: Barendrecht, 15 July 2022

For the issuing office: DNV - Business Assurance, Zwolseweg 1, 2994 LB Barendrecht, Netherlands

Erie Koek, Management Representative

Lack of fulfilment of conditions as set out in the Certification Agreement may render this Certificate invalid.

ACCREDITED UNIT: DNV Business Assurance B.V., Zwolseweg 1, 2994 LB, Barendrecht, Netherlands - TEL: +31 (0)102922689, www.dnv.com/assurance

DNV·GL

MANAGEMENT SYSTEM CERTIFICATE

Certificate No: 132284-2014-AE-IND-RvA | Initial certification date: 05 May 2014 | Valid: 05 May 2017 - 05 May 2020

This is to certify that the management system of

UltraTech Cement Limited
(Unit: Reddipalayam Cement Works)

Reddipalayam Post, 621 704, Ariyalur District, Tamil Nadu, India

has been found to conform to the Energy Management System standard:

ISO 50001:2011

This certificate is valid for the following scope:

Manufacture of Cement, Generation of Power for Captive Purpose

Place and date: Barendrecht, 05 May 2017

For the issuing office: DNV GL – Business Assurance, Zwolseweg 1, 2994 LB, Barendrecht, Netherlands

B.P. Koek, Management Representative

ISO : 9001 - Quality

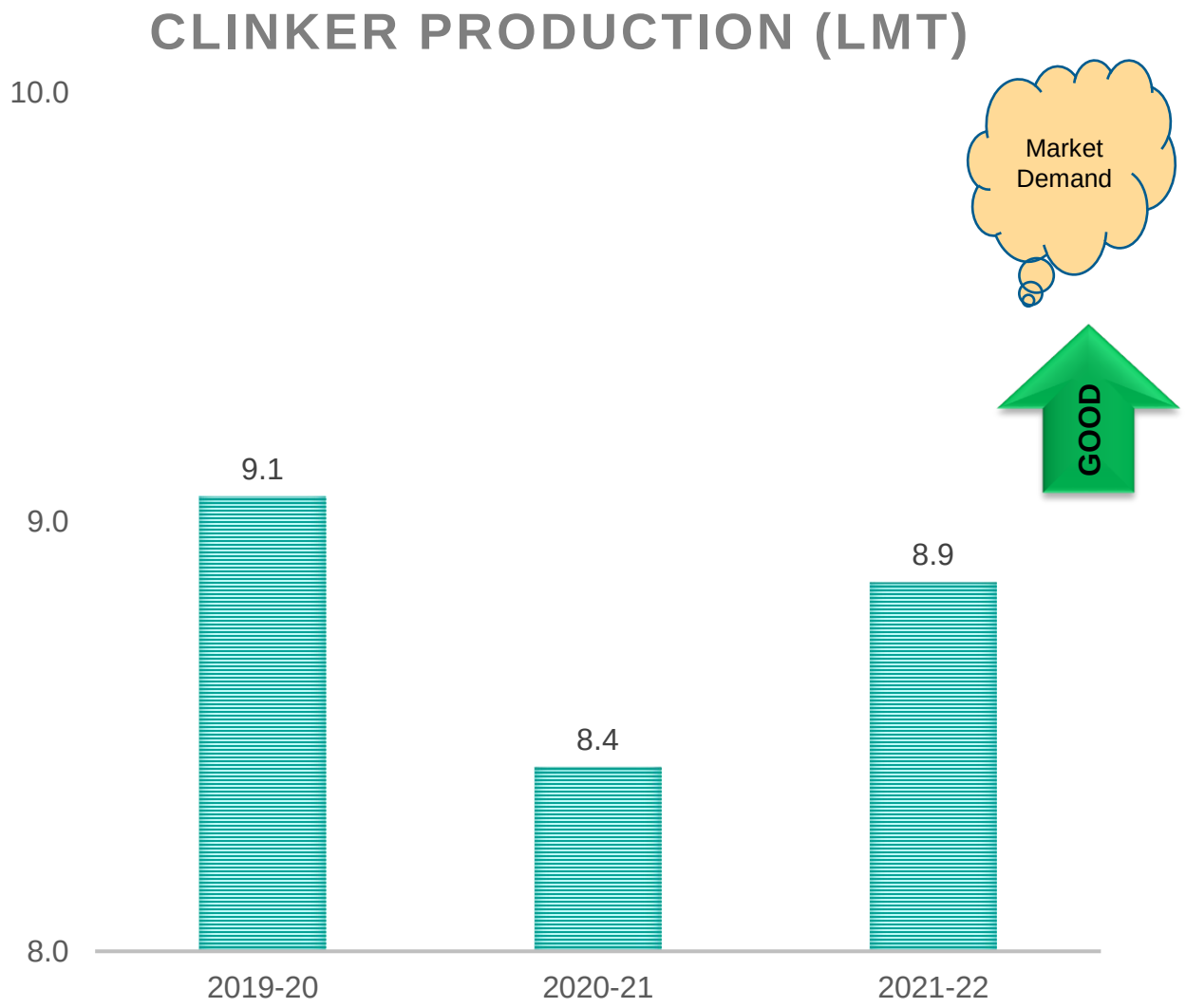
ISO :14001 Environment

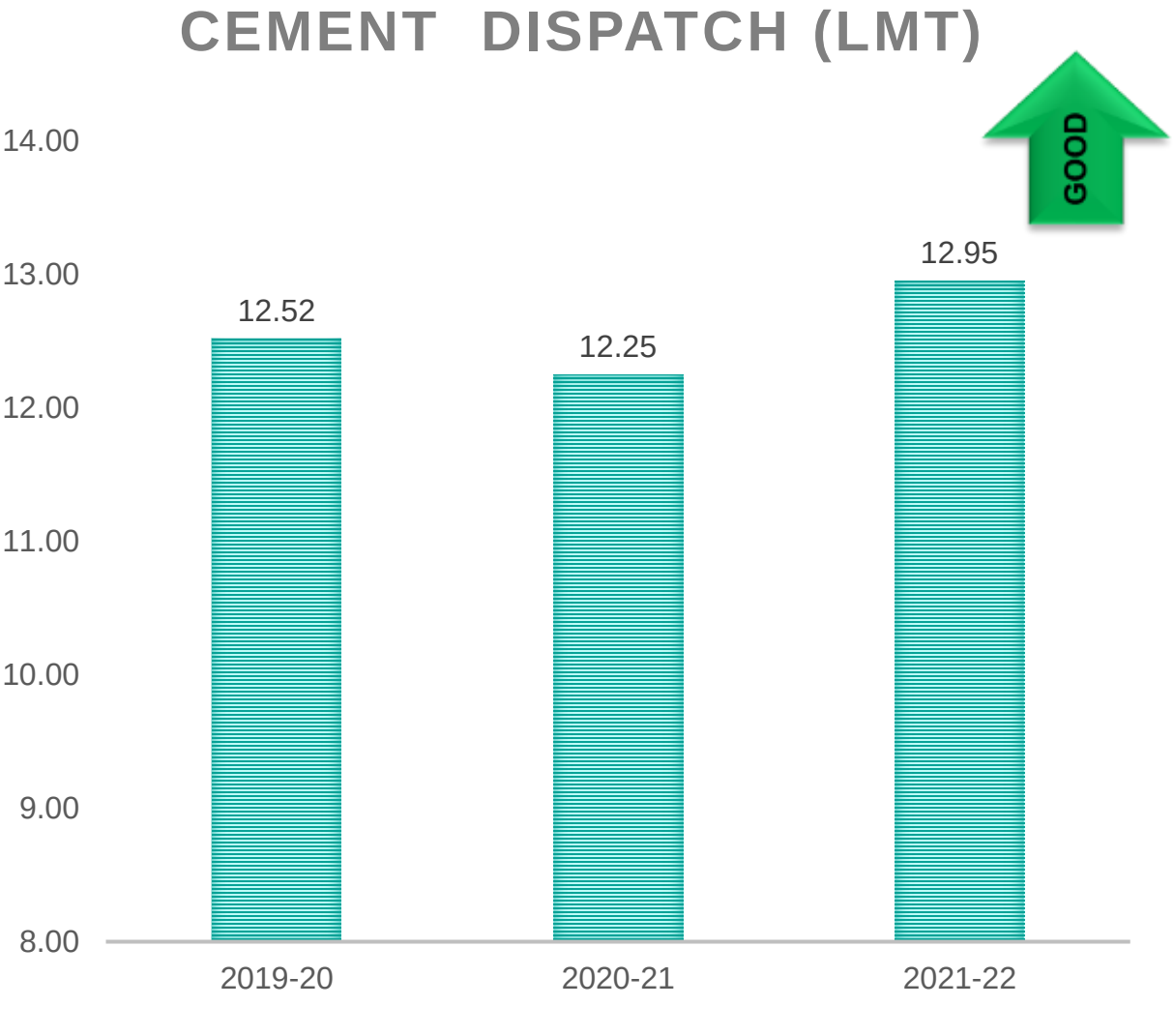
ISO :45001 -Safety

ISO :50001 EnMS

UNIT Performance

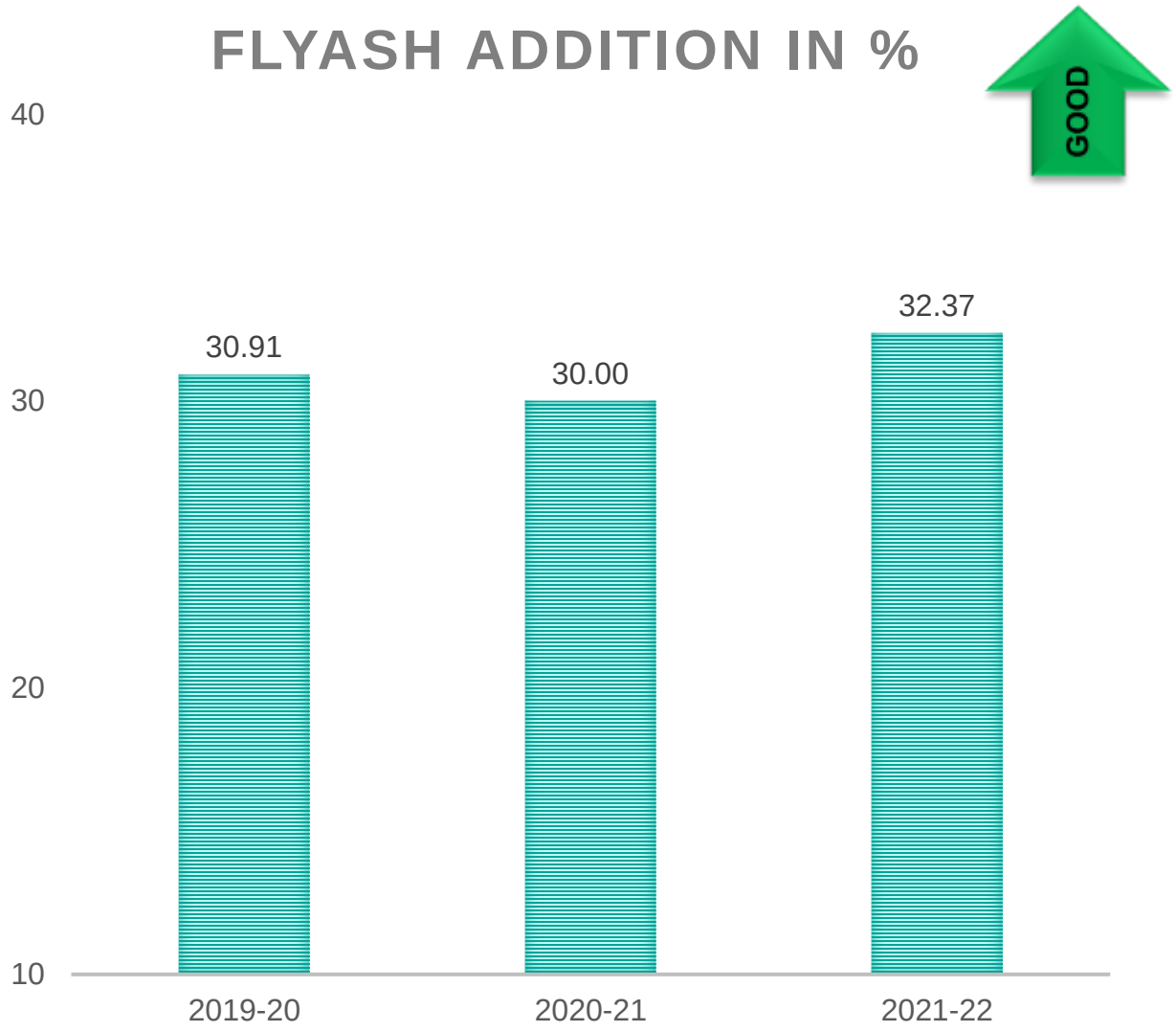
Unit's Performance



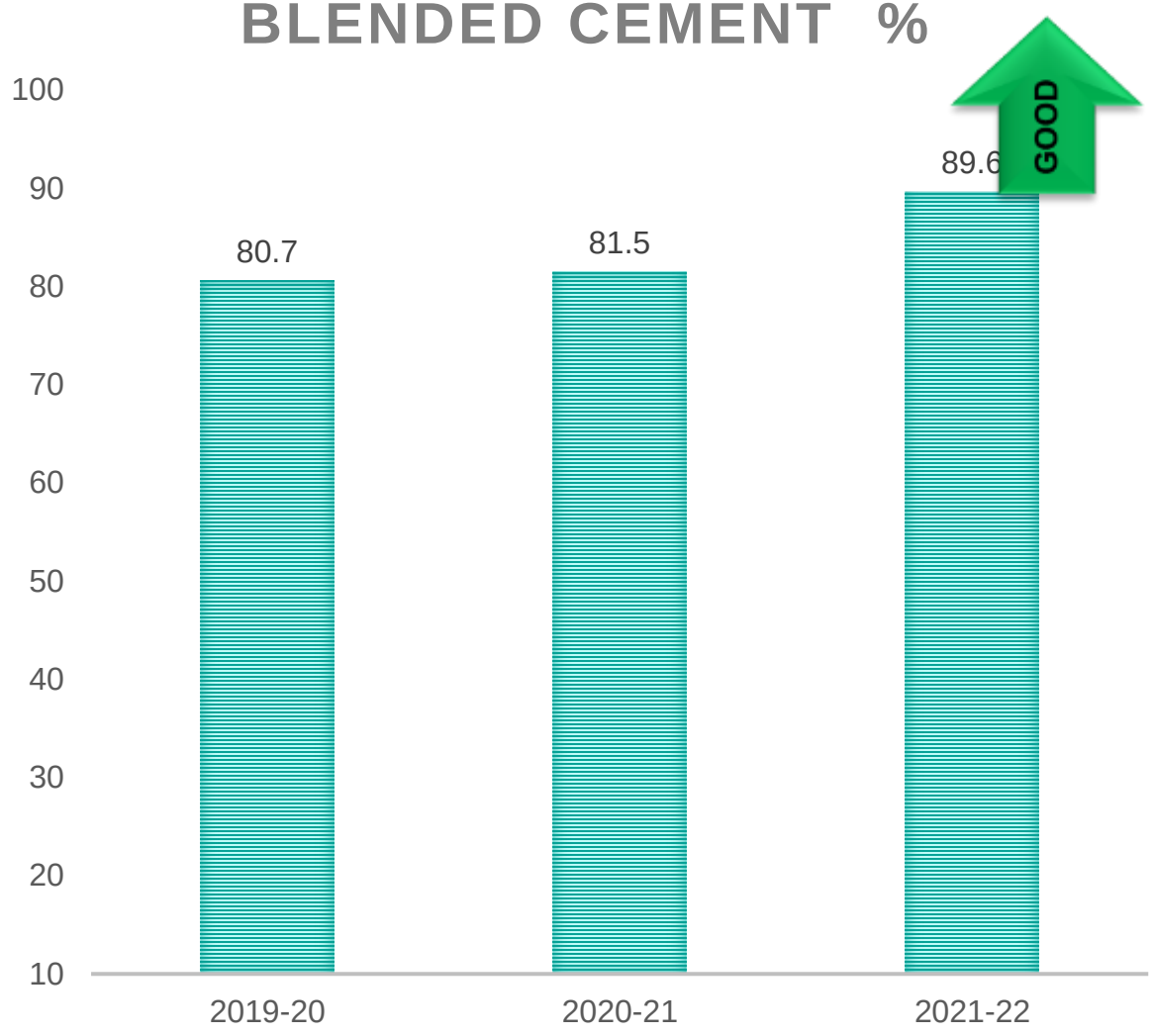


Unit's Performance

FLYASH ADDITION IN %



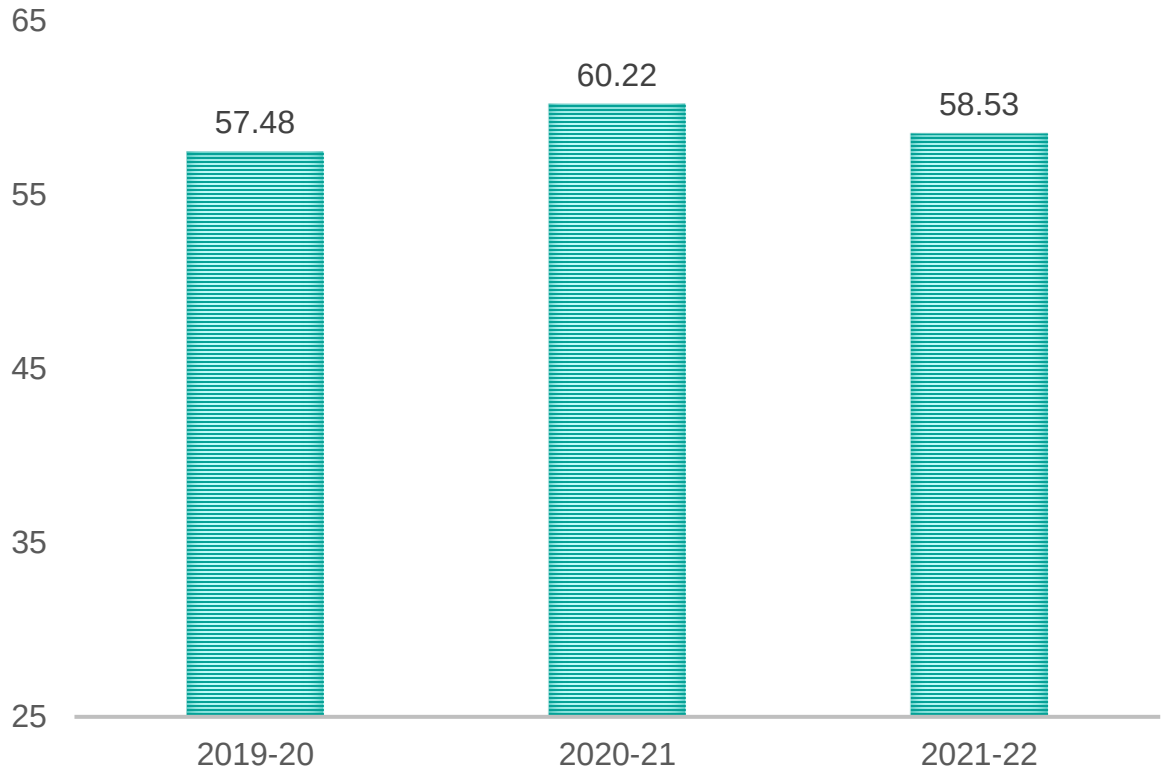
BLENDED CEMENT %



Unit's Performance

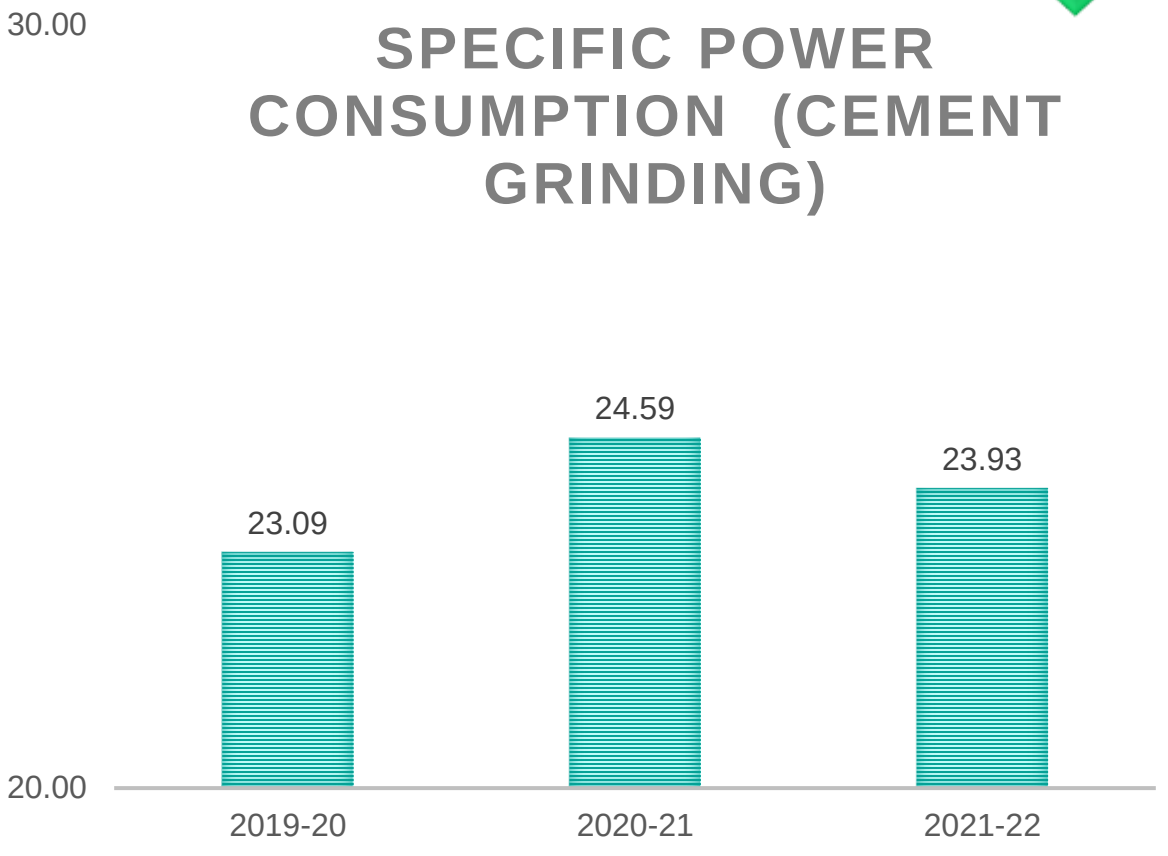
SPECIFIC POWER CONSUMPTION PER MT OF CLINKER KWH/ MT

GOOD

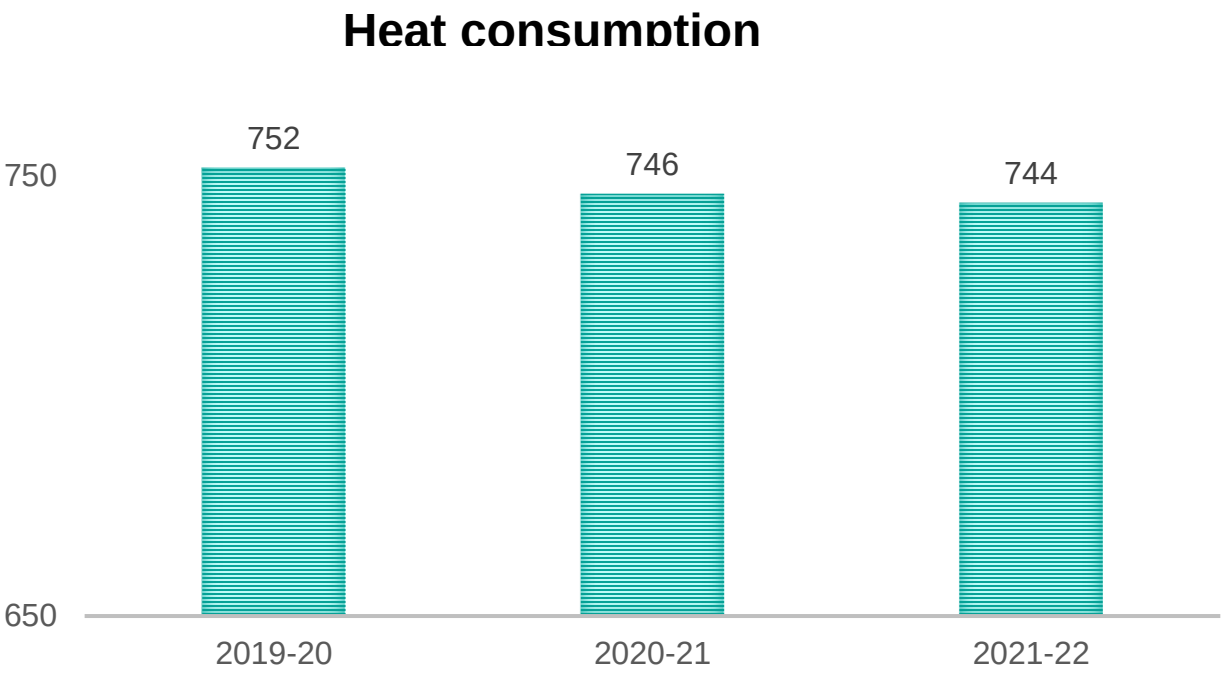


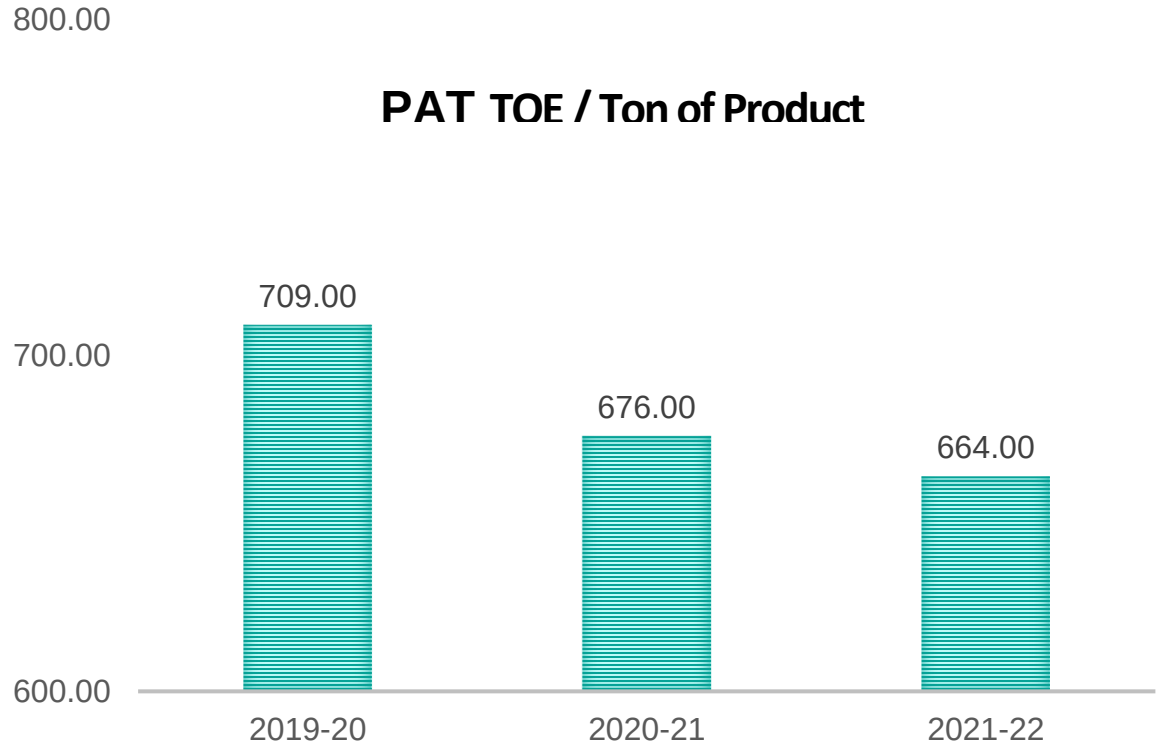
SPECIFIC POWER CONSUMPTION (CEMENT GRINDING)

GOOD

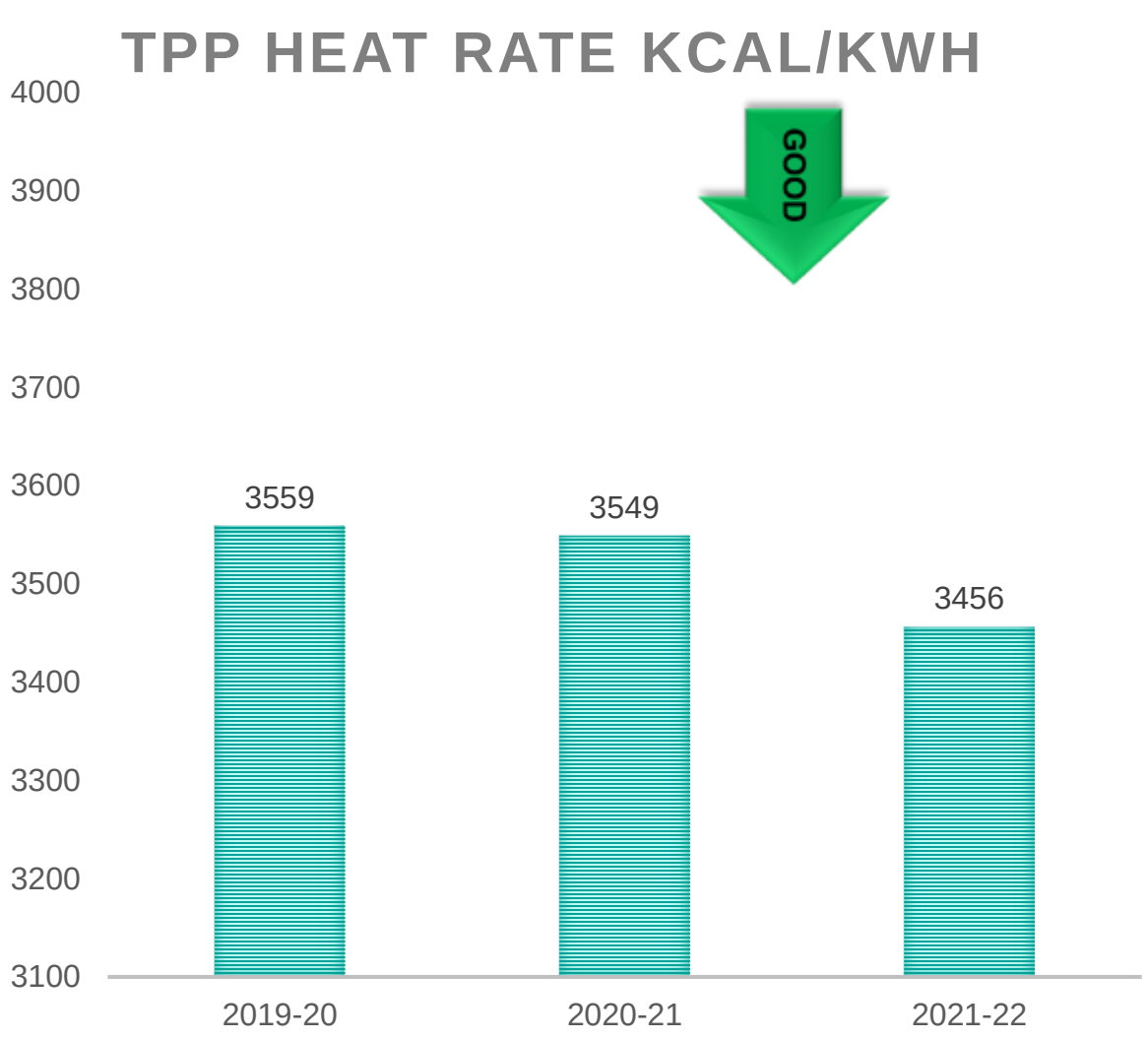


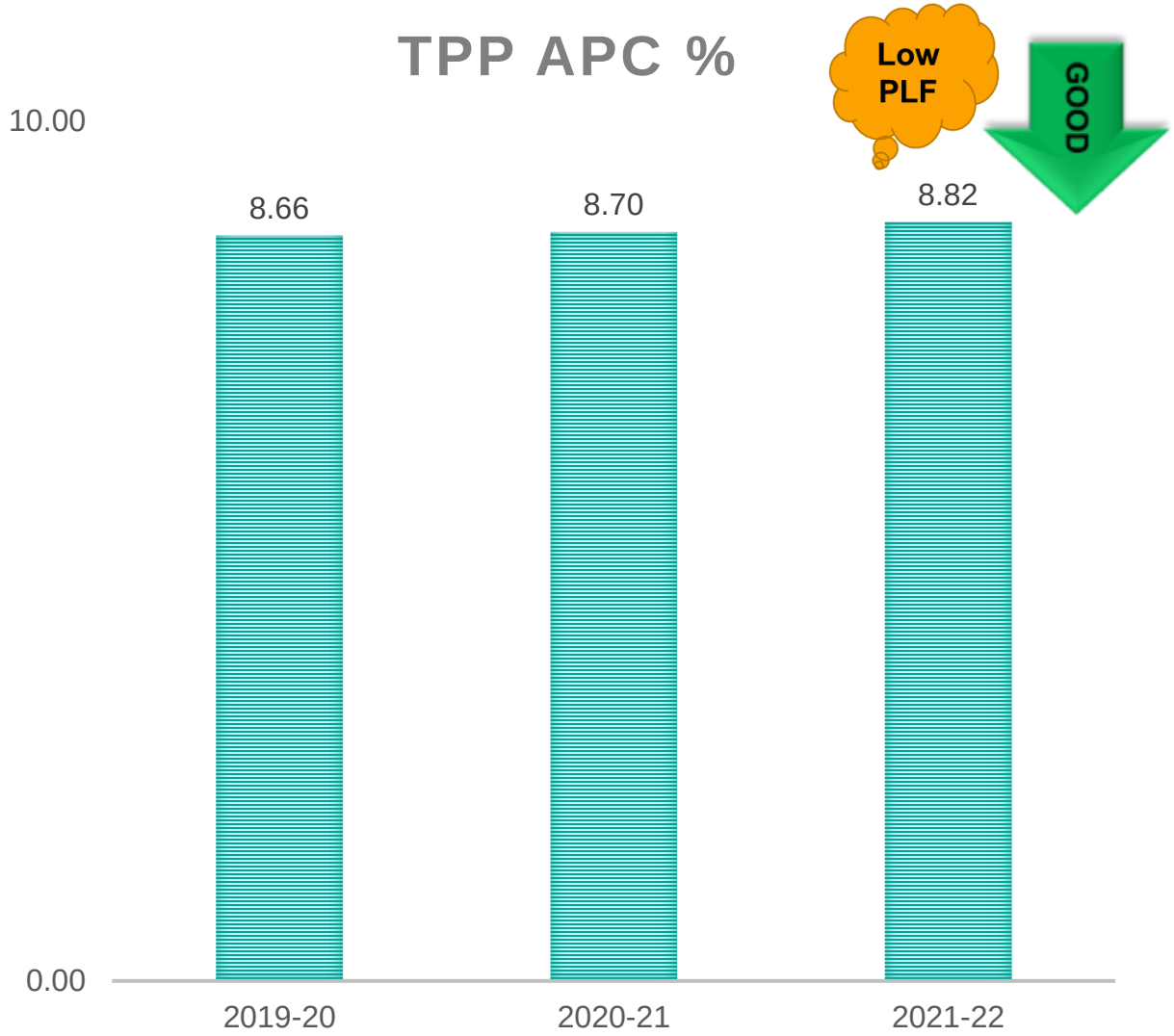
Unit's Performance



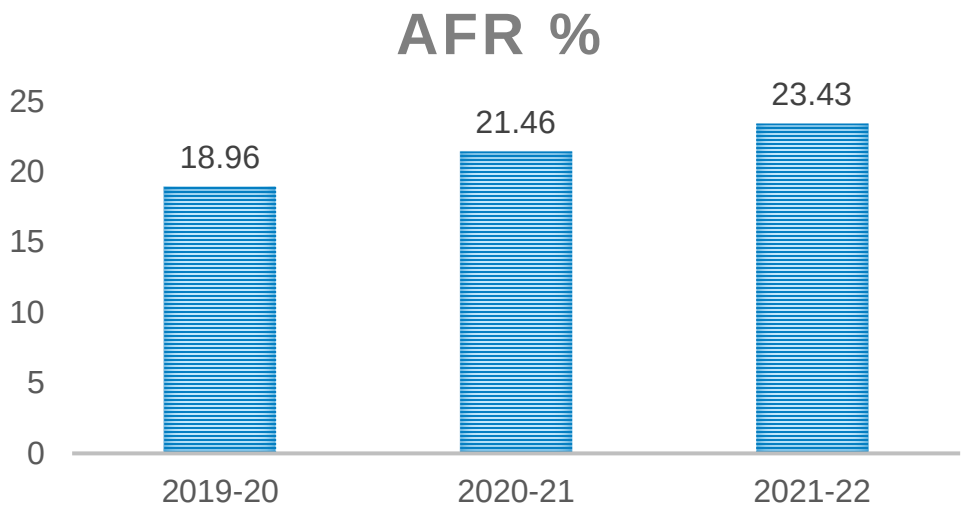


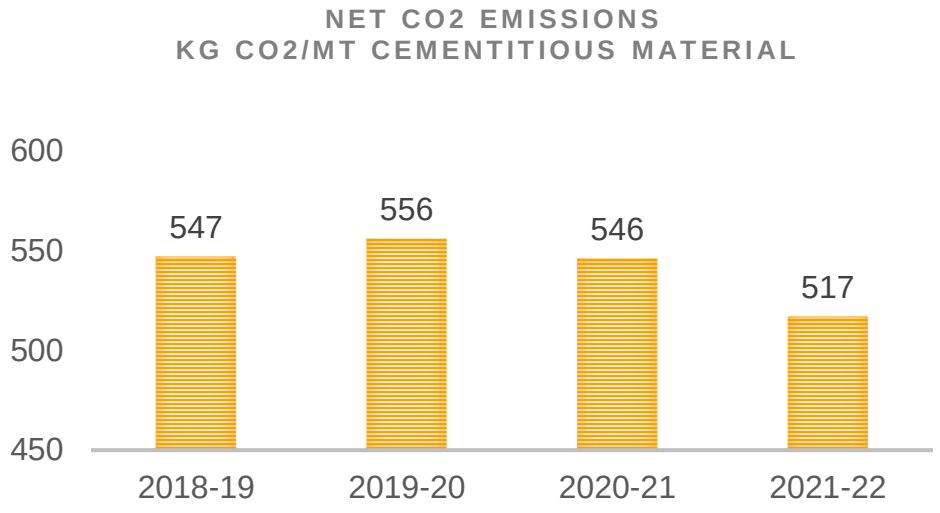
Unit's Performance

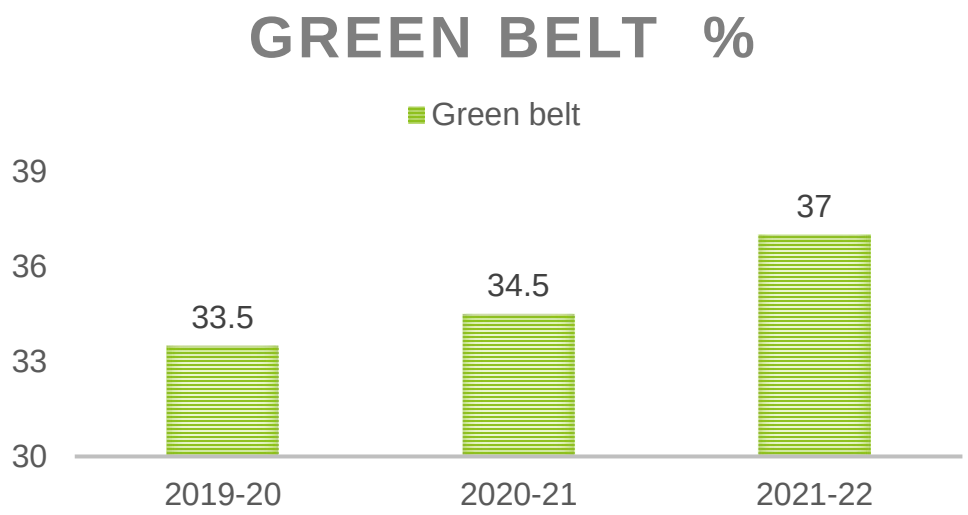




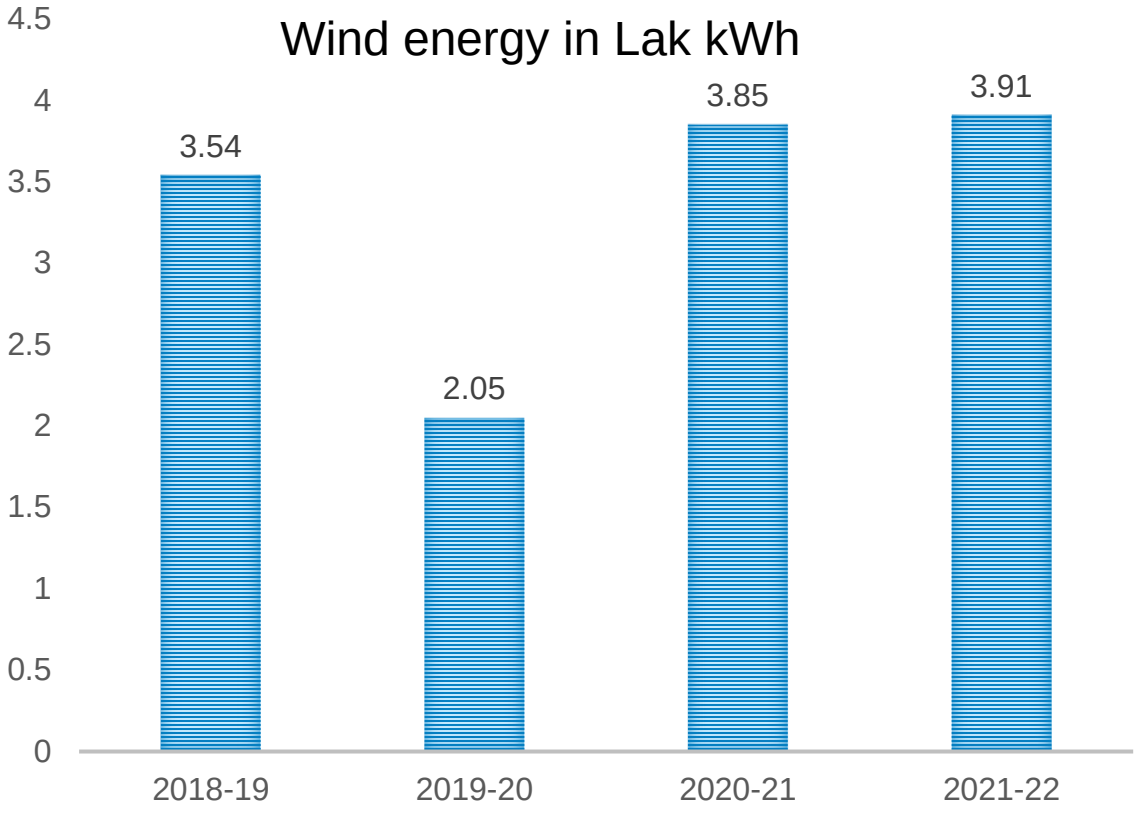
AFR & GREEN BELT Development

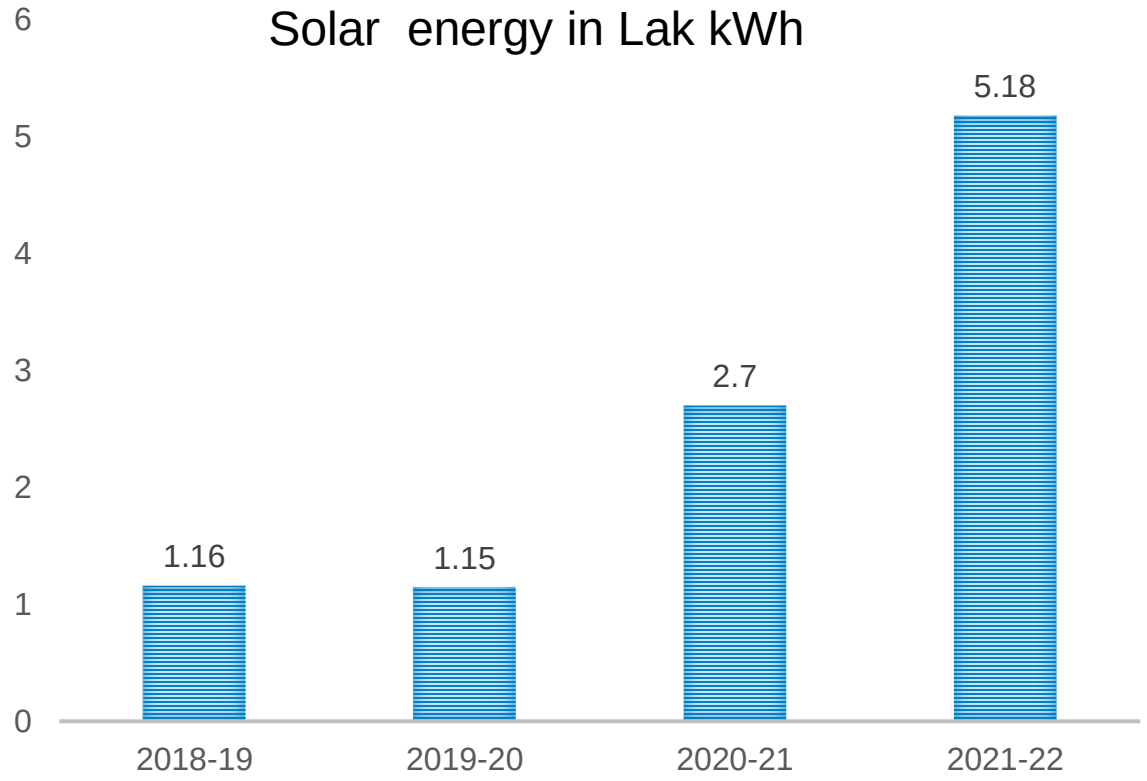




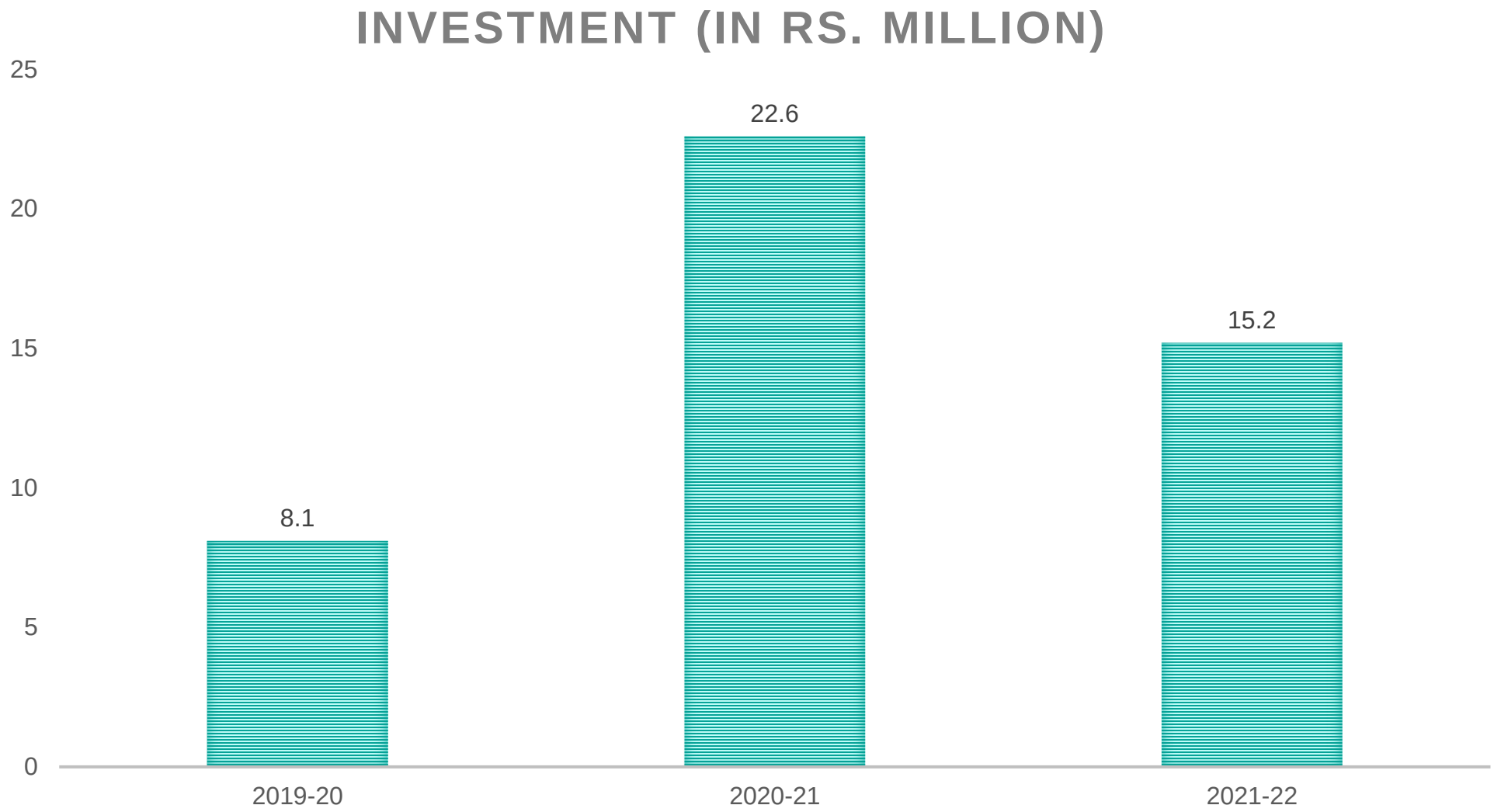


Utilization of Renewable Energy





Percentage of investment for Encon projects



List of Encon Projects Proposed in 2022 - 2023

No	Title of Project	Annual Electrical Saving (Million kWh)	Annual Thermal Saving (Million Kcal)	Investment (Rs in Million)	Comment
1	Upgradation of Coal dosing system to Corollis	0.0205	0	33.4	Replacing the existing coal dosing FK pump system (two numbers out of four) with new generation coal dosing system
2	Replacement of Energy Efficient Air Compressors (600 CFM capacity each) at Cement Mill	0.215	0	0.21	Proposed in FY23 Capex cycle under ROI.
3	Replacement of 1 no Energy efficient Pump (rated capacity = 90 M3/h with matching Pumping Head) at WTP	0.021	0	0.01	Offer received from supplier for which PR will be initiated and implemented by Mar 2023.
4	To replace Cooling Water Pump/ Boiler Feed pump by Energy Efficient Pumps in CPP	0.224	0	0.15	Energy efficient Boiler feed pump PO Released and it's expected to receive at site in the month of Jul22.
5	Install Delta to Star Connection/ Downsize the Identified Motors (03 no's)	0.071	0	0.15	new VFD panel proposed in Capex FY23 - Capex approved and waiting for WBS
6	Replacement of Metal Halide lamps (174 no's) with LED lamps	0.152	0	0.52	HPSV lights are being replaced in phased manner.

List of Encon Projects implemented in 2021 - 2022

Slno	Title of Project	Year	Annual Electrical Saving (kWh)	Annual Electrical Cost Saving (Rs million)	Annual Thermal Saving		Annual Thermal Cost Saving (Rs million)	Total Annual Savings (Rs million)	Investment Made (Rs million)	Payback (Months)
1	Upgradation of Burner pipe.	2021-2022	2.68125	6.11	0	0	0	6.11	17.2	33.78
2	Installation of double flap gate in Kiln PC	2021-2022	8.125	3.6	0	0	0	3.6	18.8	62.67
3	To replace Screw Elements in 02 nos air Compressors in CPP	2021-2022	71000	0.525	0	0	0	0.525	0.15	3.43
4	Improve PF of Transformers - 8 Nos	2021-2022	19000	0.086	0	0	0	0.086	0.01	1.4

List of Encon Projects implemented in 2020 - 2021

Slno	Title of Project	Year	Annual Electrical Saving (kWh)	Annual Electrical Cost Saving (Rs million)	Annual Thermal Saving		Annual Thermal Cost Saving (Rs million)	Total Annual Savings (Rs million)	Investment Made (Rs million)	Payback (Months)
1	Replacement of 40 watt conventional tube light by 20 watt LED tube light	2020-2021	246	0.483	0	0	0	0.483	0.383	0
2	Replacement of conventional ceiling fan by energy efficient BLDC Fan.	2020-2021	1217	0.644	0	0	0	0.644	1.3	0

List of Encon projects implemented in 2019 -2020

Slno	Title of Project	Year	Annual Electrical Saving (kWh)	Annual Electrical Cost Saving (Rs million)	Annual Thermal Saving		Annual Thermal Cost Saving (Rs million)	Total Annual Savings (Rs million)	Investment Made (Rs million)	Payback (Months)
1	Revamp the insulation on the main steam pipeline from boiler to turbine to bring down the temperature drop below 5 Deg C.	2019-2020	0	0	650	MT	3.163	3.163	4	16
2	Arrest air ingress in Boiler APH outlet to ESP outlet	2019-2020	380	0.173	0	0	0	0.173	0.01	0
3	Refurbishment and overhauling of Raw Mill Fan (Impeller change)	2019-2020	5480	2.437	0	0	0	2.437	2.6	12

Improvement Projects

Burner Replacement

Theme	Reduction of primary air consumption in burner.
Problem/ Background	High primary air consumption in burner.
Solution/ Execution	Replacing the existing burner pipe to reduce the specific heat consumption & uniform heat distribution across burning zone & minimize the Nitrogen Oxide emissions.
Result/ Benefit	3.5 kCal/kg clinker specific heat reduction. 2.6 lakh kwh power savings

Revamp the insulation on the main steam pipeline from boiler to turbine

Theme	To reduce the heat loss in main steam pipe line from boiler to turbine.
Problem/ Background	Heat loss in the main steam pipeline from boiler to turbine.
Solution/ Execution	Revamping of insulation on the main steam pipeline. Reduction of by power by improving Vacuum in condenser at CPP
Result/ Benefit	Improved Vacuum in condenser at CPP to 0.90 Kg/cm2 from existing level of 0.86 Kg/cm2. Saving of 650 MT coal

Installation of double flap gate in Kiln PC

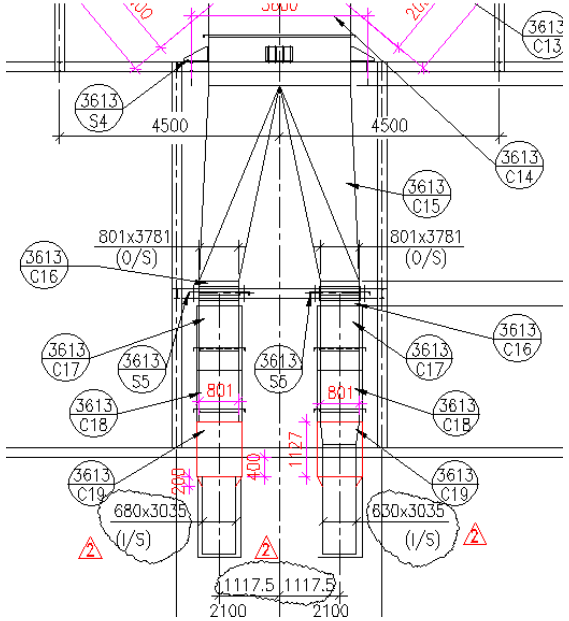
Theme	Reduction of false air ingress in the preheater circuit
Problem/ Background	High ingress of false air into Kiln riser duct during AFR feeding.
Solution/ Execution	Installation of double flap gate in the AFR feed chute to reduce the false air ingression leading to thermal energy & power losses.
Result/ Benefit	27015 kCal/kg clinker specific heat reduction.

Raw mill fan inlet box modification

Problem statement :
In Raw mill fan, the inlet velocity is in the order of 26.3m/sec, which is very high. By doing the inlet geometry change, there is a possibility of pressure drop reduction of at least 50-60 mmWg.

Action taken :
CFD analysis completed by the unit Team . Results are validated pressure velocity reduced by modifying the fan inlet box. Area increased from 3.8 m2 to 5.1 m2 and the velocity decreased from 28.4 m/sec to 20.8 m/sec

Size = 3035x630 m
Area = 3.8 m2
Velocity = 28.4 m/s



Size = 3035x830 m
Area = 5.1 m2
Velocity = 20.8 m/s

- **Result**

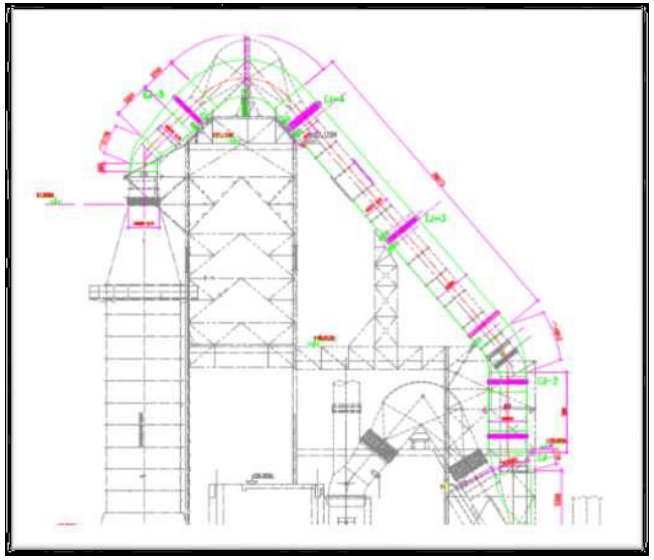
Particular	UOM	Before	After
Raw mill Fan efficiency	%	71	74
Velocity at Raw mill in let box	m/s	28	21
Power saving	KWH	33 KWH	

Pressure reduction in BH inlet & GCT circuit

We did Pressure profile comparison with our group units and identified the scope for improvement &Study conducted by unit team to explore the possibility of pressure reduction in the circuit

Description	UOM	RDCW	KCW	APCW Unit-2	GCW
RM fan outlet to BH inlet duct Dia.	m	2.73	4.9	3.6	4
RM fan outlet to BH inlet duct Velocity	m/sec	18.49	11.44	15.24	14
Bag house inlet draught in comp mode	mm wc	-90 to -100	-55	-70 to -90	-45
By pass duct dia.	m	2.3	5.3	5.3	4.25
By pass duct velocity	m/sec	38	14.9	16.7	17
Bag house/ESP draught in direct mode	mm wc	-177	-35	-50 to -70	-40 to -50

Power saving in direct mode with reduction of 60-70 mm is estimated to be about 150 KW and in case of
Compound mode saving is estimated to be about 45 KW.



➢Preheater fan to GCT inlet duct can be replaced with **3300 mm** diameter duct **to reduce the velocity 34 m/sec to 17 m/sec** during direct mode
operation, (However direct mode operation only
5% only.)

GCT to BH duct modification

➢GCT to ESP duct have higher velocity (21-22
m/sec)
➢Ducts size may not be increase (layout constraints)
➢2578 x 2224 mm duct kink to be modify as shown
in Sketch 1& 2.

Green supply chain management

- ✓ UltraTech voluntarily joined the Cement Sustainability Initiative (CSI), from 2006
- ✓ Reverse logistics in, Raw material trucks
- ✓ Eye on wheel (GPS) to reduce TAT (Truck Turn around time)
- ✓ Maximizing PPC dispatches
- ✓ Maximizing alternate Raw materials usage
- ✓ Reducing types of lubrication by effective implementing Lub Management culture
- ✓ Network optimisation
- ✓ Computer-based order management system with real-time
- ✓ Customer service level measurement on real-time basis
- ✓ GPS-based vehicle tracking system for dedicated fleet
- ✓ Automation at secondary service points like railheads and warehouses

Green supply chain Initiatives

Climate Change – Lower clinker factor, energy efficiency, waste heat recovery and generation of renewable energy are our key priorities

Resource Management - Efficient use of natural resources and reducing dependence on it by using alternative fuels and materials

Water Management – Our water management best practices consist of water recycling and reuse, rainwater harvesting and artificial aquifer recharge, and source vulnerability assessment

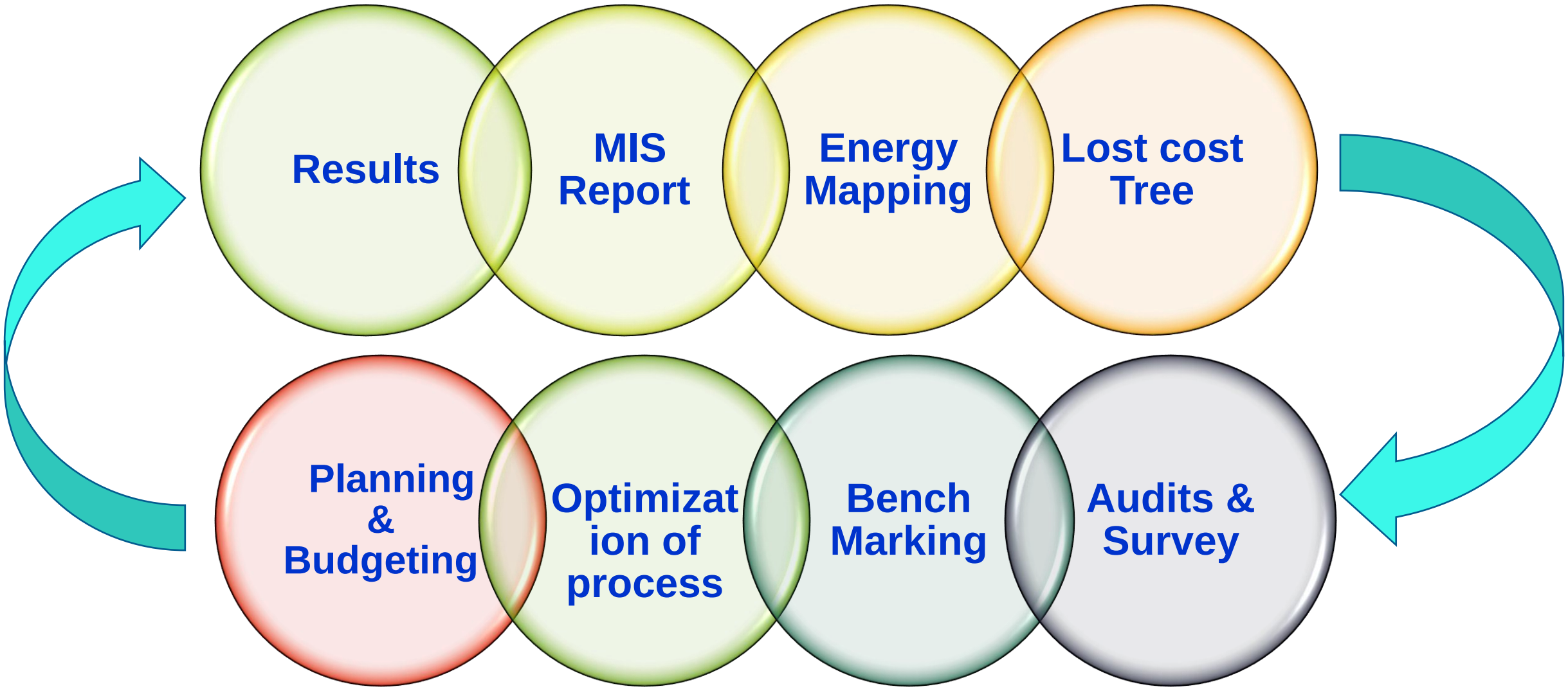
Waste Management - Reducing use of natural raw materials, utilization of waste from other industries for blended cements and using industrial waste as alternative fuel

Biodiversity Management - Working on tree plantation, green zone development, rehabilitation of exhausted mines and reclamation of land

Unit's Best Practices

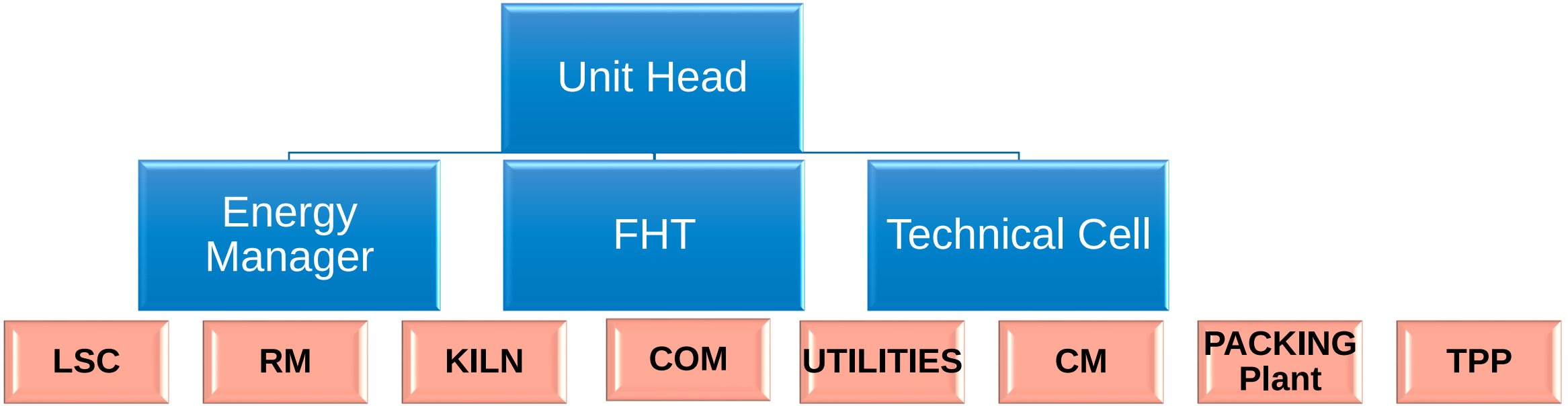
1. Safety Behaviour observation Rounds
2. Shop floor meetings
3. QCDIP performance monitoring Culture
4. Ownership culture
5. Daily self maintenance drive
6. Opportunity identification culture
7. Kaizen & suggestion portal
8. Mass communication Meeting
9. Multilevel review
10. Synergy meets
11. Dash boards
12. Sustainability & Energy Cell
13. Best Practice sharing sessions
14. Energy audits Internal / External
15. Projects Review
16. Talent management

Approach Opportunity Identification



Team work & Employee involvement

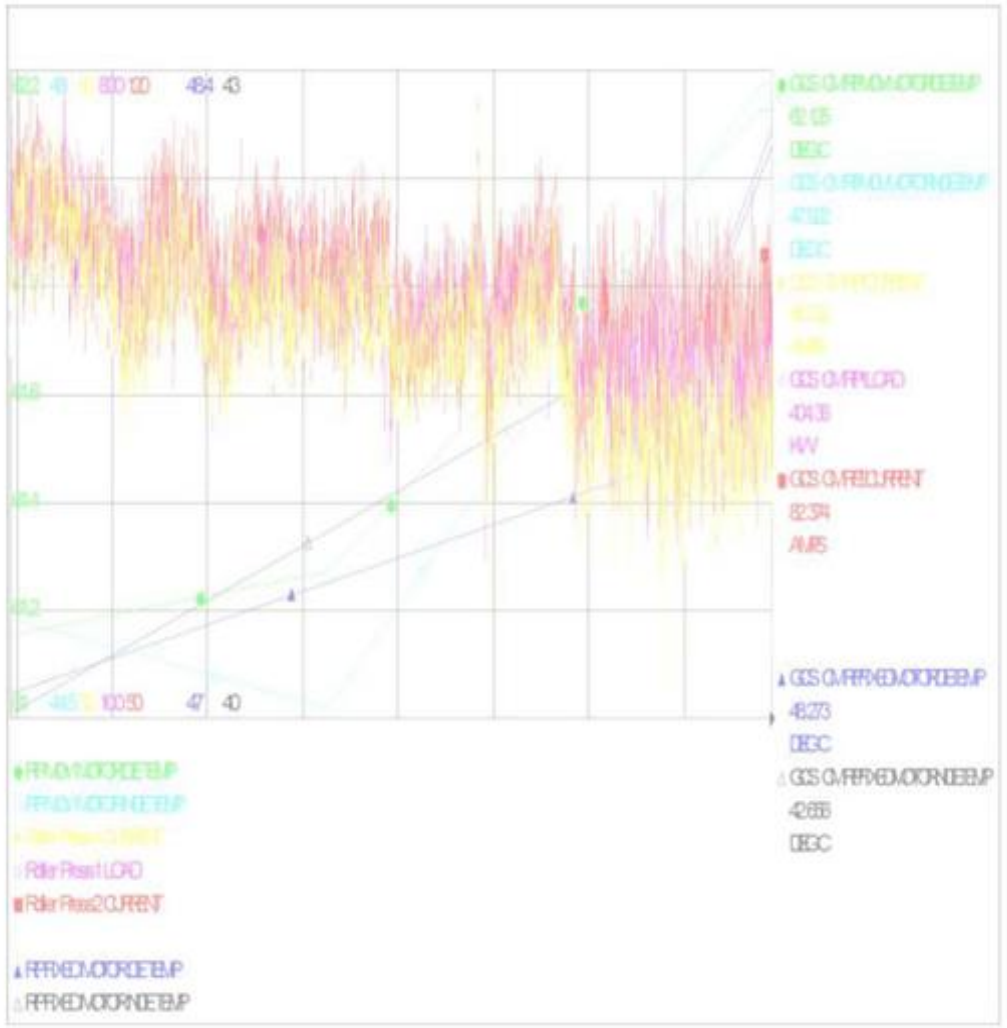
Unit Energy Cell Structure



Energy Cell Functioning focus area

- Awareness / Knowledge management
- Technology Upgradation
- Innovation
- Process / Energy Optimization
- Restoring Basic condition of the Equipments

Energy Monitoring and Reporting



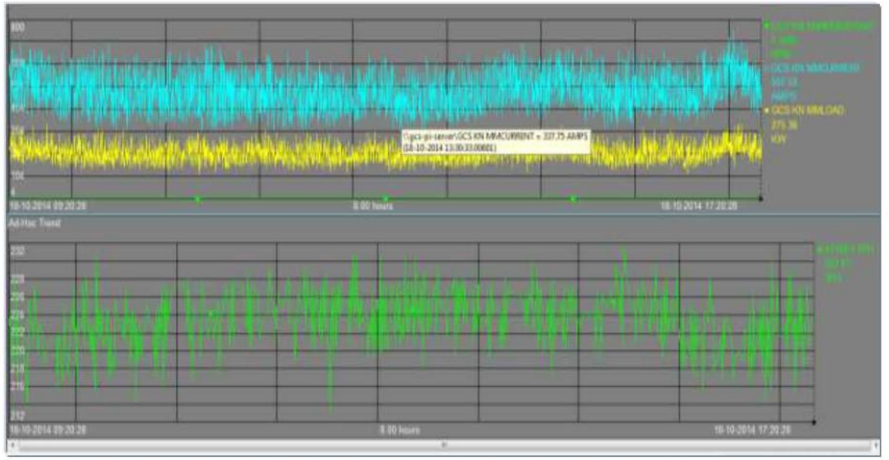
KNOWLEDGE MANAGER SOFTWARE

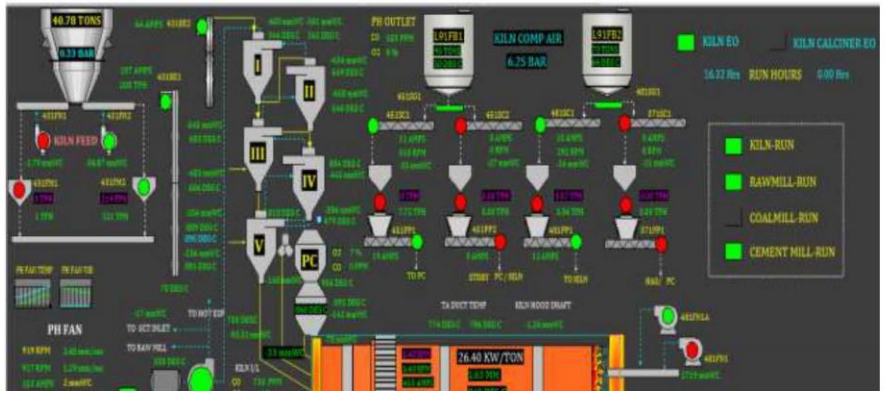
- Individual MCC's wise and section wise power details.
- Speed, load, current and running hours of all critical equipment's.
- Compressors, water pumps and bore wells running hours.
- Start/stop power for all equipments
- Online monitoring of parameters in DCS.
- HT motors power and temperature details
- Plant stoppages are automatically booked in SAP through PI system

Energy Monitoring and Reporting

To measure, monitor, trend & compare power consumption of all major systems/ sub systems/ auxiliaries for improving Sp. Energy Consumption

- Online monitoring
- Elimination of human error
- Measurable outputs
- Report generation and archiving is possible
- PI system available in all PC and every engineer can monitor all parameters.
- Daily Report on Utilization of Various Fuels.
- Useful for analysis of operational deviation





Energy Monitoring and Reporting

EXPERT OPTIMISER

- Expert optimiser is an expert software package used for optimisation of the plant operation.
- Used in Rawmill , Coalmill , Kiln ,Calciner , Cooler & Cement mill sections for optimisation.
- EO system results in optimised and smooth operation of the plant and very minimal operator intervention is required in plant operation.
- After implementing EO system, all major plant operation parameters are more stabilised and consistent.
- Quality parameters like clinker free lime , rawmill residue , cement mill blaine are more consistent.

ENCON - FUTURE PROJECTS

Project- 1 Upgradation of Coal dosing system to Corollis

Present Status:
Presently system operated through FK Pump

Proposed

With new coal dosing system, high accuracy of coal feeding will be ensured without any coal fluctuations/ flushing even with low fine coal bin levels. New system will give accurate counter readings which will help to avoid error in coal booking. Lignite/Indonesian Coal % also can be increased without any coal flushing problem.

Expected benefits :
This new dosing system will reduce the power consumption by 78 kWh/hr and a potential saving of 2 kCal/kg of thermal energy. Kiln operation will be more stable with proposed new coal dosing system. Stoppages of AFR feeding circuit with interlock of CO can be avoid.

Energy saving expected : 6.17 lakhs kwh ,20540 kCal/kg of Clinker

Project- 2 To Procure 2 nos. Energy Efficient Air Compressors (600 CFM capacity each) at Cement Mill

Present Status:

Presently the cement mill operating with ELGI Make Air Compressors CPP

Issues faced:

Both these Air Compressors as sp. Power Consumption – Very High

To procure 2 no. 600 CFM Screw Type, Air Compressor **with VFD**

Expected Specific Power Consumption = **140 watt per CFM at 5.1 Bar**

Expected Power Saving in

Air compressor # 1 = (164 watt – 140 watt) x 238 CFM x 24 Hr. x 350 days

= **47,980 Units.**

Expected annual saving in 2nd Compressor

Daily operating hours = 12 hours

Expected annual saving = 238 CFM (175 – 140) watt/CFM x 12 Hr. x 350 days

= **34,986 Units.**

Total saving : 81000 units

Project- 3 To replace Cooling Water Pump/ Boiler Feed pump by Energy Efficient Pumps in CPP

Present Status:

At present there are 2 cooling water pumps in operation of 1600 m3/hr each, but the total flow achieved is 1900 m3/hr against required of 2600 m3/hr

Issues faced:
Due to reduction in cooling water flow of 700 m3/hr we are not able to maintain Turbine vacuum resulting in increase of specific steam consumption.

Energy efficient Boiler feed pump PO Released and it's expected to receive at site in the month of Jul22.

Expected savings : 224000 kWh

Project- 4 To replace Cement ball mill liners replaced with convention liner to classifying liners

Present System:

Existing up to 3.5Meter, M/S AIA engineering supplied low lift liners provided (2018) and after that up to 11.5 Mtr M/S Aqua Alloy Drag Peb liners provided (2018).

Issue Faced:
At present across the mill blain increase is low i.e. only 50-60 m2/Kg which is supposed to be 100-110 m2/Kg due to reverse classification of grinding media. Wear rate also increased from 28 gram/MT cement to 42 gram/MT Cement. Mill grinding efficiency has reduced which is resulting to more recirculation number and low productivity.

1. Reduction Cement Mill specific power consumption by 0.5 kWh/t Cement
2. Reduction in grinding media wear rate from 42 gm/ t cement to 35 gm/t cement

Energy saving : 6.6 lakhs kWh Saving , 219145 kCal/kg of Clinker

Project 5 : LED Lights for plant

Present Status:

Currently 35 numbers conventional flood light fitting are installed at LS stacker/Reclaimer shed & Main gate area

Issues faced.

1.The power rating of each fitting is (2 X 400) Watt & consuming 6.4 KWH per day @ 8 hrs. per day running.
2.Spare & maintenance cost will increase due to conventional light fitting.
3.During rain lights will tripping due to water enter into choke box and fitting.

Expected saving of 63236 KWH /Year

Project 6 Replacement of energy efficient ceiling fans (28w)

Present Status:

Currently 400 numbers conventional FANS are available

Issues faced.

1.The power rating of each fan is (2 X 28) Watt & consuming 228 WH per day @ 12 hrs. per day running.
2.Spare & maintenance cost will increase due to conventional fans

Expected saving of 30000 KWH /Year

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- mkgandhi

Save Energy - Save Nation