

JK Cement Works Jharli



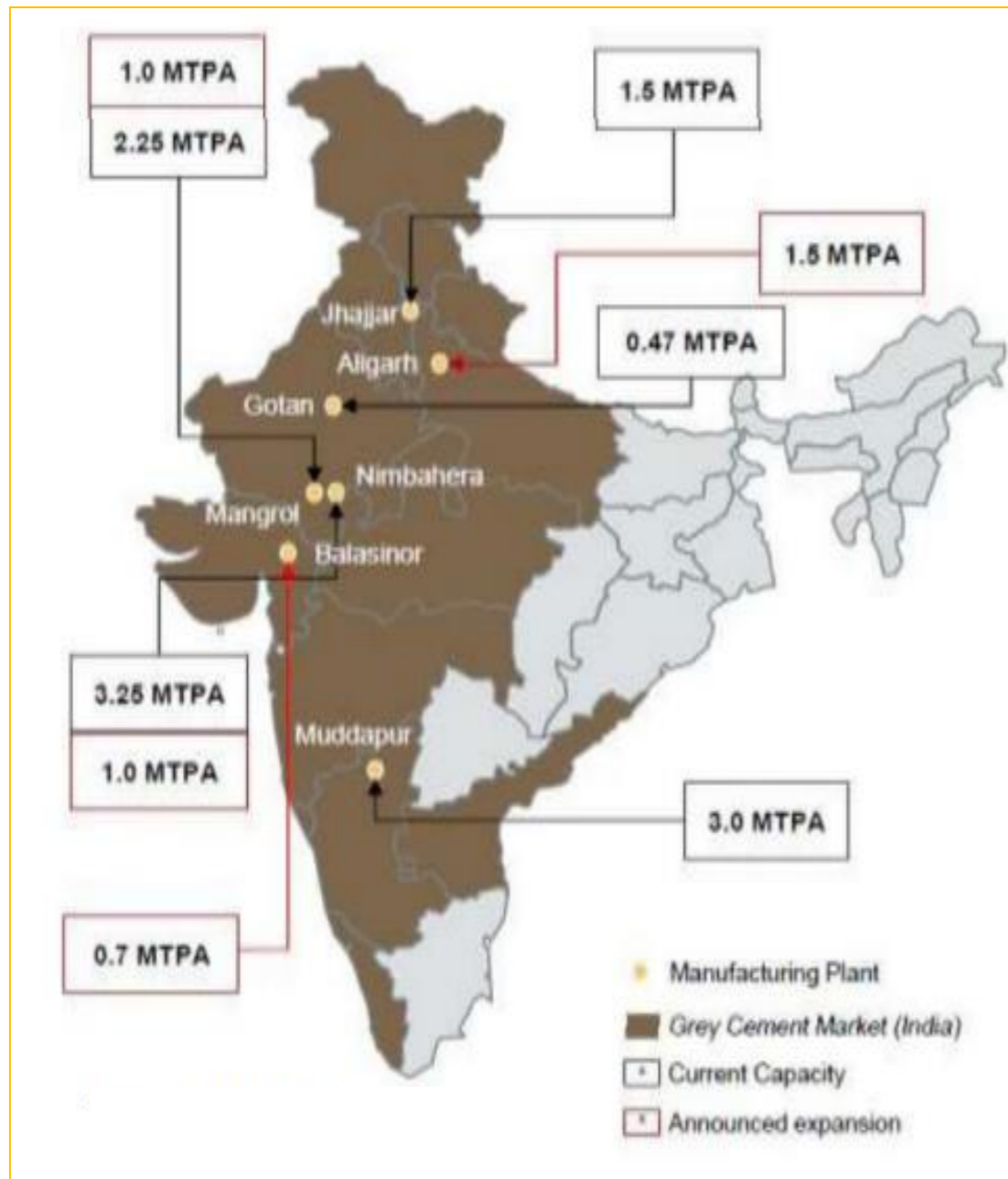
CII –National Award for Excellence in Energy Management 2023

Guided by –

Mr. Sameer Pujari (Unit Head)
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Team Member –

Mr. Rajeev Agarwal (Head – E&I)
Mr. Ashish Khulve (Head – Process)
Mr. Dheeraj Bohara (AM E&I)



J.K. Cement Ltd. is a part of Industrial conglomerate JK Organization. The Company is promoted by Late Mr. Yadupati Singhania . The group entered the cement manufacturing business in 1975.



Grey cement capacity of 18.0 MTPA & White cement capacity of 1.2 MTPA, with expansion 20.0MTPA by end of FY-23.

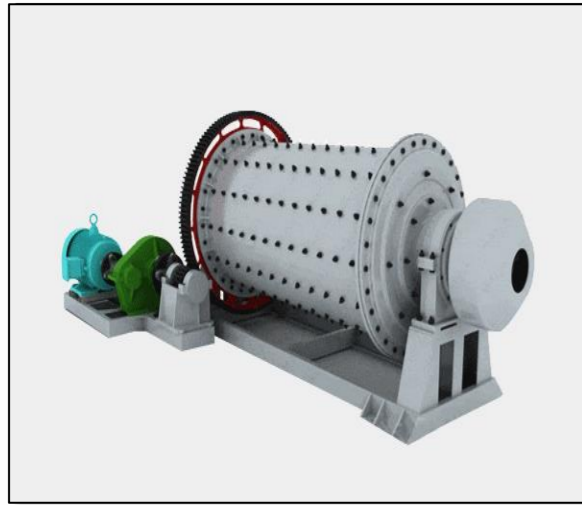


JK Cement Jharli having Designed Capacity of 2.0 MTPA Cement Grinding with major section Grinding, Packing and Wagon Tippler. Solar Plant 300 KWp.



J K Cement Jharli is certified with ISO 14001, ISO 9001, ISO 45001 & ISO 50001:2018. GreenCO Gold rated Plant, Great Place to work certified company.

Cement Mill



- **Type: RP+BM Combo**
- **Make: ThyssenKrupp Industries India**
- **Capacity: 240 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

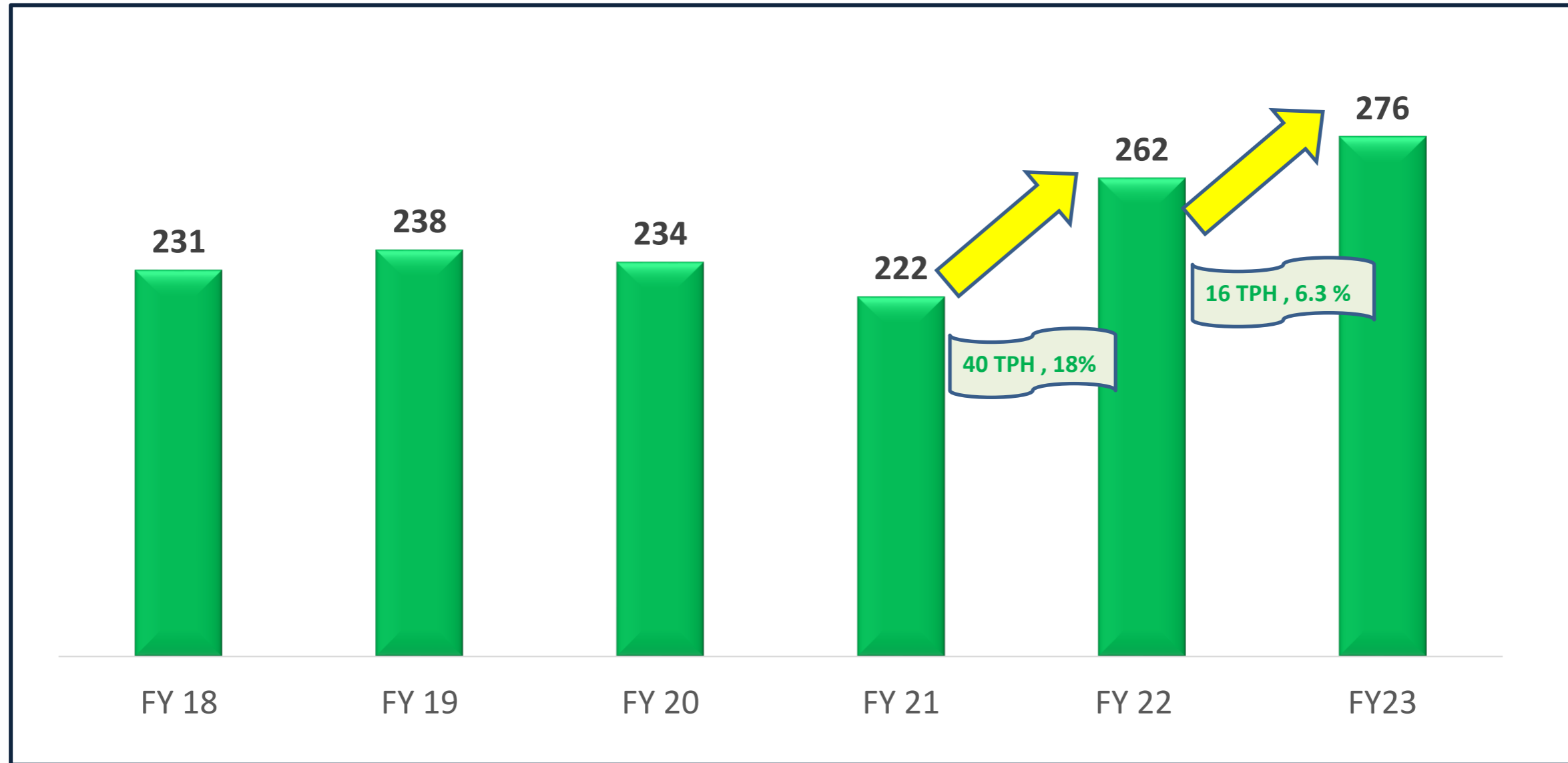


- **4 Nos. FLS Gen Ventosem 8 Rotary Packer**
- **8 Spout Single Discharge**
- **Capacity: 120 TPH**
- **4 Nos. FLS TLM:1016J Manual Loader**
- **2 No. FLS CDA-1020 Hanging Loader**

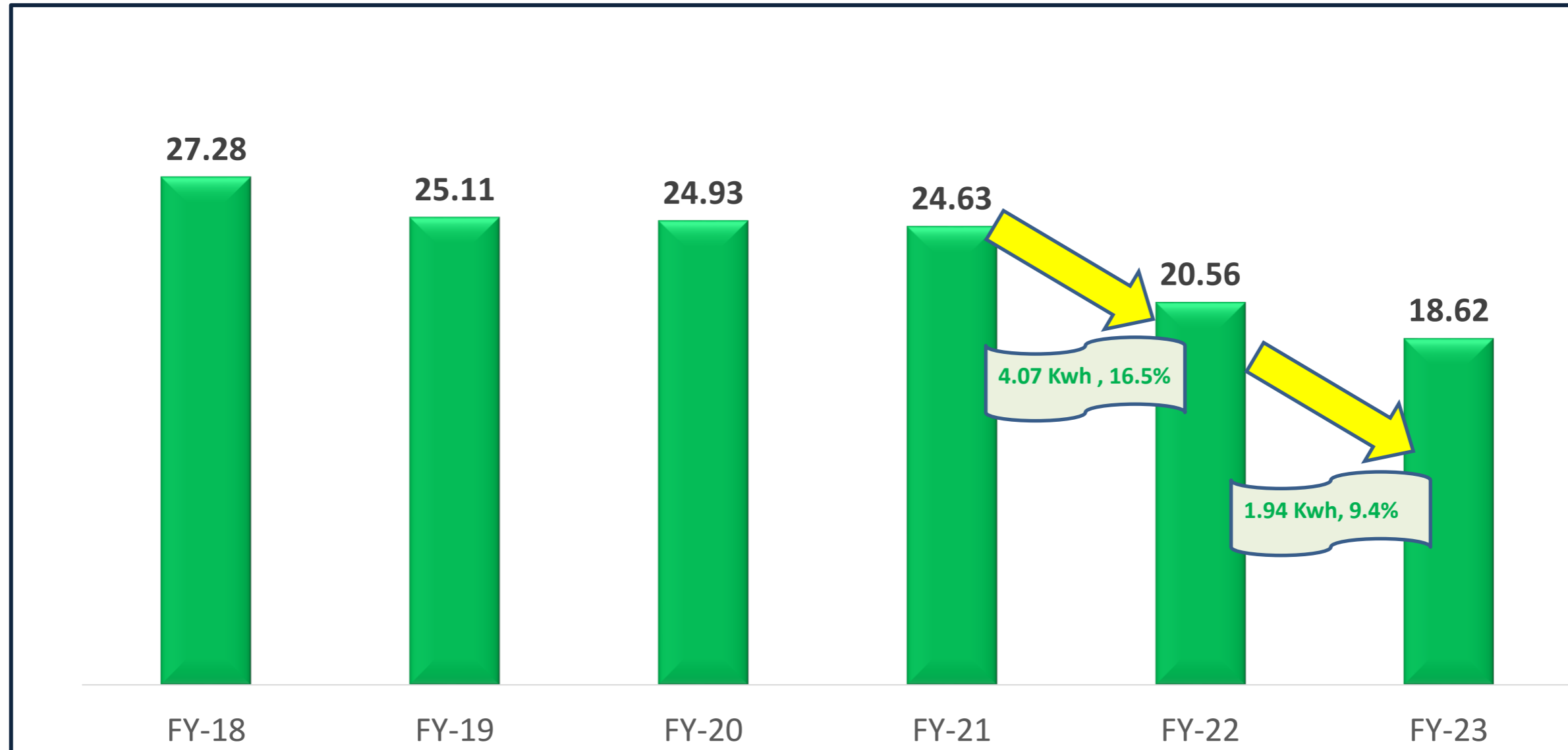
Solar Plant



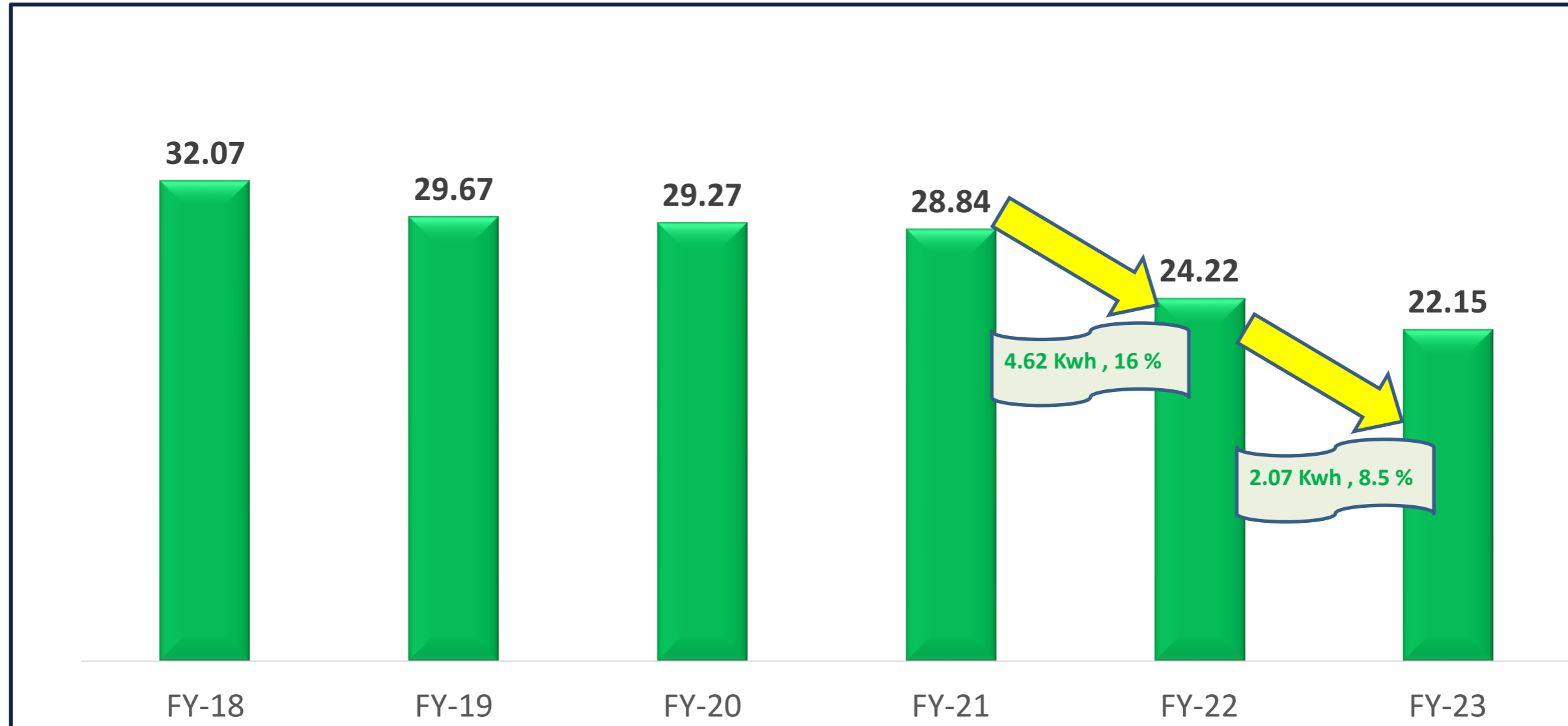
- **300 KWp Ground Mounted Solar Plant**
- **Total Area 4650 m2**



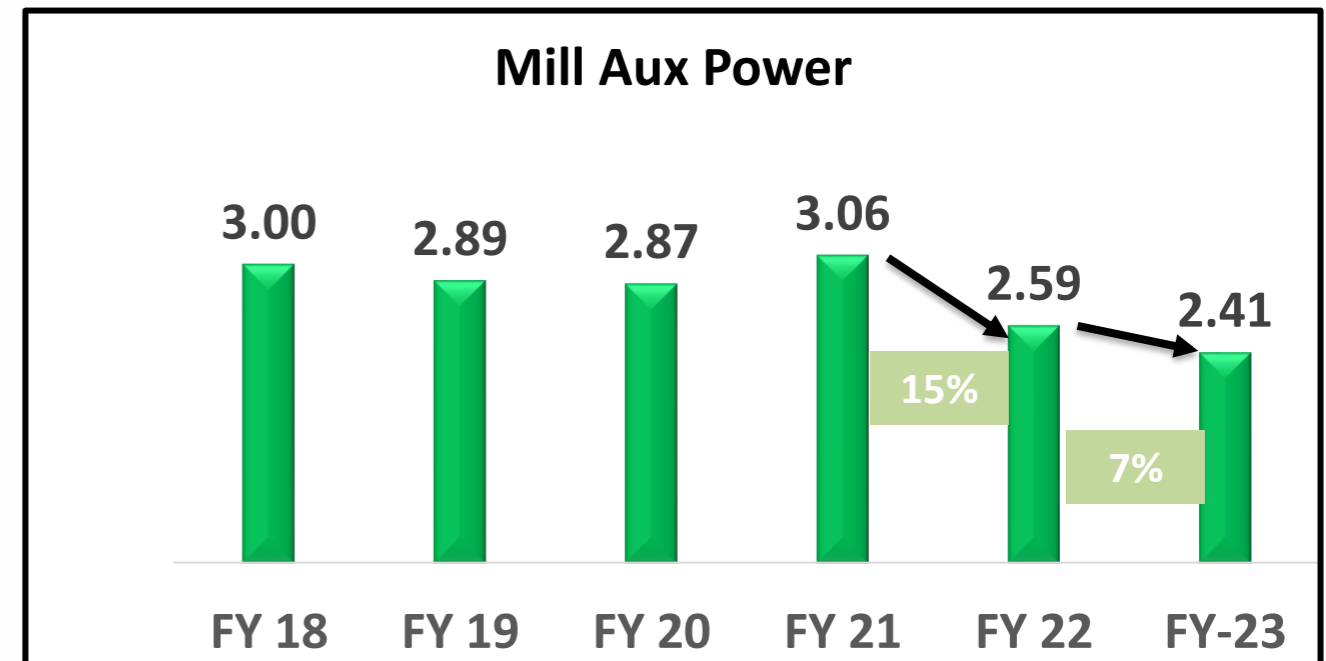
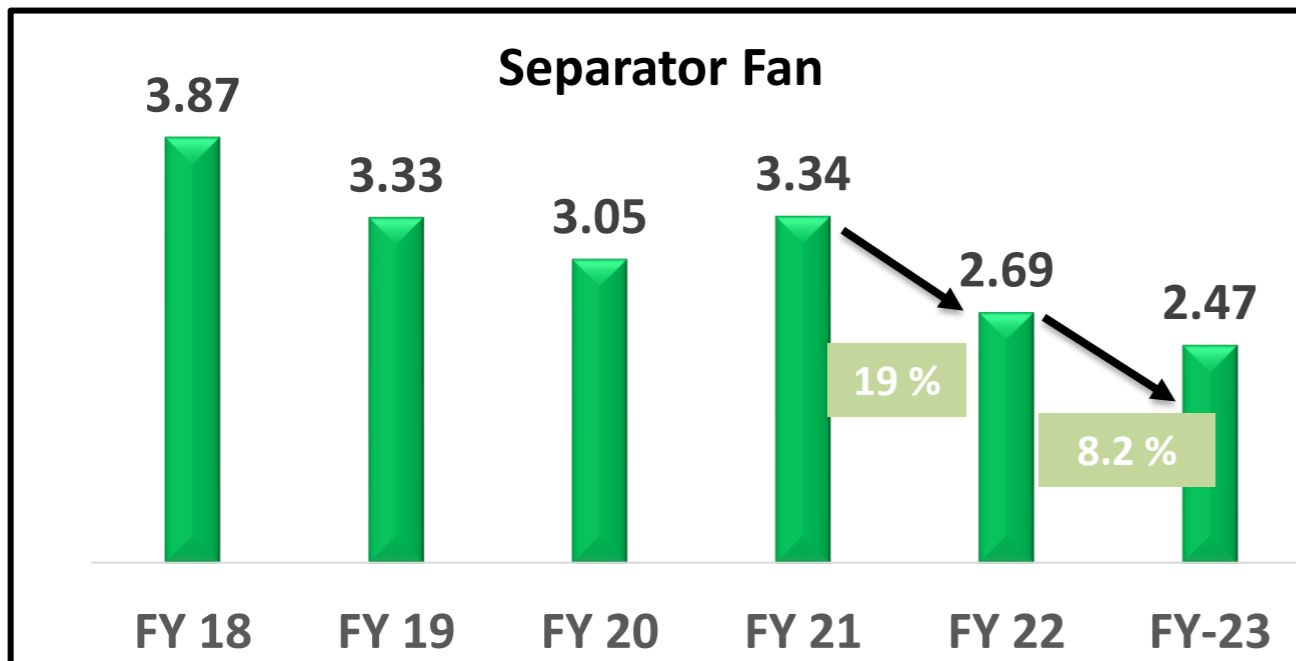
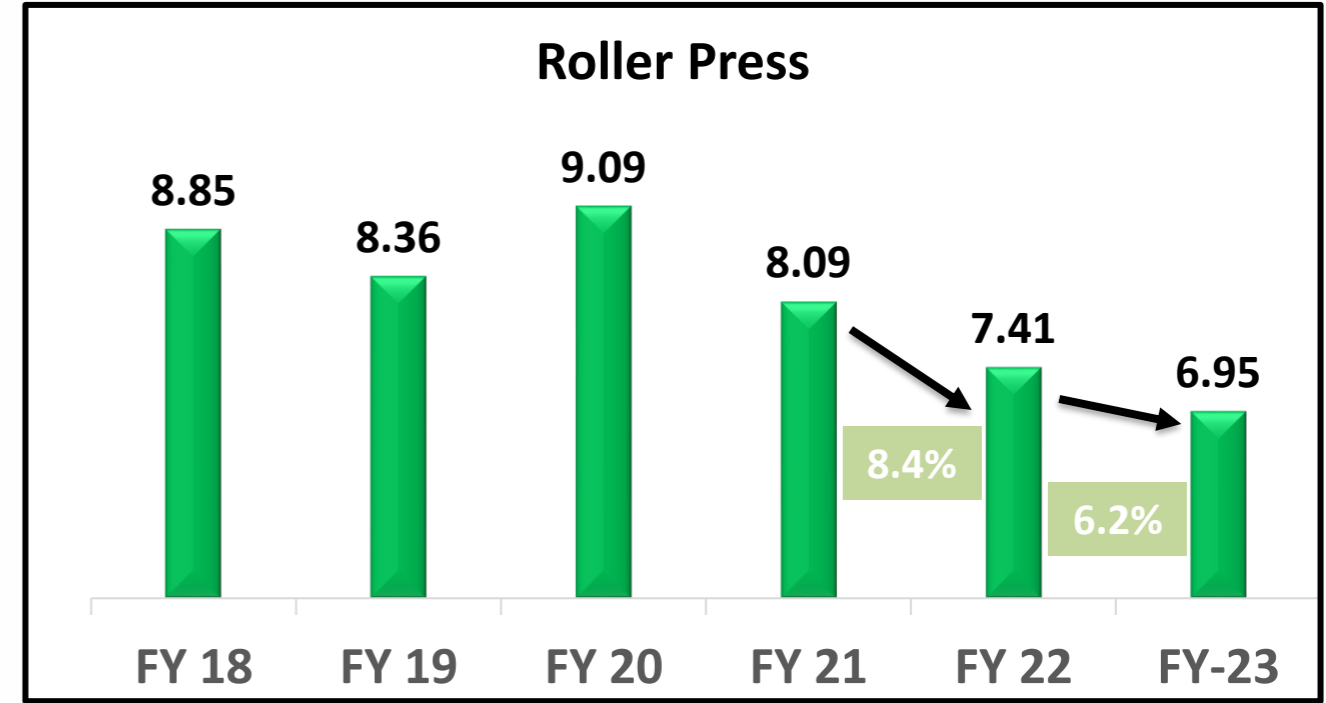
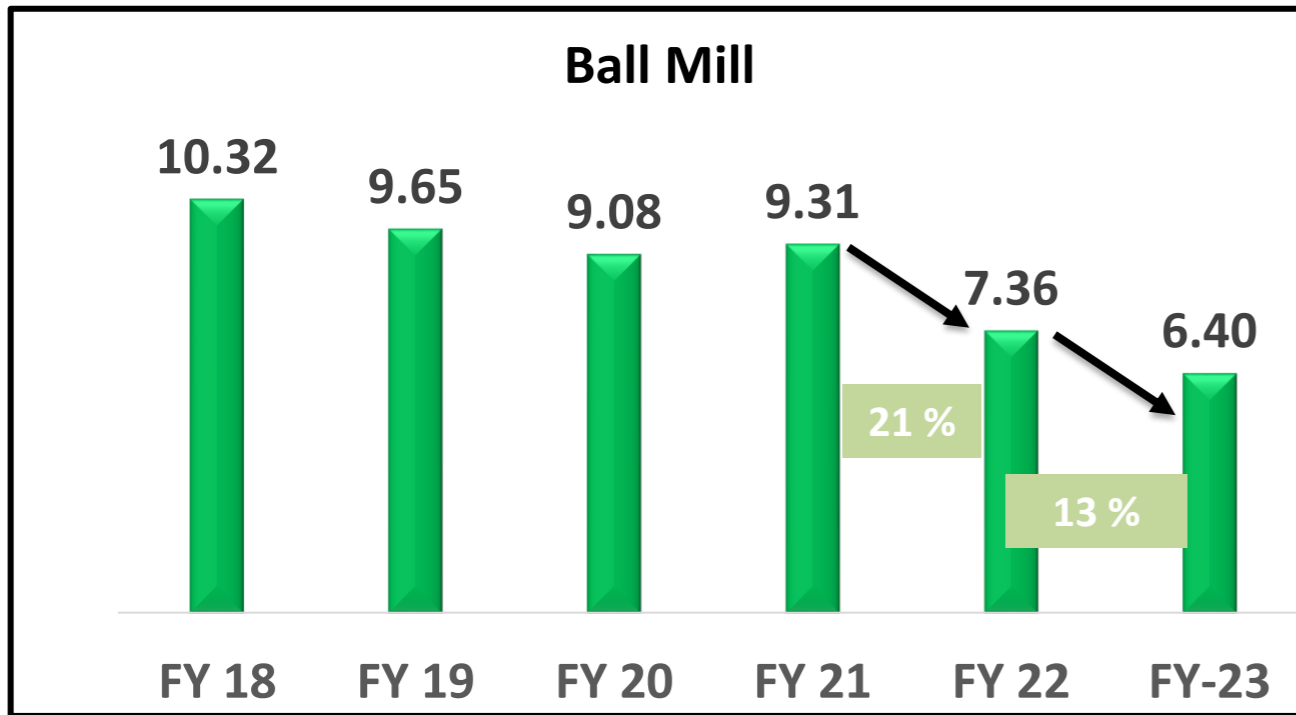
Grinding Power (KWH/T)



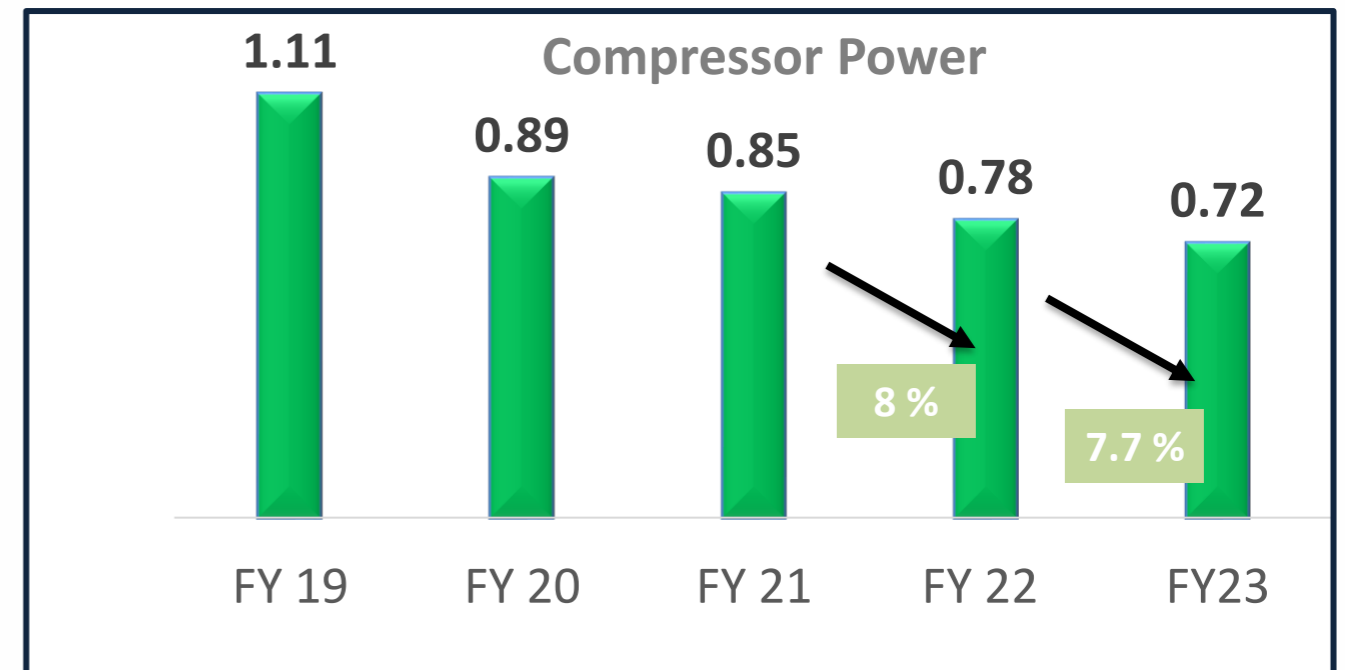
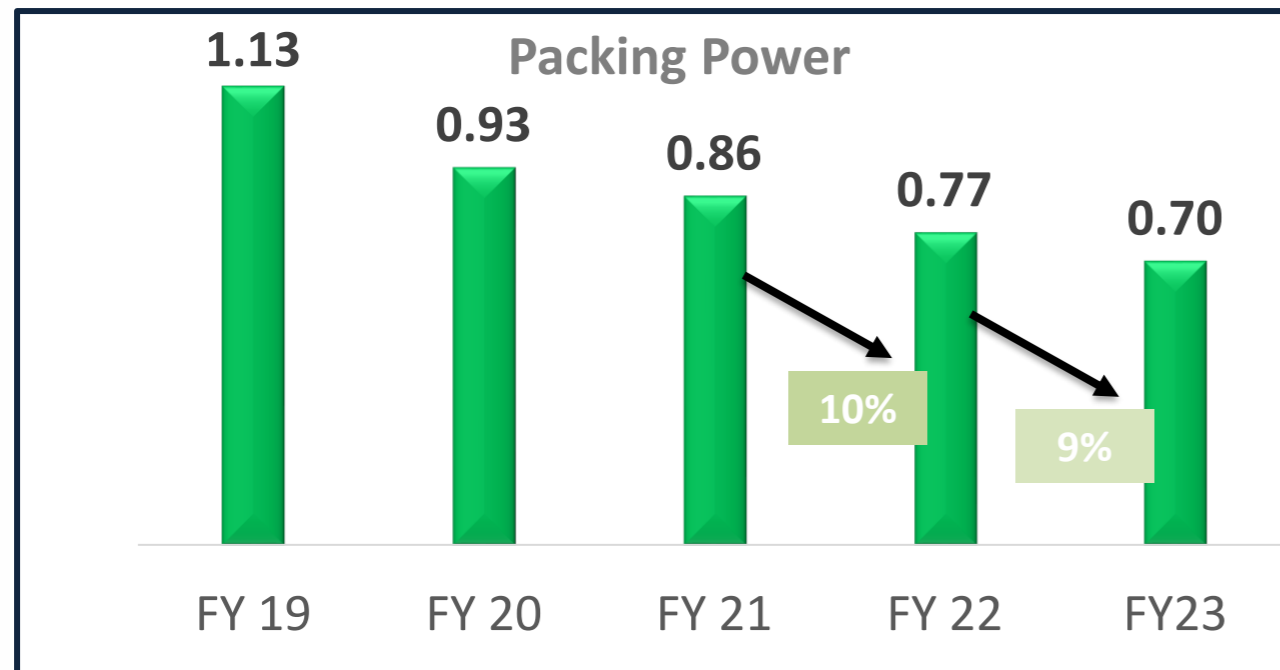
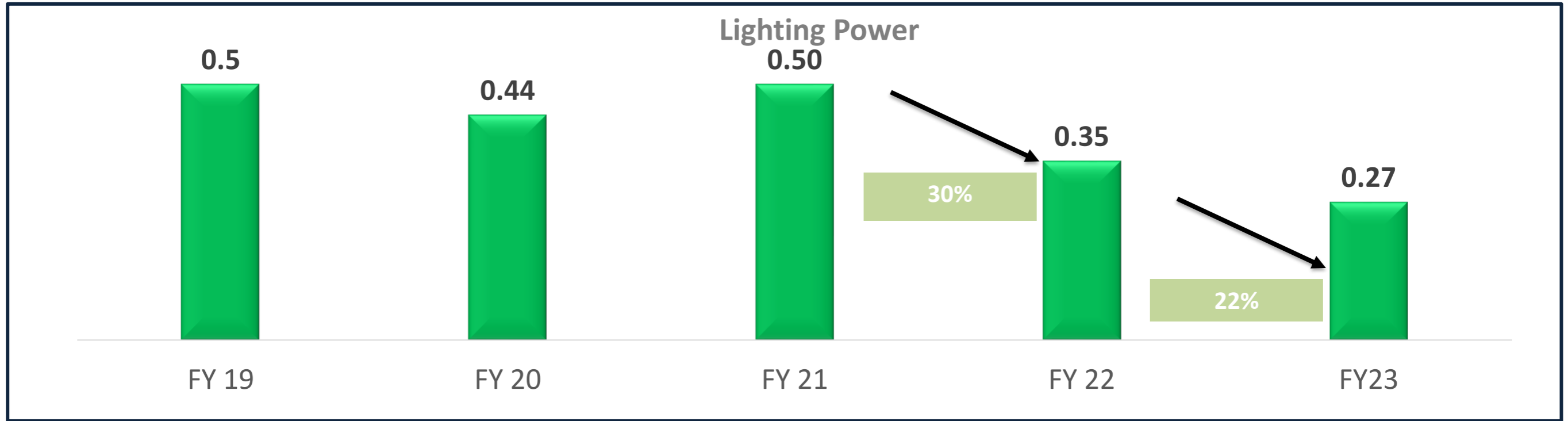
Total Plant Power (KWH/T)

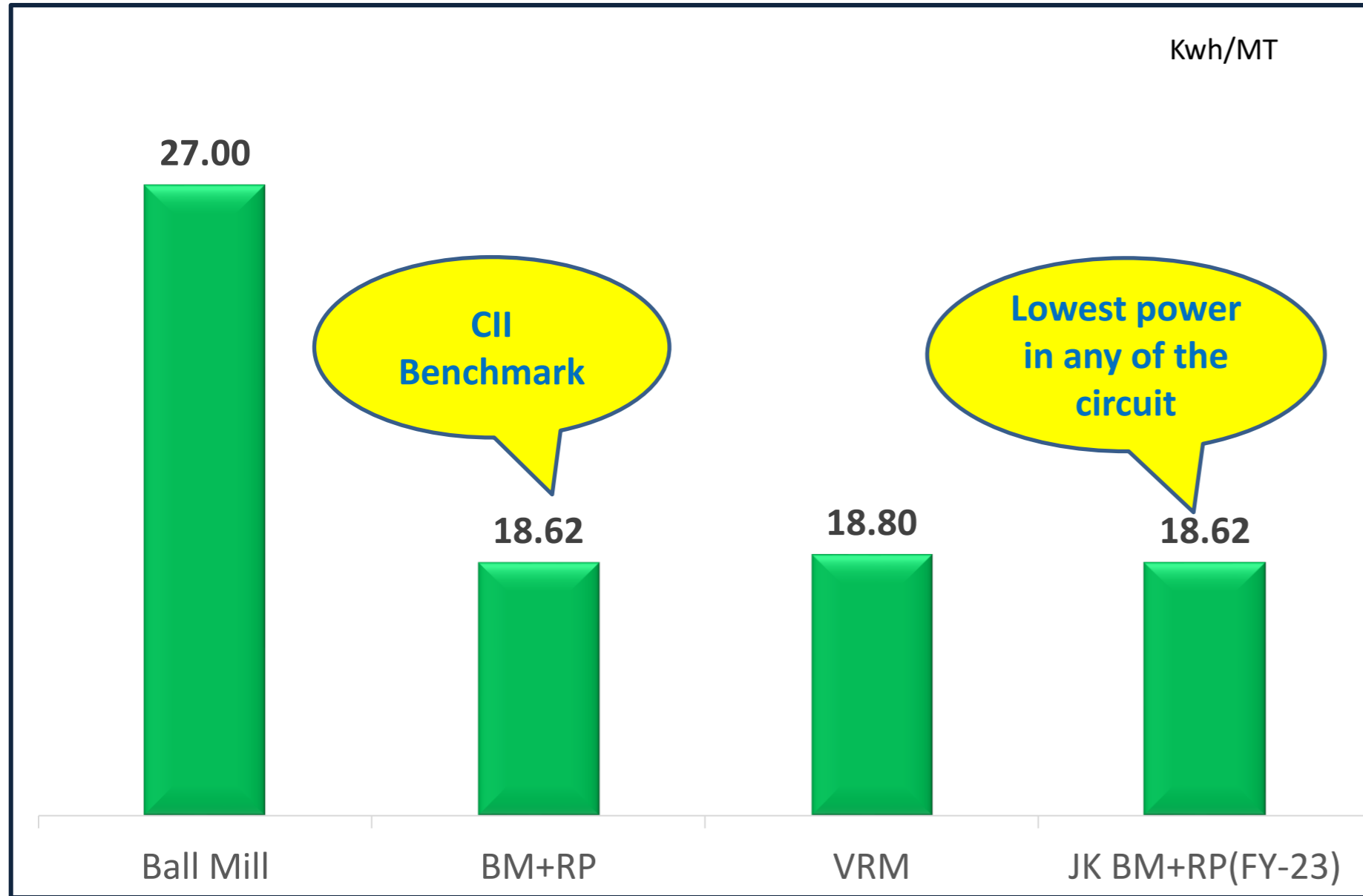


Equipment Wise Power (KWH/T)



Equipment Wise Power (KWH/T)





As per Energy bench mark by CII Version -6 published in May-2023

With BM+ RP combo we are getting lowest power in FY 23 which is 18.62 Kwh/MT

We are best in combo circuit, also surpassed best power of VRM.



FY 2023-24	
PARTICULARS	POWER (KWH/TON)
Last FY Total Power	22.25
Target	22.10
Expected Reduction	0.15
Last FY Grinding Power	18.62
Target	18.49
Expected Reduction	0.13

FY 2024-25	
PARTICULARS	POWER (KWH/TON)
Last FY Total Power	22.10
Target	21.95
Expected Reduction	0.15
Last FY Grinding Power	18.49
Target	18.35
Expected Reduction	0.14

FY 2025-26	
PARTICULARS	POWER (KWH/TON)
Last FY Total Power	21.95
Target	21.73
Expected Reduction	0.22
Last FY Grinding Power	18.35
Target	18.15
Expected Reduction	0.20

Philosophy for Target Setting:-

- We have achieved reduction of 8.13% power in FY-23 by implementation of energy saving measures and plant optimization, now more focus will be in sustaining the current power and further we considering small target of 0.15 Kwh/T reduction of power in FY-24, 0.14 Kwh/T in FY-25 and 0.2 Kwh/T in FY-26.
- Comparison with Internal Benchmark.
- Comparison with National / International Benchmark.
- If we found any lowest power in a day in normal circumstances then set this as new Benchmark.

Short Term Action Plan- FY 23-24

- Reduction in pressure drop across cement mill circuit by CFD analysis and implementation of its findings.
- Installation of High Efficient water pump for plant water circuit.
- Installation of new BLDC / Energy Efficient AC.
- Installation of 2.5 MW Solar Plant.
- Replacement of Existing Dynamic separator guide vane with curved guide vane to optimize operation.

Long Term Action Plan- FY25/FY26

- Addition of new Ball mill to increase TPH.
- Installation of 4th Generation Separator.
- Installation of Energy Efficient Compressor.
- Replacement of old conventional AC by energy efficient / BLDC AC.



Sr. No.	Project Description	Investment (Rs. In Lakh)	Estimated Energy Saving (MWH)	Estimated Saving (INR Lakh)
1.	Reduce pressure drop across Separator circuit (CFD study and modification of duct) potential 30-40 MMWC	17	317	23.3
2.	Replacement of plant water pumps with high efficient pumps	4.2	60	4.41
3.	Replacement of Old AC by Energy Efficient BLDC AC.	10	22.5	1.63
4.	Installation of 2.5 MWp Solar Power plant under PPA model.	103	3170	92.2

Summary of EnCon Projects in last 3 Years

Year	Nos. of energy saving Project	Investment (INR Million)	Electrical Saving (Million KWH)	Saving (INR Million)	Impact on SEC (KWH/T Cement)
2020-2021	8	13.2	2.67	18.74	1.78
2021-2022	12	41.6	4.57	34.01	3.67
2022-2023	11	7.18	2.91	21.65	1.75

S. No.	Description	Saving Achieved	
		Kwh	Rs in Lacs
1	Reduction in plant Power consumption by the modification and process optimization (Mill Shell Liner Change, Roller replacement and Grinding Media pattern Change, Separator drive optimization)	4500000	330.30
2	Through Put of cement grinding increased from 220 TPH to 240 TPH and total Energy Saving achieved 1.68 unit per ton of material	2016000	131.04
3	Optimize the specific gas volume of Separator fan from the existing level of 1.29 nm ³ /kg of cement to 1.1 nm ³ /kg of cement	858000	60.06
4	Clinker through Wagon Tippler in place of Truck Tippler 1 kwh per ton for total received clinker	780000	50.70
5	Remove damper for separator fan to reduce pressure loss across fan damper	211200	14.93
6	Installation of cement Mill bag House Vent Fan VFD Power Saving (110 KW)	150000	9.75
7	Stopped 4 nos Bag Filter Fans and Extra Loading to Existing Bag Houses	125000	8.13
8	Installation of Wagon tippler bag House Vent Fan VFD Power Saving (315 KW)	97500	6.34
9	Eazy clean blower is installed for body cleaning in between loading point 1,2,3 &4	85410	0.85
10	Installation of VFD for bag Filter Fan FN337 for Power Saving (37 KW)	70000	4.55
11	Installation of VFD for bag Filter Fan 624FN112 for Power Saving	70000	4.55
12	Installation of VFD for bag Filter Fan 621FN112 for Power Saving	65000	4.23
13	Installation of VFD for bag Filter Fan 622FN112 for Power Saving	60000	3.90
14	Bag rejecter removed from packer no 1,2,3 &4	59860	0.60

S. No.	Description	Saving Achieved	
		Kwh	Rs in Lacs
15	Water cooled blower in cement silo 1 & 2 replaced with Air cooled blower	58400	0.58
16	Installation of VFD in packer-2 bag filter fan motor of 75KW for power saving.	57600	4.22
17	PLC PID Modification and Stoppage of Idle running of (5.5x 2) KW Silo ventilation Fan	50000	3.25
18	PID Modification of HT Motors Cooling Blowers (5.5 x2) KW for Power Saving	50000	3.25
19	Common Use of Aeration Blower for all Packing Plant Bin , and Saved Idle Running of Pressure Blower 7.5 KW rating	50000	3.25
20	Fan FN121 used to fluidize the air slide of packer no-1has been stop	43800	0.44
21	Installation of Timers , Indoor Lightings On/Off arrangement , Led Lights , Occupancy Sensors.	43200	2.81
22	Installed VFD for Step Angle Conveyor Power Saving (160 KW)	39000	2.53
23	Optimization of voltage in distribution Transformer to 418-420V from 427-430V to reduce losses.	33120	2.43
24	Installation of VFD for P&V system (22 KW)	31104	0.31
25	Installation of 4 nos. 1.5T, 800W BLDC split AC for power saving.	27000	1.98
26	Installation of VFD for bag Filter Fan 521FN347 for Power Saving (22 KW)	26477	0.26
27	Easy clean blower installed for body cleaning in between loader no 5 & 6.	26280	0.26
28	Reduction in generation pressure of the compressors (Load / unload pressure setting from 6.0 to 5.5 Bar)	25920	1.90

List Of Major Energy Conservation Projects

S. No.	Description	Saving Achieved	
		Kwh	Rs in Lacs
29	Installation of Nibs Trab Blower variable Drive (11 KW)	25000	1.63
30	Installation of VFD for bag Filter Fan 521FN342 for Power Saving (22 KW)	24112	0.24
31	Load Redistribution and Switching off Transformer (TR-5)	24000	1.70
32	Load Redistribution and Switching off Transformer (TR-3)	24000	1.70
33	Installation of VFD for the bag filter fan 521FN347	22020	1.56
34	Minimize compressed air leakage in the packing plant by conducting air audit.	21600	1.59
35	Improve the Power Factor of PMCC-5	20151	1.42
36	P&V system provided in Compressor house to maintain compressor room temperature and increase efficiency of compressor.	17640	1.29
37	Reduction in Idle running by providing Interlock in auxiliary equipment operation in packing plant with packer operations	11520	0.85
38	Voltage Optimization for Bag Filter Fan 623FN112	11314	0.80
39	BAG HOUSE VFD RPM reduction Interlock and Idle Running Saved (estimated)	3250	0.21
40	Tran 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%.	1800	0.13
41	Installation of AC Energy saver in split AC	829	0.06
42	Modification of TPS from diesel engine to electric motor	NA	16.00

S. No.	Description	Saving Achieved	
		Kwh	Rs in Lacs
43	Installation of VFD in packer-2 bag filter fan motor of 75KW for power saving.	9600	0.7
44	Installation of 5 nos. 1.5T, 800W BLDC split AC for power saving.	5850	0.42
45	Optimization of voltage in distribution Transformer to 418-420V from 427-430V to reduce losses.	16500	1.2
46	Reduction in generation pressure of the compressors (Load / unload pressure setting from 6.0 to 5.5 Bar)	12900	0.94
47	Ball Mill Shell liner replacement, Ball Mill grinding media pattern optimization and operation optimization.	999075	73.83
48	Ball mill TPH improvement by process optimization and direct fly ash feeding in Bin inlet.	333000	24.61
49	Reduction in process fluctuation by PID loop optimization	266420	19.69
50	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	57.27
51	Maintaining Separator seal gap 6-7 mm by continues monitoring.	163485	12.08
52	Reduction in separator fan RPM by minimizing falls air ingress and keeping process flow intact.	363300	26.84
53	Lighting transformer removed from lighting circuit and voltage regulator taken in line and reduced lighting voltage 405V from 430 Volt.	7675	0.56
54	Installation of VFD in product elevator BE370 for smooth operation and power saving and tipping of buckets done to avoid material flush.	18165	1.34
55	Installation of lighting timer in packing plant lighting and Tile max area.	3285	0.24

In the Journey of last 3 years of energy saving we have achieved

- Total Saving in Million Kwh: 10.15
- Total Investment in million Rs. : 61.98
- Total Saving in million Rs. 73.9

Major Projects

Installation of 15 VFD in Fans / Blowers and Elevator.

100% LED lighting with occupancy Sensors in Offices

Roller replacement & Gap Optimization

Ball mill shell liner replacement and media optimisation

Objective: Operation of the mill stabilized by modification in silo feed bucket elevator bucket & its velocity profile.

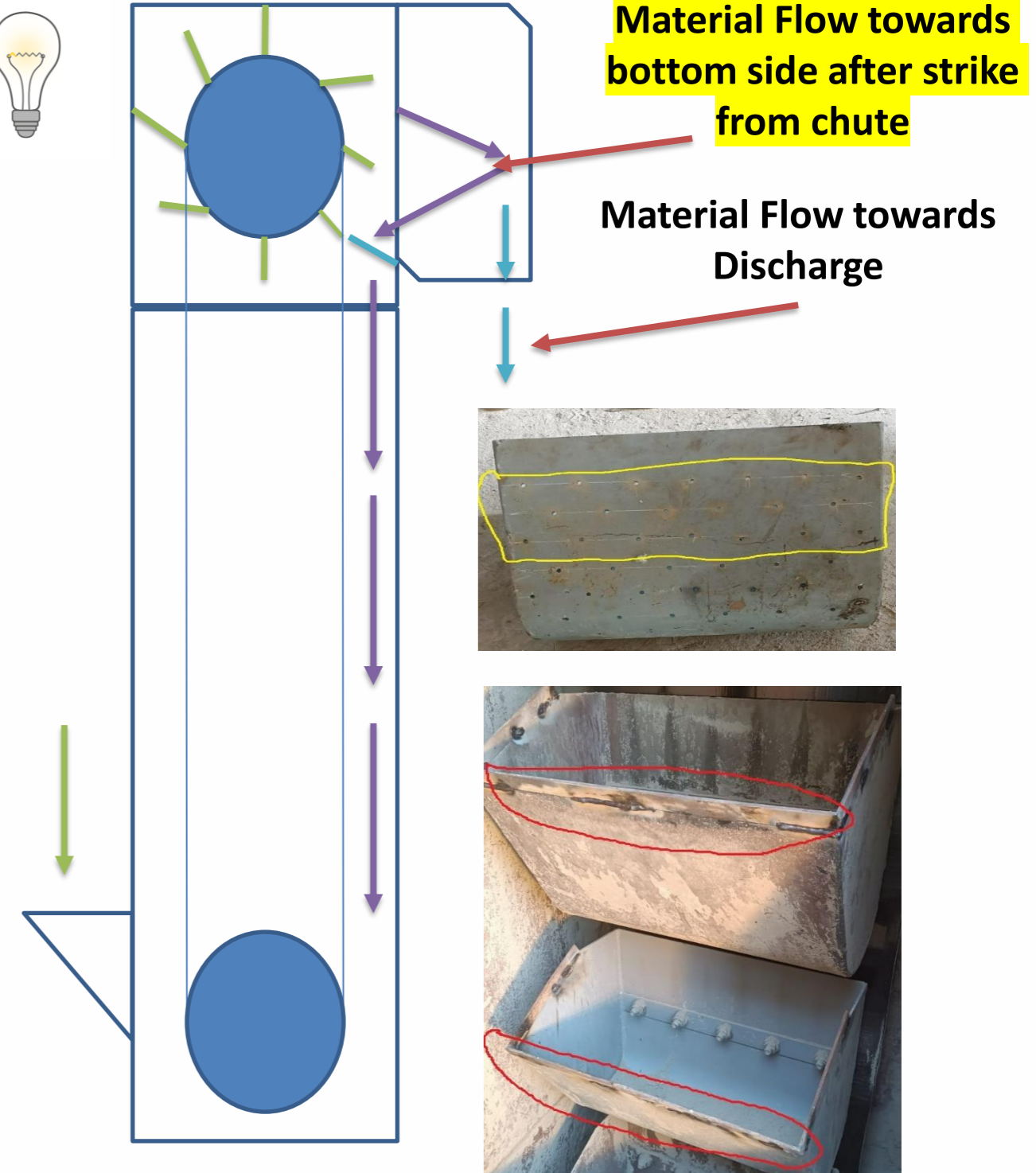
BEFORE: We were facing the issue of frequent boot level in silo feed elevator during increasing feed more than 260TPH resultant unstable operation of mill and low throughput

AFTER : Approaches for resolve the issues

1. Velocity of the bucket elevator reduced by installing the VFD
2. All bucket venting holes increased
3. Tipping of the buckets to avoid material flush from bucket.
4. Modified the discharge Chute

BENEFITS / RESULTS:

- Mill operation stable, no any restriction for mill TPH increase.
- Silo feed b/e gear box life also improve due to less running rpm i.e. 1438 rpm against 1485 rpm.
- Improvement in Housekeeping below bottom of bucket elevator.
- 04 Unit/Hr power saving in Auxiliary power .



Use of BLDC Air Conditioner



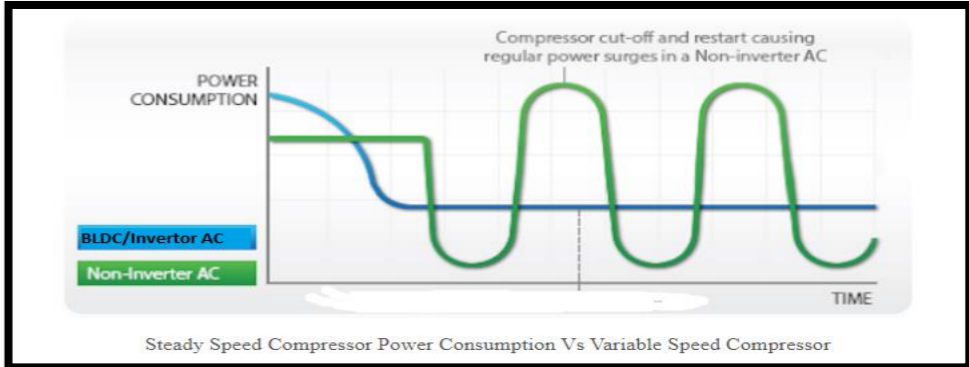
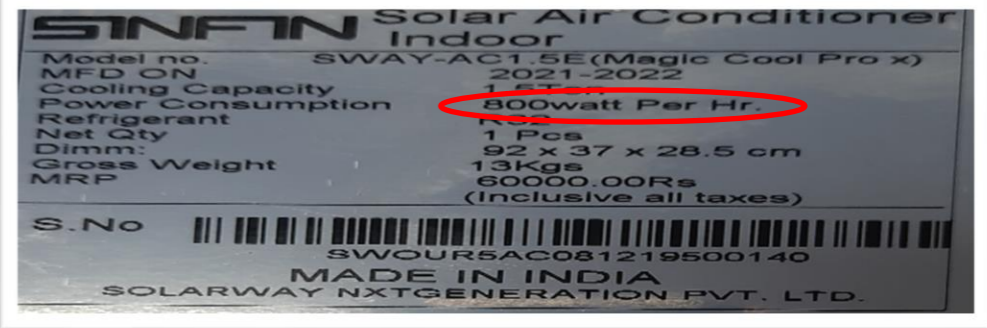
Technology Innovation:

The BLDC AC consumes 800 watt Per Hrs (20 Kwh Per Day) against the conventional 1730 watt Per Hour with Saving of 15 Kwh Per Day

Payback is 14 Months (@ Power Cost of Rs 7.25 / Kwh)

Specification and Comparison

Sr. No.	Specification	Conventional AC	Invertor AC	BLDC / Solar AC
1	Capacity (Ton)	1.5	1.5	1.5
2	Max Cooling Capacity (BTU)	17500	18000	17000
3	Rated Current (Max in A)	8.2 A	6.5 A	5.5 A
4	Voltage Range (V)	230	220-240	190-250
5	Max Power Consumption (W)	1730	1290	800
6	Starting Load (W)	3500	1500	1000
7	Noise Level (db)	72	54	33
8	Supply Source required	20A	16A	6A
9	Warranty (In year)	3	10	10
10	Compressor Motor	Conventional	Variable Speed	Variable Speed with BLDC motor



Modification of Diesel TPS Machine to Electric Motor driven Machine



Objective:

To reduce Diesel consumption under green initiative project.



Methodology used:

In-house Modification of TPS machine: Replacing Diesel Engine by 45 KW motor with required modification in base frame and provided a electric starter circuit with in house available spares. Following tools used -

- Brainstorming
- Inter Team coordination
- Kaizen



Annual Saving of 24 KL Diesel
Monitory Saving Rs. 16 Lakh/Annum
Co2 Reduction 63.36 MT.

Reduction in Ball Mill Power Consumption



Objective:

To reduce Ball Mill Power consumption.



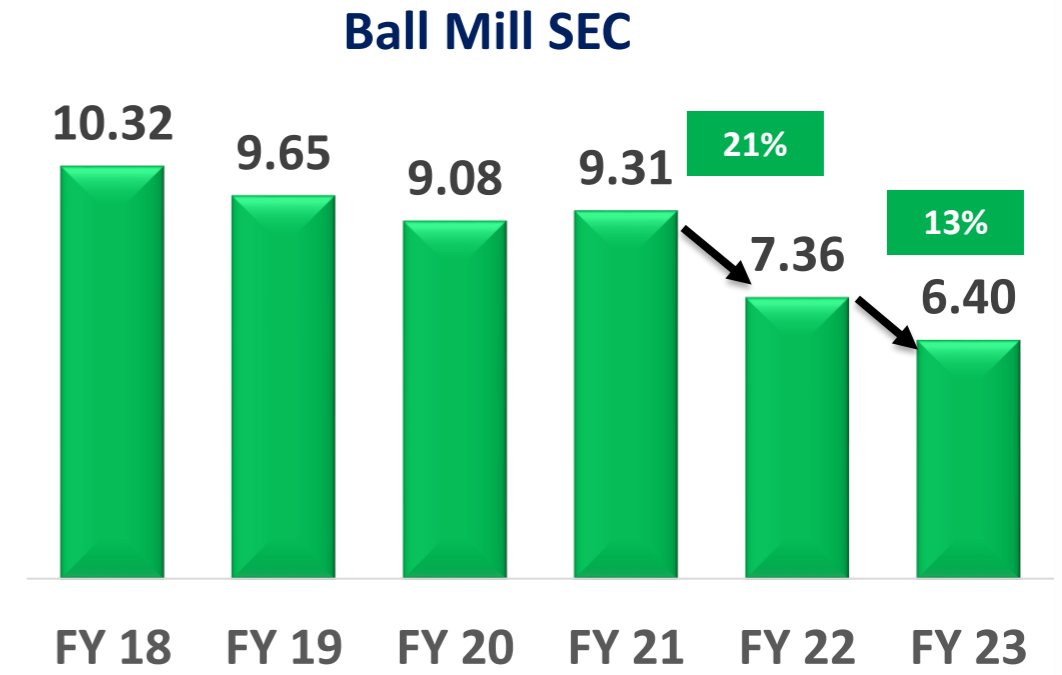
Methodology used: Grinding Media pattern optimization.

After succession of ball mill shell liner replacement by special T-shaped thin classifier liners we found opportunity to optimize Grinding Media.

- It reduce liner weight by 6%.
- Mill effective Diameter increased by 100mm.
- Increase in grinding efficiency.

We have done continuous trail with various combination of media pattern and able to reduce the Grinding media weight from 130 MT to 115 MT.

Result:



Saving of 2.91 KWH/T in last 2 Years

Year	Technology (electrical)	Generation (million kWh)	% of overall electrical energy
FY-20	Ground Mounted (PV Cell)	0.385	0.88%
FY-21		0.383	1.06%
FY-22		0.399	1.09%
FY-23		0.361	0.97%

Year	Power Consumption (Lacs KWH)	R.P.O (Lacs KWH)		Solar Generation (Lacs Kwh)	No of R.E.C (in Lacs)	
		Non solar	Solar		Non solar	Solar
FY-20	114.52	3.3	6.2	3.9	3.4	2.4
FY-21	181.16	5.4	12.7	3.8	5.4	8.8
FY-22	33.87	1.01	2.71	3.9	1.02	-1.3
FY-23	0	0	0	3.6	0	0

Yearly RPO %

- Non Solar - 3% /3%/3%
- Solar - 5.5% / 7%/8%



Installed Capacity of Solar 0.300 MWp (Ground Mounted PV Cell).

Investment: Rs. 14.2 Million

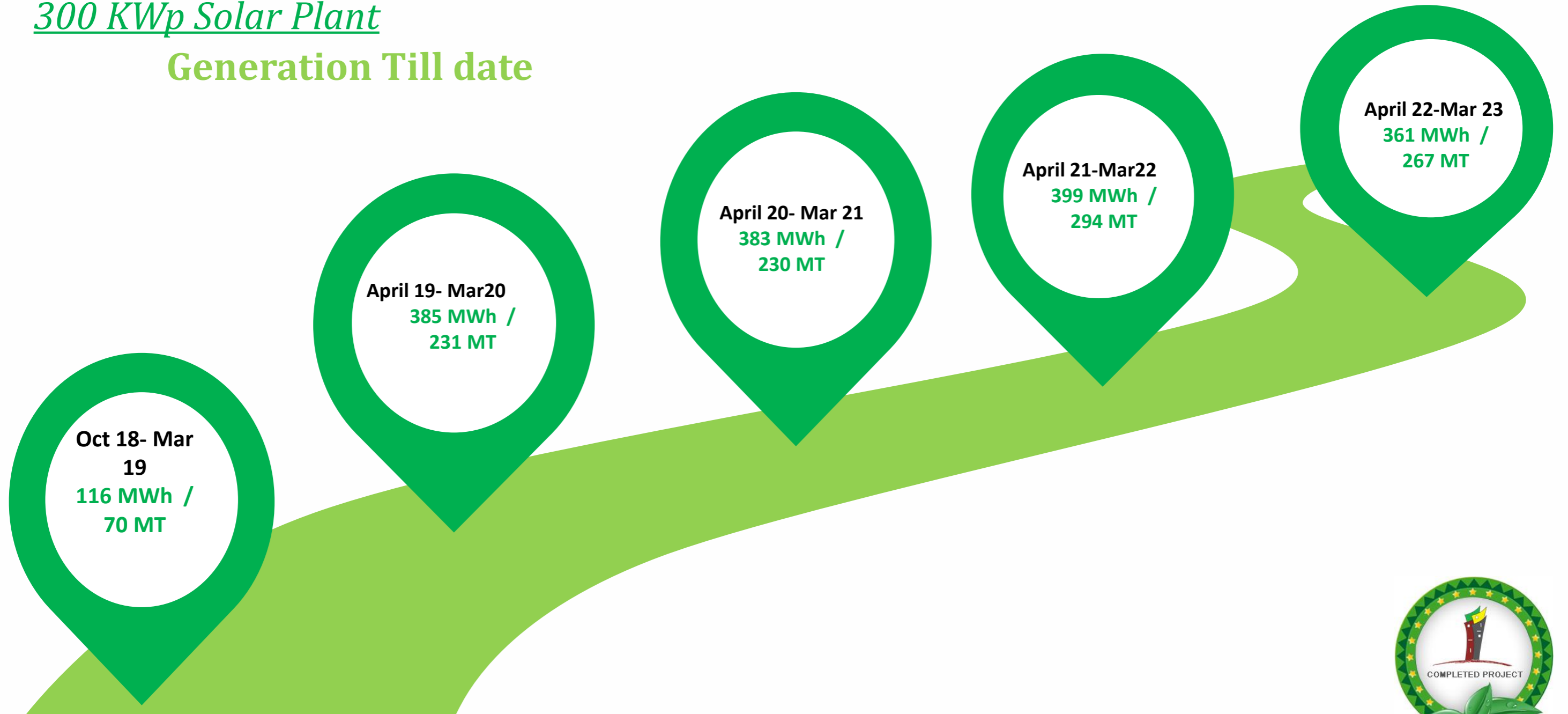
Total Area covered : 4650 m2.

Solar power generation start date: Oct'2018

Way Forward: Installation of 2 MWp Solar plant under Opex Model.

300 KWp Solar Plant

Generation Till date



Generation Achieved / Co2 Reduction

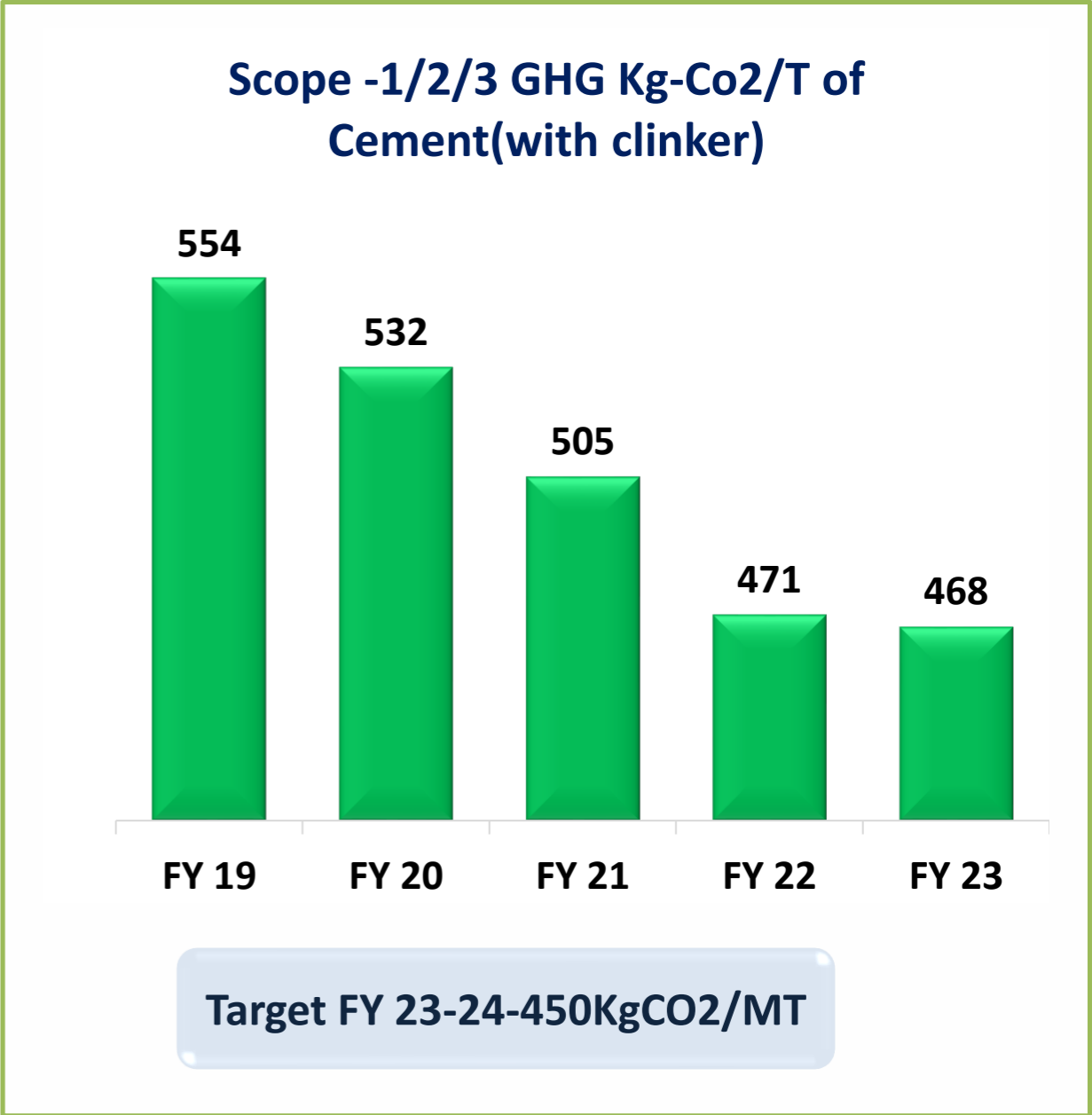


Scope 1,2&3 GHG Reduction



Initiatives taken to reduce carbon foot print

- Reduction in Clinker Factor.
- Implementation of identified energy saving projects.
- Increase usages of FGD Gypsum.
- Reduction in Diesel consumption.
- Use of occupancy sensor in office and lobbies.
- Replacement of old vehicles by BS IV and BS VI.
- Reduction in SPC of Grinding, Packing and Utility.
- Solar Power generation.
- 100% LED lighting installation in plant.
- Use of CNG Trucks
- Electrification of Rail Line
- Increase in bulk loading.
- Use of GPS for Vehicle Tracking (RFID)



S. No	Project Implemented	Project Details
1	Reverse Integration of Gypsum supplied from Punjab	Gypsum trucks from Punjab used for Cement Transportation up to Punjab
2	Use of Mould Gypsum (Waste Gypsum) as Alternate Raw Material	Mould Gypsum is Waste of the Gypsum industry and by using the same for Cement production as an alternate raw material for Mineral Gypsum
3	Bulk transportation of Cement	We increase our Bulk Cement dispatch. This enable us to reduce the standard vehicle trips.
4	Cement dispatch lead distance reduction by GPS tracking	We have installed GPS in all trucks and drivers are instructed to follow the shortest route which is validated by our Logistics dept.
5	Use of EV and CNG Vehicles	We are promoting the use of EV and CNG vehicles in plant and cement transport

Development of Green Belt Area(37 % till FY 23)



Lloyd's Register

Current issue date: 23 August 2021
 Expiry date: 27 July 2024
 Certificate identity number: 10386365

Original approval(s):
 ISO 14001 - 28 July 2016
 ISO 9001 - 28 July 2016
 ISO 45001 - 21 June 2018
 ISO 50001 - 28 July 2016

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: Matanhall, District: Jhajjar, 124106, Haryana, India

has been approved by Lloyd's Register 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
 Luis Cunha
 Area Operations Manager - SAMEA
 Issued by: Lloyd's Register Quality Assurance Limited

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ISO 14001, ISO 9001, ISO 45001 & ISO 50001

Confederation of Indian Industry

CII - Sohrabji Godrej Green Business Centre

hereby certifies that

J K Cement Works, JHARLI

has successfully achieved the standards as required for the following level of certification under the GreenCo - Green Company Rating System which is valid for a period of 3 years

GreenCo Gold

Sep 2018

Jamshyd N Godrej
 Jamshyd N Godrej
 Chairman
 CII-Godrej GBC

Pradeep Bhargava
 Pradeep Bhargava
 Chairman
 GreenCo Rating System

L.S. Ganapati
 L.S. Ganapati
 Chairman
 GreenCo Assessor Panel

K S Venkatagiri
 K S Venkatagiri
 Executive Director
 CII-Godrej GBC

Green-Co Gold Certificate

JK Cement

JK Cement Works, Jharli
 A unit of JK Cement Ltd.
 CIN: L17229UP1994PLC017199
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 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:

- To work continuously for improvement in Plant operations efficiency guided by energy conservation.
- To optimize the consumption of resources, viz. raw material, utilities, fuel, electrical and renewable energy.
- To periodically review the specific energy consumption norms by bench marking.
- To comply with all applicable Regulations and other requirement, if any.
- To carry out Energy audits for identifying area for improvement.
- To Implement Energy Conservation Activities and to adopt energy efficient Technologies.
- To promote renewable energy and green initiatives to reduce to reduce CO2 emission.
- To develop a holistic strategy on use of renewable energy for electricity, heating and cooling.
- Diversifying energy supply and reducing dependence on non-renewable energy.
- To inculcate the principles of energy conservation in its people and processes on continuous basis through Training among all Employees & stock Holders.
- 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.

20th April, 2023

Mr. Sameer Kumar Pujari
 Mr. Sameer Kumar Pujari
 UNIT HEAD

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JK SUPER CEMENT
 BUILD SAFE

JK CEMENT WallMax
 www.jkcement.com

Manufacturing Units at:
 Nandambur, Mangal, Ontan (Rajasthan) | Muddapur (Haryana)
 Jharli (Haryana) | Katti (M.P.) | Aligarh (U.P.) | Bahawpur (Gujarat)

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Energy Management Policy

Energy Data Collection

- EMS
- Total 28 Energy Meters for all section and major drives. (>5% of total power)
- 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

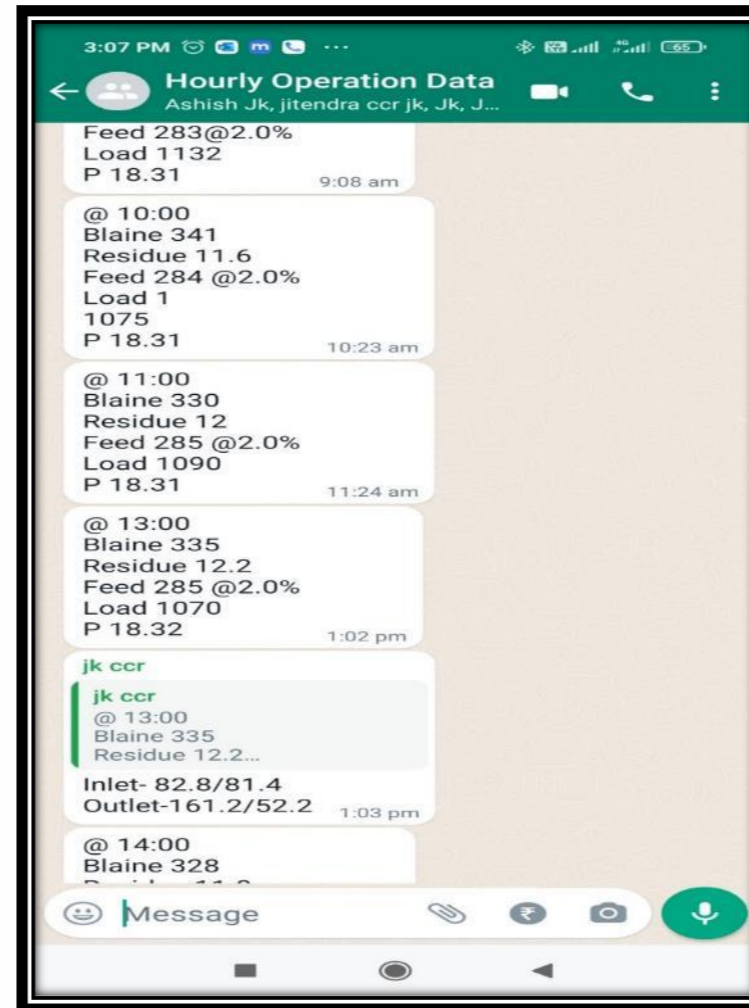
Reporting Parameters by digital platform for Real Time Action

IOT



Quality Parameters continuous monitoring through Digital platforms.

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



Sr. No.	Name	Designation	Responsible Area
1	Mr. Sameer Kumar Pujari	Unit Head	Plant
2.	Mr. Lokesh Pancholi	Energy Manager	Plant
3.	Mr. Rajeev Agarwal	Head - E&I	E&I
4.	Mr. Lokesh Maratha	Head – Mechanical	Cement Mill & Wagon Tippler
5.	Mr. Ashish Khulve	Head – Process	CCR and Cement Mill
6.	Mr. Manoj Yadav	Head – Packing & Utility	Packing Plant & Utility
7.	Mr. Vikas Prasad	QC	QC Lab and Tile-Max

Major Energy Management Cell Functions:

- Energy review meeting twice in week.
- Monthly Energy Review.
- Review on Energy saving projects.
- New Idea or suggestion for Energy saving.



Energy and GHG management measures implemented at JK Cement



Lowering our clinker factor



Increasing share of blended products



Transitioning to renewable energy



Expanding our WHRS capacity



Committed to SBTi-evaluating corporate-level target



Increasing our Thermal Substitution Rate (TSR)



Process optimisation to improve energy efficiency



The Confederation of Indian Industry (CII) is working to facilitate Industries Achieve World Class Levels In Energy Efficiency.

Various events and training programs conducted by CII are extended learning and knowledge sharing platforms where we can unearth the best practices, latest technologies and future roadmaps to achieve Excellence in energy efficiency.

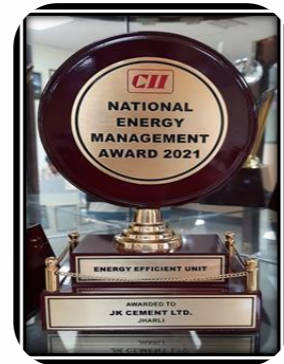
In the journey of Excellence we found CII as most enduring companion.

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:

- 1. Reduction in process fluctuation by PID loop optimization**
- 2. Installation of AC Energy saver in split AC**
- 3. Reduction in generation pressure of the compressors by Load / unload pressure setting .**



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



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



Best Fly Ash Utilization Award – 2021 by Mission Energy Foundation



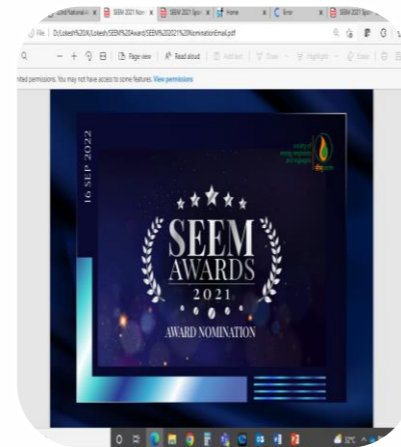
Best Fly Ash Utilization Award – 2022 by Mission Energy Foundation



Green Co Gold Award



CII Circle Award (2023) Energy Efficient DC (Under PAT Scheme)




SEEM Gold Award (2021)



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



CII Circle Award (2023) Energy Efficient organization (Large Sector)



Thank you!



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