JK Cement Works Jharli

CII –National Award for Excellence in Energy Management 2024

Guided by –
Mr. Gopal Gupta (Unit Head)
Gopal.Gupta@jkcement.com

Team Member –
Mr. Avtar Singh (Manager- E&I)
Mr. Ashish Khulve (Head – Process)

Company Profile

Group Established

- JK Cement's operations commenced with commercial production at its flagship grey cement unit at Nimbahera, Rajasthan in May 1975

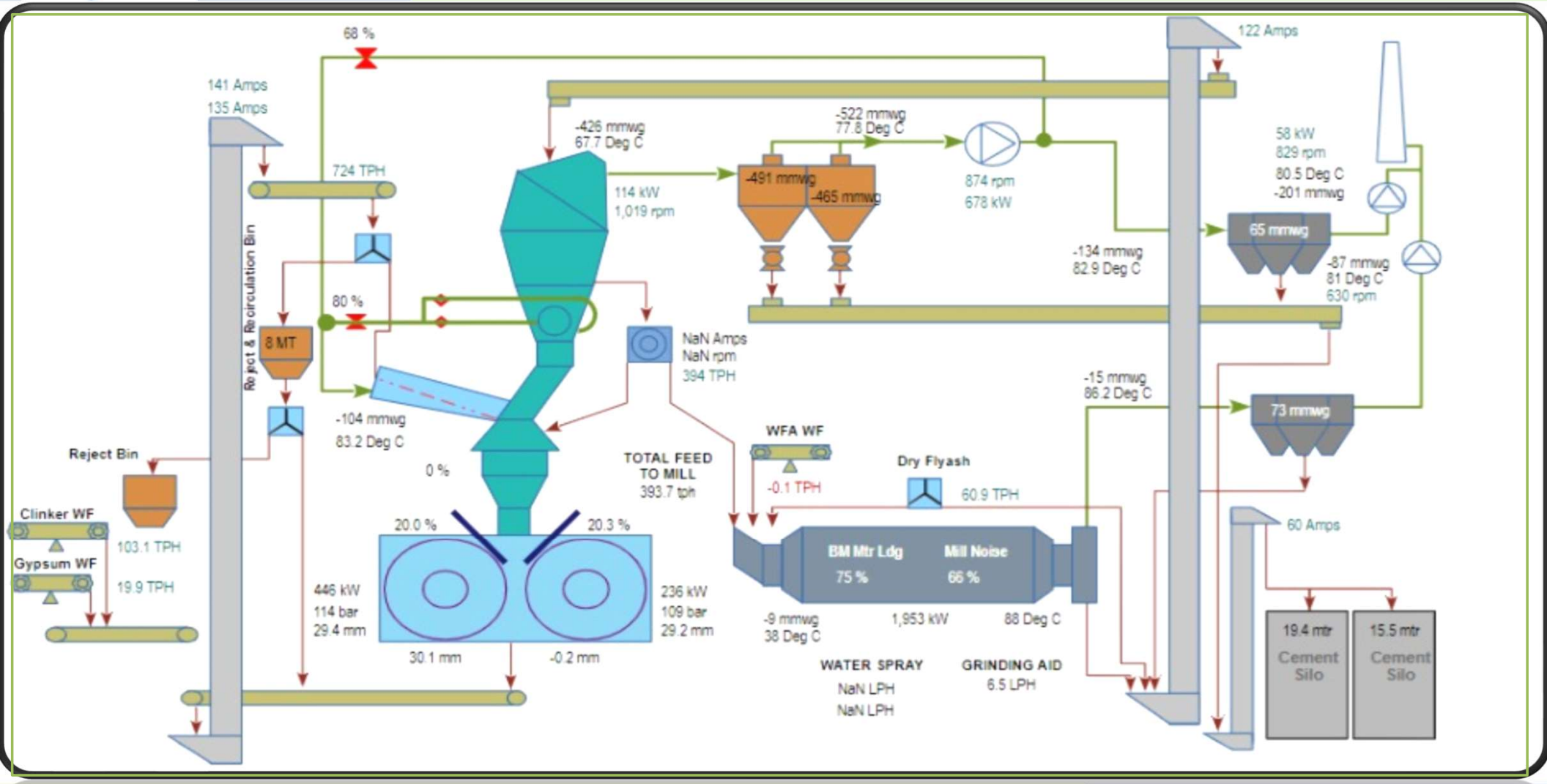
Group Cement capacity

Grey Cement	22.34 MTPA
White Cement	1.10 MTPA
Wall Putty	1.30 MTPA

JK Cement Works, Jharli

Capacity	2.0 MTPA
Commencement	2014
Production FY'24	1.69 MTPA
Contribution of PPC	100 %

Process Flow



Major Equipment Specification

Cement Mill

- Type: RP+BM Combo
- Make: ThyssenKrupp
- Capacity: 260 TPH PPC @3800 Blaine
- Polycom size: D-2050/ L-1300
- Ball mill size: 4.4 m*11.0m
- Separator size: SEPOL PC 32/27-410
- Design power: 28 Kwh/Ton

Packing Plant

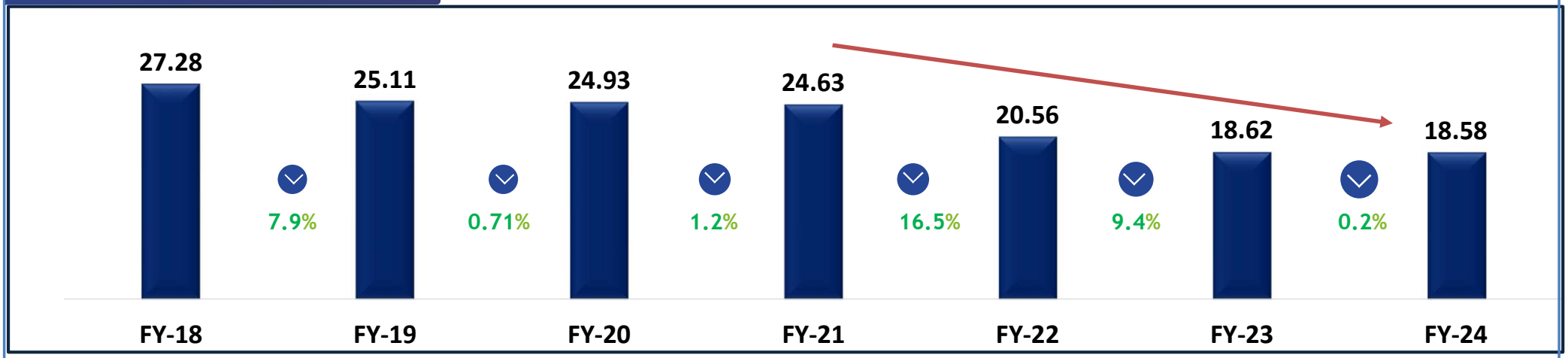
- 4 Nos. FLS Gen Ventosem 8 Rotary Packer
- 8 Spout Single Discharge
- Capacity: 120 TPH
- 4 Nos. FLS TLM:1016J Manual Loader
- 1 No. FLS CDA-1020 Hanging Loader
- 1 No. Beumer Autopac Loader

Solar Plant

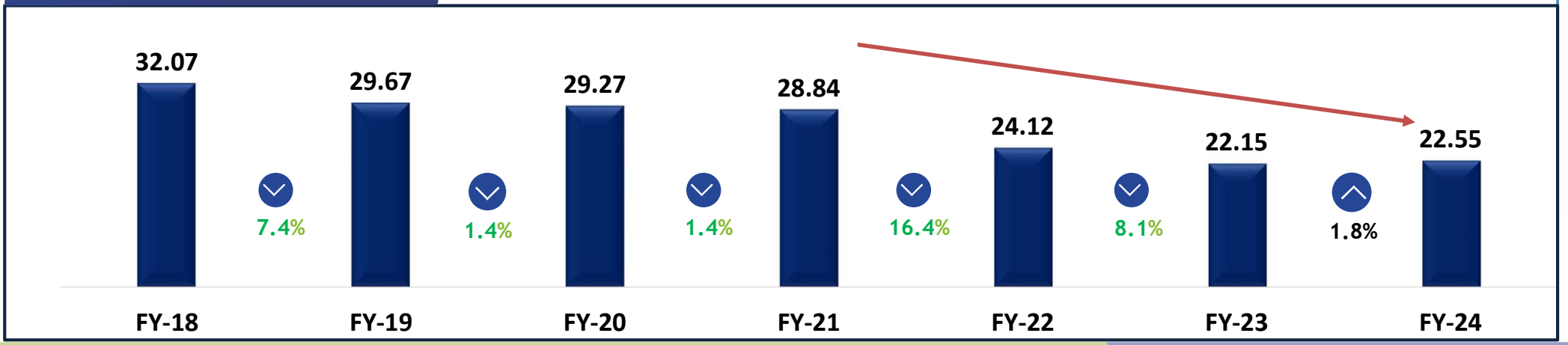
- 2.51 MWp Solar Plant under PPA model (Behind the Meter)
- 300 KWp Ground Mounted Solar Plant

Specific Energy Power Trends- Journey of Excellence

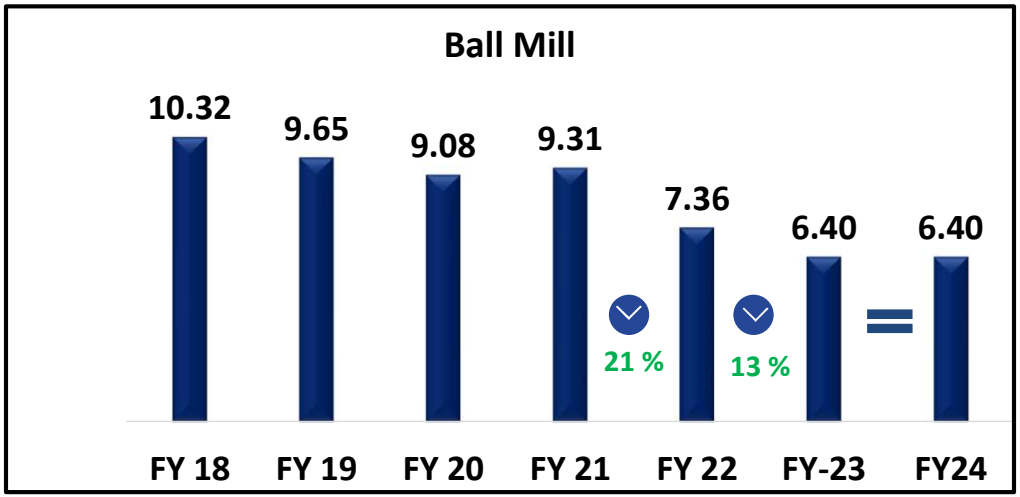
Grinding Power (KWh/MT)

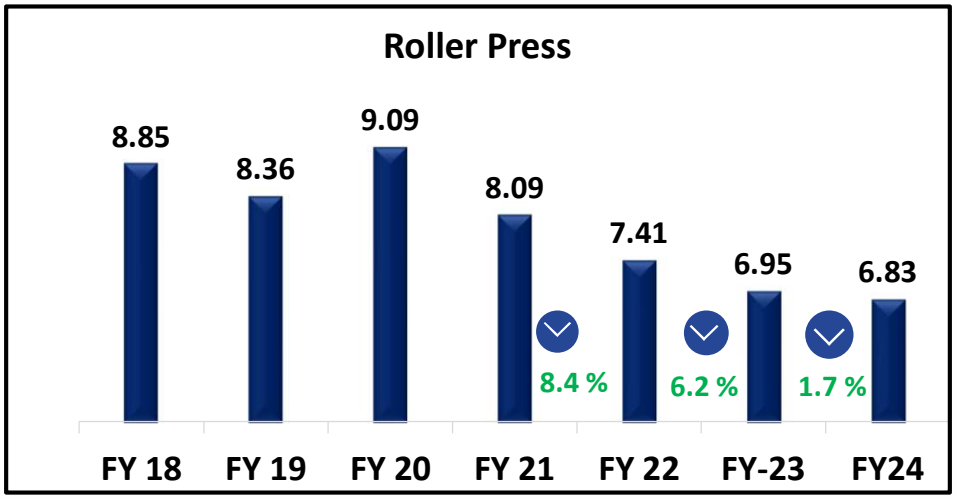


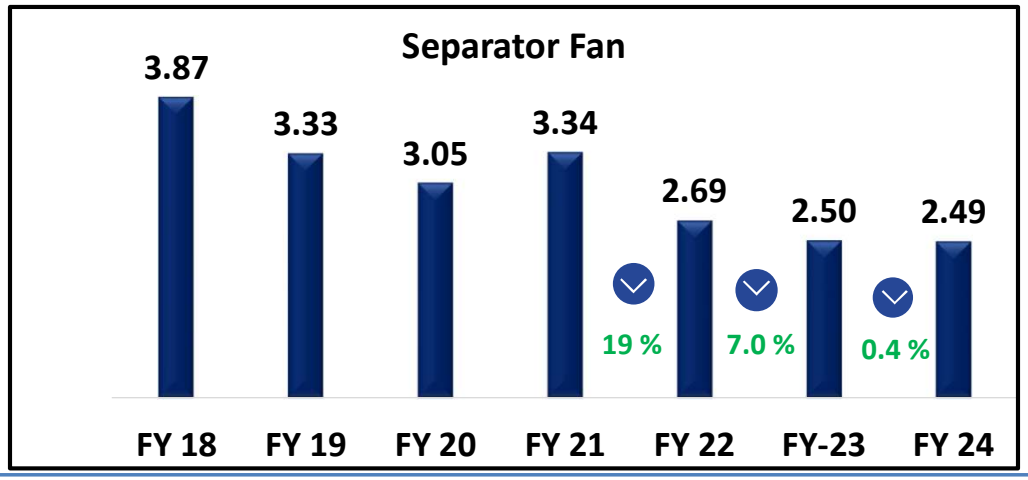
Total Plant Power (KWh/MT)

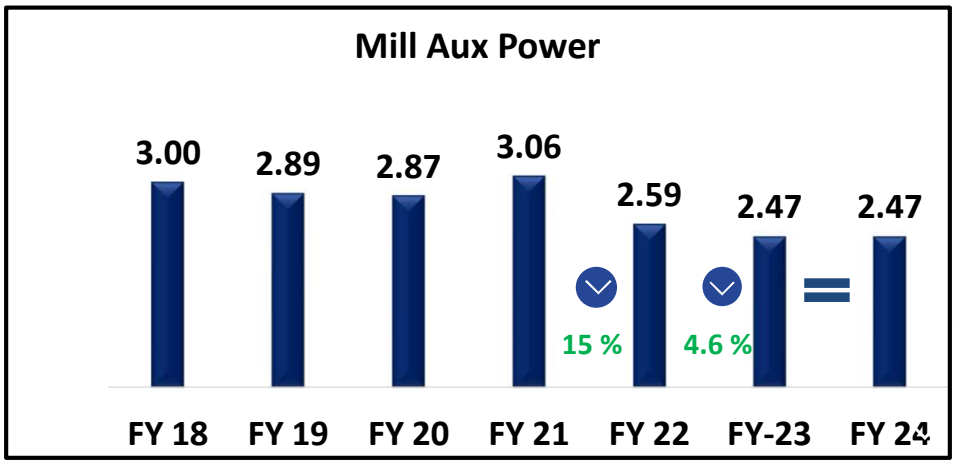


Equipment Wise Power (KWH/T)

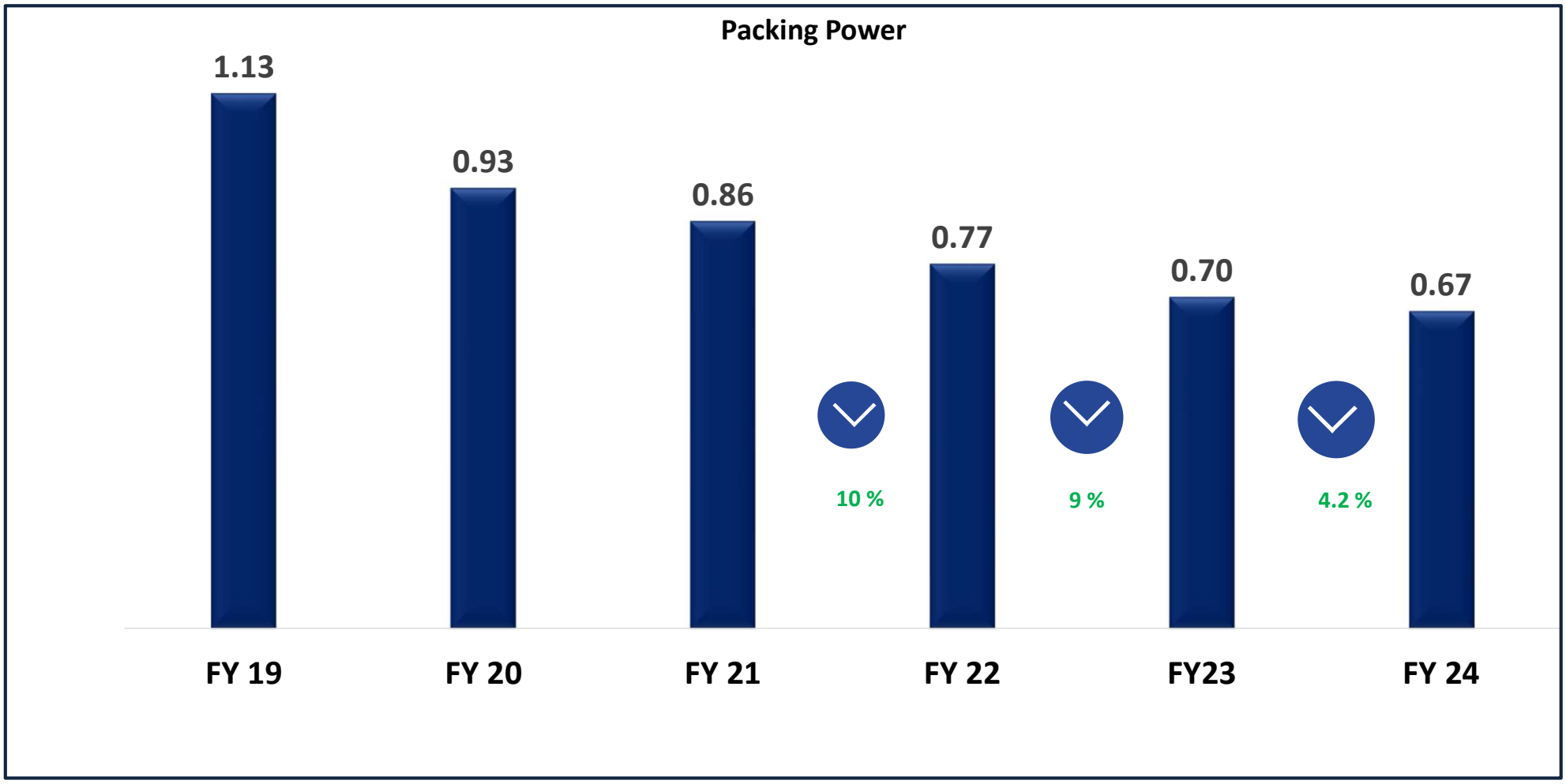








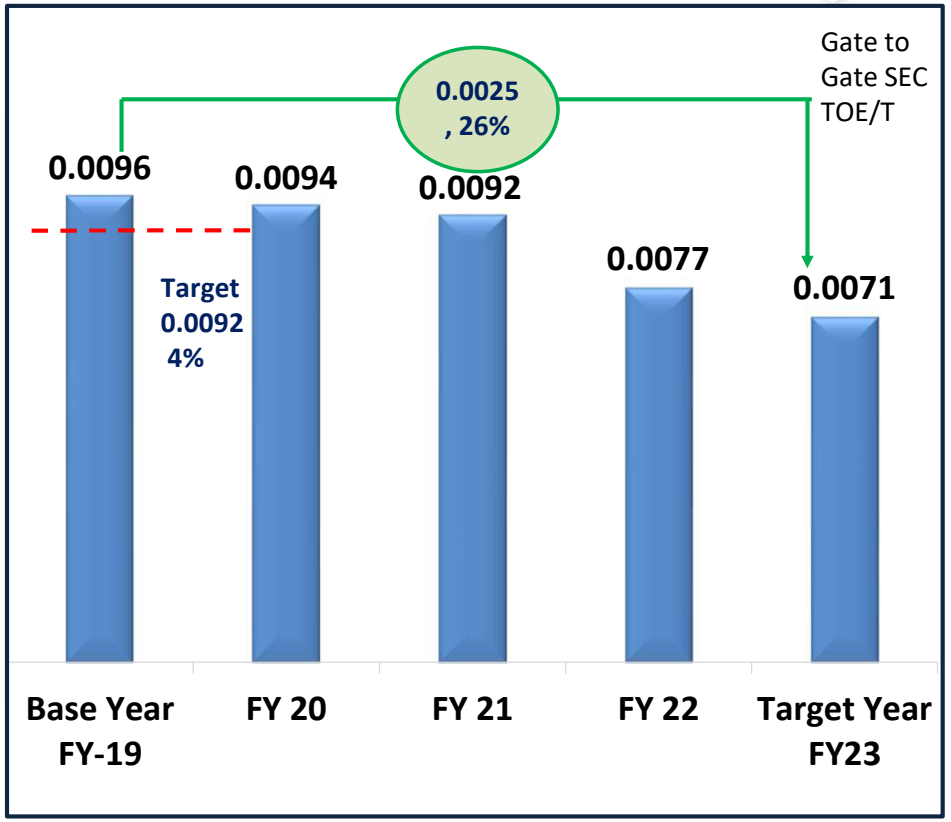
Section Power (KWH/T)



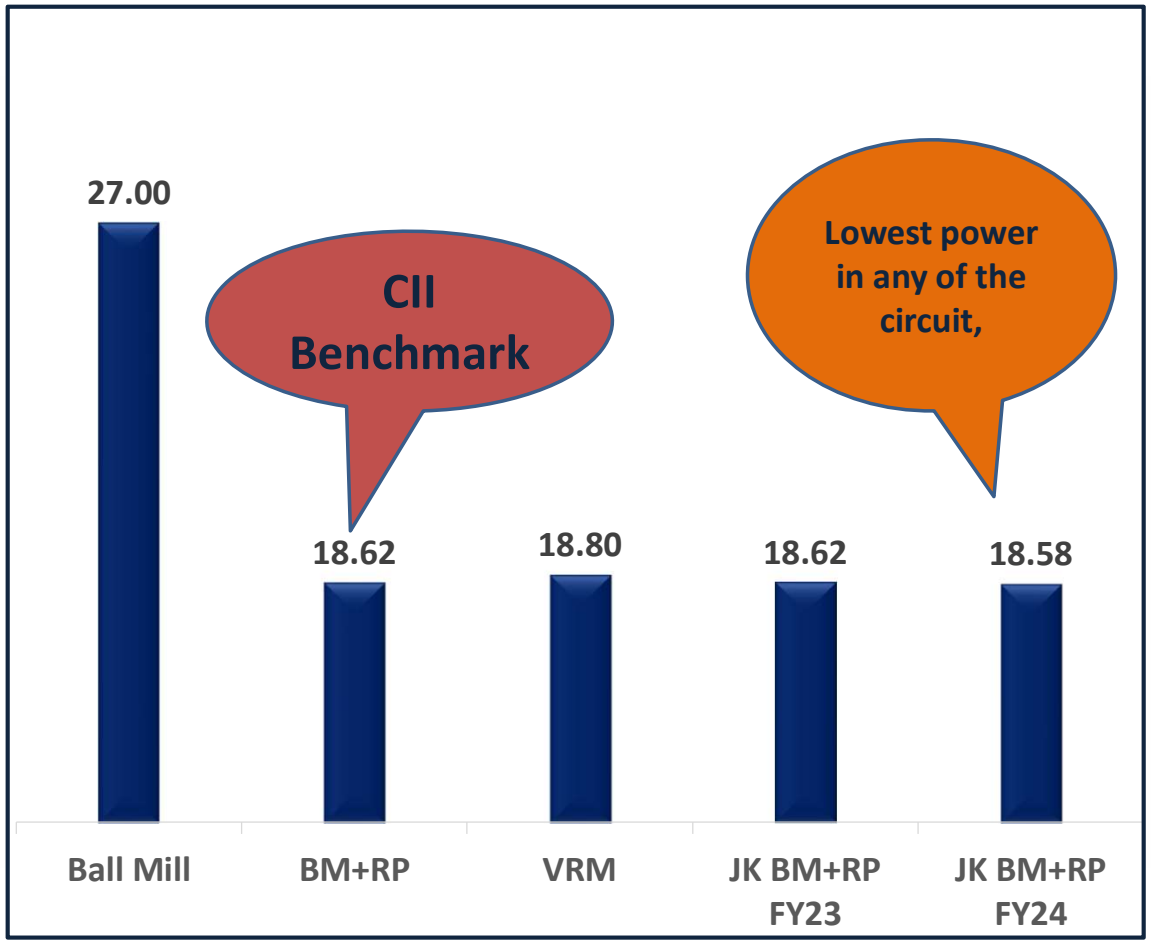
PAT CYCLE-VI

Major Product : PPC

1. BASE YEAR : 2018-19
2. Target YEAR : 2022-23
3. BASE YEAR GTG SEC (TOE/Ton) : 0.0096
4. BASE YEAR PRODUCTION(Ton) : 1491807
5. Target GTG SEC (TOE/Ton) : 0.0092
6. Achieved GTG SEC in M&V Audit (TOE/Ton) : 0.0071
7. **Estimated Escerts as per M&V Audit** : **3133**



CII Benchmark VS JK Cement Jharli



- In Fy-23

Our Grinding power18.62 kwh/MT. Recognized as CII Bench mark

In Fy-24

- With BM+ RP combo we are getting lowest power which is 18.58 Kwh/MT .
- **We Surpassed the CII Bench mark**
- **We are best in combo circuit,.**

Energy Reduction Target

FY 2024-25	
PARTICULARS	POWER (KWH/TON)
Last FY Total Power	22.55
Target	22.40
Expected Reduction	0.15
Last FY Grinding Power	18.58
Target	18.56
Expected Reduction	0.02

FY 2025-26	
PARTICULARS	POWER (KWH/TON)
Last FY Total Power	22.40
Target	22.30
Expected Reduction	0.10
Last FY Grinding Power	18.56
Target	18.54
Expected Reduction	0.02

FY 2026-27	
PARTICULARS	POWER (KWH/TON)
Last FY Total Power	22.30
Target	22.15
Expected Reduction	0.15
Last FY Grinding Power	18.54
Target	18.51
Expected Reduction	0.03

Philosophy for Target Setting:-

- We have achieved ever lowest grinding power by implementation of energy saving measures and plant optimization, now more focus will be in sustaining the current power and further we Taking coming 3 years target with a vison of sustain it.

- **Challenges to Sustain-**
- New Premium PPC Product started(super strong) as per market demand .
-

Road Map to Achieve Internal Benchmark

1 Raw material preparation

- Sun drying for moisture removal
- Selection of raw material

2 Testing of raw material

- Automation of sampling and testing
- New SOPs for RM testing

3 Quality advancement

- Separator optimization for residue control
- Real time product quality measurement

4 Energy

- 100% Renewable energy uses
- Idle power optimization.
- VFD installation
- PF optimization

5 CCR Operations

- 100% utilization of Expert control system
- KPIs Monitoring & analysis
- Auto data fetching and storage

6 PM Cell

- Industry 4.0
- Predictive maintenance
- Advance sensor to improve life of equipment
- SAP PM module utilization.

7 Cement Grinding & packing

- Real time variable product cost
- Real time weighing system error monitoring.
- AI based bag counting
- RFID & Auto plant operation

Indicators	FY-24	Target FY-25
Throughput-PPC	272 TPH	275 TPH
SEC-Grinding	18.58	18.56
SEC Total	22.55	22.40

Major Encon Project Planned for FY'24-25

Sr. No.	Project Description	Investment (Rs. Million)	Estimated Energy Saving (Million KWH)	Estimated Saving (Rs Million)
1.	Installation of Pneumatic Operated Flow Control Gates	1.3	0.042	0.8
2.	Installation of Energy Efficient Compressor with VFD	2.4	0.167	1.3
3.	Installation of Energy Saving Water Pump	1.0	0.078	0.6
4.	P&V Upgradation by VFD installation	0.8	0.071	0.5
5.	AC Energy Saver (Microprocessor based) Installation	0.1	0.007	0.05
	Total	5.6	0.365	3.25

Summary- Last 3 Year Encon Project

Year	Nos. of energy saving Project	Investment (Rs Million)	Electrical Saving (Million Kwh)	Saving (Rs Million)	Impact on SEC (Electrical kWh/MT cement)
2021-2022	12	41.4	1.5	11.1	1.0
2022-2023	11	11.5	2.9	21.5	1.7
2023-2024	3	1.4	0.1	1.0	0.7
Total	26	54.3	4.5	33.6	

Last 3 Year Encon Project Details

Year	Description	Saving Achieved		
		Kwh	Rs in Lacs	Investment (Lacs)
FY'23-24	Replacement of the 4 no's Centrifugal Blower in Packing Plant capacity of 5.5KW for bag cleaning replace by one blower of capacity of 3.7KW in between 4 packer	59292	4.62	0.03
FY'23-24	Replacement of the Elevator Feed Belt Conveyor 521BC100 Motor 45 KW to 37KW for energy saving	9180	0.71	1.60
FY'23-24	Reduction of pressure drop across cyclone by installing baffle plate & swirler in cyclone through CFD Analysis.	73600	5.74	12.65
FY'22-23	Ball mill further media pattern optimization and operation optimization.	999075	73.83	64.92
FY'22-23	Maintaining Separator seal gap 6-7 mm by continues monitoring.	2,24,035	16.56	0
FY'22-23	Ball mill TPH improvement by process optimization and direct fly ash feeding in Bin inlet.	393575	29.09	0
FY'22-23	Improvement in maintenance practice of RP gap optimization by profiling as per wearing pattern in place of traditional approach by maintaining RP gap 30 mm and edge grinding every 6 months. Improving clinker galvanometry which helps in reducing recirculation.	775040	57.28	16.0

Last 3 Year Encon Project Details

Year	Description	Saving Achieved		
		Kwh	Rs in Lacs	Investment (Lacs)
FY'22-23	Reduction in seperator fan RPM by minimizing falls air ingress and keeping process flow intact.	4,23,850	31.32	0
FY'22-23	Lighting transformer removed from lighting circuit and voltage regulator taken in line and reduced lighting voltage 405V from 420 Volt.	7,665	0.56	0
FY'22-23	Installation of VFD in product elevator BE370 for smooth operation and power saving and tipping of buckets done to avoid material flush.	18,165	1.34	4.50
FY'22-23	Installation of lighting timer in packing plant lighting	3,285	0.24	0.03
FY'22-23	Occupancy Sensor provided for exhaust fans and Lights in all washrooms for power saving	2,190	0.16	0.12
FY'22-23	Merging of Belt BC170, BAC175 and CW180 in to Belt BC190 in packing plant to reduce the length of circuit.	48,440	3.57	1.032
FY'22-23	Installation of FLS CDA Truck loader by replacing Auto loader for power saving and output enhancement.	15,000	1.10	28.0
FY'21-22	Installation of VFD in packer-2 bag filter fan motor of 75KW for power saving.	9600	0.71	5.10
FY'21-22	Installation of 5 nos. 1.5T, 800W BLDC split AC for power saving.	5850	0.43	2.07

Last 3 Year Encon Project Details

Year	Description	Saving Achieved		
		Kwh	Rs in Lacs	Investment (Lacs)
FY'21-22	Installation of AC Energy saver in split AC	138	0.01	0.08
FY'21-22	Trans vector nozzle (Air pressure gun) provided in each air line at packer floor for cleaning application. It works on venturi principle and suck atmospheric air with compressed air. Thus, reduce compressed air usage by 40-50%.	600	0.04	0.30
FY'21-22	P&V system provided in Compressor house to maintain compressor room temperature and increase efficiency of compressor.	8820.0	0.65	8.46
FY'21-22	Optimization of voltage in distribution Transformer to 418-420V from 427-430V to reduce losses.	16560	1.22	0
FY'21-22	Reduction in generation pressure of the compressors (Load / unload pressure setting from 6.0 to 5.8 Bar)	12960	0.95	0
FY'21-22	Minimize compressed air leakage in the packing plant by conducting air audit.	10800	0.79	0
FY'21-22	Optimization and modification in Roller press circuit by following action- Reduction in idle running of roller press circuit. Replacement of Bainite rollers by Compound casting rollers & Gap reduction.	1027661	75.52	313.6
FY'21-22	Grinding Media pattern change and optimization. Grinding media optimization done with previous weight of 130 Ton to 115 T. By doing this optimization effective Diameter of mil enhance by 100mm.	423154	31.10	85.0

Action Plan for Future

Short Term Action Plan- FY25

- Installation of Energy Efficient Compressor with VFD.
- Installation of High Efficiency energy saving water pump for plant water circuit.
- Installation of New BLDC / Energy Efficient AC.
- Installation of Pneumatic Operated Flow Control Gates in packing plant.

Long Term Action Plan- FY26/FY27

- Reroute Compressor line for Process Air, Packing Air, Instrumentation Air separtely.
- Installation of 4^{th} Generation Separator.
- Conversion of IE-3 motors to IE-5
- Installation of BLDC Air Handling Unit Cooling System for Load Centre
- for the optimum purging in Bag Filter by converting from timer mode to DP mode.
- Maximum Solar power generation Through Open Access

Innovative Project

Use of Robotic Cleaner for increasing solar generation efficiency

Regular cleaning of solar panels was done manually by using the water & it took a lot of time in cleaning , leading to generation loss & the cleaning is also not effective.

Methodology Used: Instead of manual cleaning we have used the Automatic Robot Cleaner for cleaning of panels.

Impact - Robotic cleaner cleans the panel effectively with less consumption of water & thereby increasing the solar generation from 10000 Kwh/day to 10450 Kwh/day.

Investment- 1.5 Lacs

Benefits- Solar Generation increased by 450 KWh/Day.

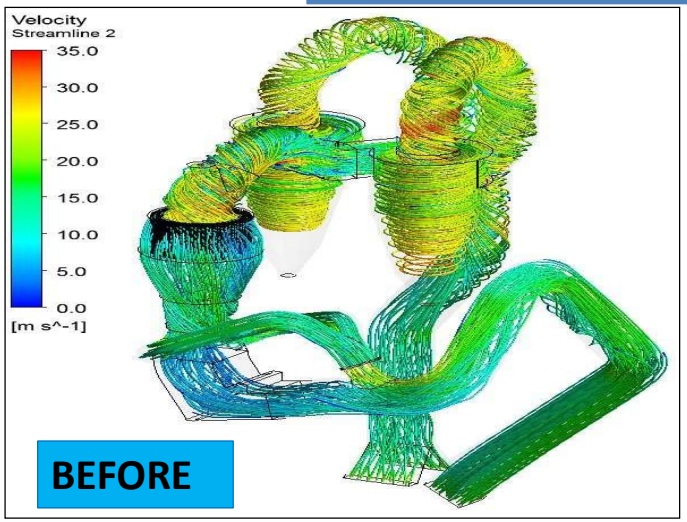
Annual Benefit – Generation of 1.5 lack KWh

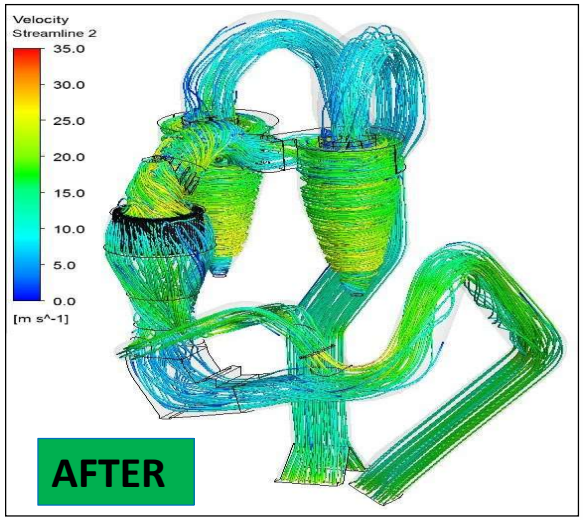
Annual Energy Cost Saving- 5.4 Lacs

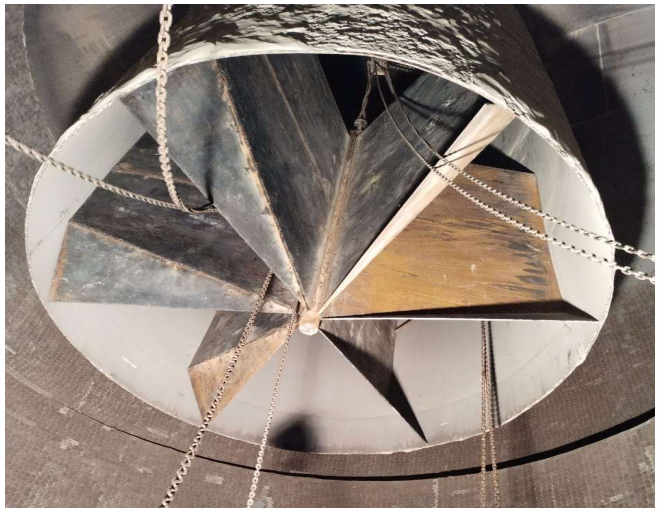
Manpower Cost Saving- 1.8 Lacs

Innovative Project

Reduction of Pressure drop Across Cyclone through CFD Analysis







Concern – There is non uniform Flow distribution across Mill separator & Cyclone outlet which is turbulence in nature resulting high pressure drop across cyclone.

Action Taken- we Execute CFD analysis & fixed Swirler in both Cement mill cyclones and baffle plates fixed in separator discharge duct

	Unit	Before	After
Pressure drop across cyclone	mmwc	80	45
Flow	m3/hr	472300	472500
Fan RPM	RPM	870	830
Power	KW	616	600
Saving	KWh	16	
Annual Saving	KWh	73600	

Benefits- After Fixing of Swirler arrangement getting the uniform flow across the circuit and reduction in pressure drop across cyclone, resulting in lower fan power consumption for desired flow and improvent in quality

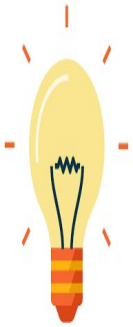
Annual Cost Saving- 5.74 Lacs

Investment- 12.65 Lacs

Innovative Project-For Go Green

Modification of Diesel Vacuum cleaning Machine To Electric Motor driven Machine

Objective:
To reduce Diesel consumption For CO2 emission Reduction.



Methodology used:

In-house -Replace Diesel Engine by 45 KW motor with modification in base frame and provided electric starter circuit-

- **Annual Saving of 24 KL Diesel**
- **Co2 Reduction by 63.36 MT.**

Strategic Project

Reduction in Ball Mill Power Consumption

Objective:
To Reduce Ball Mill Power Consumption.

Methodology used: Ball Mill Shell Liner Replacement & Grinding Media Pattern Optimization.

- Replacement of conventional bolted shell liners done with special T-Shaped thin classifying liners.
- T-shaped thin liner classifier has property of effective segregation & having less weight
- This optimization helped in increasing productivity and reduction in power consumption

We found opportunity to optimize Grinding Media.

- We have done continuous trail with various combination of media pattern by maintaining surface area and able to reduce the Grinding media weight from 130 MT to 118 MT.

Result:

Parameter	Unit	Before	After
Media Loading	MT	130	118
Media Loading	%	18.5	16.6
Motor KW	KW	1950	1770

Strategic Project

Reduction in RP Power Consumption

Objective:

To reduce Roller Press Power consumption.

Methodology used: Roller replacement and roller gap optimization.

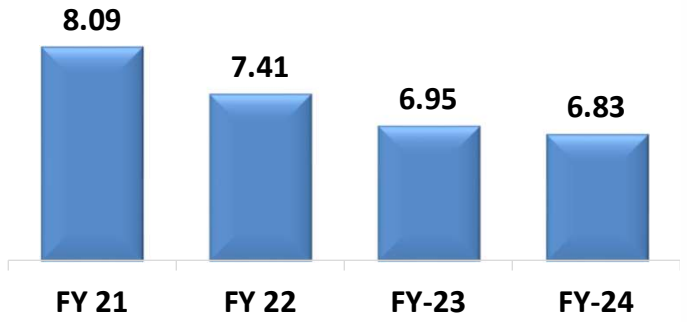
- Replacement of Bainite Rollers by Compound cast Rollers which has low wearing pattern.
- Monthly roller profiling as per roller wearing pattern to maintain working gap.

Benefits:

- Reduction in recirculation load.
- Increase in Throughput and reduction in Specific Power.

Result:

Roller Press SEC



Annual Saving of 0.46 KWH/T

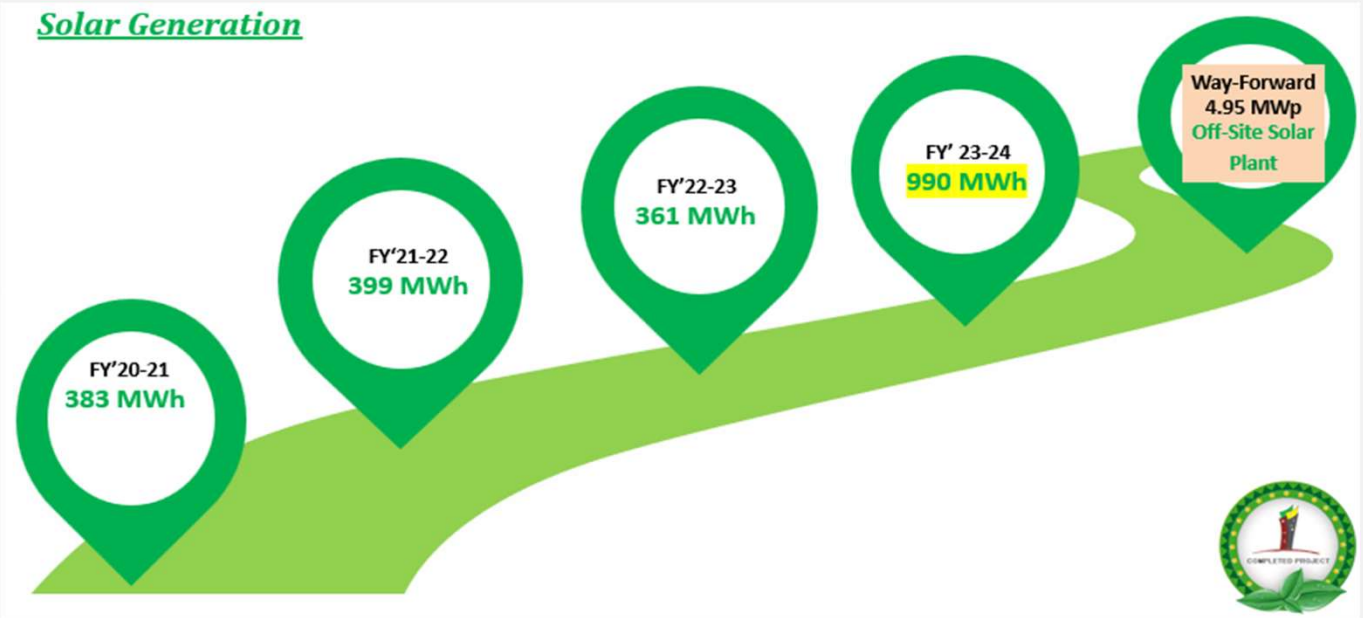
Utilization of Renewable Energy Sources

Year	Source	On- site	Installed Capacity (MW)	Capacity Addition (MW)	Generation (Million kWh)	% of overall electrical energy
FY' 21-22	Solar	On- Site	0.300	NA	0.399	1.09 %
FY' 22-23	Solar	On- Site	0.300	NA	0.361	0.97 %
FY' 23-24	Solar	On- Site	0.300	2.51	0.990	2.58 %

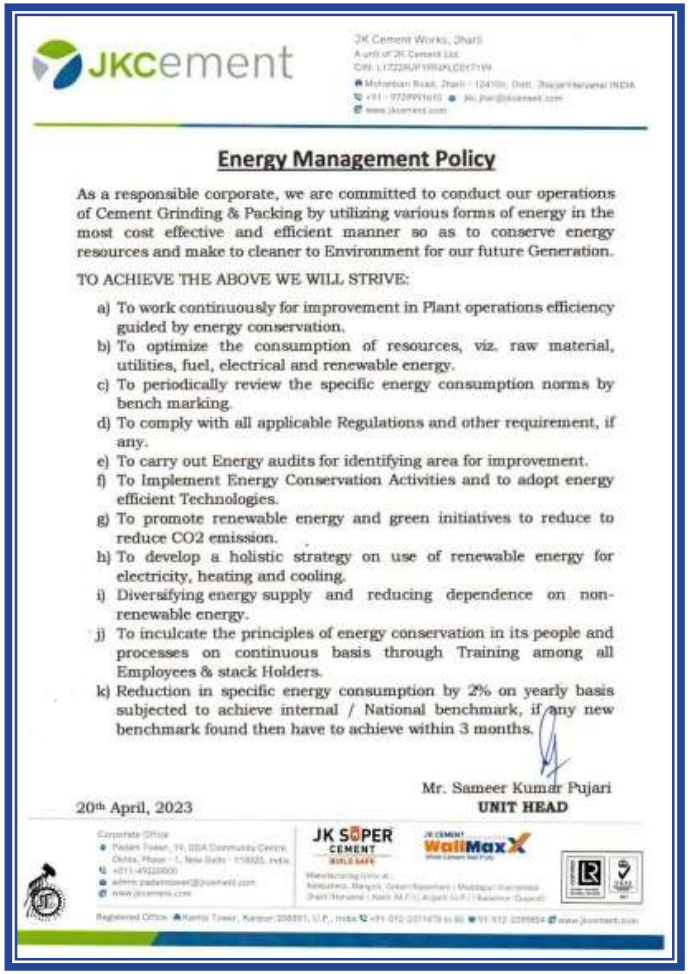
In FY'23-24-(32 dec-23)
Addition of solar capacity of 2.51 MWp
Annual solar Generation- 3.73 Million Units

Way forward- In process of maximum utilization of solar power, Till coming NOV. we will purchase approx. 4.96 OFF SITE solar power through Open ACCESS.

BENEFIT- Renewable energy utization % will increase to 30%



Energy Policy



JKCement

JK Cement Works, Jharli
A unit of JK Cement Ltd.
CIN: L17229UP1994PLC071199
Mohanbari Road, Jharli - 124106, Dist. Jhajjar Haryana INDIA
+91 - 9729991613 jkc.jharli@jkcement.com
www.jkcement.com

Energy Management Policy

As a responsible corporate, we are committed to conduct our operations of Cement Grinding & Packing by utilizing various forms of energy in the most cost effective and efficient manner so as to conserve energy resources and make to cleaner to Environment for our future Generation.

TO ACHIEVE THE ABOVE WE WILL STRIVE:

a) To work continuously for improvement in Plant operations efficiency guided by energy conservation.
b) To optimize the consumption of resources, viz. raw material, utilities, fuel, electrical and renewable energy.
c) To periodically review the specific energy consumption norms by bench marking.
d) To comply with all applicable Regulations and other requirement, if any.
e) To carry out Energy audits for identifying area for improvement.
f) To Implement Energy Conservation Activities and to adopt energy efficient Technologies.
g) To promote renewable energy and green initiatives to reduce to reduce CO2 emission.
h) To develop a holistic strategy on use of renewable energy for electricity, heating and cooling.
i) Diversifying energy supply and reducing dependence on non-renewable energy.
j) To inculcate the principles of energy conservation in its people and processes on continuous basis through Training among all Employees & stack Holders.
k) Reduction in specific energy consumption by 2% on yearly basis subjected to achieve internal / National benchmark, if any new benchmark found then have to achieve within 3 months.

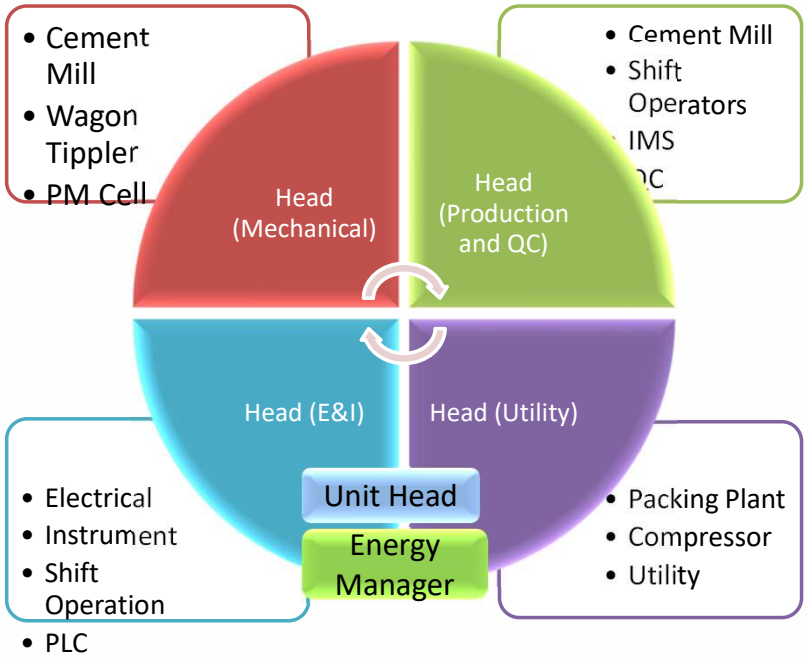
Mr. Sameer Kumar Pujari
UNIT HEAD

20th April, 2023

JK SUPER CEMENT BUILD SAFE
WallMaxX

- Reduction in SEC
- Utilization of Renewable Energy
- Reduction of GHG
- Training and Awareness
- Adoption of new Technology
- Review with Benchmarking

Energy Management Cell



Sr. No.	Name	Designation	Responsible Area
1	Mr. Gopal Gupta	Unit Head	Plant
2.	Mr. Lokesh Pancholi	Energy Manager	Plant
3.	Mr. Avtar Singh	Head – Electrical	E&I
4.	Mr. Lokesh Maratha	Head – Mechanical	Cement Mill & Wagon Tippler
5.	Mr. Ashish Khulve	Head – Process	CCR and Cement Mill
6.	Mr. Dheeraj Bohara	Electrical	Cement Mill, Packing, Utility
7.	Mr. Manoj Yadav	Head – Packing & Utility	Packing Plant & Utility
8.	Mr. Vikas Prasad	QC	QC Lab and Tile-Max

We have dedicated Energy Management Having cross functional member

- Organize Weekly Energy review meeting.
- Organize Brain storming session for new idea .
- Monthly Energy Review for review on energy saving projects

Energy Monitoring system

Energy Data Collection

- EMS
- Total 26 Energy Meters for all section and major drives. (>10% of total power 7 Energy Meter/ >5% of total power 3 Energy Meter / <5% of total power 316Energy Meters)
- KW Transducers for All MCC incomers

Energy Reports

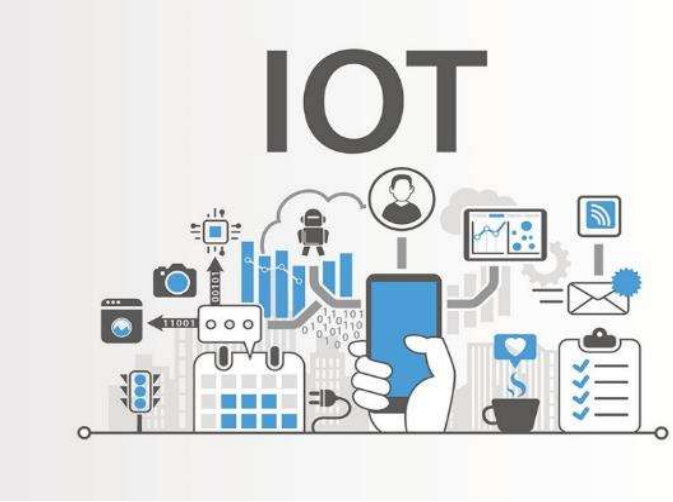
- Daily Power Report
- Shift wise Report
- Real Time display of total power in CCR (IOT)

Review System

- Daily Variance analysis in power
- Daily Production meeting and Power review
- Weekly Energy Cell Meeting chaired by unit head
- Quarterly Objective and Target review
- Comparison of data with benchmark
- Energy Score Card

Energy Management

Reporting Parameters by digital platform for Real Time Action



Quality Parameters continuous monitoring through Digital platforms.

Online monitoring of power consumption shift wise for timely corrective action in real time to optimize power.

ISO Compliance & Certification

❖ISO 14001, ISO 9001, ISO 45001 & ISO 50001 certification

❖Green Co Gold Award 2018

LRQA

Current issue date: 26 July 2024
Expiry date: 27 July 2027
Certificate identity number: 10010110

Original approval(s):
ISO 14001 - 28 July 2015
ISO 9001 - 28 July 2015
ISO 45001 - 21 June 2018
ISO 50001 - 28 July 2015

Certificate of Approval

This is to certify that the Management System of:

J K Cement Works

(Unit of J. K. Cement Ltd.), Village: Jharli, Tehsil: Matanhail, District: Jhajjar, 124106, Haryana, India

has been approved by LRQA to the following standards:

ISO 14001:2015, ISO 9001:2015, ISO 45001:2018, ISO 50001:2018

Approval number(s): ISO 14001 – 0053121, ISO 9001 – 0053123, ISO 45001 – 0053124, ISO 50001 – 0053122

The scope of this approval is applicable to:

Manufacture of Ordinary Portland Cements and Blended Cements.

Luis Cunha

Area Operations Manager - North Asia & SAMEA

Issued by: LRQA Limited

UKAS MANAGEMENT 0001

Issued by: LRQA Limited, 1 Trinity Park, Bickenhill Lane, Birmingham B37 7ES, United Kingdom

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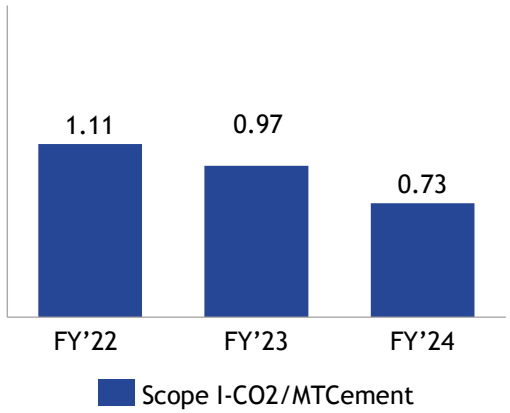
Certified by 50001:2018
Validity: 27 July 2027

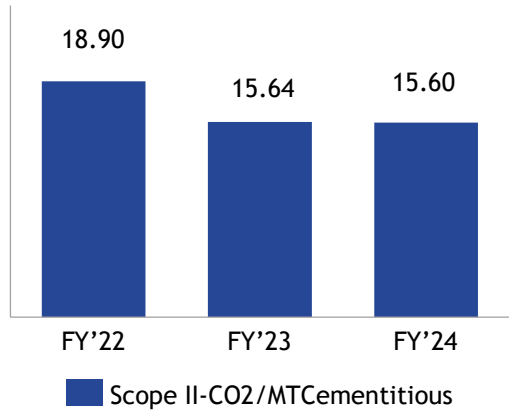
ISO 50001 brings an effective process to measure and manage energy uses

GHG Inventorisation

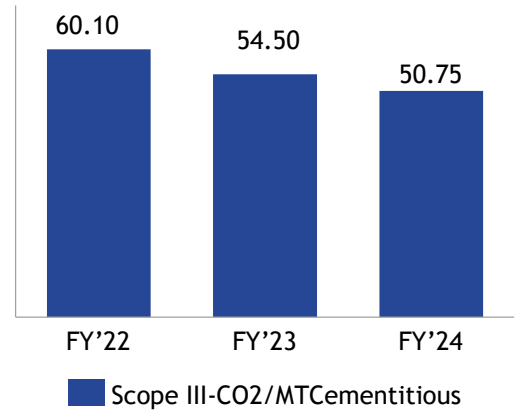
Scope I-CO2/MTCementitious



Scope II-CO2/MTCementitious



Scope III-CO2/MTCementitious



CO2 reduction:

- Clinker factor reduced by 6.77% (from 59 to 55)

Note:

- Scope I- Direct emission from fuel used
- Scope II- Indirect emission from grid electricity
- Scope III- Employee Commuting, Business Travel

GHG Inventorization- Green Belt Area Development

Initiatives Taken
to Reduce Carbon Foot-Print

- Reduction in Clinker Factor.
- Increase usages of FGD Gypsum to save natural gyp consumption.
- Reduction in Diesel consumption by using EV VEHICLE.
- Use of occupancy sensor in office and lobbies.
- Replacement of old vehicles by BS IV and BS VI.
- Increasing Solar Power generation.
- 100% LED lighting installation in plant.
- Use of CNG Trucks
- Increase in cement bulk loading.
- Use of GPS for Vehicle Tracking (RFID)

S. No.	Description	Units	2021-22	2022-23	2023-24
1	Number of saplings planted in plant and colony area	nos.	9000	11250	15250
2	Plantation area in plant and colony area	m2	95000	101000	107400
3	% of Green Area cover in plant and colony area	%	32.0	36.7	36.8

Green Supply Chain: Best Practices

S. No	Project Implemented	Project Details
1	Reverse Integration of Gypsum supplied from Punjab	Gypsum trucks coming in plant ,are used for Cement transportation up to Punjab.
2	Bulk transportation of Cement	We increase our Bulk Cement dispatch. This enable us to reduce the standard vehicle trips & Carbon Emission.
3	Cement dispatch lead distance reduction by GPS tracking	We have installed GPS in all trucks & drivers are instructed to follow the shortest route which is validated by our Logistics dept.
4	Use of EV Vehicle	Use of EV for shift operation and Local transport Within Company - Car Loan eligibility increases by 20% w.r.t to normal limit Outside Company - Promoting use of EV trucks by financing Transporters in phased Manner.

GHG Inventorization

Action Plan towards reduction of CO2 emission

Short Term

S.No.	Action plan
1	Increase renewable generation capacity
2	Clinker factor reduction by 0.5%
3	Uses of high capacity vehicle for inward and outward tranport
4	Use of CNG Vehicle for Cement Transportation

Long term

S.No.	Action plan
1	100% Renewable energy uses
2	45% of plant area to be cover by plantation
3	Encourage rail transportation to transition towards greater use of electric energy/renewable sources
	.

Sustainability Commitments

JKCL is a member of prestigious global organisation, and our climate-related targets are aligned and validated by them.

SBTi

- Reduction of Sp. Gross (Scope 1+2) CO_2 emissions from **680** to **532** **kg CO_2/t** cementitious material *(~21.7% reduction)* **by 2030** from base year 2020 – including Scope-1 & 2.
- Targets approved in 2023
- In FY 25 (Q1), we have reduced Sp. Gross (Scope 1+2) CO_2 emissions to **567** **kg CO_2/t** cementitious material from base year 2020.

GCCA

- Global member of GCCA & joined UNFCC's "**Race to Zero**" initiative (2050), including reducing specific Net Scope-1 carbon emissions by 19.8% from **580** in base year FY20 to **465** **kg CO_2/t** cementitious material by FY30
- In FY25 (Q1). We have reduced specific Net Scope-1 Carbon Emissions to **519** **kgCO_2/t** cementitious material *(~19% reduction)* from base year 2020.

UN Energy Compact

- Increase Green Power Mix from **19%** (**FY2020**) to **75%** (**FY2030**)
- Submitted to Ministry of New & Renewable Energy, Govt. of India.
- In FY25 (Q1), We have increased Green Power to **53%** as compared to base year 2020.

JKCL collaborate with these National organizations for Decarbonisation Strategy:

Cement Manufactures Associations

National Council for Cement and Building Material

GCCA India,

Confederation of Indian Industry

Learning from CII

In the journey of Excellence, we found CII as most enduring companion.

Various Energy saving projects implemented in our plant are replicated from Knowledge sharing programs and events by CII.

Some of these projects are as follows:

- PLC based Plant Lighting auto start stop from CCR
- Installation trans vector nozzle for cleaning applications
- Reduction in process fluctuation by PID loop optimization
- Installation of AC Energy saver in split AC
- Sequential operation for clinker silo gate's

Awards and Recognition

CII Circle Award (2022) - Best Energy Efficient DC (Under PAT Scheme)

Energy Efficiency Unit in CII National Award for Excellence in Energy Management- 2021

Excellent Energy Efficiency Unit in CII National Award for Excellence in Energy Management- 2022

CII Circle Award (2024) -1St Runner-Up Best Energy Efficient DC (Under PAT Scheme)

Green Co Gold Award – 2018

JKCement

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