UltraTech Cement Limited

Unit: Kotputli Cement Works

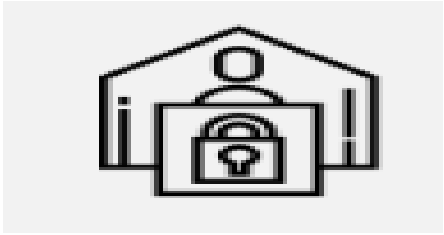
Company Profile

KCW was commissioned in the year 2009 with clinker production capacity of 3.3 MTPA (10,000 TPD)

Equipment	Make	Rated Capacity	Benefits
Raw Mill	Loesche GMBH	735 TPH	Improved energy efficiency, Easy maintenance
Coal Mill	Loesche GMBH	50 TPH for Pet Coke	
First Vertical Cement Mill in UTCL	Loesche GMBH	2 X 215 TPH	
Kiln	KHD GMBH	8000 TPD on 100% Pet coke Mechanically designed for 10000TPD	
Six- Stage Pre-heater twin string	KHD GMBH	-	Enhanced heat & mass transfer
Pyro floor clinker cooler with roller crusher	KHD GMBH	-	High heat recuperation efficiency

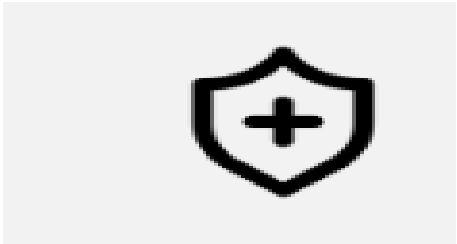
Impact of COVID 19

Lock Down



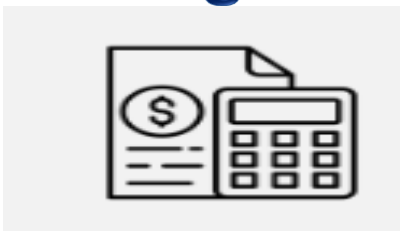
- Plant stopped from 22nd March'2020
- Resumption of Plant at 30 % Man Power.
- successfully run the plant without effected the man power.
- Protection of human being by dividing plant in POD system
- In house manpower skill development.
- successfully run the plant without effected the man power

SOP



- Revisit of all HIRA, SOP and SMP in view of new risk COVID 19
- Conducted online training & visualization on Covid-19.
- Provided awareness on vaccine & Encouraged people to get vaccine.

Budget



- Capex Deferred
- Sanction budget reduced in form of 70%, 50% of Actual Budget
- Annual Maintenance Contract Differed

Cash Conservation

- PR/PO Hold ,Only essential item procured & Every PR discussed through Plant head.
- BSR JOB totally stopped

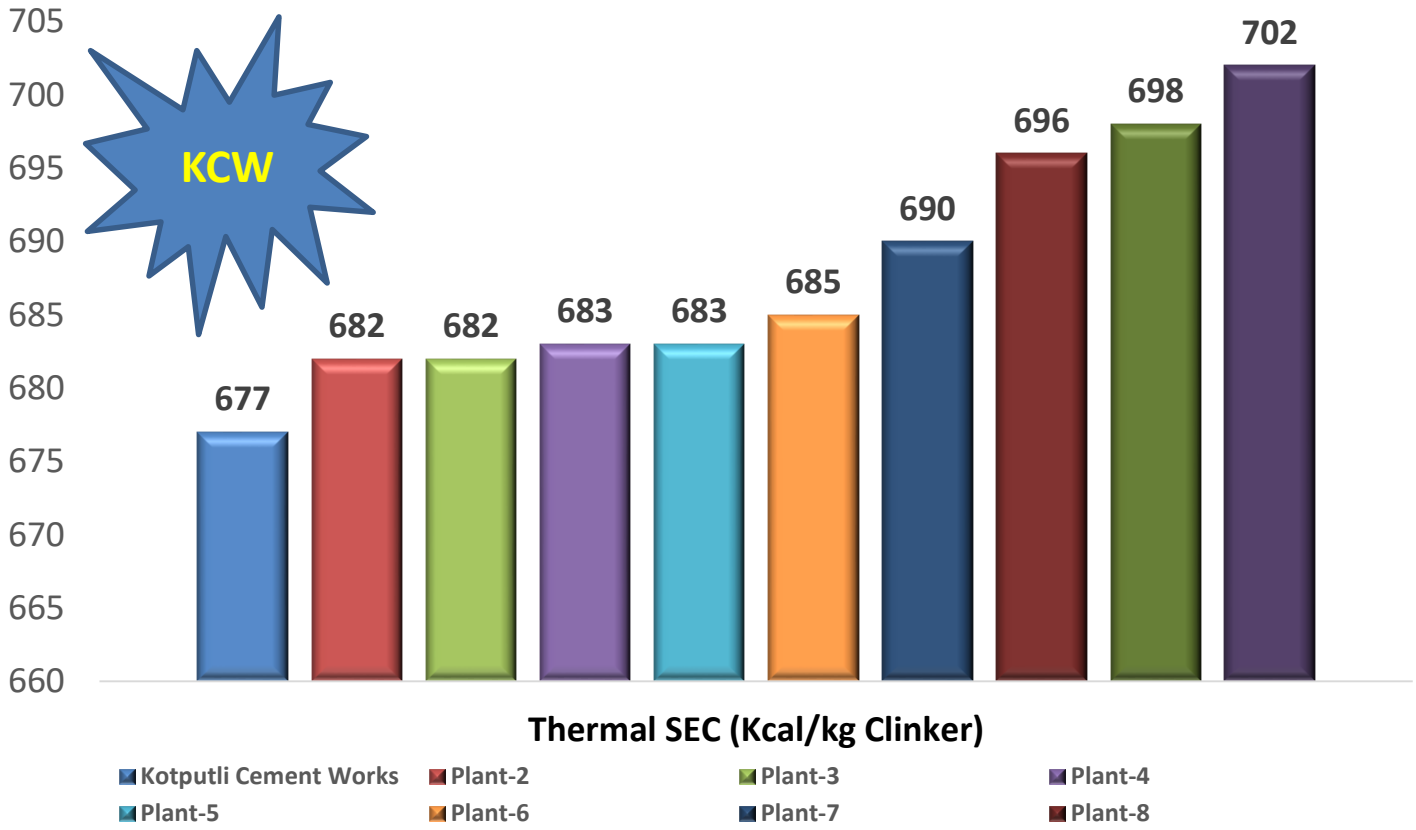
Our approach of KCW is to counter business challenges to sustain and consistently improve performance to reach world class levels with focus on Sustainability, Customer Centricity, Innovation, Team Empowerment and Cost Reduction.

Performance - Highlights

Thermal Energy Performance

KCW is National Benchmarking in Kiln Sp. Heat Consumption

** CII Energy Benchmarking V5-2021



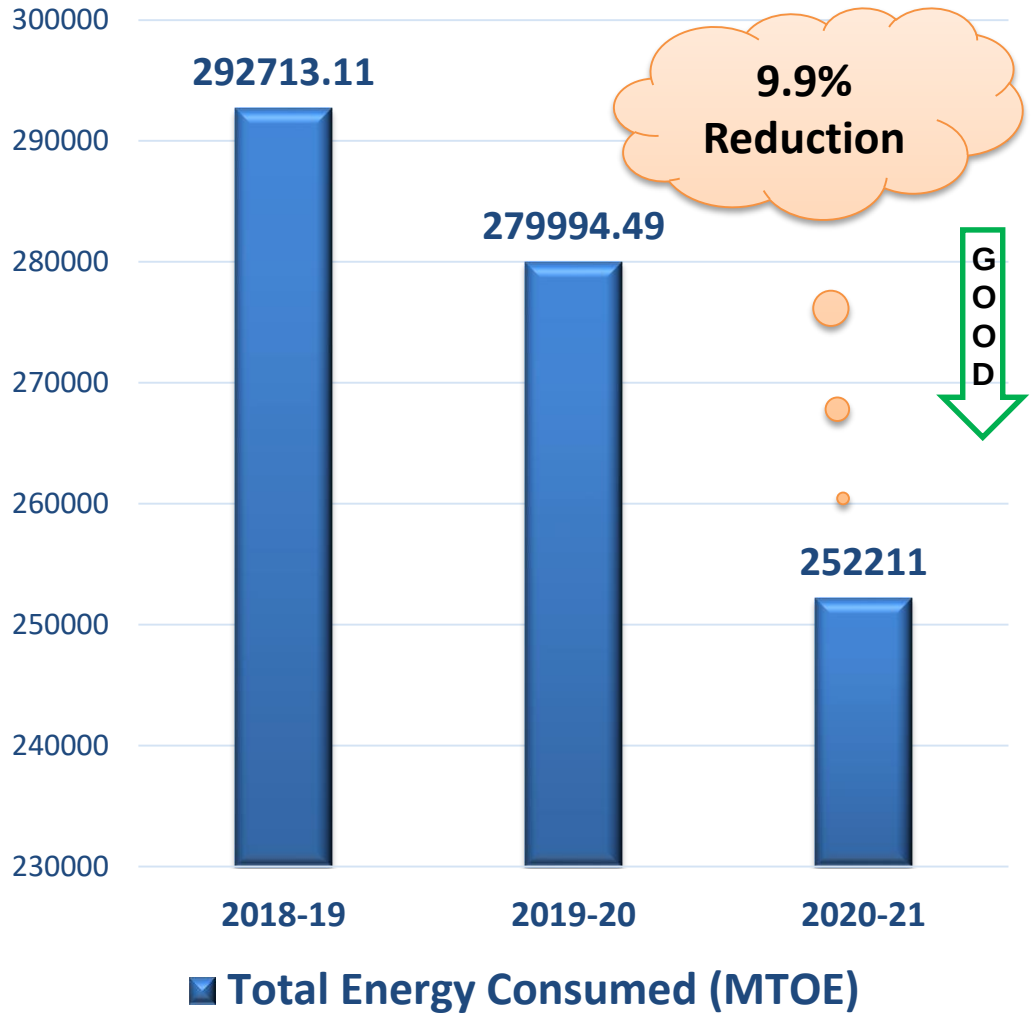
Electrical Energy Performance

Lowest Raw Mill Power Consumption - 12.14KWh/ MT (VRM in UltraTech Units)

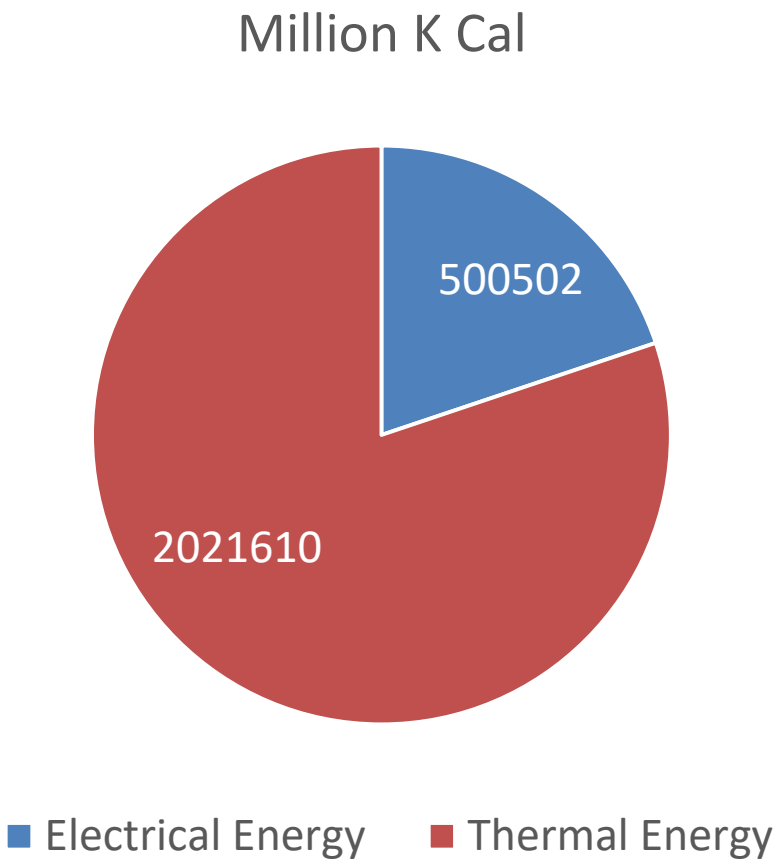
One of the Lowest Packing Power of 0.90 KWh/MT with multi grade loading

Unit Energy Performance

Total Energy Consumed (MTOE)

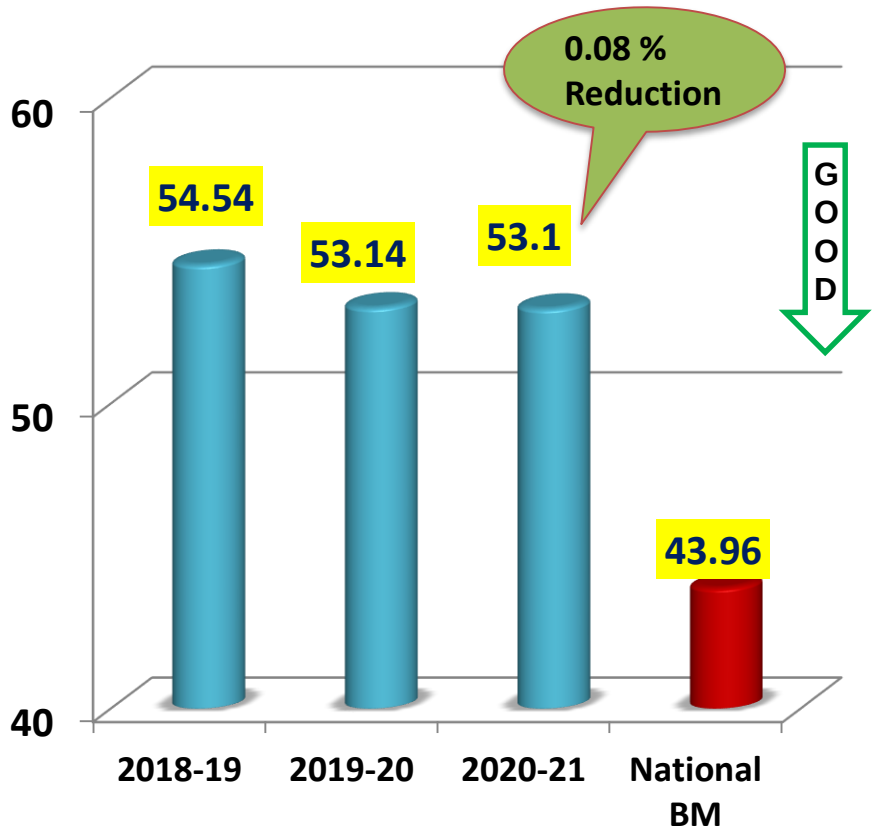


Breakup of Total Energy Consumption

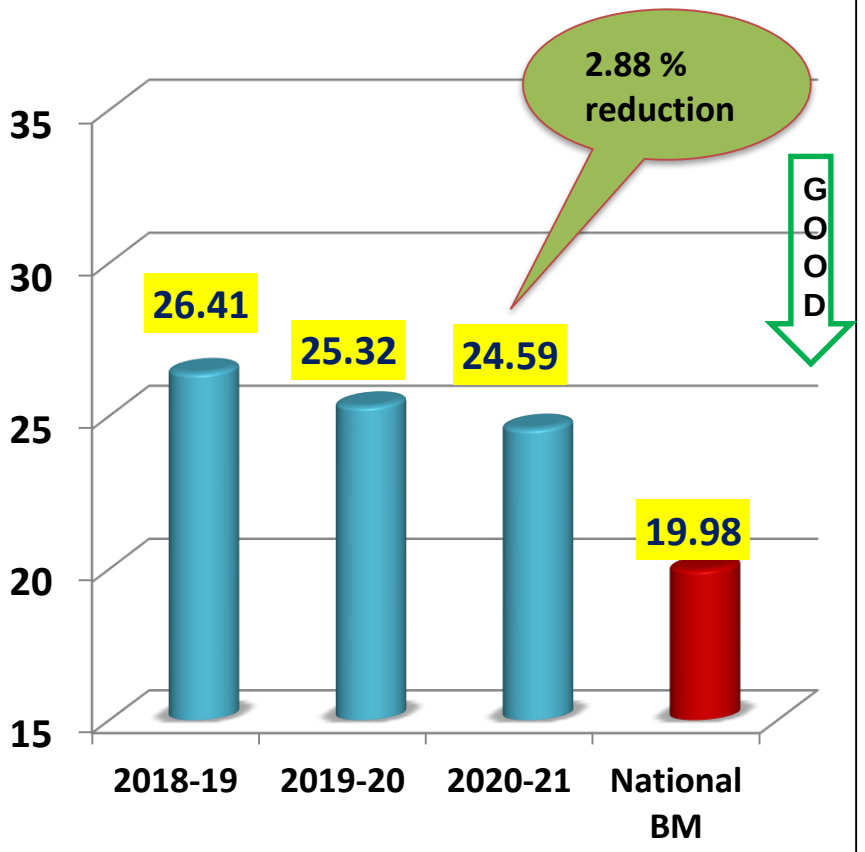


Unit Energy Performance

Specific Power Up to Clinkerization (KWh/ MT Clinker)

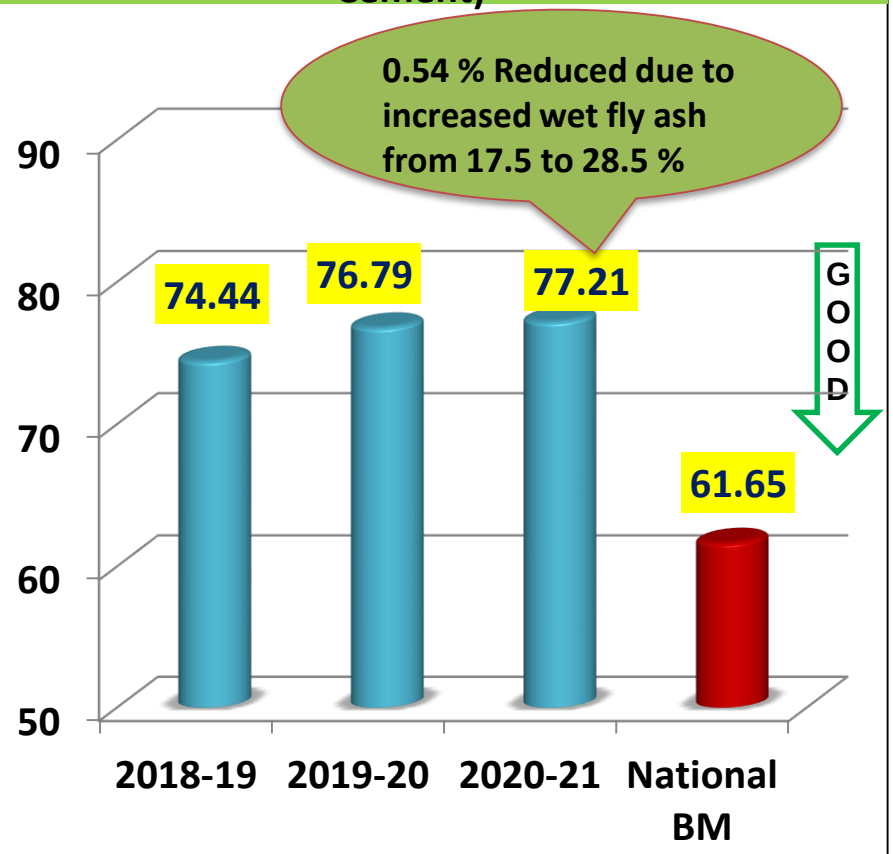


Specific Power Kiln(KWH/MT CLK.)

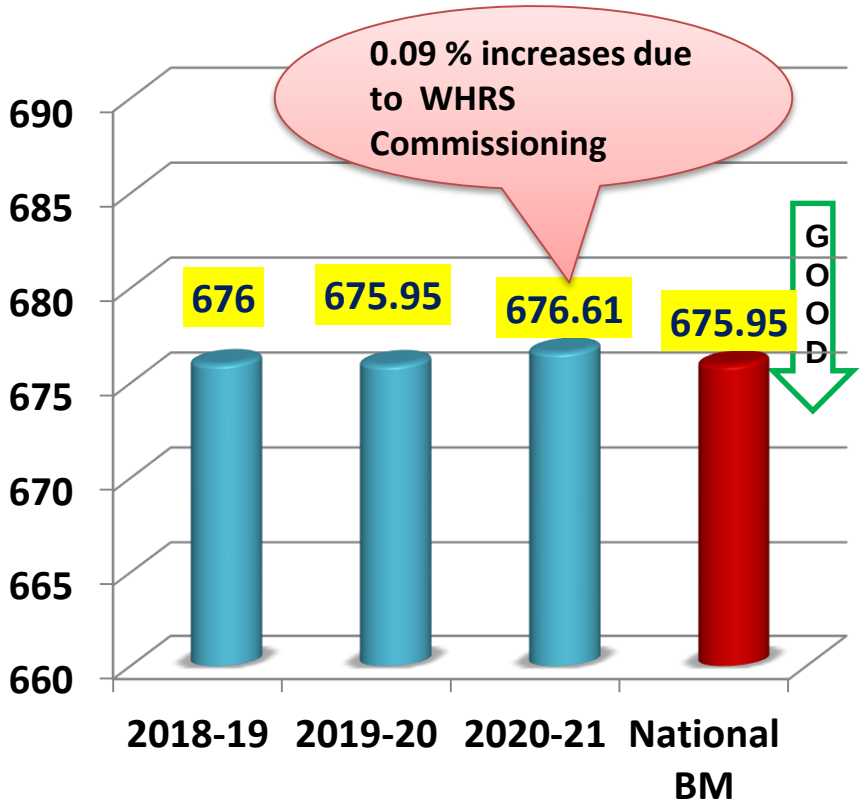


Unit Energy Performance

Overall Specific Power Consumption (KWh/MT of Cement)

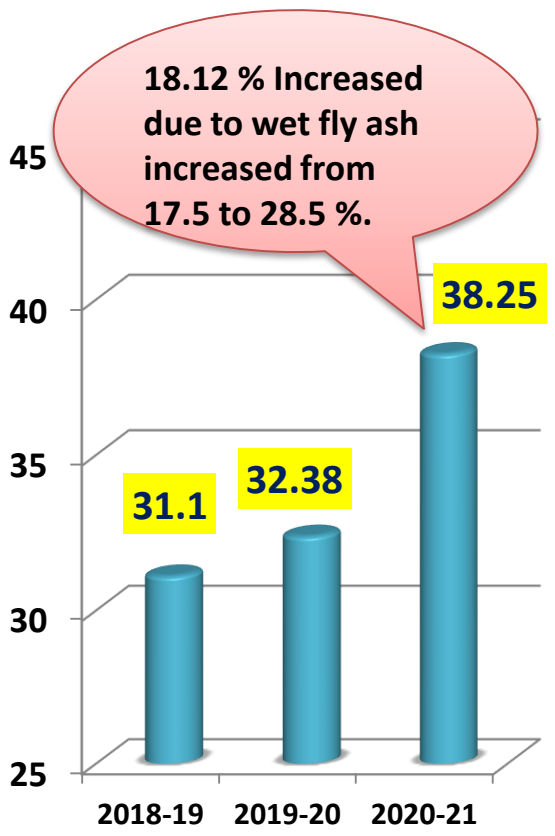


Specific Heat Consumption (Kcal/ KG Clinker)

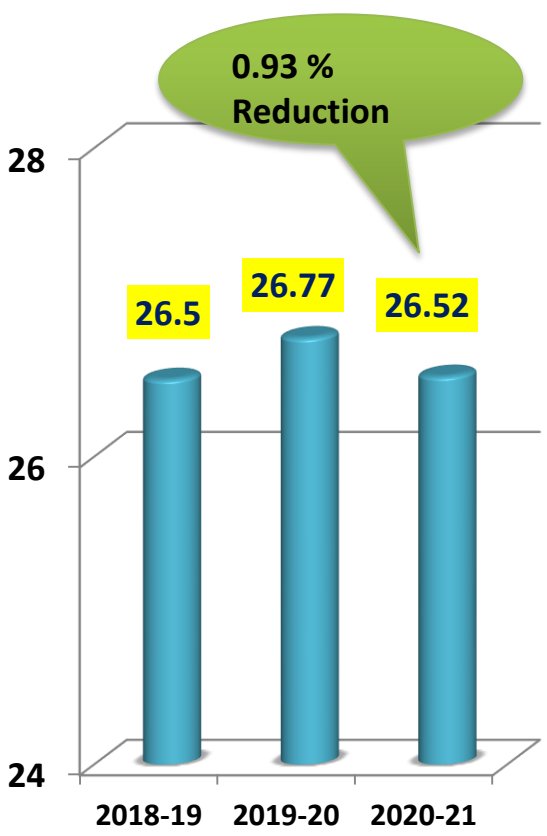


Unit Energy Performance

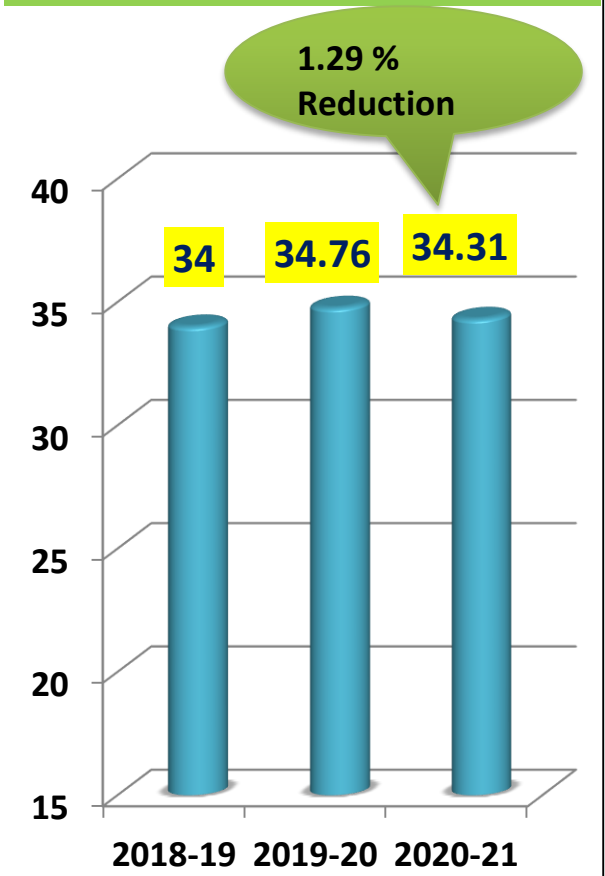
PPC (KWh/MT Cement)



OPC 43 (KWh/MT Cement)



OPC 53(KWh/MT Cement)



Road Map- Benchmarking

- Optimizing operation through Digitization in Raw Mill, Cement Mill, coal mill , Kiln and WHRS operation for performance improvement.
- Exploring for replacement existing Cooler with high efficiency cooler.
- Monitoring and Improving Efficiency of Process Fans.
- Increasing TSR (upto 1.5%) by using cheaper Fuel.
- Technology of Artificial intelligence in manufacturing

Kiln Sp. Heat :- 672 KCal/ Kg
Clinkerization Sp. Power- 50 KWh/MT
Grinding Sp. Power < 25KWh/MT
TPP Heat Rate & Aux – 2900 KCal / KWh & 7%
WHRS Aux: 2.5%

Planned ENCon Project FY 21-22

S.N.	Energy Saving theme	Potential Energy Saving		Target For Completion
		Elect (MWH)	Thermal (Mkcal)	
1.	Replacement of Raw Mill fan with Energy efficient fan	2257.2	-	Mar'22
2.	Increasing WHRS Generation from 13.5 MW to 14 MW.	3960	-	Dec'21
3.	Reduction in post clinker power by improving mill productivity through mill internals rebuilding and improvement.	5289	-	Sep'21
4	Process data Analytics and optimization through digitization for Reduction in fluctuation of key variables at Kiln, Cement Mill and Coal Mill.	689	323	Sep'21
	Total	**12195.2**	**323**	

ENCon Project

SN.	Energy Saving theme	Energy Saved/yr		Savings (Rs. Lacs/yr)	Invest (Rs. in Lacs)	Payback (months)
		Elect (MWH)	Thermal (Mkcal)			
	2020-21					
1	Installation and commissioning of **Waste heat recovery boiler (PH-1 & PH-2)**	65829.6	-	3953.8	11742.8	35
2	**Increase WHRS generation from 12 MW/Hr. to 13.5 MW/Hr** by, developing PID's of Cooler fans to reduce Variation of AQC I/L Temperature. False air reduction, Cooler operation & lane DP optimization. Burner Pipe adjustment to reduce cooling zone and stabilize kiln operation.	3101.7	-	1318	-	-
3	**VFD for packer fan** and interlock with machine operation.	55.6	-	0.2	0.07	4
4	Power consumption reduction by stopping one water pump at Pre Heater by providing Tank level settings HI & LO limit to run one pump if tank level < 40% will start & stop at 100%	43.56	-	1.52	-	-

ENCon Project

SN.	Energy Saving theme	Energy Saved/yr		Savings (Rs. Lacs/yr)	Invest (Rs. in Lacs)	Payback (months)
		Elect (MWH)	Thermal (Mkcal)			
2020-21						
5	TG Overhauling to improve heat rate by 25 Kcal/KWh	-	1242	54	50	11
6	**Raw Mill power reduction** by – Enhancing mill output (Replacement of RM silo B/E belt, rollers and table liners, grit cone, mill body liners & guide vanes in mill separator)	162.83	-	5.7	20.6	43
7	**Reduction in Kiln Specific Power consumption** by 0.77KWh/MT by Increased Kiln output from 9650 to 9950TPD, Optimizing process fans and reducing false air below 7.5%. Reduction in Ideal running of equipment by Bag House Rotary airlock timer mode.	2187.17	-	76.6	-	-
8	Process data Analytics and optimization through digitization for Reduction in fluctuation of key variables at crusher, Raw Mill and WHRS	644.8	-	22.05	15	8
	Total	**72035.4**	**1242**	**4247.4**	**11829.2**	

ENCon Project

SN.	Energy Saving theme	Energy Saved/yr		Savings (Rs. Lacs/yr)	Invest (Rs. in Lacs)	Payback (months)
		Elect (MWH)	Thermal (Mkcal)			
	2019-20					
1	**Reduction in Raw Mill Power consumption from 12.19KWh/MT to 11.85KWh/MT by** a) Single start Command for Mill groups. b) Mill Roller Replacement. c) Increase in Grinding pressure from 74 to 77 bar. d) Increase in mill outlet temperature from 85 to 90 OC. e) Dam ring height adjustment & nozzle velocity optimization. f) Static blade replacement of Classifier. g) False air reduction up to 10.38%.(UTCL Target – 15%) h) Raw Meal residue optimized & changed from 0.8% to 1% @ 212micron i) Aux Power reduction through VFD, 1000RPM Motor , IE3 Motor, Idle running optimisation j) EO utilization >95%. k) Dust collector fan tipping which were running with dampers.	1478	-	71.5	25.2	4.23

ENCon Project

SN.	Energy Saving theme	Energy Saved/yr		Savings (Rs. Lacs/yr)	Invest (Rs. in Lacs)	Payback (months)
		Elect (MWH)	Thermal (Mkcal)			
	2019-20					
2	**Installation of Energy Efficient Impeller in Raw Mill Baghouse Fan**	1340	-	64.9	229	21.00
3	Installation of Energy Efficient Fan in Cement Mill-1 Fan	1364	-	66.0		
4	**Replacement of 14 Nos Motors IE1 to IE3 in Cement Mil & Packing Plant**	39.48	-	1.9	6.94	43.58
5	Expert Optimizer utilization to improve Kiln Heat Rate		934	10.76	40	44.4
6	Installation of VFD in Pre Clinker Compressor	199.93	-	9.7	3.4	4.22
7	Installation of VFD in Post Clinker Compressor	211.72	-	10.2	3.4	3.98
8	Install Energy Efficient VFD in Bag Filter Fan	199.39	-	9.7	3.5	4.35
9	**Commissioning of WHRS AQC Boiler**	**29052.9**	**-**	1406.2	**7730**	-
	Total	**33885**	**934**	**1640**	**8001**	

ENCon Project

SN.	Energy Saving theme	Energy Saved/yr		Savings	Invest	Payback
		Elect (MWH)	Thermal (Mkcal)	(Rs. Lacs/yr)	(Rs. in Lacs)	(months)
2018-19						
1	Installed VFD at 6 nos bag filter fans across plant drive to operate on reduced speed and power saving.	671.15	-	36.9	15.2	7.12
2	**Saved electrical energy in lighting by replacing existing conventional light fittings in various area's with LED light fitting or LED lamp.**	**83.53**	**-**	**4.59**	**16**	**23**
3	Reducing Pressure Drop in Preheater by increasing the height of stage –II cyclone roof by 500 mm along with riser duct, cyclone inlet portion modifications for both String-I & String-II	326.98		17.98	21	10.2
4	**Expert Optimizer in Raw Mill, Cement Mill**	**830.9**	**-**	**45.69**	**74.8**	**19.7**

ENCon Project

SN.	Energy Saving theme	Energy Saved/yr		Savings (Rs. Lacs/yr)	Invest (Rs. in Lacs)	Payback (months)
		Elect (MWH)	Thermal (Mkcal)			
2018-19						
5	**Expert Optimiser** in Kiln	284.56	15840	174.05	160	11
6	Eliminate throttling of Pyro pumps by impeller trimming / Impeller replacement.	68.87		3.78	0.1	1
7	Eliminate throttling of Post Clinker pump house by impeller trimming / Impeller replacement.	28.76		1.58	0.1	1
8	Installation of Energy Efficient Motor (replacing IE2 with IE3 Motor)at Cement Mill, Raw Mill and Crusher (19 Nos)	57.16	-	3.16	6.94	26.3
9	Installation of Turbo Blower in Kiln firing circuit 481BL2 & 481BL3	120.92	-	6.65	14	25.2
	Total	**2472**	**15840**	**294.3**	**308.1**	

WHRS Generation Improvement by 1.5MW

Activity

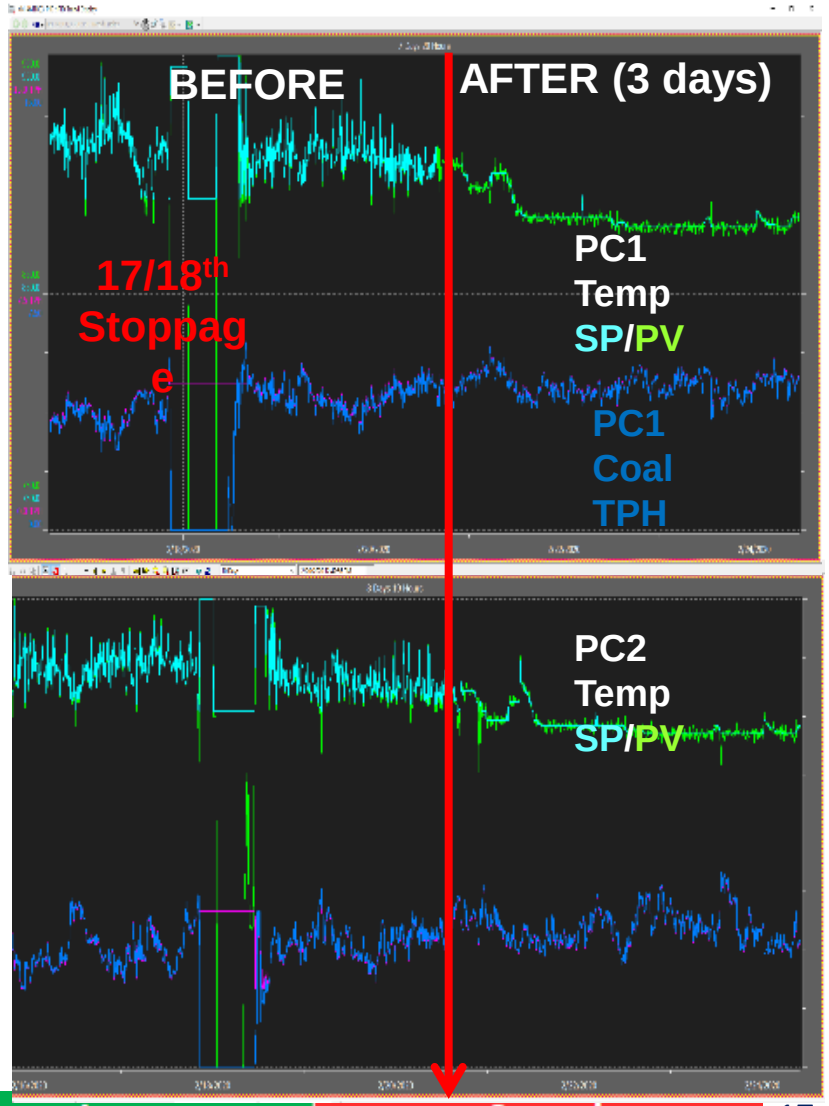
1. Developed 4 PID's

- ❖ AQC Inlet Temperature vs Cooler Fan 8 flow
- ❖ Fresh Air Damper vs AQC Inlet temperature > 500 DegC
- ❖ PC (Both string) Temperature with PC Coal. Temperature Variation reduced to +/- 8 Deg c

2. Burner Pipe adjusted to reduce cooling zone and stabilize kiln operation.

Result Indicators

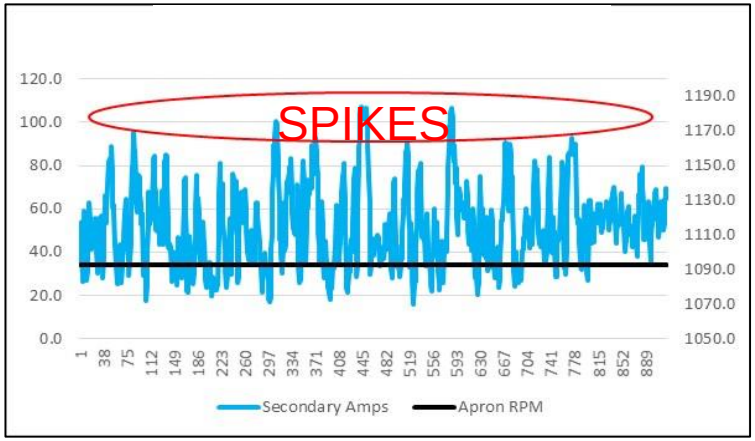
- ❖ Smooth Kiln and cooler operation resulting less AQC inlet temperature fluctuation.
- ❖ WHRS generation improved from 12 MW/Hr to 13.5 MW/Hr
- ❖ Increased % share of WHRs from 36.6% to 41.63%

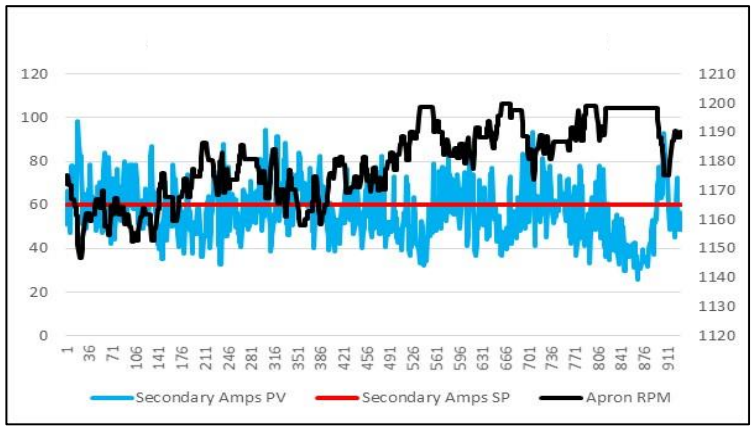


INNOVATIVE PROJECT-2

Process data Analytics and optimisation for Reduction in fluctuation of key variables

Section	Activity	Result
Crusher	PID for Lime Stone Crusher operation - Secondary Crusher Amps control with Apron Feeder speed.	1. Specific power reduction from 1.55 to 1.44 KWH/MT. 2. TPH increased from 1982 to 2245 TPH.
Raw Mill	1.Raw Mill DP/ KW control with Mill Feed 2. Raw Mill buffer hopper weight control with Mill Feed.	1. Stable Raw Mill operation and feed optimization (3 TPH Increase)





INNOVATIVE PROJECT-3

Artificial intelligence for Mining

Activity

❖ Used SRT technique to characterize the rock mass.

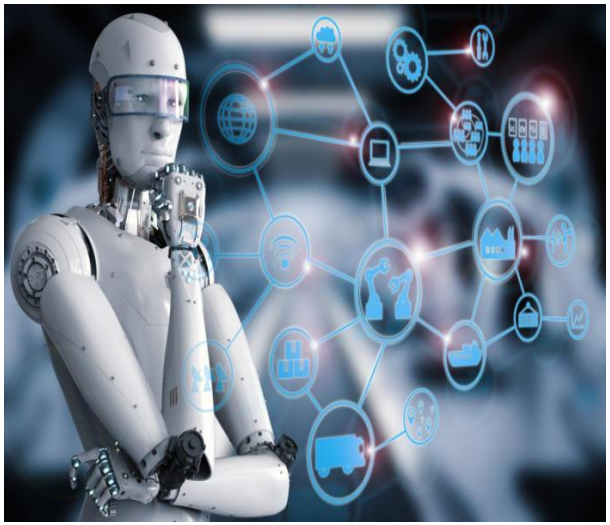
❖ Determined layer wise VOD and density of explosives, dynamic properties of rock mass & simulating the blast hole detonation pressure, oversized and optimum size boulders.

❖Designed drilling, blasting and initiation parameter for improved blast performance using dynamic simulation technique .

Result Indicators

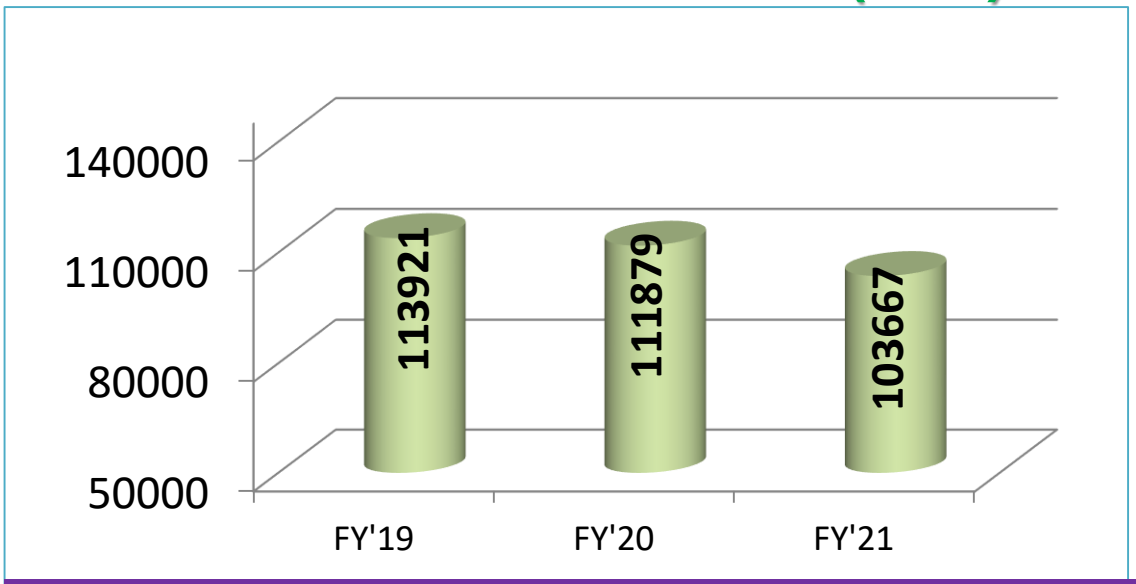
Digitalization initiative coupled with real time fragmentation monitoring improved the plant savings significantly covering mining & crushing.

SL.NO.	DESCRIPTION	2018-19	2019-20	2020-21
1	EXCAVATOR TPH	406	431	452
2	LTR / HOUR	70.7	66.89	62.17
3	POWDER FACTOR	5.76	6.79	7.28



Renewable Energy

➢ Solar Power Generation (KWh)

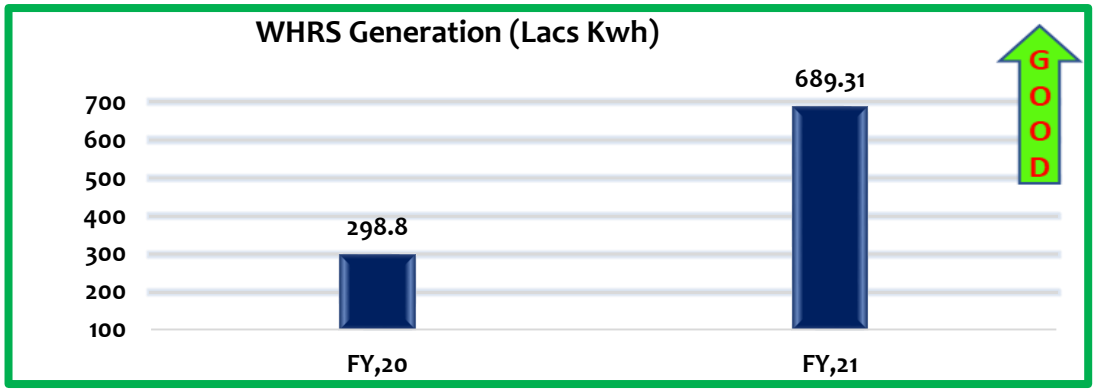


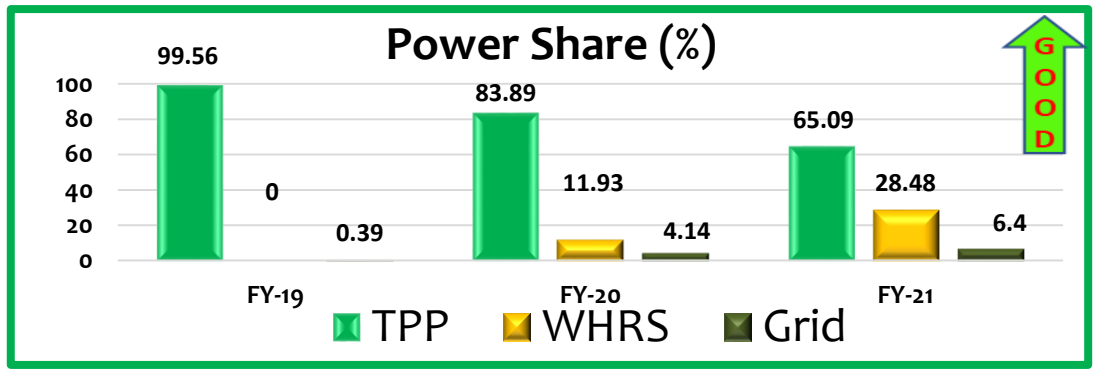
28.74% energy share of WHRS and Solar in FY21

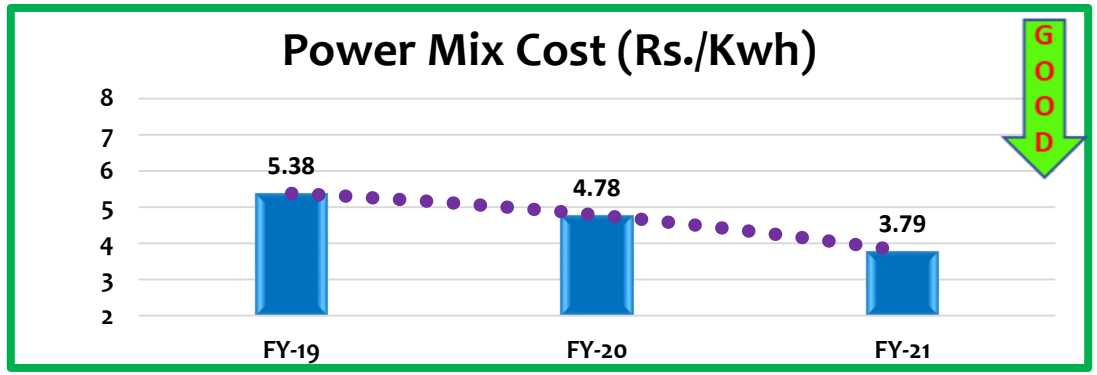
100% Compliance of RPO

Solar lighting system

Waste Heat Recovery System







Waste Utilization and Management

- Utilization of **ETP Sludge, FMCG (Fast Moving Consumer Goods) and Lime sludge in Raw Mix**. Total Quantity used in **FY 2020-21 – 7849.89 MT**

ETP Sludge (MT)	FMCG (MT)	Lime Sludge (MT)
6791.22	393.21	665.46

- Utilization of **Lime sludge waste as Alternate Fuel** in Kiln. Total of **665.46 MT AFR** has been fired into Kiln during **FY 2020-21**.

- Identified **Authorized vendors for Recycling of Wastes**. Followings are the detail of category wise wastes recycled through authorized vendor, Total of **23.28 MT wastes have been recycled** in **FY2020-21.**

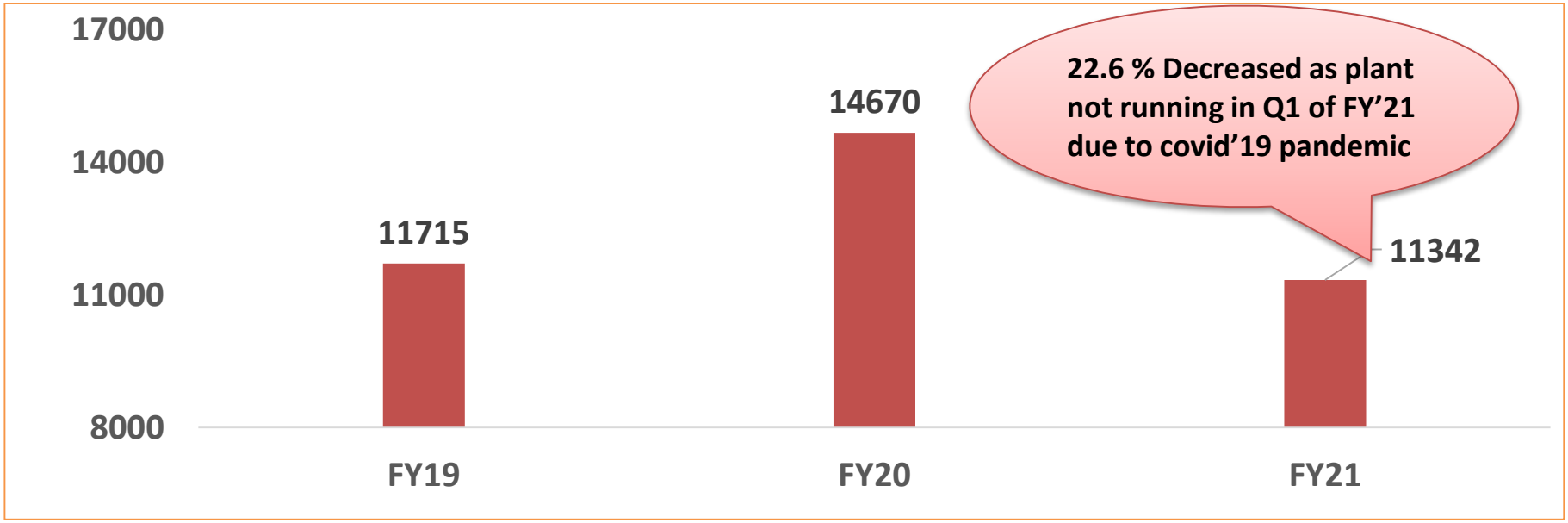
Medical Waste (MT)	Empty Barrel (MT)	Batteries (MT)	Grease (MT)	Oil (MT)
0.06	11.62	0.84	5.06	5.70

Waste Utilization and Management

- **Domestic effluent generated** from offices and township is being treated in the STP and **recycled for green belt development**, dust suppression and Cement Plant process operation **(61214 Cum./annum)**
- **STP sludge** is used as manure for green belt development within the plant premises**. (69.98 Ton/annum)**
- In FY 20-21, total **2.53 Million Cu Meter** water has been collected and harvested.

KCW is 5.19 times water positive in FY21

RDF Production at Municipal Solid Waste Plant

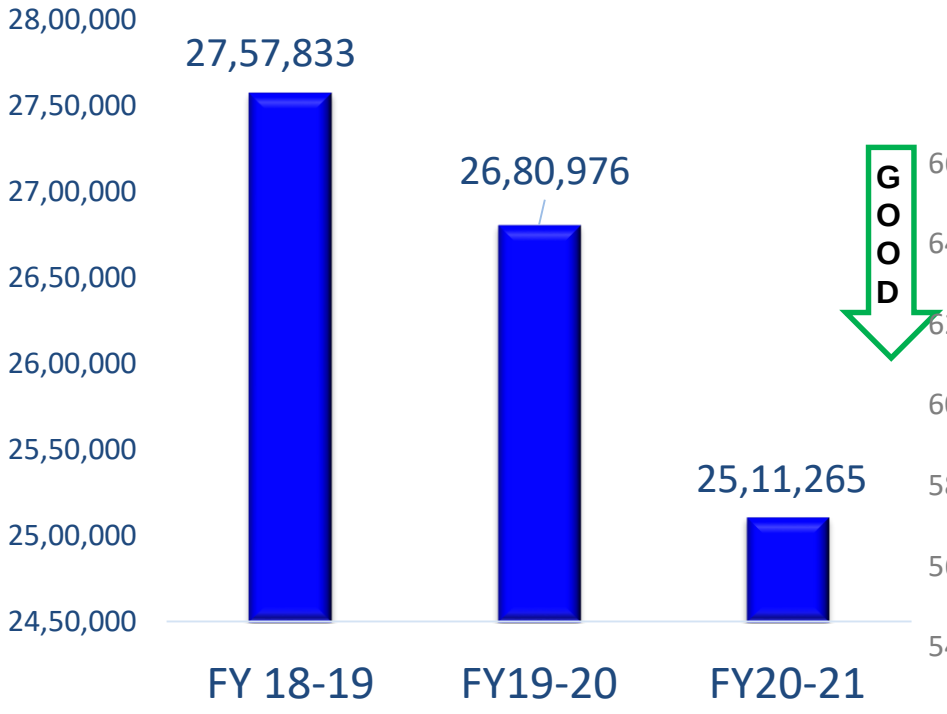


learning from CII Energy Award 2020

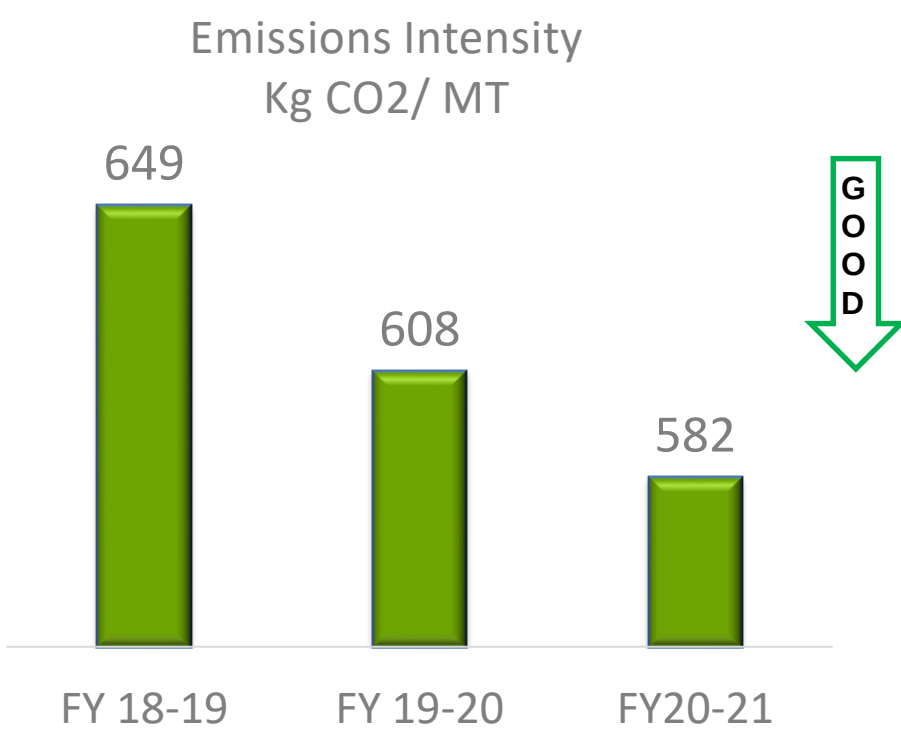
1. CII is a platform to learn the complete energy conservation related technology and innovation tactics.
2. We get inspiration to view overall data of different industry at common platform.
3. Analytical level increased to understand the data and how to conserve energy in industry level.
4. Awards gives possibility to industry to explore and be known nationally and internationally for their innovative products and services.
5. CII has formulated an Enterprise Innovation Maturity Framework which forms the basis of assessment of firms applying for CII Industrial Innovation Awards.
6. Learn about innovation best practices by taking part in various stages of the award process.
7. By involving in CII Awards platform at national level we can enhance our knowledge regarding different unit ideas for reduction of energy in different fields. So we can explore the implementation of the suitable points in our plant/area.
8. We can reduced the cost of the final product by enhancing the knowledge by adopting the latest technology and innovation in different plant.

GHG Emission

Ton CO2 Emission/ Year Including onsite Power generation



Kg CO2 / Ton of Cementitious material (including onsite Power Generation)



Reduction in CO2 emission intensity by 4.3% in 2020-21 over previous year

GHG Inventorisation and Public disclosure

We follow an annual cycle of reporting compliance with global reporting norms and public disclosure in accordance with Cement Sustainability Initiative (CSI) on key performance indicators & Global Reporting Initiatives (GRI) G4 Core guidelines.

"UTCL Target Reduction for Scope 1 GHG intensity by 27% by 2032 from the base year of 2017"

Science-Based Target initiative (SBTi) has validated the targets to lower its CO2 intensity by 462 kg net CO2 per ton of cementitious material

UltraTech Cement joined '2050 Climate Ambition'

Commitment to drive down the CO_2 footprint and deliver society carbon neutral concrete by 2050.

Green Supply Chain

UltraTech Cement Ltd.
Kotputli Cement Works

Green Supply Chain Policy

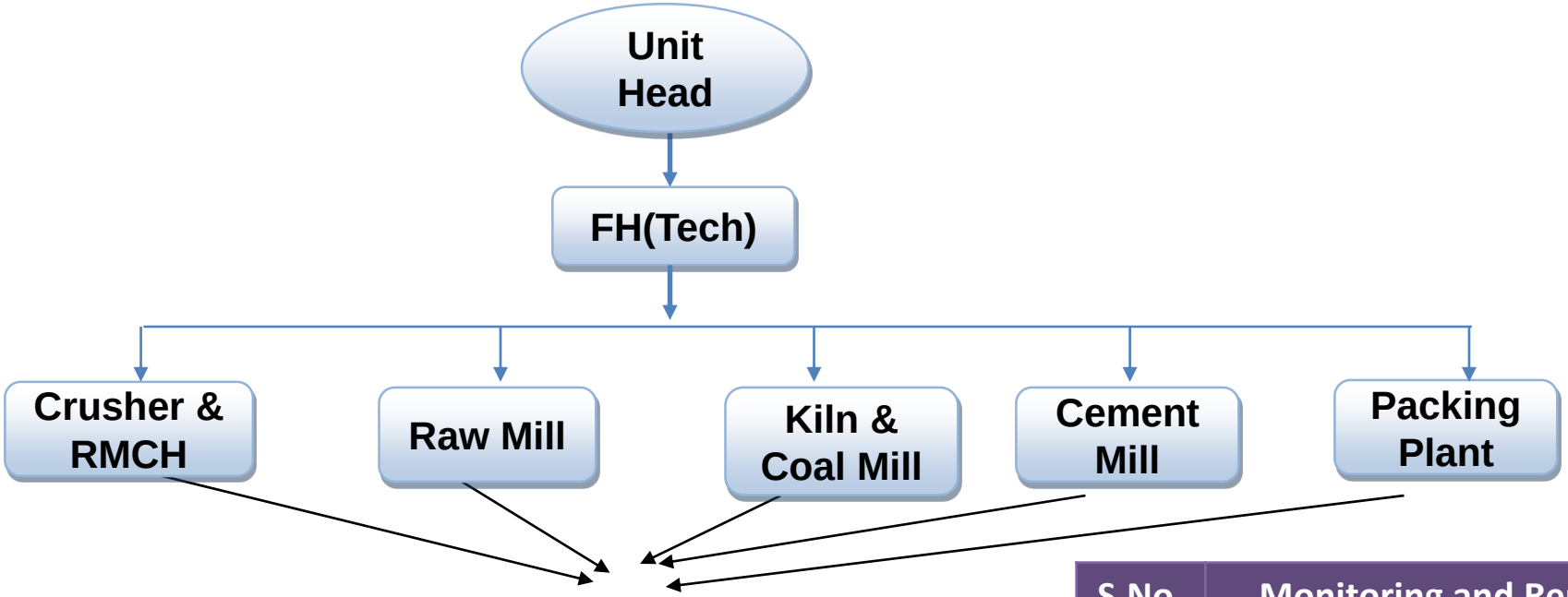
We at UTCL is committed to Green procurement through a selection of products and services that minimize environmental impact. We will develop and conduct programs for the suppliers with focus on green supply chain.

We are also committed to:

- Use of waste generated by other process industries for co processing and working towards zero discharge to the landfill.
- Incorporate the use of renewable resources.
- Encourage suppliers, transporters, contractors/service providers to offer environmentally preferable products and services at competitive prices.
- Encourage suppliers, transporters, Contractors/service providers to continually improve their performance with respect to Safety, Health, and Environment through Sustainable Development.
- Purchasing preference will be given to the suppliers who -
  - o Minimize the generation of waste and safe disposal.
  - o Offer eco-friendly products
- Consider Life Cycle Cost during procurement activities.
- Sustain appropriate development programs for our employees and suppliers.
- Comply with all environmental legislative and regulatory requirements in the procurement of products and services.

- 100% synergy between petcoke lifting from IOCL ,Panipat and Clinker dispatches to Panipat Grinding unit.
- While procuring the Motors, AC's, luminous products & refrigerators we are incorporating the Clause of Energy efficient Products needs to be supplied with ratings mentioned.
- Implementation of RTGS/NEFT for making online payment instead of Cheque Process there by reducing the Paper Consumption.
- Increasing the Vendor Management inventory to save multi packing & Shipments.
- Reduction of carbon foot print by developing the reverse logistics & reduce the CO_2 emissions.

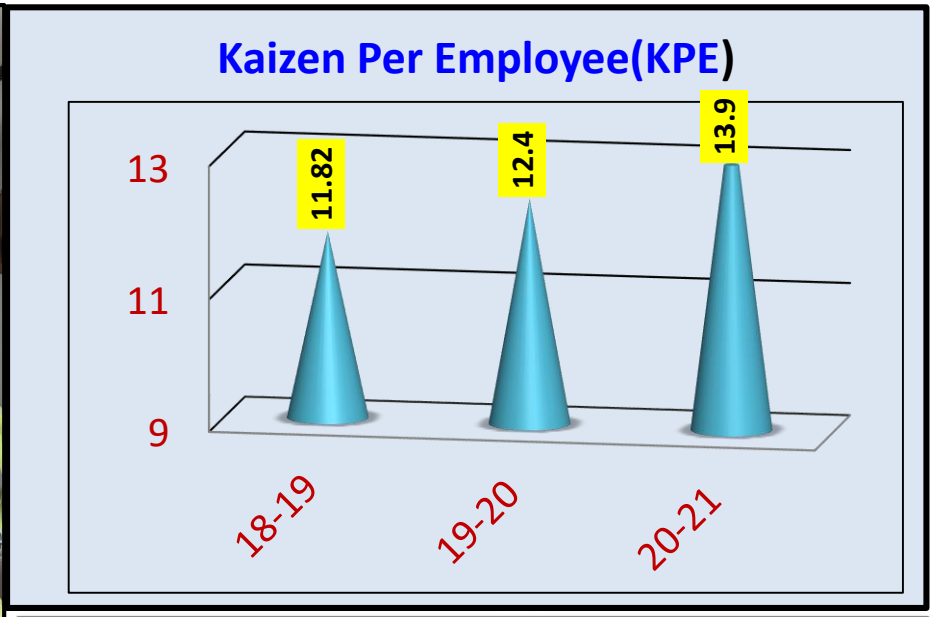
Methodology for Energy Monitoring



- Energy Conservation Meeting
- Daily production review Meeting
- Technical Performance review meeting
- Capex review meeting

S.No.	Monitoring and Reporting
1	Daily Power Report
2	*Daily Section Performance Review Report*
3	Daily Compressor Power Report
4	Daily HOF Optimization Report
5	Daily Idle run hrs report

Involvement & Recognition



Celebrating energy conservation week
for idea sharing and recognition for participation
and best idea sharing

Kaizen Award winning teams

System Adopted

DNV·GL

MANAGEMENT SYSTEM CERTIFICATE

Certificate no.: 172280-2015-AE-IND-RvA | Initial certification date: 09 March 2015 | Valid: 10 March 2021 – 09 March 2024

This is to certify that the management system of

Ultratech Cement Limited

Unit: Kotputli Cement Works, Village: Mohanpura, Tehsil: Kotputli,District: Jaipur - 303108, Rajasthan, India

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

ISO 50001:2018

This certificate is valid for the following scope:

Manufacture of Cement and clinker

Place and date: Barendrecht, 22 February 2021

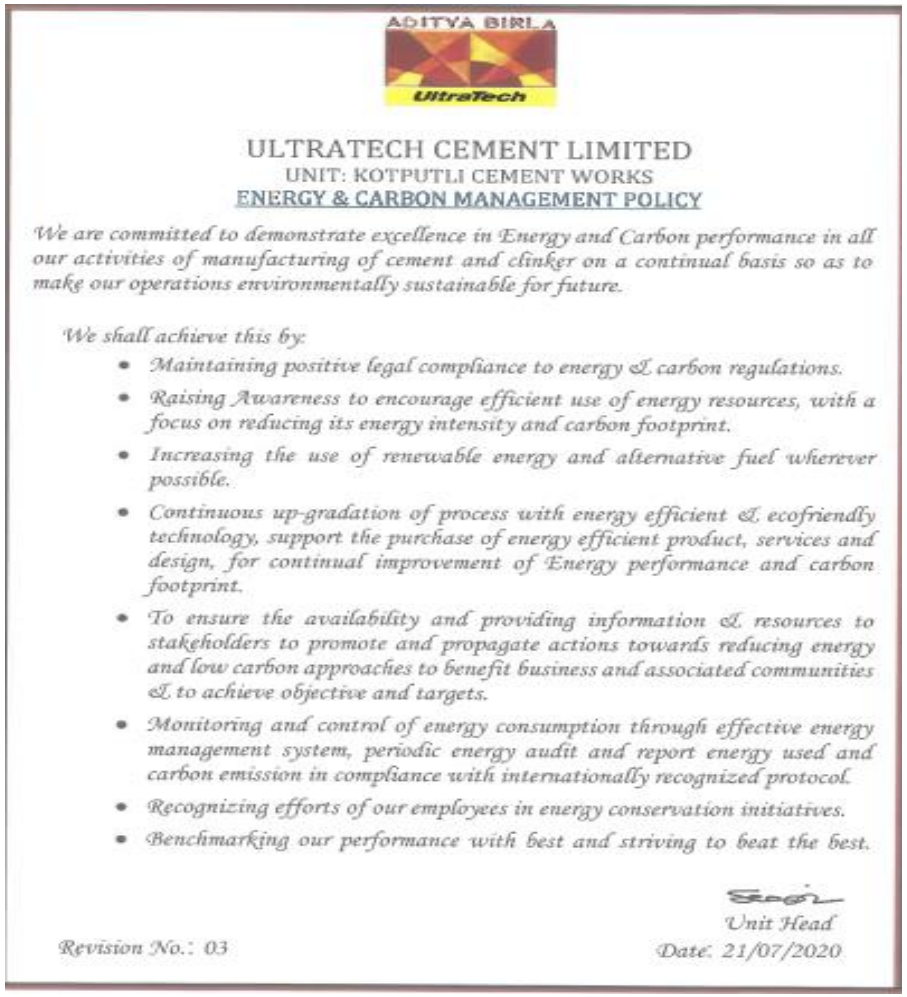
For the issuing office: DNV GL - Business Assurance Zwolseweg 1, 2994 LB Barendrecht, Netherlands

Erie Koek
Management Representative

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

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

ISO 50001-2018



ADITYA BIRLA

UltraTech

ULTRATECH CEMENT LIMITED

UNIT: KOTPUTLI CEMENT WORKS

ENERGY & CARBON MANAGEMENT POLICY

We are committed to demonstrate excellence in Energy and Carbon performance in all our activities of manufacturing of cement and clinker on a continual basis so as to make our operations environmentally sustainable for future.

We shall achieve this by:

- *Maintaining positive legal compliance to energy & carbon regulations.*
- *Raising Awareness to encourage efficient use of energy resources, with a focus on reducing its energy intensity and carbon footprint.*
- *Increasing the use of renewable energy and alternative fuel wherever possible.*
- *Continuous up-gradation of process with energy efficient & ecofriendly technology, support the purchase of energy efficient product, services and design, for continual improvement of Energy performance and carbon footprint.*
- *To ensure the availability and providing information & resources to stakeholders to promote and propagate actions towards reducing energy and low carbon approaches to benefit business and associated communities & to achieve objective and targets.*
- *Monitoring and control of energy consumption through effective energy management system, periodic energy audit and report energy used and carbon emission in compliance with internationally recognized protocol.*
- *Recognizing efforts of our employees in energy conservation initiatives.*
- *Benchmarking our performance with best and striving to beat the best.*

Unit Head

Revision No.: 03

Date: 21/07/2020

Energy And Carbon Policy

Awards & Accolades

CII Excellent & Energy Efficient Award
Consecutively 9th year..

CII Excellent & Energy Efficient Award
Journey started from 2012.

National Energy Conservation Award 2017 (First Prize)

Under category of Thermal Power Stations (Less than 100MW Coal & Gas) Sector.

Award received on 14th Dec 2017 at Vigyan Bhavan, New Delhi by honorable President of India

Thank You…

Presenting Team Members :–

Mr. Rajnish Roshan (Manager, Electrical)

Mr. Devershi Bisht(Senior Manager, Technical Services)

Mrs. Sarita Yadav (Asst. Manager, WCM/ ISO)

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