

25th Cll National Award for Excellence in Energy Management 2024



UltraTech Cement Limited Unit: Kotputli Cement Works









Ultratech Cement Limited Kotputli Cement Works

Krishankant Parmar : Senior Manager Sarita Yadav : Assistant Manager



Introduction of Organization



				Equipment Lime Stone Crusher Raw Mill Coal Mill Coal Mill Cement Mill (2 Nos.) Kiln Six- Stage Pre-heater twin string	Make M/s L &T Ltd M/s Loesche GMBH M/s Loesche GMBH M/s KHD GMBH KHD GMBH	Model APCM- 2022 LM 69.6 LM 43.4D LM 53.3 +3 Size: 5.8 m Ø and 85 m long	Rated Capacity1600 TPH735 TPH50 TPH for Pet Coke2 * 215 TPH8000 TPD on 100% Pet coke	Improved energy efficiency, Easy maintenance Enhanced heat & mass transfer
KCW was	Symbol	Plant	Nos	Pyro floor	10/ 50	1		High heat recuperation
commissioned in the year 2009		Integrated Units	23	with roller	KHD GMBH			efficiency
with clinker		Grinding Units	23	Packer (8	M/s Haver	8 RS-F	120 TPH	
production	D	White Cement & Putty Units	03	Nos.) Turbine	Boecker M/s HTC	Condensin	(Modified FY24)	
MTPA (10.000		Jetty	04	(02Nos)	(<u>1</u>	9	23 10100	<u> </u>
TPD)		Bulk Terminals	07	WHRS Turbine	M/s Siemens Ltd.	Pressure Injection	12.9 MW	
				Solar System		Туре	7.0 MWH	



Performance - Highlights



Thermal Energy Performance



Electrical Energy Performance

Lowest Raw Mill Power Consumption - 11.75 KWh/ MT (Bestever in KCW)

One of the Lowest Packing Power of 0.82 KWh/MT with multi grade loading



Unit Energy Performance







Unit Energy Performance











- a) In CM-1, installed Sinter cast roller tire &table liner and support ring build up.b) Separator blanking and seal gap reduction.
- c) Reduction in air to material ratio from 2.9 to 2.3 kg air/kg mat.
- d) Optimization of nozzle velocity.



Unit Energy Performance







Road Map-Benchmarking



- > Exploring for replacement existing Cooler with high efficiency cooler.
- > Monitoring and Improving Efficiency of Process Fans.
- Increasing TSR (upto 2.5%) by using cheaper Fuel.
- Technology of Artificial intelligence in manufacturing
- Star Plate installation for return dust reduction from 6.8% to 5.3%



The Engineer's Choice



EN-Con Projects FY 21-24



Year	No of Energy saving projects	Investment (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Impact on SEC/ SHC (Electrical kWh /MT cement or Kcal/Kg cement)
FY 2021-22	17	2.10	1.25		6.989	
FY 2022-23	2	0.55	0.423	-	1.653	
FY 2023-24	7	17.8	0.842		12.997	

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EN-Con Project Implemented



S.N	Name of Energy saving projects	Investment (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Impact on SEC/ SHC (Electrical kWh /MT cement or Kcal/Kg cement)
1	Energy Savings by Reduction in Suction Side Pressure Drop of Cooler Fans	5.50	0.11	-	0.42	
2	Energy Savings by Pressure Drop Reduction across RABH	5.50	0.32	-	1.24	
3	Thermal Savings by way of reduction in unburnt in Fly ash in Boiler# 1 and Boiler #2 by boiler U-beam retrofitting.	15.0	-		6.43	
4	Energy Saving by improvement of BFP efficiency by replacing with an efficient pump in Boiler#2	2.5	0.61	-	4.74	

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EN-Con Project Implemented



S.N	Name of Energy saving projects	Invest ment (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Impact on SEC/ SHC (Electrical kWh /MT cement or Kcal/Kg cement)
5	Energy savings in ID fan power consumption by way of arresting the air leakage in the Flue gas path of Boiler-1	0.3	0.05	-	0.46	
6	Reduction in Specific Power Consumption of the Compressor in TPP by optimizing the operating pressure of compressor.	-	0.05		0.45	





Cement grinding power reduction from 32.51 to 30.00 kWh/MT

Problem-

- Low MTBF of Cement mill 113.02 Hrs.
- Worn out grinding parts
- Poor product quality resulting in higher separator speed

Solution-

- In CM-1, installed Sinter cast roller Tire and table liner
- CM-2 roller tires were replaced with worn out raw mill tires, which was done for the first time in KCW history
- Build up of support ring
- · Separator seal gap reduction and maintenance
- Separator blanking reduction
- Reduction in air to material ration from 2.9 to 2.3 m³/gm
- Increased MTBF to 186.91 hr.

Benefits-

- Increase in productivity by 25 tph in OPC grade and 8 tph in PPC
- Cement mill MTBF improved from 113.02 hr in FY'23 to 186.91 hr in FY'24
- Cement Overall Power reduction from 32.51 KWH/MT to 30.00 KWH.MT









Energy Savings by Reduction in Suction Side Pressure Drop of Cooler Fans

Problem-

The suction side pressure drop is found to be on the higher side for the Cooler fans – 1A, 1B, 2, 3 & 5 which are – 102mmWG, – 140mmWG, – 155mmWG, – 75mmWG and – 70mmWG. The above suction pressure of Cooler Fans are higher, as compared to the maximum allowable limit of -30mmWG

Solution-

With help of OEM – designed straight bell mouth of higher area to reduce pressure drop to modify the inlet suction of above-mentioned Cooler Fans, such that the suction pressure can be limited to a maximum of – 30mmWG as it is drawing the air directly from atmosphere. This would result in an annual power saving of 0.13MU, 0.19MU, 0.33MU, 0.07MU and 0.06MU for Cooler Fans 1A, 1B, 2, 3 & 5 respectively

Benefits-

Annual Electrical saving -534600 KWH , 68 KW Saving









Kiln inlet riser area enlargement

Problem-

- Diminution in O2 % at kiln inlet
- Unstable kiln operation
- Inadequate fuel combustion
- CO generation across the system
- Coating formation causing frequent jamming at kiln inlet
- Increased frequency of UT pump operation for coating removal
- Upsurge in PH fan KW
- Increased pre-Clinkerization power causing higher clinker cost

Solution-

Kiln Inlet throat area enlargement to decrease velocity across riser resulting in proper fuel combustion and increase in oxygen

Benifits-

PH outlet draft has reduced by 30-35 mmwg and PH fan inlet fan draft reduced by 50-60 mmwg. PH fan reduced by 20-22 rpm with simultaneous reduction in Fan kw by 150 kwh/each fan which resulted in reduction in Pre-Clinkerization power

Kiln stability has improved as Kiln Torque which has increased from 260-270 kw to 260-310 kw which has happened due to additional Kiln coal firing margin (27-28% from 21-22% before) with increase in Kiln throat area.

There is no material fall through observed at Kiln inlet after riser area expansion







Theme- Power reduction of Cement Mill through expert optimizer

Activity

Loop optimization for Controlled variables-Mill DP,Mill Main Drive KW,Mill elevator KW,Mill Outlet Temperature, Mill Inlet draft, Mill Vibration,Mill Fan flow, Blaine

Result Indicators

- Smooth operation of cement mills during different cement grade grinding.
- CM1 OPC grade N53 production improved from 168.80 to 176.46 TPH and specific power reduced from 32.90 to 31.61 KWh/T
- CM2 PPC grade production improved from 160.30 to 166.86 TPH while specific power reduced from 37.00 KWh/T to 36.00 KWh/T







Theme- Reduction in miscellaneous power consumption/MT of Clinker

Problem- Higher unit consumption in various sub head of Misc power consumption resulting into higher Sp power consumption / MT of clinker

Solution-

- High efficiency pump operation started instead of normal pumps.
- Crusher HVAC supply stopped after crusher stoppage.
- LED lights replacement against existing conventional HPSV lamps Qty 150 number
- Existing RMHS light operational time optimization done.
- Colony Consumption raised due to colony Occupancy increased for line 2. Hence
- consumption observed more. Whereas there is net saving of approx. 100 Units/day.
- Alternate lighting provision made for streetlight after 11 PM at colony which has given
- saving of approx.100 units/Day.
- Distribution transformer for colony power supply and cement mill turned off with low load
- operation to reduce transformer losses in both transformer.

Benefits-

- Miscellaneous power reduced by 0.427 kWh/mt clk
- Overall specific power up to clinkerization reduced by 0.483 kWh/mt clk



Renewable Energy



Solar Power Generation (KWh)



100% Compliance of RPO



Installed new 9.14 MWp Solar Plant at Colony and earlier solar was 100 KWp.

41.51% energy share of WHRS and Solar in FY24

Solar lighting system







Utilisation of Renewable Energy sources (Onsite)



Onsite								
Year	Source(Solar)	Installed Capacity(IN MW)	Capacity Addition (MW) After FY 2021	Total Generation (Million kWh)	Share % w.r.t. to overall energy consumption			
FY'21-22	Solar	0.1	100	0.099293	0.04			
FY'22-23	Solar	9.24	9.14	11.804298	4.65			
FY'23-24	Solar	9.24	9.14	14.131561	5.08			

- No, Utilisation of Renewable Energy sources (Offsite).
- No, RPO Obligation.

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Waste Heat Recovery System

WHRS Generation (Lacs Kwh)

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C E M E N T The Engineer's Choice

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Utilization of AFR (Alternative Fuels and Raw Material) as Alternate Fuel in Kiln. Total of 142 MT AFR has been fired into Kiln during FY 2023-24.

Year	Waste as fuel	Quantity (MT)	GCV (kcal/kg)	Waste as percentage of total fuel (TSR%)
FY'21-22	AFR	146	3720.92	0.02
FY'22-23	AFR	139	3505.32	0.02
FY'23-24	AFR	142	3282.60	0.02

Utilization of ETP Sludge and Lime sludge waste in Raw Mix. Total Quantity used in FY 2023-24 – 2898.03 MT

Year	Waste as raw material	Quantity (MT)	Replaced material	Waste as percentage of raw material
FY'21-22	ETP & Lime Sludge	2690.3	2690.3	0.05
FY'22-23	ETP & Lime Sludge	4998.62	4998.62	0.11
FY'23-24	ETP & Lime Sludge	2898.03	2898.03	0.05





Identified Authorized vendors for Recycling of Wastes. Followings are the detail of category wise wastes recycled through authorized vendor, Total of 40.44 MT wastes have been recycled in FY'23-24.

Year	Medical Waste (MT)	Empty Barrel (MT)	Batteries (MT)	Grease (MT)	Oil (MT)	Sum
FY'21-22	0.06	11.62	0.84	5.06	5.7	23.28
FY'22-23	0.0838	3.66	0	5.64	28.6	37.98
FY'23-24	0.0989	3.44	10.816	3.46	22.63	40.44



Waste Utilization and Management

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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 (78400 Cum./annum)

STP sludge is used as manure for green belt development within the plant premises. (13.99 Ton/annum)

In FY 23-24, total 2.90 Million Cu Meter water has been collected and harvested.

KCW is 6.50 times water positive in FY21

RDF Production at Municipal Solid Waste Plant

Year	Effluent waste water-	Soild waste generated-	19000		Ton	
	(KL)	(MT)	16000	16206.48	14379.66	14275.97
FY'21-22	60024	11.66	13000			
FY'22-23	60757	13.99	10000			
FY'23-24	78400	13.99	10000	FY'21	FY'22	FY'23



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 CO₂ footprint and deliver society carbon neutral concrete by 2050.



GHG Emission





EMS System and other requirements

The Engineer's Choice

Existing monitoring system:

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Latest Schenider Energy Monitoring System Software Name: Power Operation.

Suitable for Windows 10 with 15000 Tag license.

Complying all cyber security requirement.

Software with IEC61850 protocol for communication via OFC.

Software Platform support OPC DA Server & OPC client .

- Challenges and upgradation during implementation :
- EMS upgraded on Dec'23.
- Earlier version of EMS was supported upto OS window -7 which was marked absolute by Micro Soft.
- Earlier it was RS485 communication through Moxa converter which required to hook-up with new OFC network.
- Data fluctuation issue faced due to different type of make & model of energy meters communicated under same communication protocol.





Green Supply Chain





UltraTech Cement Ltd. Kotputli Cement Works

Green Supply Chain Policy

We at UTCL is committed to Green procurement through a sele ction 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 CO₂ emissions.



NET ZERO Commitment



Net Zero Target: UTCL is committed to Net-Zero Concrete Pathway to produce carbonneutral concrete by 2050.

Road Roadmap for achieving the target :

- UTCL targets to reduce its Scope 1 emission intensity by 27% and Scope 2 emission intensity by 69% by 2032, from base year2017, validated by Science Based Targets Initiative (SBTi).
- UTCL's major decarbonisation initiatives include transition to green energy mix (waste heat recovery and renewable energy), substituting fossil fuels with alternative fuels, R&D for low-carbon products and technological advancements. UTCL has also signed an agreement with M/s Coolbrook, a Finland-based company, for large-scale deployment of their patented technology – RotoDynamic HeaterTM for kiln electrification.
- The green energy share of KCW was 42% in FY24. 9MWp solar power plant was commissioned in the year 2022-23.

Voluntary Commitment:

- RE100: UTCL working extensively towards transition to green energy and targets to substitute 85% of its electricity requirement through green energy (WHRS plus Renewable energy) mix by 2030.
- As part of its RE100 commitment, UltraTech aims to source 100% of its electricity from renewable resources by 2050.
- EP100: UTCL set Voluntary targets to reduce emissions by 27% and 69% for scope 1 and scope 2, respectively, by 2032 from 2017 as the base year, which SBTi validates.



System Adopted



ISO Certification & Development on energy efficiency



- Energy Conservation related projects impacting and contributing for natural resources conservation are being approved immediately by the management.
- **Conduct the training for awareness of energy conservation.**





Awards & Accolades



Cll Excellent & Energy Efficient Award Consecutively 11th year..





Cll Excellent & Energy Efficient Award Journey started from 2012.



Awards & Accolades







KCW Has Been Awarded Excellence Energy Efficient Unit from CII Hyderabad in FY-22 First Consolation Award received on 9th Dec'22 by NCBBM for for Energy Excellence" in Integrated Cement at Delhi by "Shri Som Parkash Ji" Honorable Minister of State 'Ministry of Commerce & Industry, Govt. of India



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Involvement & Recognition





Celebrating energy conservation week for Suggestion campaign , Slogan, Drawing & Poster Competition and recognition to all winners for participation.

Kaizen Award winning teams ³³

learning from CII Energy Award 2024

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- 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.





Thank You...

Presenting Team Members :-

Mr. Krishankant Parmar(Senior Manager, Electrical) Mrs. Sarita Yadav (Asst. Manager, WCM/ ISO)

Energy Manager Mail Id and Contact No.

jasmin.bhavsar@adityabirla.com 9594909764





LOCAL KO VOCAL BANANA HAI

" विदेशी सीमेंट नही देसी सीमेंट लगाओ देश के No.1 सीमेंट अल्ट्राटेक से देश को बनाओ"