
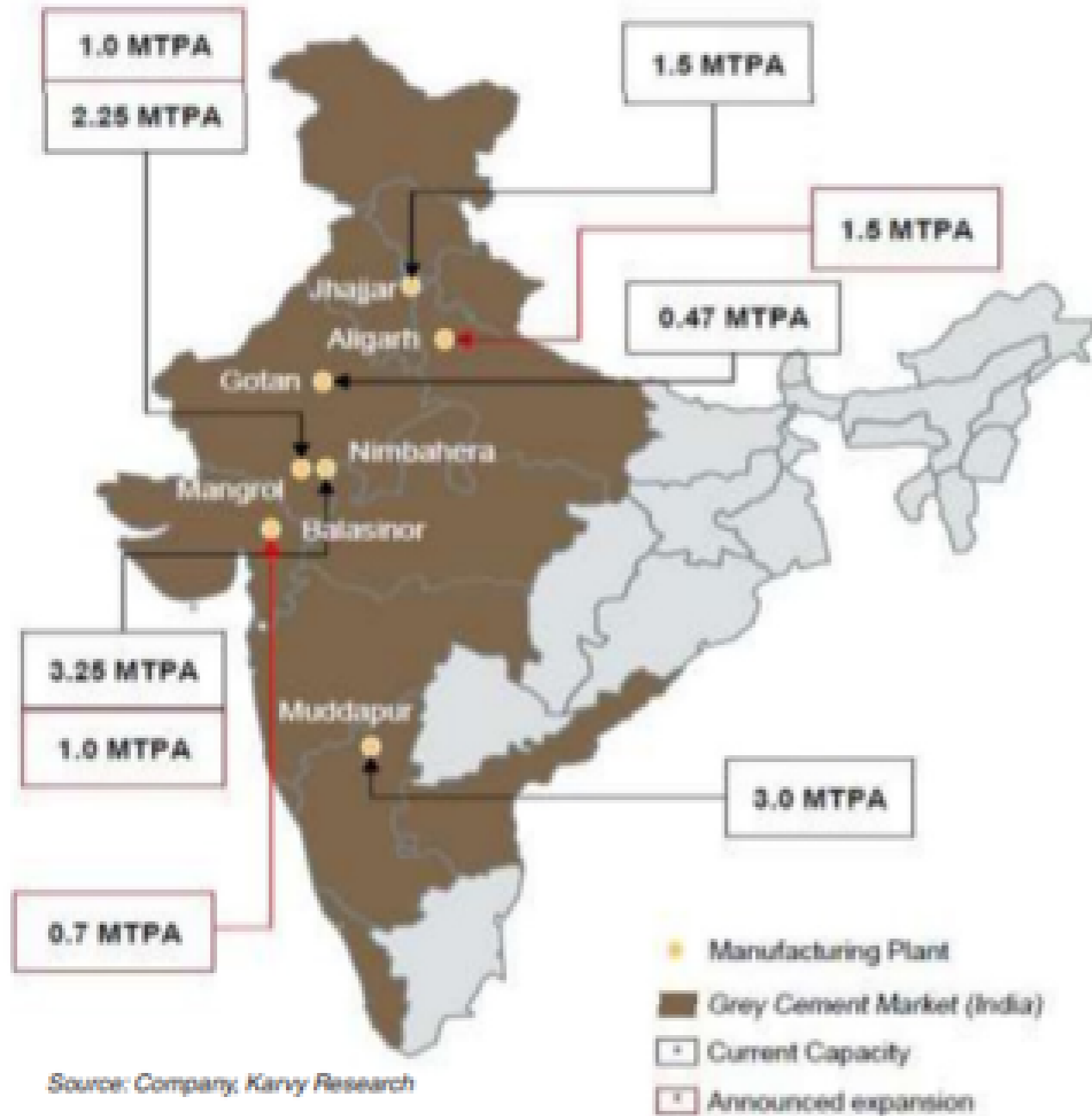


# “CII National Award for Excellence in Energy Management 2022” JK Cement Works Aligarh



Mr. Sanyog Dubey (Unit Head)  
Mr. Anil Kumar Sharma (Production Head)  
Mr. Saurabh Kesarwani (AM-Planning)



- JK Cement Ltd. is one of India's leading manufacturers of Grey Cement and the third largest White Cement manufacturer in the World.
- JK Cement's operations commenced with commercial production at its flagship grey cement unit at Nimbahera, Rajasthan in May 1975.
- The Company has an installed Grey Cement capacity of 15 MnTPA as on date, making it one of the top cement manufacturers in the Country.



Aligarh cement grinding and packing unit is first cement plant installed by JK Group in state of Uttar Pradesh.

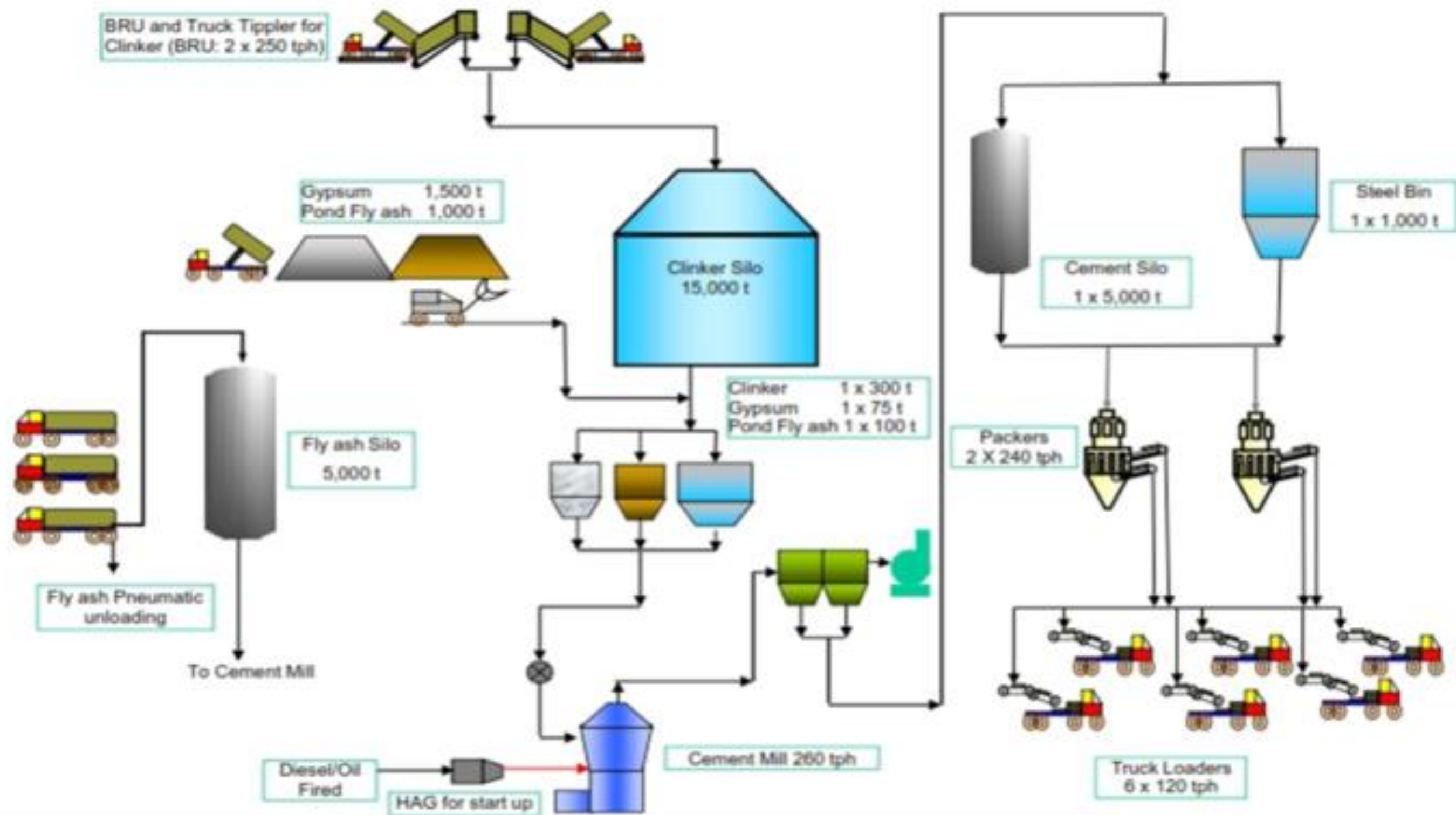
Installed capacity of plant is 2.MTPA.

Plant was commissioned in Feb-2020.



Major Section	Equipment	Capacity	Installed Nos	Total Capacity
Grinding Cement Mill Make-FLS OK56.4	Cement Mill	260 TPH	1	260 TPH
Packing Make- Beumer 16-Spout double discharge Packer	Packer Machine	240 TPH	2	480 TPH
	Loader Machine	120TPH	6	720 TPH
Bulk Receiving Unit Schenck Process	Truck Tippler	100 MT	2	200 MT
	Box Feeder	250 TPH	2	500 TPH







Since commissioned in Feb2020. With Continuous improvement efforts by team.

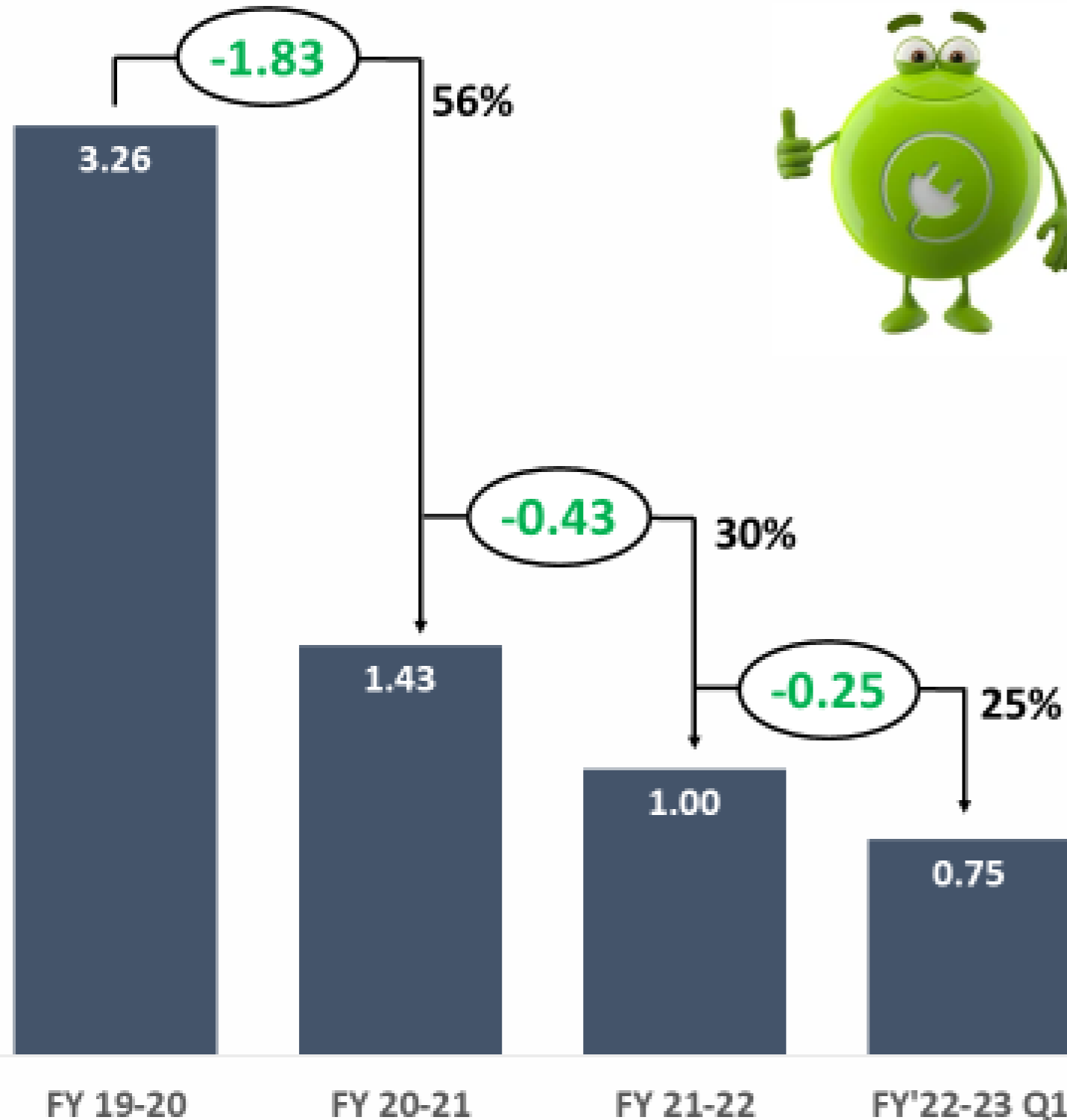
JK Cement Works Aligarh Unit has become one of the best Energy efficient Grinding unit across India.

And commitment to become the best in upcoming FY.



## Key Initiative to reduce Power

- Optimization of process parameter.
- Process fan impeller changed.
- Installation of Dry Fly Ash dispersion plate inside the mill feed point.
- New motorized gate installed after Bin discharge for eliminating unwanted vibration and tripping.
- Reduced idle running of machine.
- Energy review and action plan for energy saving.

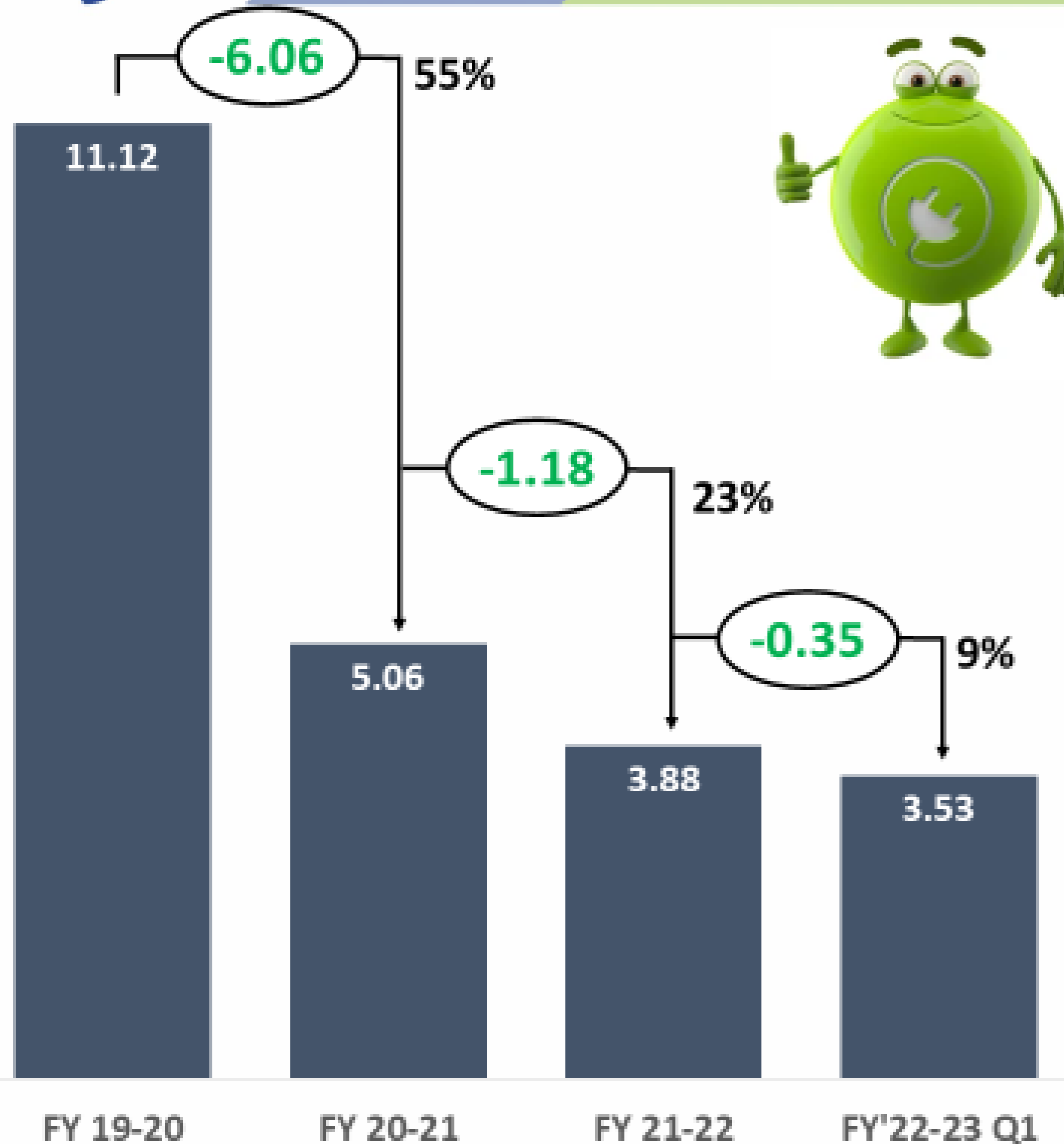


## Key Initiative to reduce Power

Through various KAIZEN done by team

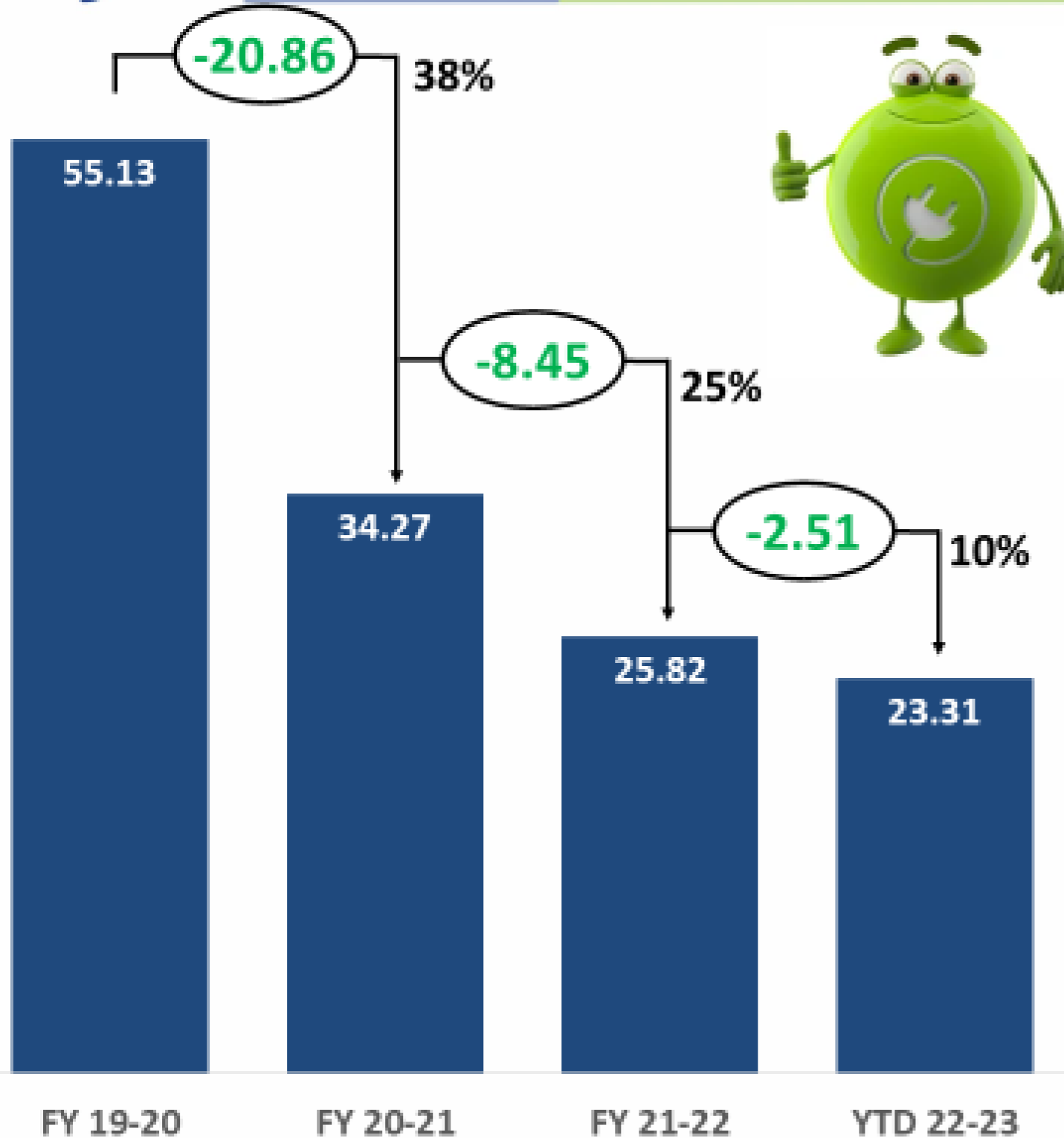
- ✓ Stopped total 13 Drive saved total 112.5 KW.
  - a. 2 nos. fan with 2 nos. RAL of bag-filter (Cap. 17250m<sup>3</sup>/H) stopped by connecting with higher capacity fan of bag-filter (Cap. 35650m<sup>3</sup>/H).
  - b. 2 nos. blower and 1 nos. air slide fan stopped by interconnection of pipeline.
  - c. 4 nos. bag cleaning belt removed.
  - d. 2 nos. bag cleaning fan stopped out of 4 nos. by interconnection of pipe line.





## Key Initiative to reduce Power

- Optimization of compressor by eliminating the leakages and regulating unloading at 6.5 Bar.
- Automation of plant lighting with illumination sensor and AC with timer setting.
- Installation of 50 Nos. Solar street light in Plant.
- Optimizing DFA and Clinker Unloading by running circuit on sufficient availability of Bulker/Clinker Truck.
- Maintaining power factor at 0.99 in FY-21-22.



**THINK. ACT. SAVE.**  
WE ALL HAVE THE POWER!

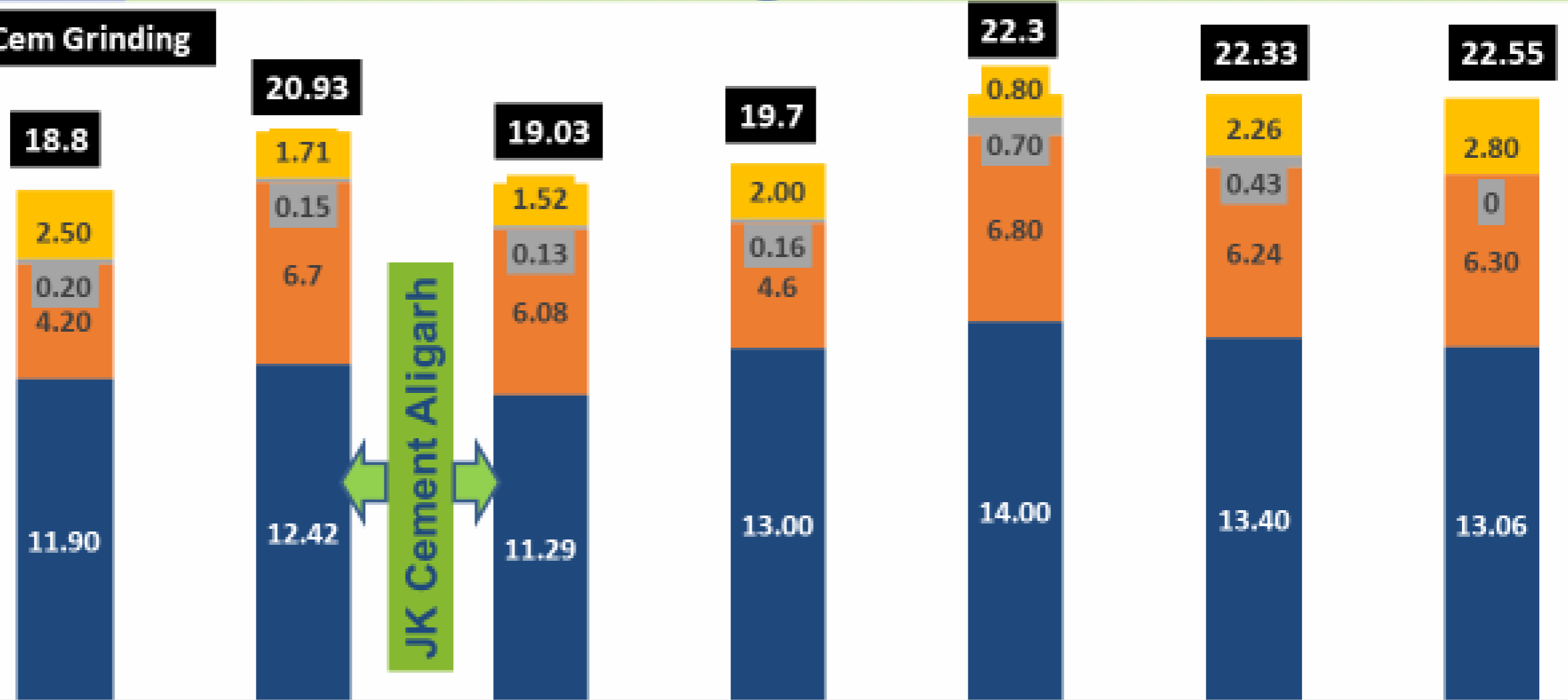
**Sustainable reduction in plant total power consumption.**

Total CM SEC Kwh./MT Cem Grinding

Q1-SEC Achieve  
2<sup>nd</sup> best with  
VRM Grinding



TEAM WORK



	Plant 1	FY-2021-22	FY-2022-23 Q1	Plant 2	Plant 3	Plant 4	Plant 5
■ Auxiliary	2.50	1.71	1.52	2.00	0.80	2.26	2.80
■ Separator/classifier	0.20	0.15	0.13	0.16	0.70	0.43	0
■ Mill fan	4.20	6.7	6.08	4.6	6.80	6.24	6.30
■ Mill drive	11.90	12.42	11.29	13.00	14.00	13.40	13.06

■ Mill drive   ■ Mill fan   ■ Separator/classifier   ■ Auxiliary

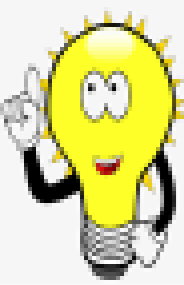
## JK Cement Aligarh

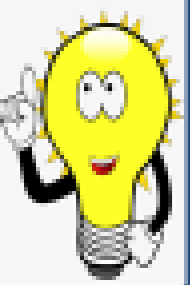
Sr.No	Parameter	Unit	Plant 1	JK Cement Aligarh		Plant 2	Plant 3	Plant 4	Plant 5
				FY-2021-22	FY-2022-23 Q1				
*	Overall SEC	kWh/MT Cement	18.80	20.93	19.03	19.70	22.30	22.33	22.55
1	Product variety	PPC	PPC	PPC	PPC	PPC	PPC	PPC	PPC
2	Make	-	LOESCHE	FLS	FLS	FLS	Pfeiffer	Pfeiffer	Pfeiffer
3	Type / Model	No	LM 53.3+3S	OK 56.4	OK 56.4	OK 39.4	MBR 6000 C6	MPS 5600 BC	MPS 5600 BC
4	Design output	TPH	280	260	260	265	412	300	230
5	Operating output	TPH	320	259	244	300	412	400	324
6	Final Product Blaine	m <sup>2</sup> /kg	330	380	380	350	360	350	335
7	Final Product residue (% residue on 45 mics)	%	14	15	15	14	10	16	12
8	Fly ash Addition	%	32.0	33.7	34.3	34.5	35.0	35.0	34.9
9	Clinker factor	-	0.66	0.58	0.58	0.63	0.60	0.63	0.58
10	Pressure drop Across Nozzle ring	mmwg	200	198	198	200	-	180	205
11	Pressure drop Across Separator	mmwg	100	150	150	150	-	120	83

## JK Cement Aligarh

Sr.No.	Parameter	Unit	Plant 1	FY-2021-22	FY-2022-23 Q1	Plant 2	Plant 3	Plant 4	Plant 5
*	Overall SEC	kWh/MT Cement	18.80	20.93	19.03	19.70	22.30	22.33	22.55
12	Mill DP (Mill inlet to Mill outlet)	mmwg	350	250	230	250	510	200	215
13	Bag house pressure drop	mmwg	140	25	25	25	110	130	118
14	Mill fan operating flow	m <sup>3</sup> /hr	5,55,000	619000	590000	5,85,000	11,20,000	9,28,500	7,95,796
15	Mill fan speed control type (GRR/SPRS/ VFD)	GRR/VFD/SPRS	VFD	VFD	VFD	VFD	GRR	SPRS	SPRS
16	Mill fan operating efficiency	%	73	82	82	78	79	81	78
17	Mill Fan inlet pressure	mmwg	-595	-620	-590	-595	-782	-700	-530
18	Separator type/model	-	-	ROKSH90	ROKSH90	ROKSH90	-	SLS 5600 BC - Lamella Wheel	Air swept lemella classifier SLS 5000 BC
19	Nozzle ring velocity	m/s	31	41	38	44	43	42	31
20	Dam ring height	mm	380	165	165	152	275	230	270
21	Table Diameter	mm	5,300	3900	3900	-	6,000	5,600	5,600
22	Grinding Pressure	bar	90	160	160	160	185	110	115
23	Thermal In Case of HAG	kcal/MT Cement	-	-	-	-	300	-	-

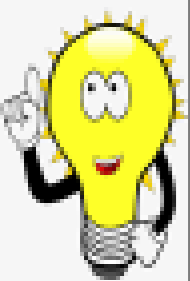
Name of the Project	Brief description	Trigger for implementing the project	Impact on SEC
Bag House fan Impeller changed.	OEM supplied fan Power consumption was High and material to air ratio was low. Due to high static pressure of fan inlet.	To reduce power consumption and maintain optimize air to material ratio with the help of low static pressure fan. We need to change the impeller of fan.	1 Kwh/MT Cem
Process operation optimized by:- Installation of Dry Fly Ash dispersion plate inside the mill feed point.	First time modification in VRM.	For maintaining proper bed height level in mill and reduce mill operation on stopper due to thrust pad gap zero resulting mill vibration maintained and fluctuation of main drive power negligible.	7 Kwh/MT Cem
New motorized gate installed after Bin discharge for eliminating unwanted vibration and tripping.	First time modification done.	To reduce mill vibration due to flushing of fly ash motorized flow control gate fixed, resulting mill vibration maintained and fluctuation of main drive power negligible.	
Mill nozzle velocity maintained upto 38m/Sec. by the help of balanced flow.	Nozzle area increase for maintaining low velocity.	Higher pressure drop.	
Reuse stack temperature by fixing new recirculation duct into HAG resulting primary air changed into the secondary air.	First time modification done.	Reuse of emissive temperature by stack.	
Various interlock modified.	OEM interlock modified.	Minimized idle running and also resulting mill vibration maintained and fluctuation of main drive power negligible.	
Single point start of various circuit	Single Command plant start in sequence.	Idle power consumption reduce due to minimizing idle running.	

	Title of Project	Annual Electrical Saving (kWh)	Annual Electrical Cost Saving	Total Annual Savings	Investment Made	Payback (Months)
			(Rs million)	(Rs million)	(Rs million)	
1	Bag House fan Impeller changed.	961484	7.12	7.12	0	
2	<p>Process operation optimized by:-</p> <p>A) Installation of Dry Fly Ash dispersion plate inside the mill feed point.</p> <p>B) New motorized gate installed after Bin discharge for eliminating unwanted vibration and tripping.</p> <p>C) Mill nozzle velocity maintained upto 38m/Sec. by the help of balanced flow.</p> <p>D) Reuse stack temperature by fixing new recirculation duct into HAG resulting primary air changed into the secondary air.</p> <p>E) Various interlock modified to reduce idle running.</p> <p>F) Single point start of various circuit.</p>	11014917	81.62	81.62	0.02	
3	471FN-100 Power saving after VFD installed	55202	0.41	0.41	0.42	12
4	471FN-200 Power saving after VFD installed	55202	0.41	0.41	0.42	12



	Title of Project	Annual Electrical Saving (kWh)	Annual Electrical Cost Saving	Total Annual Savings	Investment Made	Payback (Months)
			(Rs million)	(Rs million)	(Rs million)	
5	642FN-100 Power saving after VFD installed	49682	0.37	0.37	0.34	11
6	641FN-100 Power saving after VFD installed	49682	0.37	0.37	0.34	11
7	Separation of inverter Transformer chamber of 531FN550 MVD and 3nos. Package AC made OFF.	17536	0.13	0.13	0.15	2
8	Control Running Hrs. of 241FN300 Silo cone Venting Fan	16166	0.12	0.12	0	
9	Control Running Hrs. of 611FN400 Silo cone Venting Fan	16166	0.12	0.12	0	
10	Office Area , Conference room ,Cafeteria Area all cassette AC ON/OFF through DCS with timer And 3 nos. AC made off (2KW*3Nos)	9600	0.07	0.07	0	
<b>Total</b>		<b>12245638</b>	<b>91</b>	<b>91</b>	<b>1.68</b>	





	Title of Project	Annual Electrical Saving (kWh)	Annual Electrical Cost Saving	Total Annual Savings	Investment Made	Payback (Months)
			(Rs million)	(Rs million)	(Rs million)	
1	Installation of new Air Slide from Mill Building to Product elevator to increase through put.	720000	5.2	5.2	2.3	6



- For VRM Cement grinding it is mandatory requirement to maintaining temperature inside mill for effective grinding.
- Supplied system was designed for Diesel Fuel.
- Continuous exploring alternative fuel for Mill operation
- And with Process optimization and Kaizen achieve sustainable reduction in Fuel consumption.



## Root Cause Analysis Step



### Problem

- Hot Air generator fuel consumption high

### Data collection

- Checked last 5 month fuel consumption trend.

### Problem Identification

- To maintain operating temp. fuel Cons. high

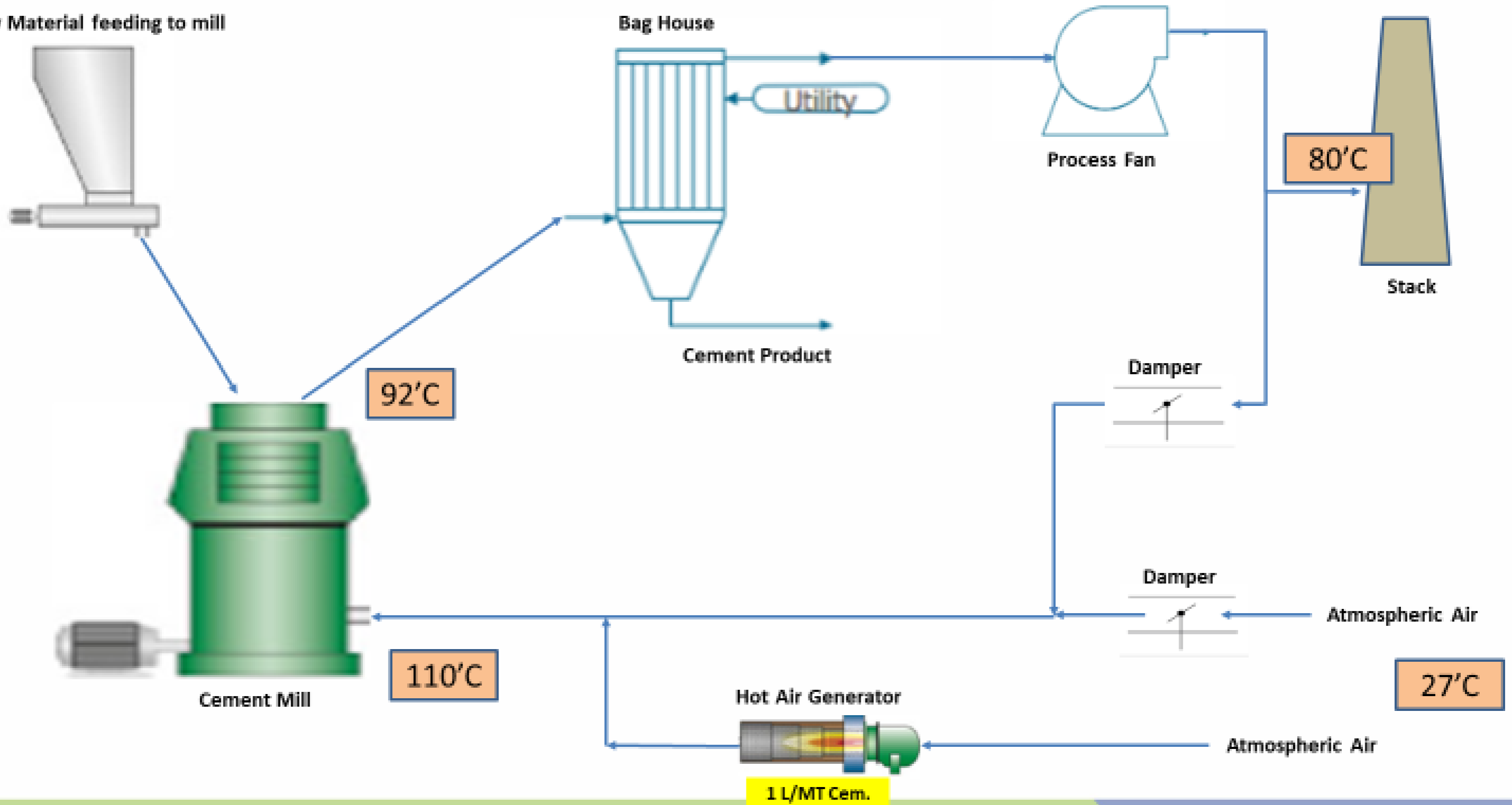
### Root Cause

- Low temperature of atmospheric air

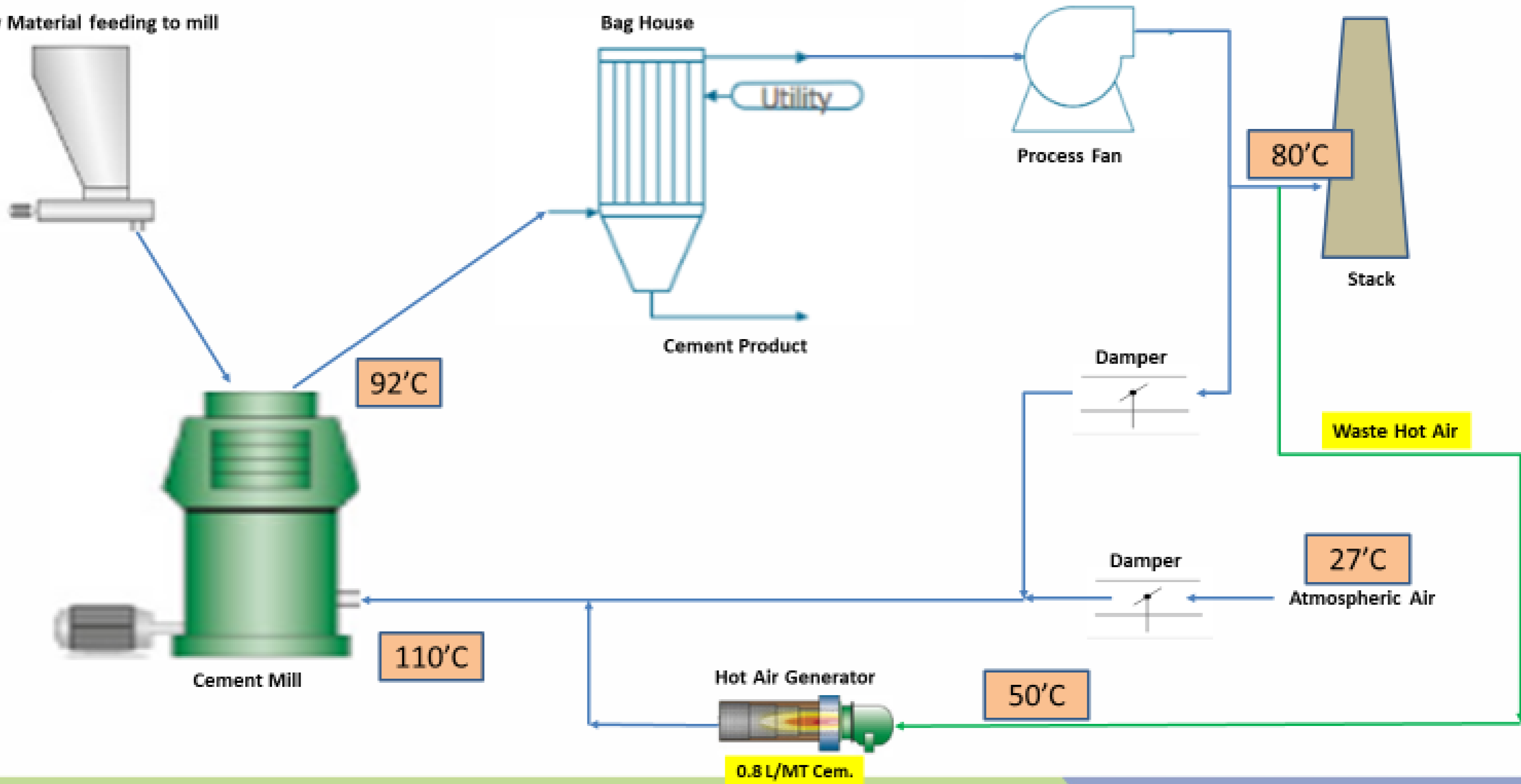
### Recommended Modification

- Use of waste hot air as secondary air for HAG

Raw Material feeding to mill

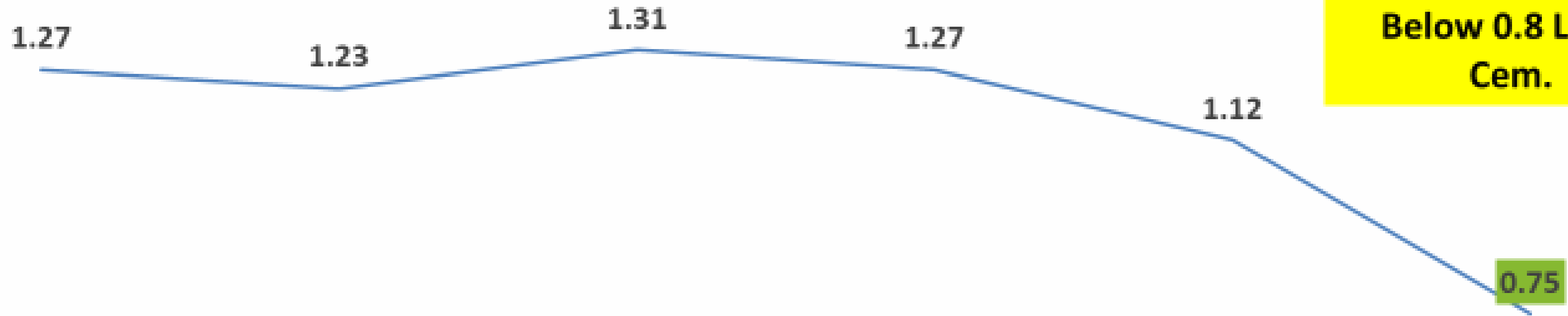


Raw Material feeding to mill



## HAG Fuel (L/Ton of Cement Production)

Fuel consumption  
Below 0.8 L/MT  
Cem.



Nov-21

Dec-21

Jan-22

Feb-22

Mar-22

Apr-22

—HAG Fuel (L/Ton of Cement Production)

**Implemented area** – Hot air generator (HAG)  
**Implemented By** – Mechanical and Process team  
**Cost of implementation**– INR 20K.

**ONE TIME  
INVESTEMENT**

**Result/Benefit –**

- Saving of fuel.

**Saving of fuel per ton of Cement production** – Approx. 0.2 L

**Saving of fuel for 15 Lacs MT cement production/annum**– Approx. 300000 L

**Fuel Cost per L**– INR 65

**Annual Saving**– INR 195 Lacs approx.



**SHARE PURCHASE, SUBSCRIPTION AND SHAREHOLDER'S AGREEMENT**

This **SHARE PURCHASE, SUBSCRIPTION AND SHAREHOLDER'S AGREEMENT** ("Agreement") is entered into at New Delhi as on this the 4th day of February, 2021,



**JK Cement Aligarh has made agreement with AMP Solar Urja Pvt. Ltd. & AMP Solar technology Pvt. Ltd.**

**To Purchase Contracted Quantity of Solar Power with Power producer.**

**Awaited to receive power for non renewable source of Energy Conservation.**



**50 Nos. Solar Light inside plant**



**60 Nos. Solar light nearby village**



**Power Saving of 10000 KwH/year**



**COMMITTED TOWARDS BUILDING  
A SUSTAINABLE FUTURE**

In an endeavor to achieve its 'Decarbonisation Dream',  
**JK Cement Ltd** signs a long-term-strategic  
**Memorandum of Understanding (MoU)** with  
**Punjab Renewable Energy Systems Private Limited (PRESPL)**  
to reduce carbon emissions by **20%**.

JK Cement Ltd announced signing a long-term strategic Memorandum of Understanding (MoU) with Punjab Renewable Energy Systems Private Limited (PRESPL), India's largest biomass aggregation and densification company with forward integrated value chain. The MoU, valid for 10 years, is part of JK Cement's endeavour to decarbonize its operations and aims to significantly scale-up the use of biomass-based and alternate fuels as a replacement to fossil fuel like coal in its manufacturing operations.

Target of reducing current emissions from 593 kg/T of cementitious product in FY20 by more than 20% till FY30. This will support us in replacing our fossil fuel consumption by more than 35% TSR by 2030, thereby leading to our significant milestone of being net-zero in carbon emissions by 2050.



Current issue date: 22 July 2021  
 Expiry date: 21 July 2024  
 Certificate identity number: 10379092

Original approval(s):  
 ISO 14001 - 22 July 2021  
 ISO 45001 - 22 July 2021  
 ISO 50001 - 22 July 2021  
 ISO 9001 - 22 July 2021

## Certificate of Approval

This is to certify that the Management System of:

### J. K. Cement Works

ALIGARH

(Unit of J. K. Cement Limited), Village - Satha, Tehsil - Koil, ALIGARH  
 UTTAR PRADESH 202127, INDIA

has been approved by Lloyd's Register to the following standards:

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

Approval number(s): ISO 14001 – 00031804, ISO 45001 – 00031805, ISO 50001 – 00031806, ISO 9001 – 00031807

The scope of this approval is applicable to:

Manufacture of ordinary Portland cements and blended cements at Aligarh.

**Certified By-  
 Lloyd's Register  
 For all Four standards  
 ISO 14001:2015  
 ISO 45001:2018  
 ISO 50001:2018  
 ISO 9001:2015  
 Issue Date: 21-07-2021  
 Valid till: 21-07-2024**

#### EnCon Project budget allocation %

Total turnover of the company/plant FY 2021-22 (Rs. Million)	6020
Amount invested in EnCon Projects FY 2021-22 (Rs. Million)	1.7
Investment %	0.03%

**98% energy saving project done without investment**



## JK Cement Aligarh, Daily monitoring system

PPP		YTD 19-20	YTD 20-21	YTD 21-22	YTD 22-23	Apr-22	May-22	Jun-22
Cement Mill	TPH	213.21	256	259	244	241.81	244.80	245.11
Cement Production	MT	40035	942411	1255371	358022	125417	97112	135493
Cement Dispatch	MT	36466	943337	1255360	357072	124533	98023	134516
Grinding Power SPC	KWh/ MT.	40.75	27.77	20.93	19.03	19.34	19.05	18.73
Pkg. Power SPC	KWh/ MT.	3.26	1.43	1.00	0.75	0.76	0.72	0.77
Misc Power	KWh/ MT.	11.12	5.06	3.88	3.53	3.33	3.88	3.47
Total Power Pack SPC	KWh/ MT.	55.13	34.27	25.82	23.31	23.44	23.64	22.97

Energy review meeting chaired by UH, with plant team for reviewing the energy parameters and setting up the targets for next month.

**IMPORTANT  
KAIZEN**

**SUPERVISOR LEVEL-** Installation of DFA dispersion plate inside mill.

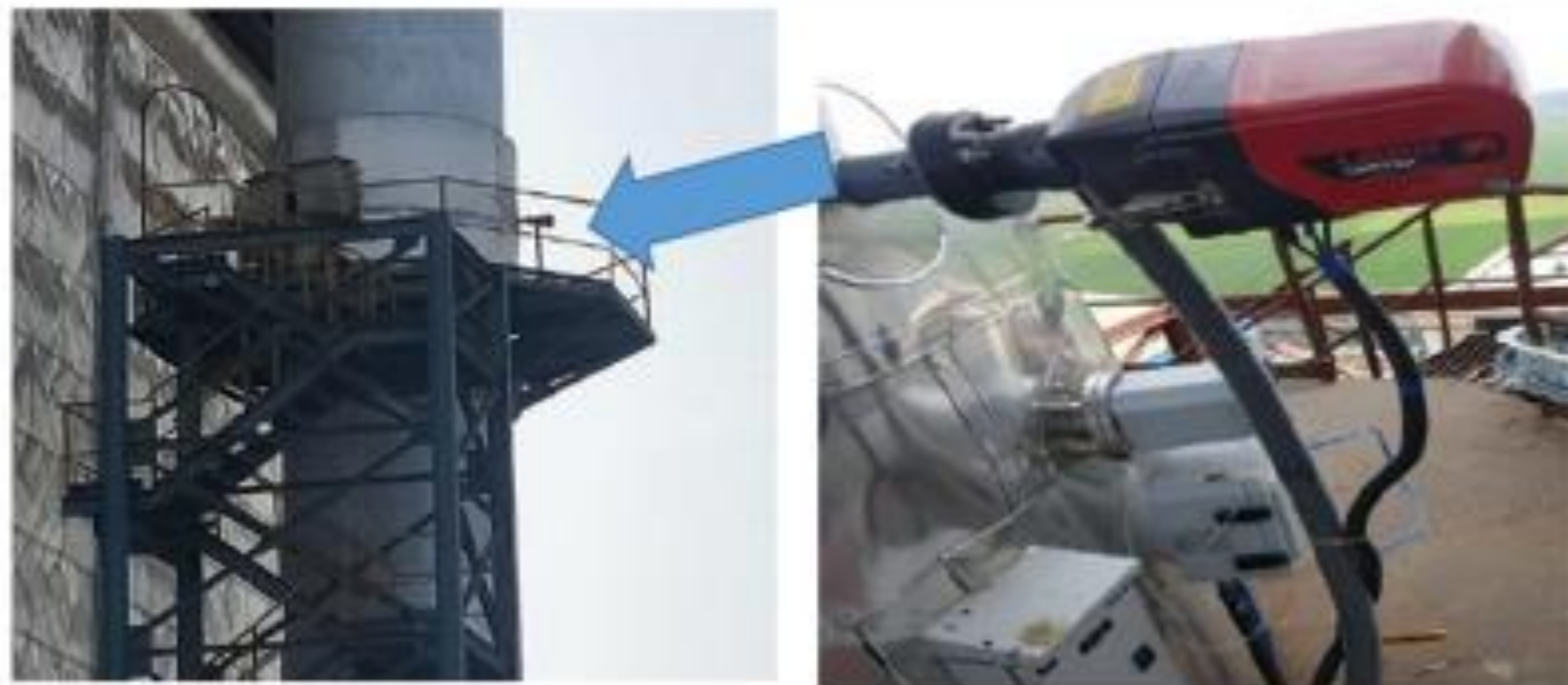
**WORKER LEVEL-** Interconnection of airslide blower pipe, to stop one blower.

JKCement DASHBOARD PROJECTS PROJECT ENERGY SAVING FORM Vipin Choudhary PROJECT USER

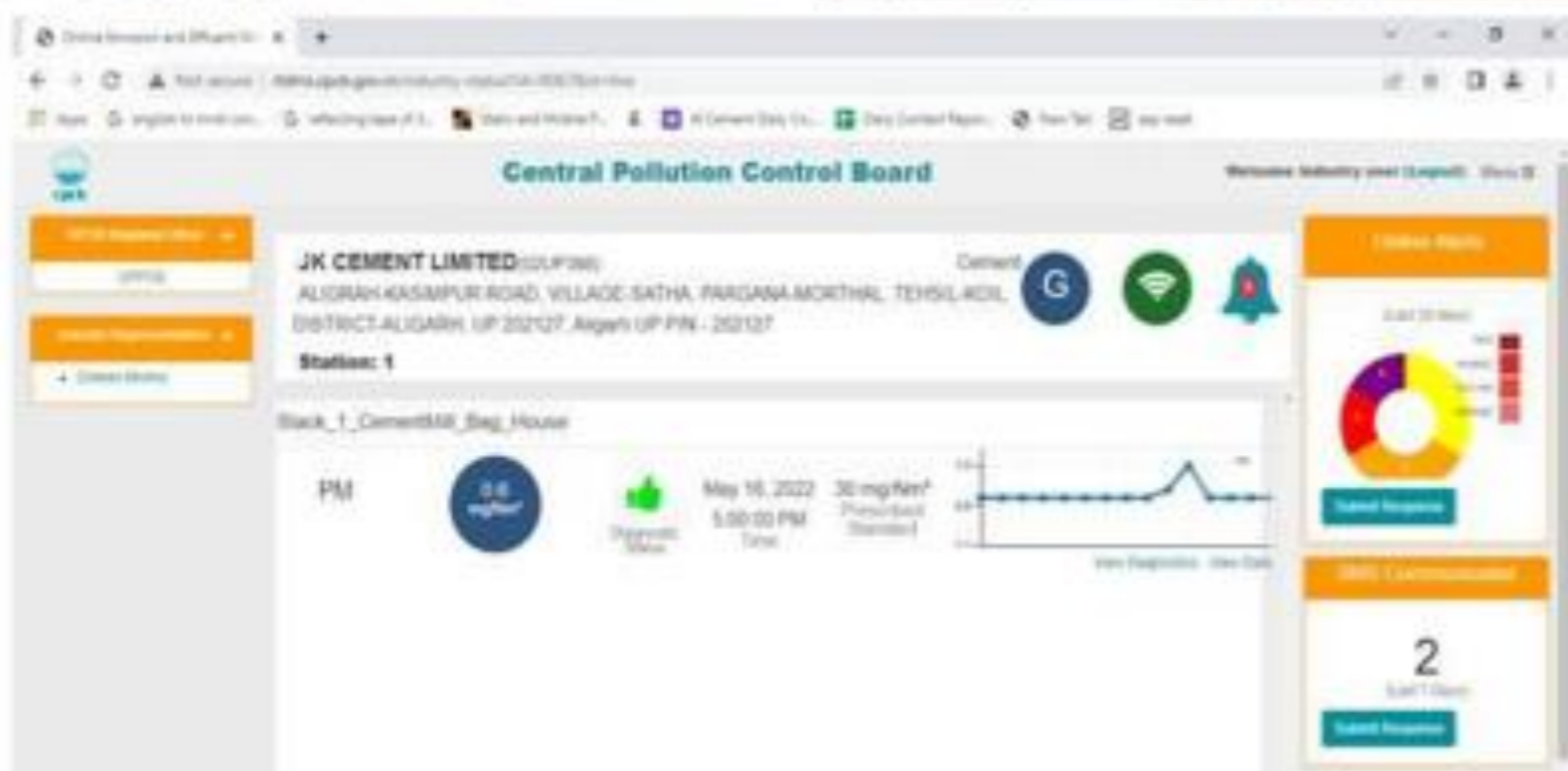
Select Plant Name ALIGARH Select Project Type -select- Select Year -select- Search project title

Project #	Plant Name	Project Type	Project Title	Year	Total cost (lacs)	Total energy saving (lacs)	Payback time (months)	
<a href="#">RQ0000002</a>	ALIGARH	Kaizen	Seperation of invertor Transformer cham...	2022	3.00	1.09	4.31	APPROVED
<a href="#">RQ0000003</a>	ALIGARH	Kaizen	Seperation of invertor Transformer cham...	2022	3.00	1.09	4.31	APPROVED
<a href="#">RQ0000004</a>	ALIGARH	Kaizen	Seperation of invertor Transformer cham...	2022	3.00	1.09	4.31	APPROVED
<a href="#">RQ0000005</a>	ALIGARH	Kaizen	Seperation of invertor Transformer cham...	2022	3.00	1.09	4.31	APPROVED

Sharing and Learning of best practice for energy saving across various JK plant



Continuous Emission monitoring system and its online connectivity to SPCB and CPCB



Public display of emission data



# THANK YOU

**Sanyog Dubey (Unit Head)**

[sanyog.dubey@jkcement.com](mailto:sanyog.dubey@jkcement.com)

9108517806

**Anil Kumar Sharma (Production Head)**

[anil.sharma2@jkcement.com](mailto:anil.sharma2@jkcement.com)

9993907089

**Saurabh Kesarwani (AM-Planning)**

[saurabh.kesarwani@jkcement.com](mailto:saurabh.kesarwani@jkcement.com)

8787647447

