Ambuja Cement | ACC

adani Cement

udAAAn
Hum Karke Dikhate Hain

Adani Cement Ltd,
Unit- Ambuja Cement Ltd, Marwar

Team Members & Presenters		
Name	Chetan Raval	Indra Mani Singh
Designation	Chief Plant Manager	Head –Plant Performance Center

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1.Company Profile: Unit Introduction

Adani Group is an Indian multinational conglomerate, headquarter in Ahmedabad. Founded by Shri. Gautam Adani in 1988 , comprising 10 publicly traded companies. It has created a world class transport and utility infrastructure portfolio that has a pan-India presence.

India's 2nd Largest Cement Manufacturer

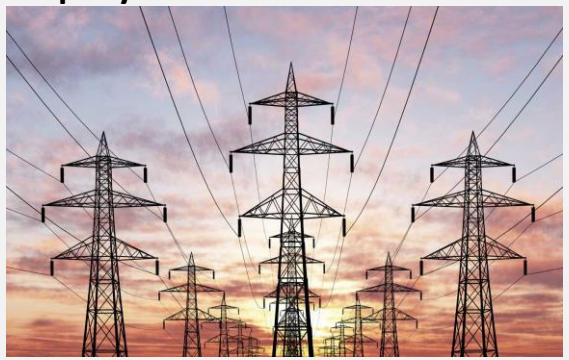
India's Largest Integrated Port Network

India's Largest Renewable Energy Company

India's Largest City Gas Distribution Network

India's Largest Airport Operator

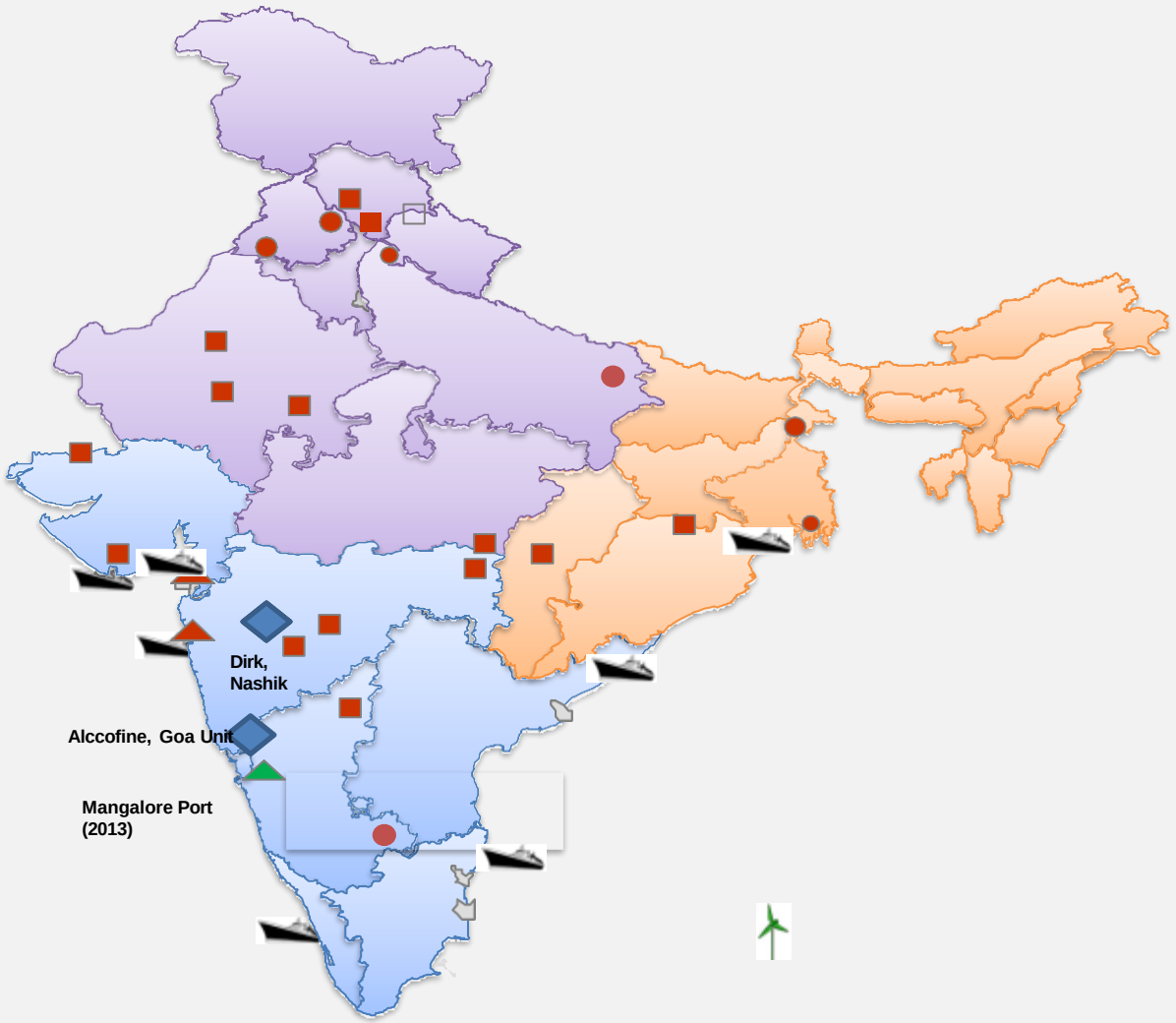
India's Largest Thermal Power Generation Company



India's Largest Private Power Transmission Network

India's Largest Food and FMCG Companies

Adani Cement at a Glance

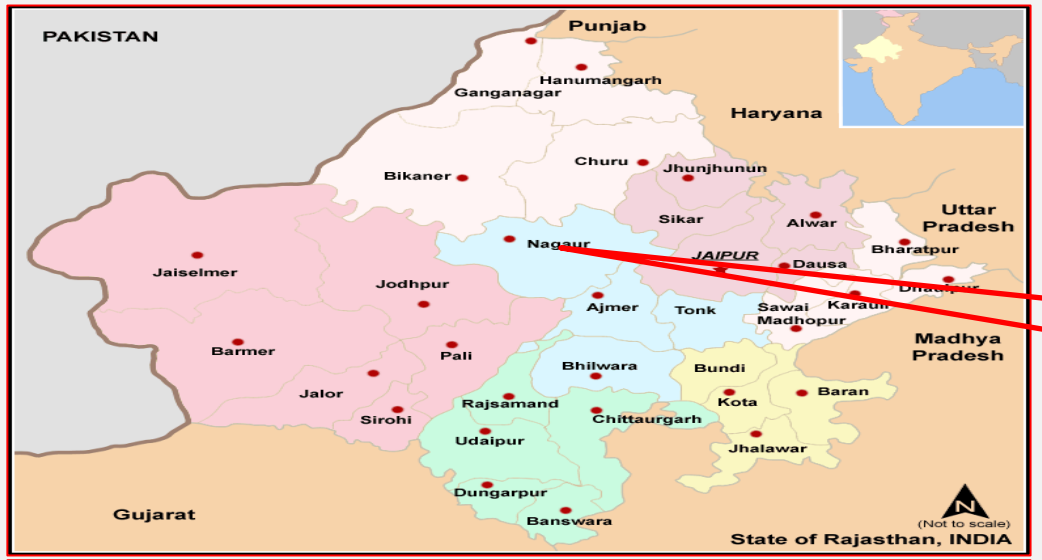


Total Capacity:78 Mio T (~12% of India's total capacity)

Asset Footprints

- **17 Integrated plant (13 Kilns)**
- **18 Grinding Unit (50 Mills)**
- **4 Terminal (BCT)**
- **9 Ports**
- **13 CPPs (Fly Ash source)**

Plant Location



1a.Plant Capacity Overview- Marwar

Mines-
5.5 MTPA

Kiln-
3 MTPA ,
9500- TPD

Clinker Storage
Silo 1 -113000 MT

WHRS
14 MW

AF Feeding and
Co-Processing
35 TPH
~20 % TSR

Cement-
2.0 MTPA in PPC

Silo
Connectivity

1 &2

CM 1

Packing-2nos of
180 TPH each

Packer Connectivity

Silo-1
7500
MT

BOTH
PACKER

Silo-2
7500
MT

Packer – 1 & 2
No. of Spouts-12
Double discharge

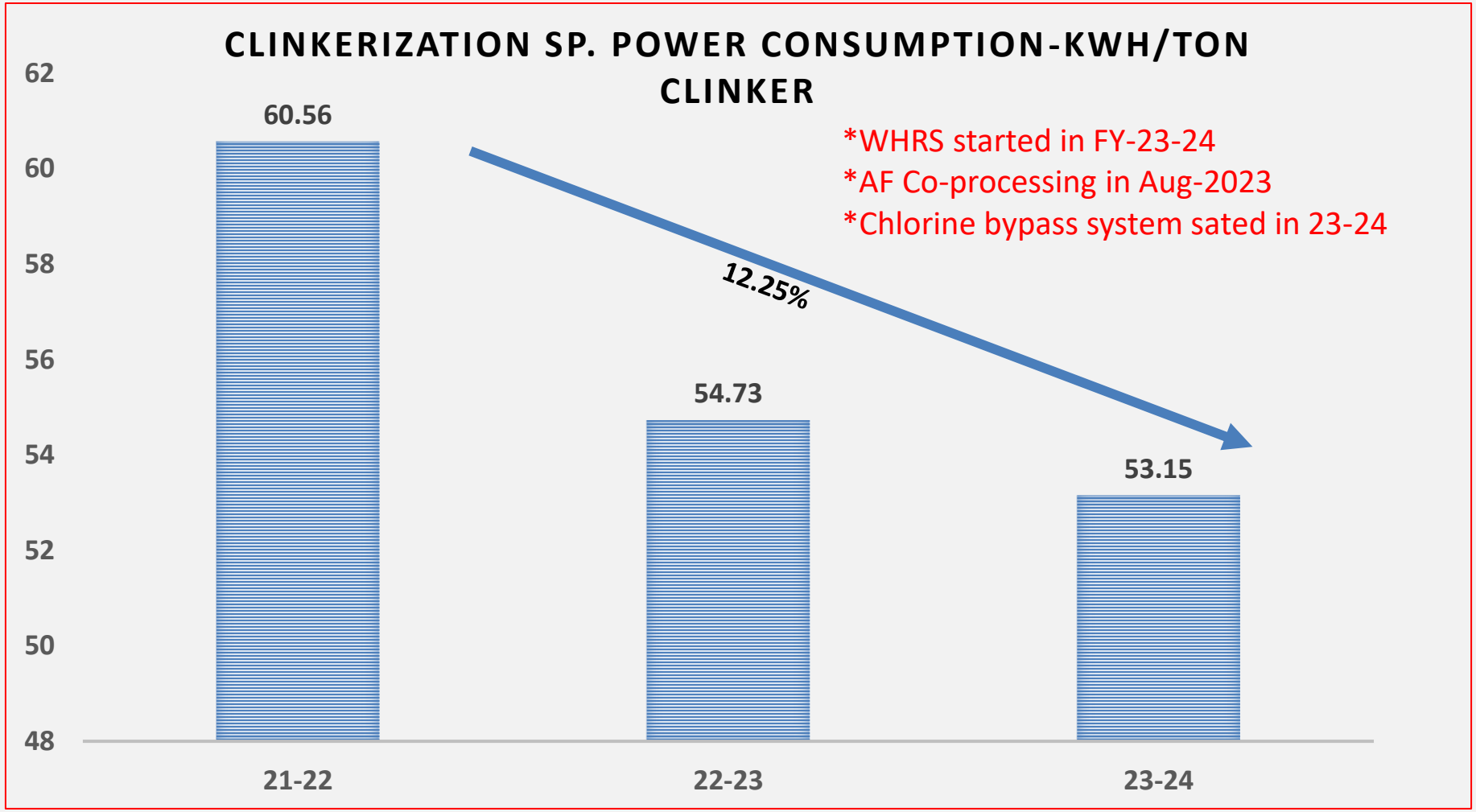
6 nos Truck loader (2 nos auto & 4 nos manual)

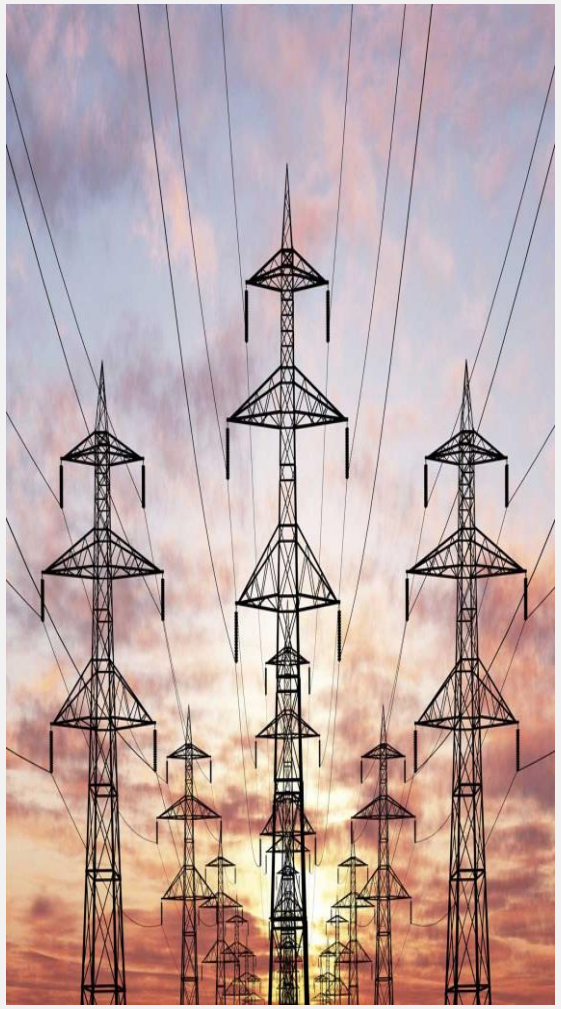
Clinker Bulk loading capacity: 3*150 TPH

1b.Major Sections - Specifications

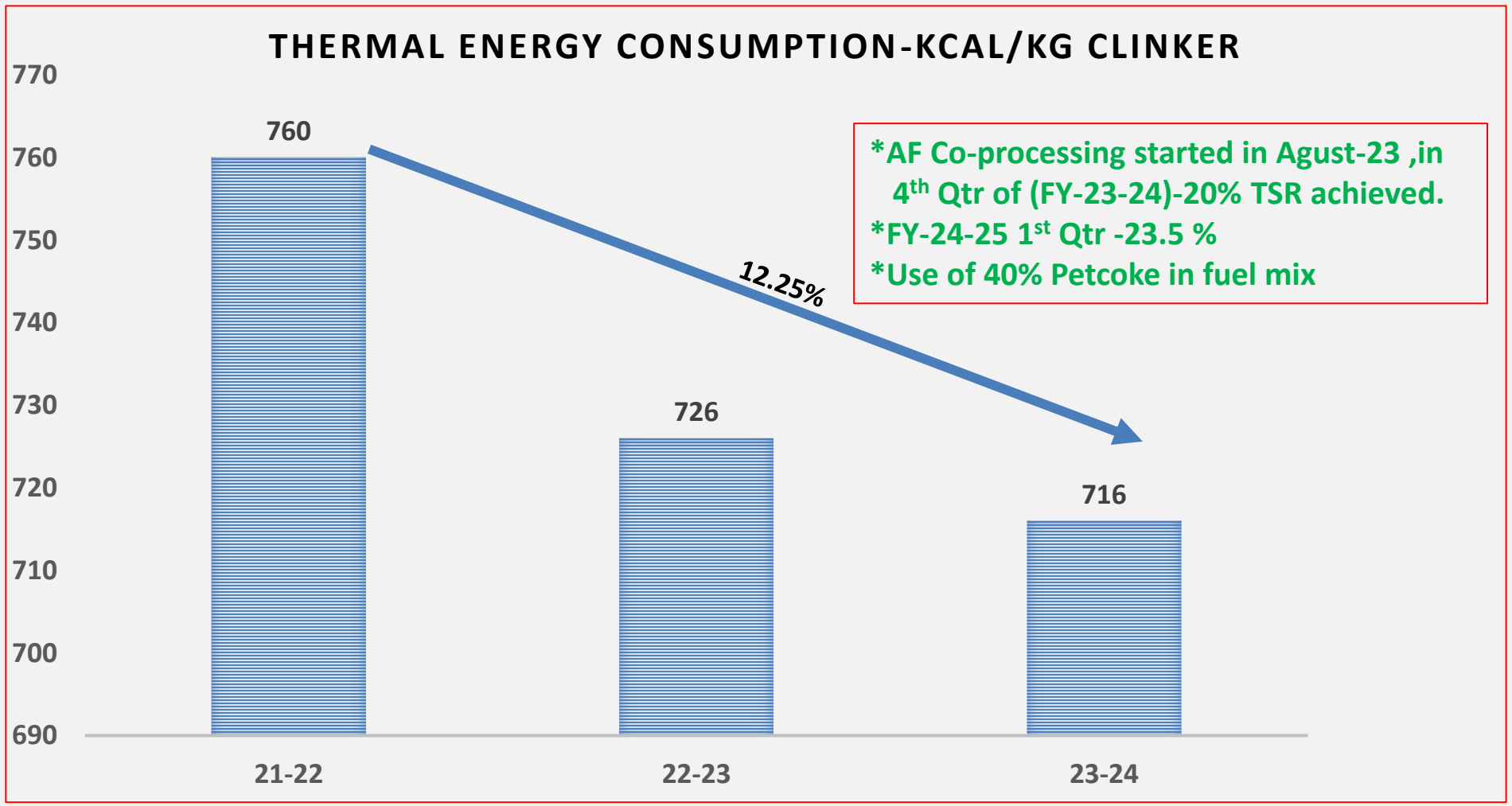
Equipment	Type / model	Design Capacity	Make
Limestone Crusher	L & T / APPM 2030	1650 with Wobbler -2000 TPH	M/S L & T
Raw Mill	FRM 59/575	800	M/S FLS
Raw Mill Bag House	Pulse Jet	1500000 m3/Hrs	M/S Thermax India
Pre Heater	LP Cyclone	9500 TPD	M/S SINOMA
Kiln	5.6 mtr Dia x 84 Mtr	9500 TPD	M/S FLS
Grate Cooler	IKN PEN – Effective Area 239 SQM	9500 TPD	M/S IKN
AF Feeding System		650 TPD/20 % TSR	M&J Denmark A/S
Cement Mill-1	OK 42-4 Vertical Roller Mill	280 TPH @8% Residue on 45 micron	M/S FLS

2.Specific Energy Consumption in Last 3 Years

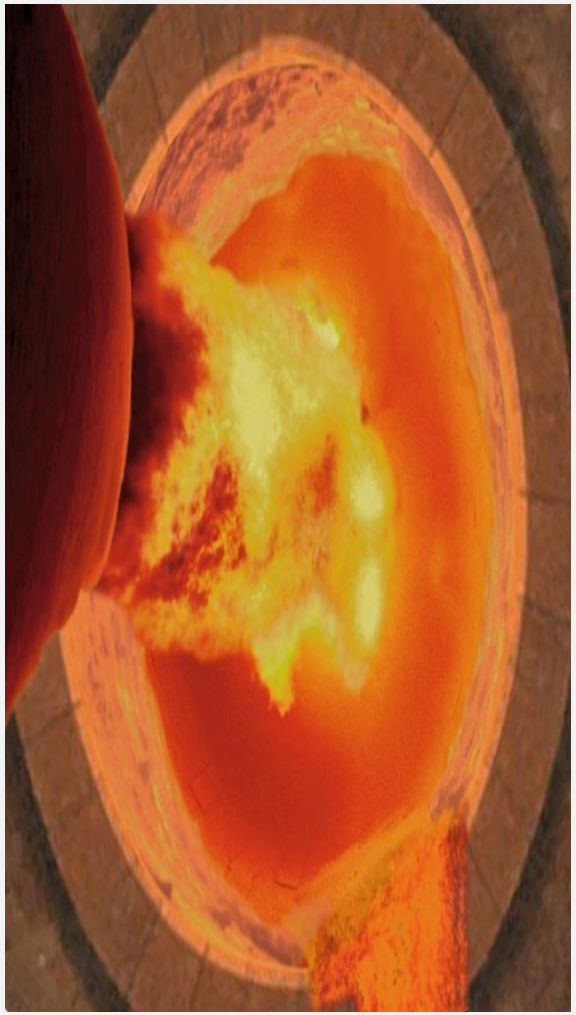




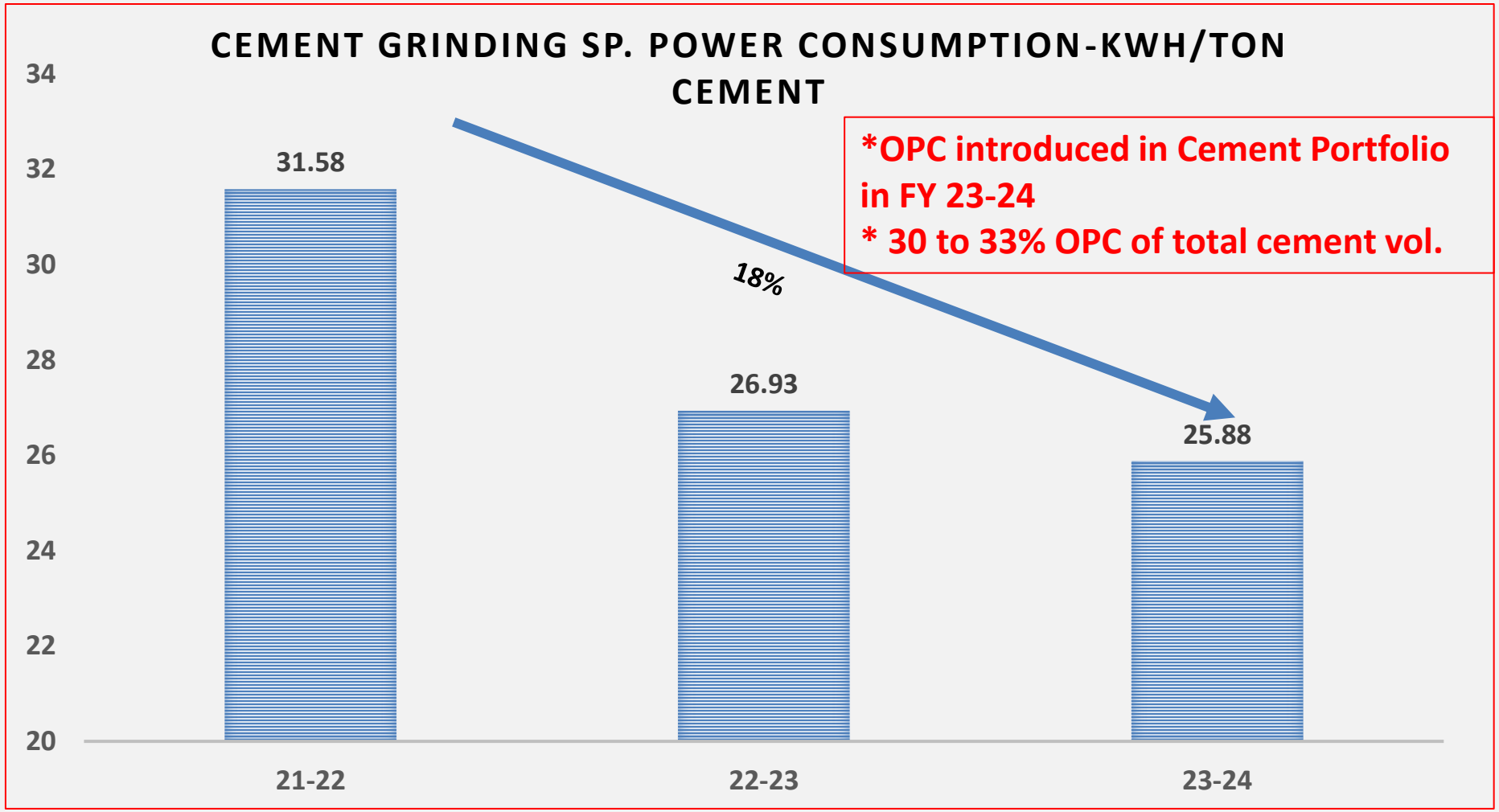
2a.Specific Energy Consumption in Last 3 Years

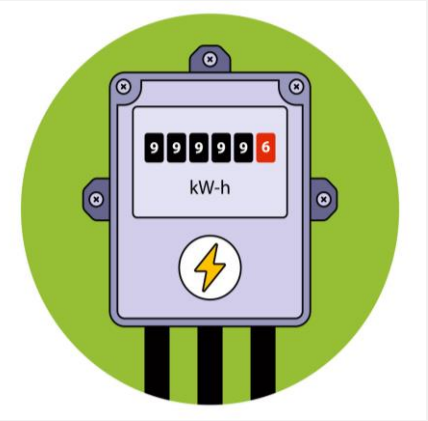


*AF Co-processing started in Agust-23 ,in 4th Qtr of (FY-23-24)-20% TSR achieved.
*FY-24-25 1st Qtr -23.5 %
*Use of 40% Petcoke in fuel mix

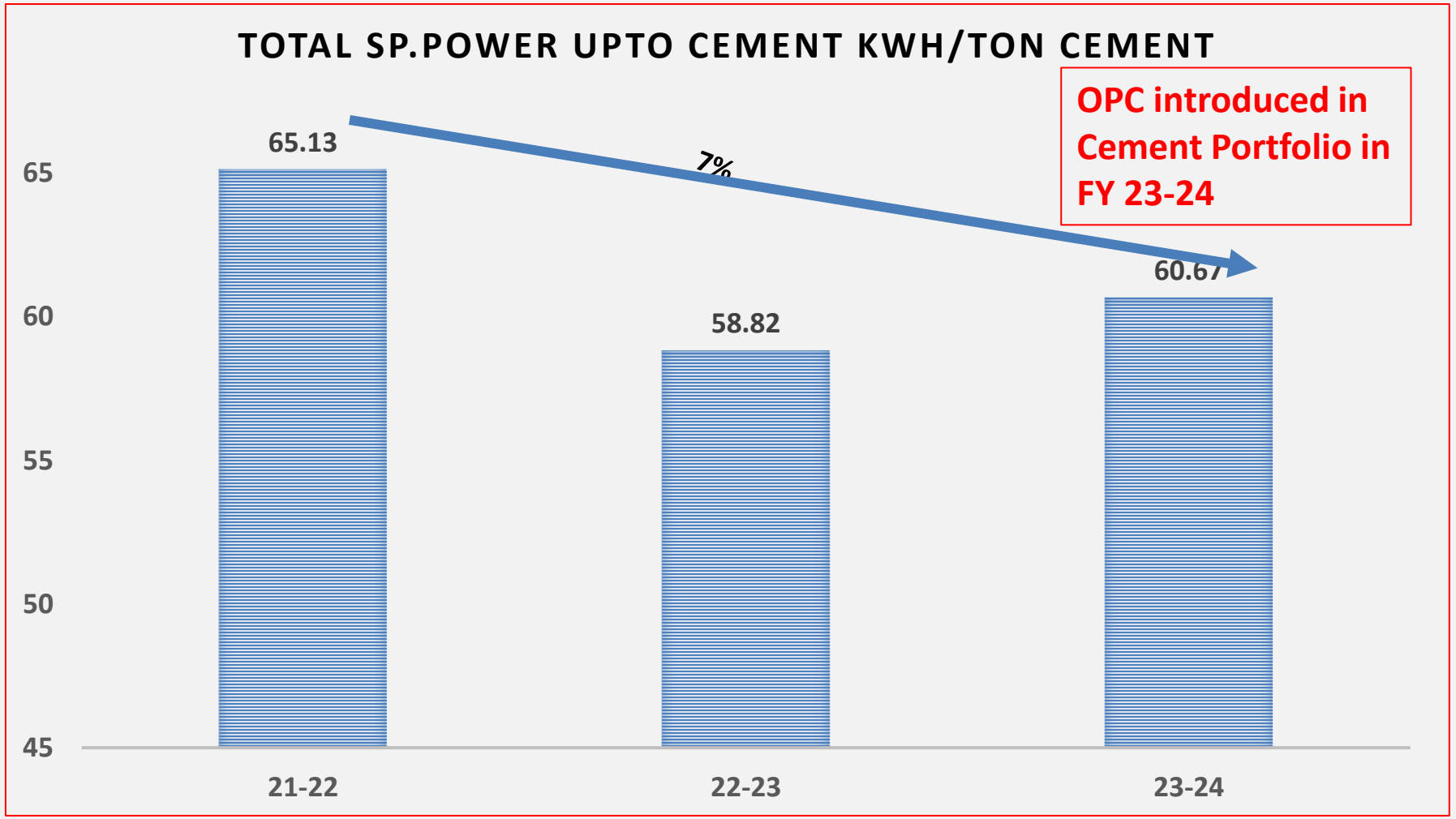


2b.Specific Energy Consumption in Last 3 Years





2c.Specific Energy Consumption in Last 3 Years



Road Map To Achieve Benchmark/National/Global Best

S.N		Marwar(With WHRS)	Ajmer clusterbest plant (ILC without WHRS)	Country Best Plant -1 (without WHRS)
1	Raw mill - VRM (kWh/ton of material)	15.2	12.9	12.8
2	Kiln (6 stage) (kWh/ton of clinker)	20.5	17.7	15.45
3	Coal mill (VRM) (kWh/ton of material)	**32.5**	37.9	33.9
4	Up to clinkerization (including crusher power) Kwh/Ton Clinker	53.5	42.6	42.1

Applause

- CII would like to congratulate Ambuja Marwar Plant Team for having one of the best Thermal Efficiency number (705 kcal/kg clinker) while operating at more than 20% TSR.
- Cluster Best Plant is having Thermal SEC of 679 kcal/kg clinker while operating at 5% TSR.

Road Map To Achieve Benchmark/National/Global Best

2023-24

1.BH Bags replaced with improve quality bags (SEEC – Reduced by 0.20 kwh/ton clk.
2.Raw Mill Dam ring and nozzle area modified; Raw Mill power reduced by 1.5 kwh/ton mat.
3.Kiln and Raw Mix optimized to produced clinker from 9500 to 10500 TPD
4.Installation of AF feeding and processing system –TSR improved from 0.19% to 20%
5.Optimization of cooler air distribution and bed height(SEEC- reduced by 10 Kcal/Kg Clk.
6.Cement mill Dam ring and roller gap optimization ,SEEC red. By 2.0 Kwh/ton Cem

2024-25

1.Kiln up gradation plan to run on 12000 TPD)
2.Modification of Nozzle ring & Armour ring of Raw Mill and Rocker arm , Roller sealing
3.Modification of OLBC to increase TPH of Belt from 1000 to 1600.
4. Modification of Cement Mill product elevator and separator to increase capacity from 310 to 330 TPH
5.Installation of hot air duct from cooler stack to cement mill I/L duct for improving the WFA consumption from existing 10 % to 13 %

2025-26

1.Installation of secondary crusher /Installation double rotor crusher in line no-1
2.PH Top cyclone modification to reduce dust return and reduction of STEC by 4 kcal/Kg
3.Solar Power Plant of 30 MW
4.Bogie container unloading system for fly ash unloading, wagon trippler for unloading coal
5. LC cement Production
6. Modification of PH down comer duct
7. Modification of Raw Mill Cyclone to reduce pressure drop.

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Major ENCON Projects

Year	With Investment				Without Investment	
	No. Of Proposals	Investments in Cr	Savings in Cr	Payback Years	No. Of Proposals	Savings in Cr
2021-22	2	5	13		1	1.7
2022-23	3	0.35	2.25		1	0.7
2023-24	4	52	12.5		0	5.7
Total Cost Saving in Cr			27.75			8.1

Energy Saving projects implemented in last three years

Year	Name of Energy saving projects	Investments (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)
21-22	Improvement of Reliability of Each section	50	5.1	100	130	4
	Running Raw Mill in Power Mode	0	3.0	0	17	0.75
22-23	Reduction of Limestone Size from 90% passing on 75 mm to 90% passing 50 mm	2.0	1.27	0	6.65	0.3
	start and stop delayed time optimized and auto stopped of equipment on idle running	0	1.4	0	7.4	0.45
	Raw Mill Dam ring reduced from 145 mm to 130mm and Coal Mill Dam ring increased from 180 mm to 200mm	1.5	1,45	0	7.65	0.5

Energy Saving projects implemented in last three years

Year	Name of Energy saving projects	Investments (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Impact on SEC/ SHC (Electrical kWh /MT cementor Kcal/Kg cement)
23-24	Installation of HLC for Kiln and Mills	15	1.02	43	49.7	0.32 unit/cem & 7.5 Kcal/Kg Clk
	Cement mill Dam ring and roller gap optimization ,SEEC red. By 2.0 Kwh/ton Cem	0.25	3.0	0	3.0	2
	BH Bags replaced with improve quality bags (SEEC – Reduced by 0.20 kwh/ton clk.	50	0.56	0	14.59	0.15
	Optimization of cooler air distribution and bed height(STEC-reduced by 10 Kcal/Kg Clk.	0	0	57.82	57.82	10

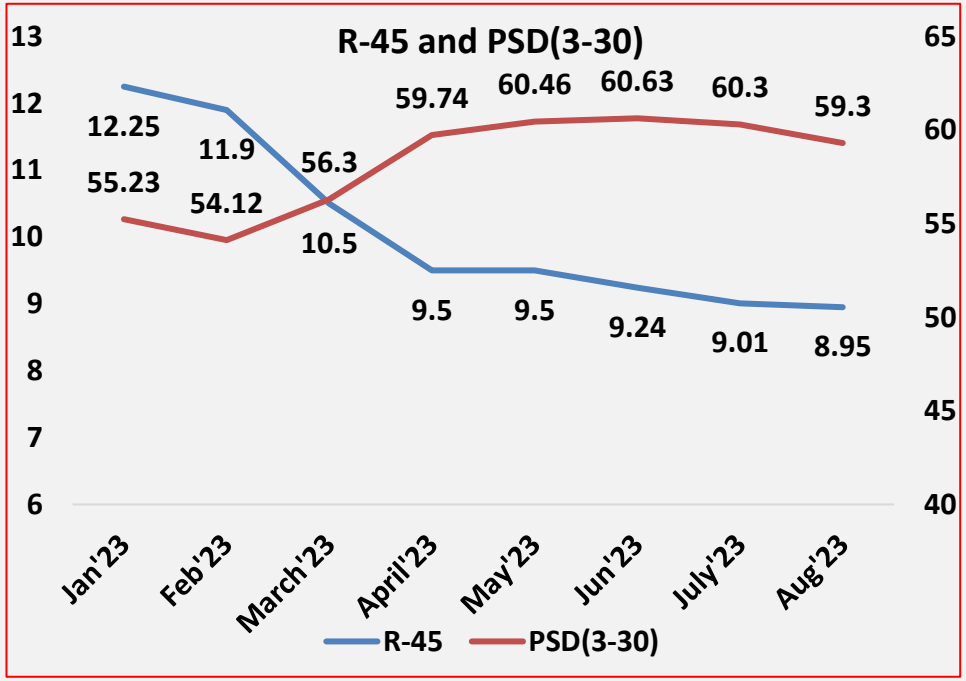
List of Major ENCON project planned in FY 2024-25

Title of Project	Annual Electrical Saving (Million kWh)	Annual Thermal Saving (Million Kcal)	Annual Energy Saving (ToE)	Invest. (Rs in Million)	Est. Payback Period (months)	Comment
Raw Mill Rocker arm modified Seal installation to minimize the false air ingress	1.75	0	150	10	13	Sealing of rocker arm surrounding to reduce false in ingress
Raw Mill Armer ring and Nozzle ring modification	2.5	0	215	5	9	Nozzle area increased ,also angle changed from 45 to 42 degree
Low PA burner	0	1650	165	30	88	Primary air reduced from 9.5 % to 5.5%
OLBC Modification	0.924	0	79.44	15	50	Drive and motor modification for increased the LS TPH from 1050 to 1650 TPH
Hot air duct from ESP stack to Cement mill I/L hot air duct	0.46	0	39.55	15	175	WFA consumption increased by 3% ,considering this payback period -8 month

List of ENCON improvement in Cement grinding

During separator inspection, rotor seal gap measured, both vertical and horizontal distance found slightly higher side, Hence Team decided to reduced gap by installation of Felt

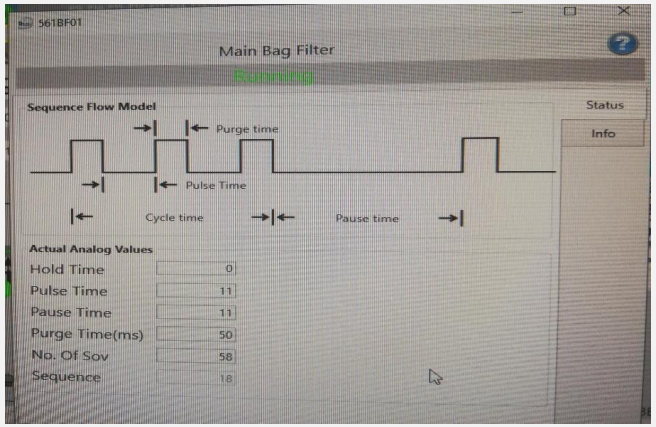
	0°	45°	90°	135°	180°	225°	270°	315°
Vertical	24	24	25	30	29	33	25	28
Horizontal	14	14	10	8	7	11	14	8

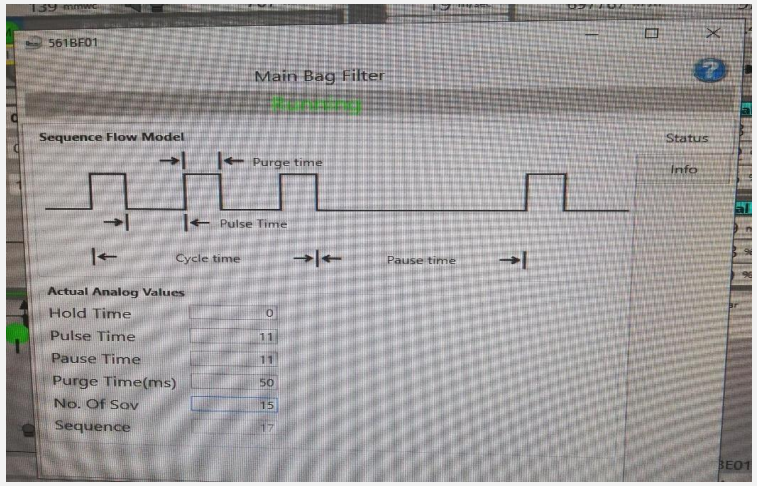


List of ENCON improvement in Cement grinding

Optimization of numbers of SOV pursing in one Command.

Problem-Earlier in one command 15 nos of SV Purged and 15 times command on to purge the all 212 SOV. of BH.(OEM original sequence) This result to high surges of material from Bag House and frequent tripping of product Elevator on high current, High DP of Bag House (130 -135 mmWG) and requirement of high purging Pressure i.e < 5.5 Kg/cm2.





Solution -Plant reduced the number of SOV purge in one command from 15 to 4 nos and also reduced the Purge pressure from 5.5 Kg/Cm2 to 3.5 Kg/cm2.

Benefits- **1**. Material surges minimized which result into smooth current of product elevator

2. Bag House DP reduced by 20 mmwg and fan power by 50-60 kw

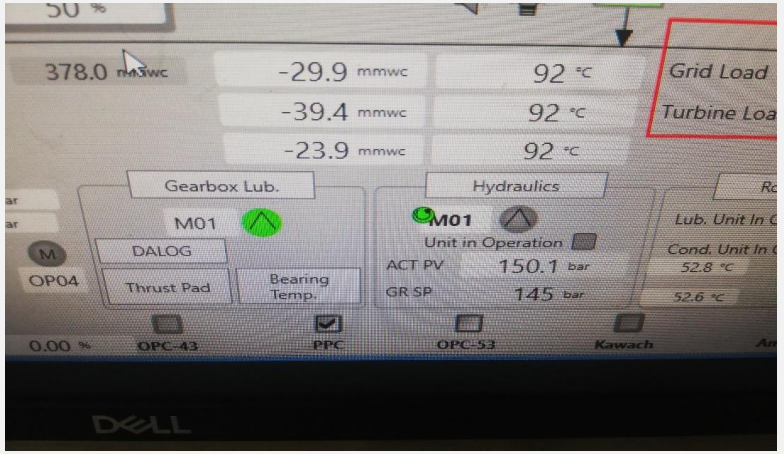
3. Reduction of Compressed air consumption in BH.

4. Bag life increased.

List of ENCON improvement in Cement grinding

Reducing the Table and Roller gap from 12 mm to 4 mm.

Increasing the Hyd. Pressure from 135 bar to 145 bar.



Benefit- 1.Mill Output increased by ~25 TPH

2. Grinding bed height decreased from 35mm to 30 mm.

3. R(3-30) also improved.

List of Major ENCON project planned in FY 2024-25

Title of Project	Annual Electrical Saving (Million kWh)	Annual Thermal Saving (Million Kcal)	Annual Energy Saving (ToE)	Invest. (Rs in Million)	Est. Payback Period (months)	Comment
STEC reduction by 1.5% by use of AB Catalyst in fuel	0	3465	346	0	0	55000 INR/Ton catalyste cost.300 gm/ton coal (only in main firing)
Installation of Trommel in AFR for siliceous & Clay material segregation, TSR increase by NCV improvement	0	36375	3637	34	51	TSR increased by 2.5%
PH cyclone Study and modification to reduce the pressure drop by 150-200 mmWg	1.5	12000	1328	100	4	
Cooler Fan-4, 5, 6 7,8 req. high flow capacity to meet air requirement on 12000 TPD	1.5	3000	128	75	0.5	

Innovative Project- Running WHRS In Island Mode

Project/Problem Description -

Frequent Tripping of Kiln due to voltage fluctuation & power failure from grid

Implementation Plan -

Installation of UV Relay

Implementation of Islanding scheme

Fine tuning of WHRS Governor

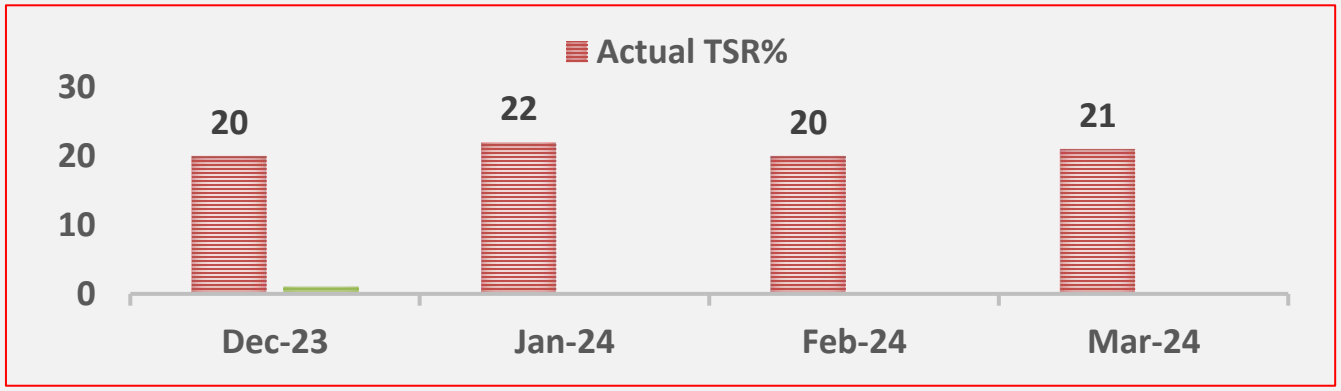
Fine tuning of UV Relay setting to avoid Unnecessary islanding of WHRS

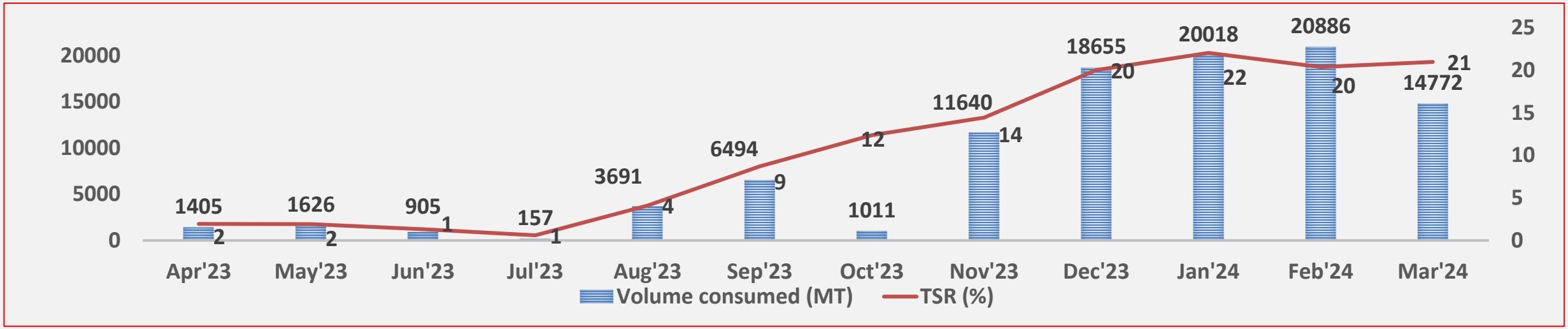
Change of Cooler operation strategy like increased the cooler fan RPM and ESP fan RPM to support WHRS(Island mode only) for higher power generation and incorporate in DCS for auto action.

SEG Make HIGH PROTECH Voltage Protection Relay.

- After implementation there is no stoppage on account of power failure / voltage fluctuation
- Avoided Kiln tripping (21 Times tripped in 2023)
- Saving in EBITA of **2.36Cr.**
- Improved Reliability of Equipment by avoiding thermal shock to Kiln refractory & Protection of Tire etc

AF Pre & Co-processing facility

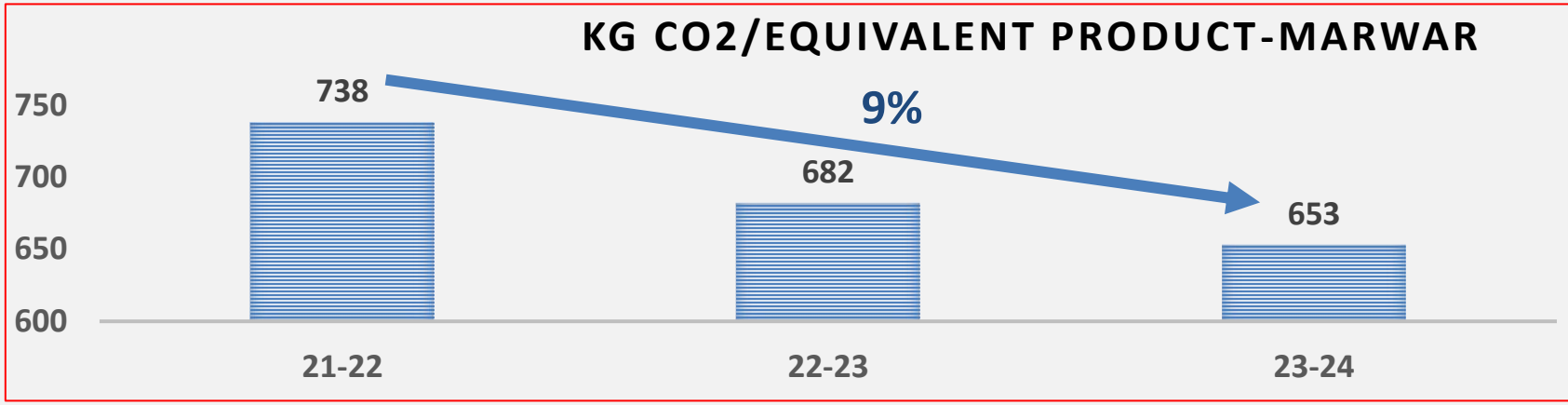




AF Volumes Co-processed

Year	Name of the Fuel	Quantity of waste Fuel used (MT/year)	NCV of fuel (kCal/kg)	TSR%	Heat Value (million kcal/year)
23-24	Biomass	21537	2337	2.38	50.52
23-24	RDF	76184	2111	7.62	160.83
23-24	Trade Reject	2179	2018	0.21	4.39
23-24	Carbon Black	1338	5379	0.34	7.20

GHG Emission Reduction and Action Plan



Comapany have taken this under ESG

1.Net Zero targets:

Ambuja Cements have committed to become Net Zero by **2050** or earlier.

2.The Group (adani group) plans to nearly quintuple its renewable energy footprint from currently operational capacity of 10.9 GW to 50 GW by 2030.

Decarbonisation Levers at Ambuja Cements

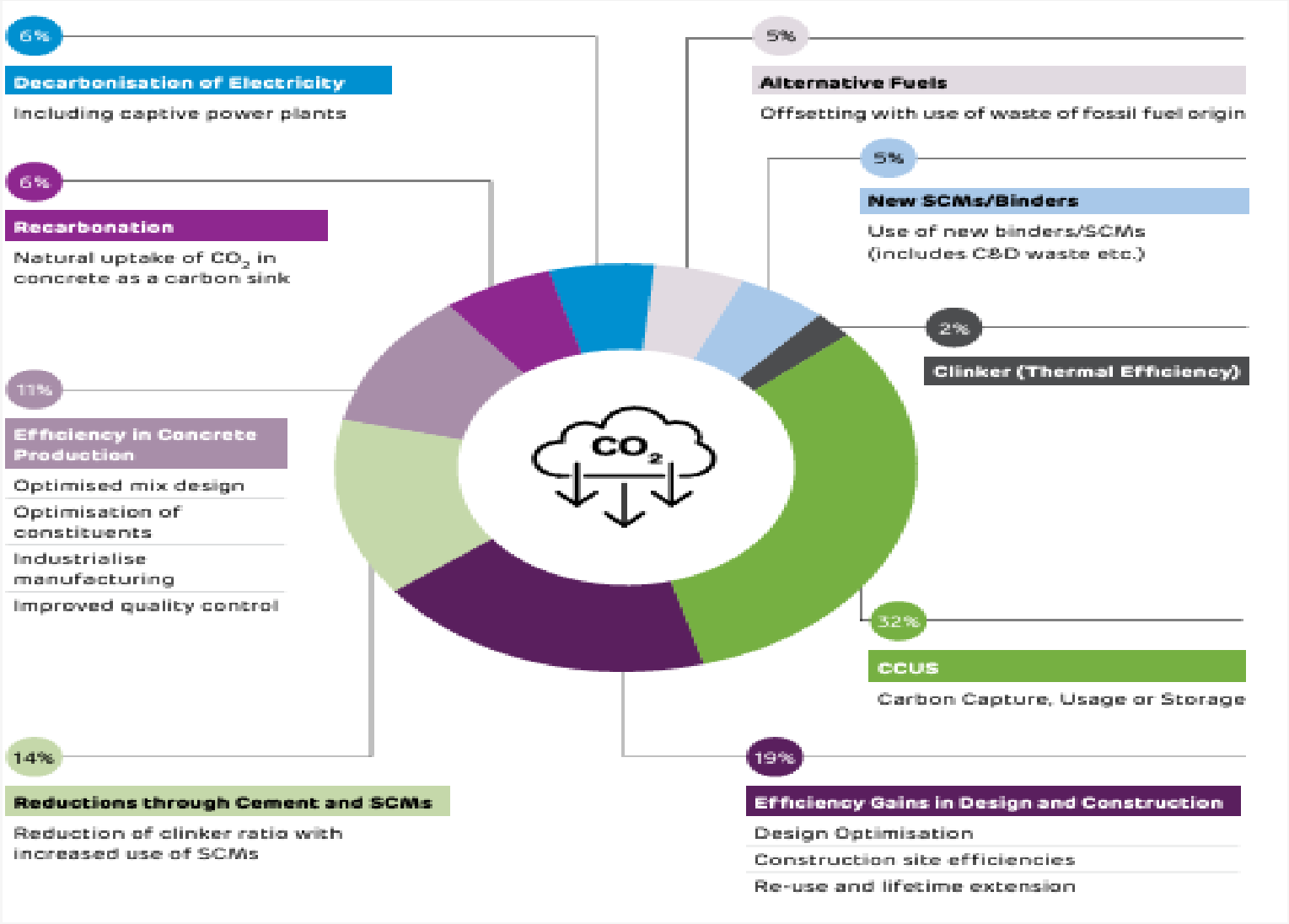
Scope 1	Scope 2	Scope 1 and Scope 2
▪ Energy efficiency improvement ▪ Use of alternate fuel ▪ Thermal substitution rate (TSR) improvement ▪ Development of new low-carbon products, i.e. low clinker content ▪ Maximising use of supplementary cementitious materials like fly ash, slag, and waste gypsum ▪ Higher use of waste heat	Decarbonisation of electricity ▪ Use of renewable energy ▪ Use of green energy – Waste Heat Recovery Systems (WHRS)	▪ Decarbonise supply chains ▪ Supplier engagement ▪ Procurement policy and choices ▪ Operational policies ▪ Business model innovation

Future Initiatives

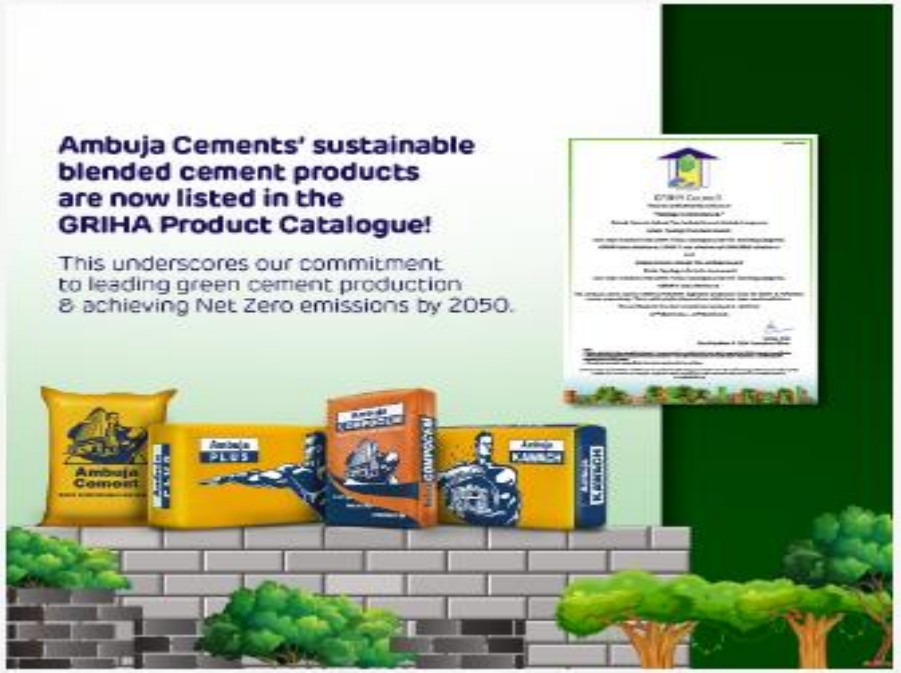
- Pilot on carbon capture and utilisation/storage with GCCA
- Green hydrogen: Exploring pilot project for green ammonia firing in cement kiln

KPIs	Targets for 2030	Performance in FY 2023-24	SDGs Impacted
Scope 1 CO_2 emissions	488 kg/tonne of cementitious material	559 kg/tonne of cementitious material	
Scope 2 CO_2 emissions	14 kg/tonne of cementitious material	22 kg/tonne of cementitious material	
Specific thermal energy consumption	710 kCal/kg of clinker	752 kCal/kg of clinker	
Specific electrical energy consumption	63 KWh/tonne cement	73.4 KWh/tonne cement	
Renewable and green energy installation	60%	19.1%	

Net Zero Road Map



Ambuja Cements is the industry leader in manufacturing and selling blended cement, that is green cement with a much lower clinker factor. This not only helps the environment by using the slag and fly ash but also helps to build durable and strong structures for the nation. More than **85%** of the Company's production is in blended cements.



Energy review & monitoring System

S. No.	Section / Equipment	Energy Consumption kWh	Average Load kW	Running Hours H	Production MT	Output TPH	kWh/MT of Material Target	Today	MTD	YTD
1	**Raw Material Extraction**									
1.1	Raw Material Extraction MiscelNPneous Power	1493	87	17.17	16528	963	0.04	0.0903	0.085	0.118
2	**Raw Material Preparation**	0								
2.1	Limestone Crusher Main Drive	5042	294	17.17	16528	963	0.8	0.31	0.329	0.321
2.2	Aux	7616	444					0.4	0.473	0.519
2.3	OLBC (291-BC03)	8290	483					0.4	0.518	0.535
	Total	20948	1220					1.1	1.32	1.375
3	**Raw Meal Preparation**	0	0							
3.1	Raw Mill Main drive	94118	4080	23.07	18067	783	15.2	5.21	5.973	5.973
3.2	Raw Mill Fan	129326	5606					7.16	7.165	7.103
3.3	Raw Mill classifier	3548	154					0.2	0.202	0.205
3.4	Raw Mill Auxiliary	27760	1203					1.54	1.673	1.674
3.5	Corrective Raw material handling	922	40					0.05	0.061	0.067
	Total	255673	11083					**14.15**	15.074	15.023
4	**Clinker Production**	0	0							
4.1	Kiln Main Drive	17091	712	24	10343	431	18.4	1.65	1.907	2.093
4.2	Preheater Fan	75701	3154					7.1	7.064	7.071
4.3	Baghouse Fan	16528	689					1.6	1.659	1.892
4.4	CooNPr ESP Fan	11428	476					1.1	1.123	1.183
4.5	CooNPr Fans	50248	2094					4.8	4.874	4.811
4.6	Kiln Aux.	40687	1695					3.93	3.704	3.915
4.7	Non Productive Power	18876	787					1.6	1.648	2.109
	Total	230558	9607					**21.78**	21.98	23.073
5	**Coal Preparation**	0	0							
5.1	Coal Mill Main Drive	13591	681	19.97	934	47	25.5	14.55	15.213	13.993
5.2	Coal Mill Fan	14104	706					12.1	14.988	14.34
5.3	Coal Mill Aux	9172	459					9.82	8.958	8.23
5.4	Traditional fuel handling	2366	118					2.53	2.052	2.142
	Total	39232	1965					**39**	41.211	38.705
5A	**AFR**									
5A.1	**AF COPROCESS POWER**	**3011**	**151**		**676**			**4.45**	**3.997**	**4.416**
5A.2	**AF PREPROCESS (GEOCYCLE PLATFORM)**	**4517**	**226**					**6.68**	**5.996**	**6.624**
	Total	**7529**	**377**					**11.14**	**9.99**	**11.04**
6	**Clinker auxiliaries**	0	0							
6.1	Water Pumps	5814	242	24	10343	431	2	0.56	0.562	0.587
6.2	Factory Lighting	4771	199					0.46	0.436	0.52
6.3	**Colony Lighting (70%)**	1408	59					0.14	0.123	0.166
6.4	Compressors	13994	583					1.35	1.425	1.414
6.5	Losses	251	10					0.02	0.034	0.044
	Total	26239	1093					**2.54**	2.579	2.732
A	**Total Energy consumption in clinkarisation**	**572650**	23860				48.04	**50.5**	**53.82**	**54.88**

1.War Room setup for monitoring Key KPIs

2.Weekly morning meeting in each section of Sr. Executives to review the energy consumption and performance of section.

3. Daily Coordination meeting to analysis the detail energy consumption report.

4.Monthly meeting with of all section in charge and HOD with Unit Head to review the plant efficiency parameter and action plan to recovered the gap if any.

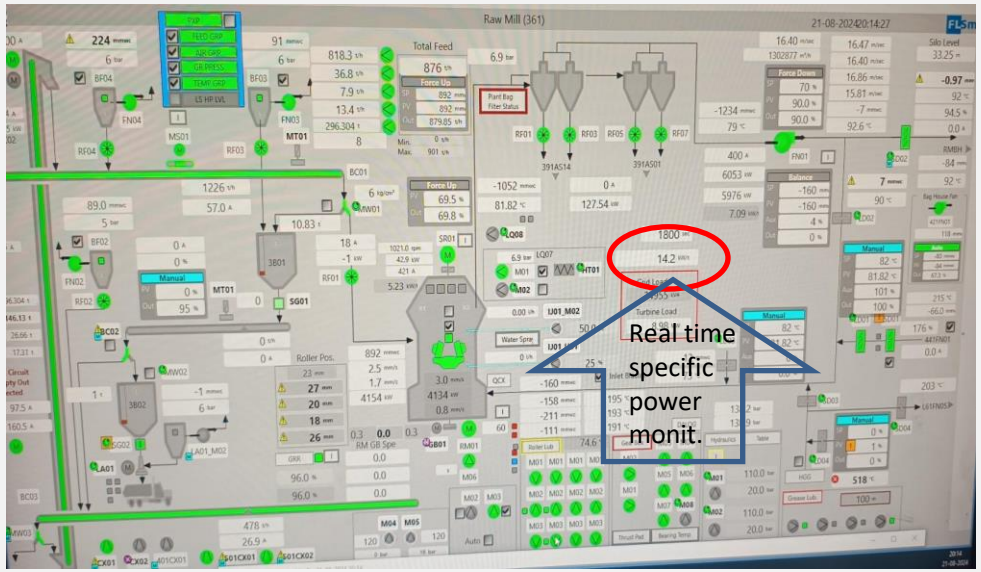
4.Half Yearly UdAAAn Championship at plant level and AAA level for best energy saving project

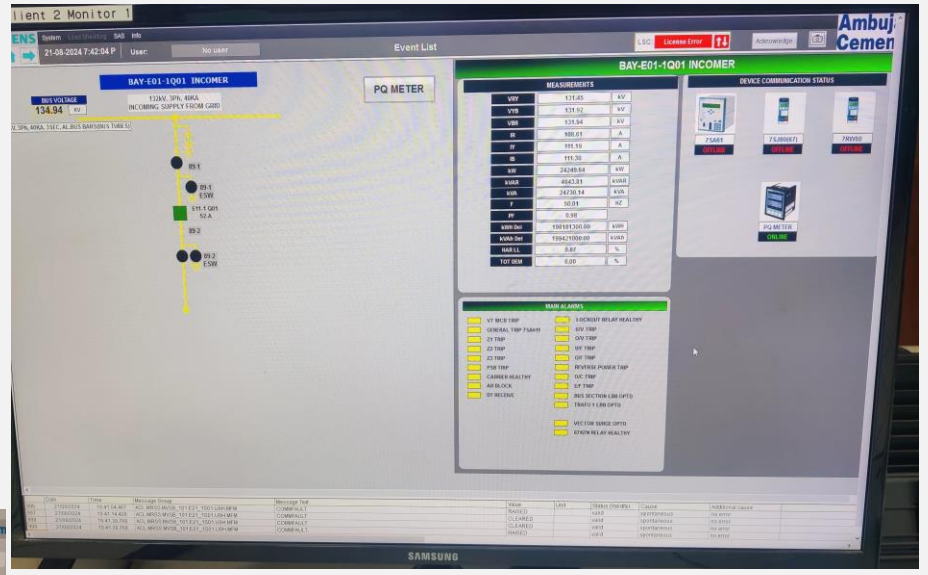
5.Yearly & Quarterly Idea Generation Session to get best efficiency parameter.

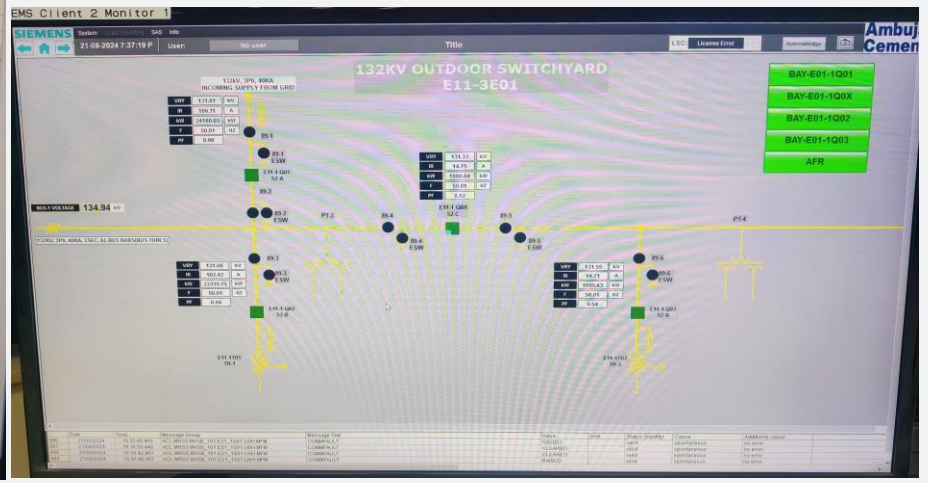
6. UPI (UdAAAn Performance Index) to choose best plant of month.

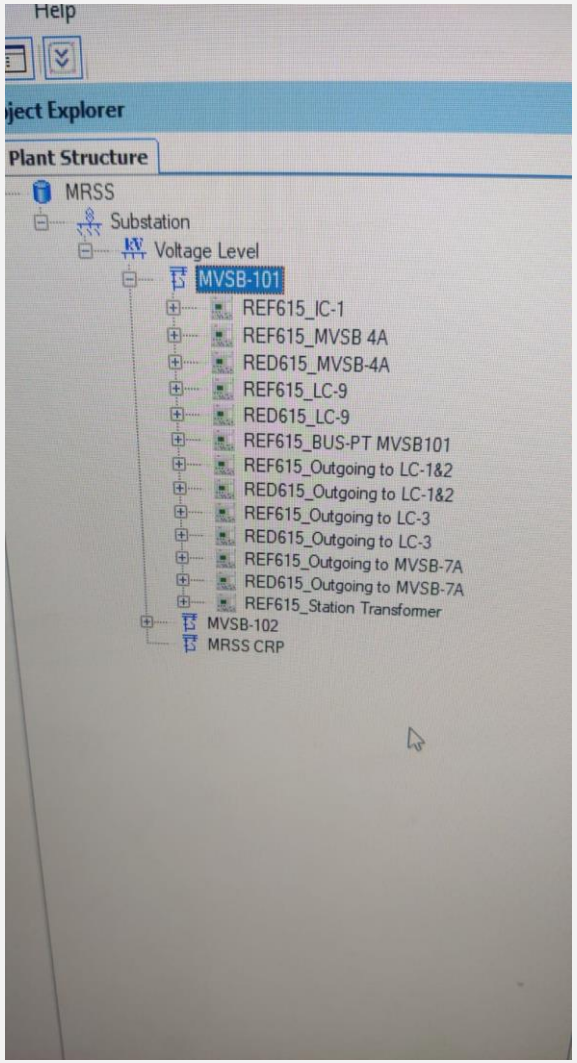
Energy Management System

- Real Time Energy & Electrical Parameters Monitoring.
- Auto Power Reporting by exporting data to TIS.
- Online Line viewing of Panel Relays Parameters and changes can be done.





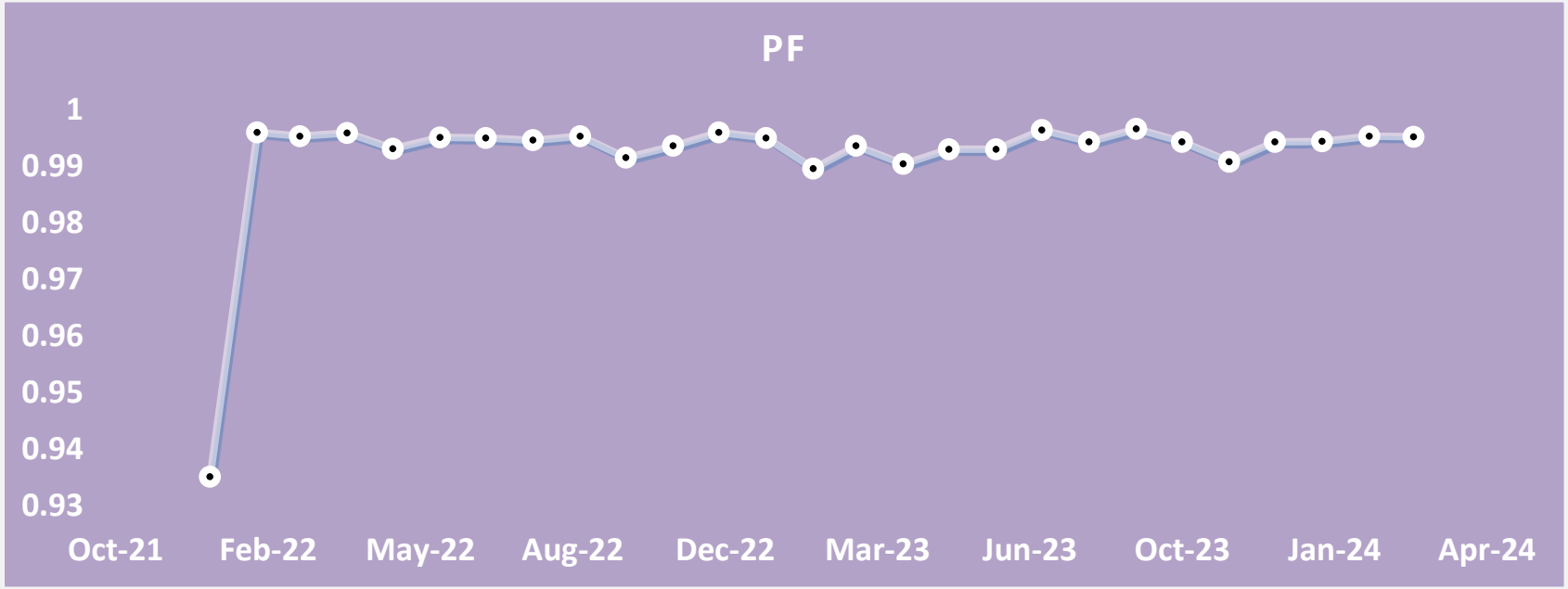




Energy Management System

Getting Rebate by Maintaining Power Factor

- ❑ Regularly Maintaining Power Factor to achieve rebate on Electricity Bills.
- ❑ Installed Reactor for maintaining power factor during low load (Shutdown)



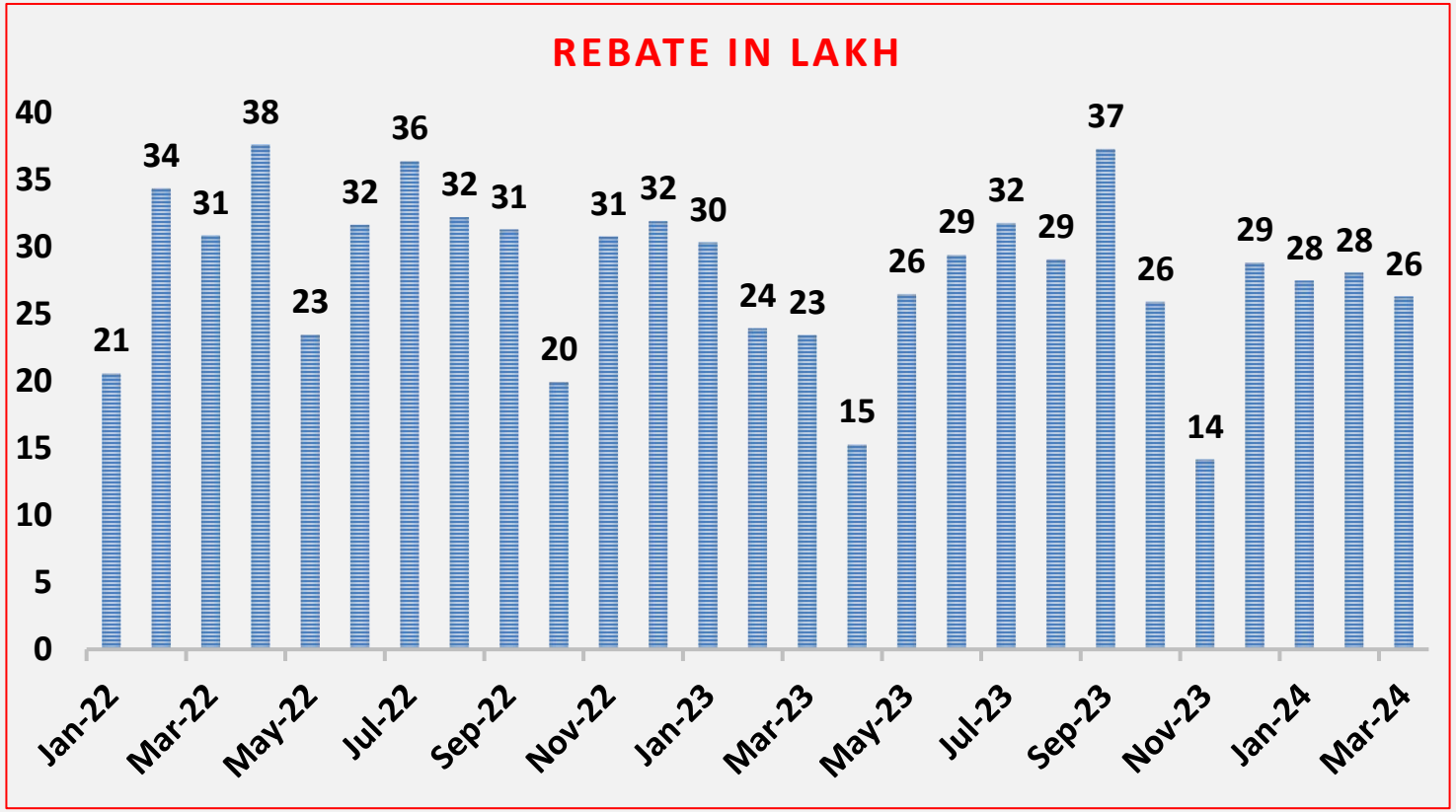
Inphase Reactor Panel

Energy Management System

Saving in Energy Bill-Year Wise by Maint. PF

FY 22-23 – 3.53 Cr INR

FY 23-24 – 3.20 Cr INR

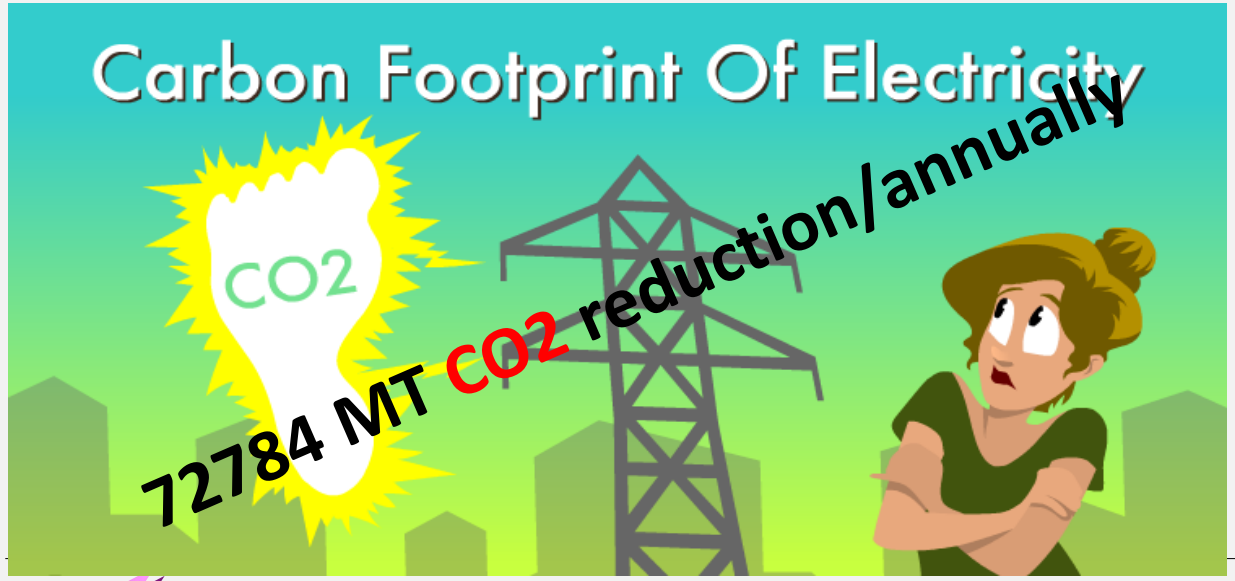


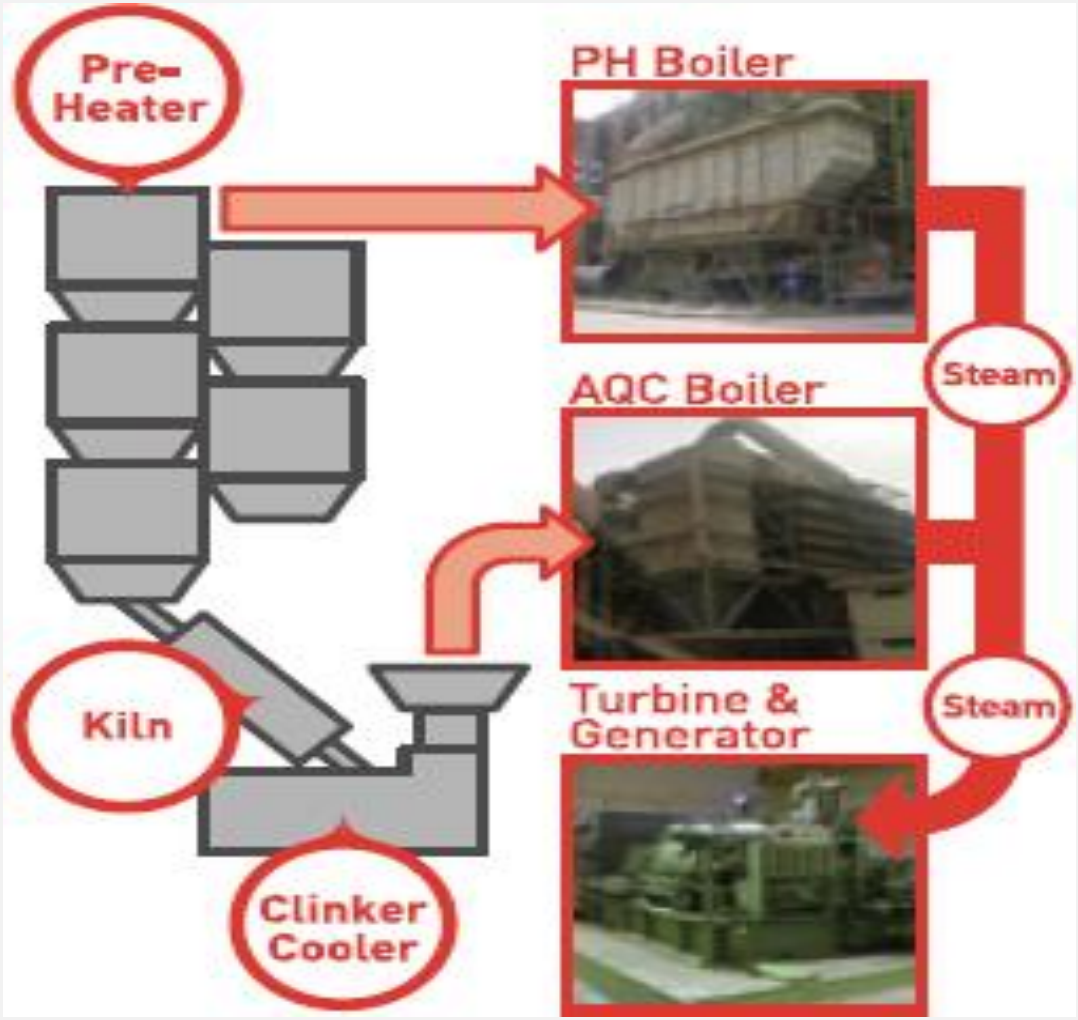
Installation of WHRS-Clean & Green Energy In Power Mix

14 MW Capacity

1.Waste Heat Recovery Commissioned in Apr-23

2. 35-40 % contribution in Power Mix





Greenery in plant and colony to protect Fauna and flora

Certificate

This is to Certify that

AMBUJA CEMENTS LIMITED

MARWAR MUNDWA, TEHSIL & DISTRICT NAGAUR, RAJASTHAN-341026, INDIA

has been found in Compliance with requirements of

Occupational Health and Safety Management Systems

ISO 45001:2018

for the following scope:

CLINKER AND VARIOUS TYPES/GRADES OF CEMENT CARRIED OUT AT MARWAR MUNDWA

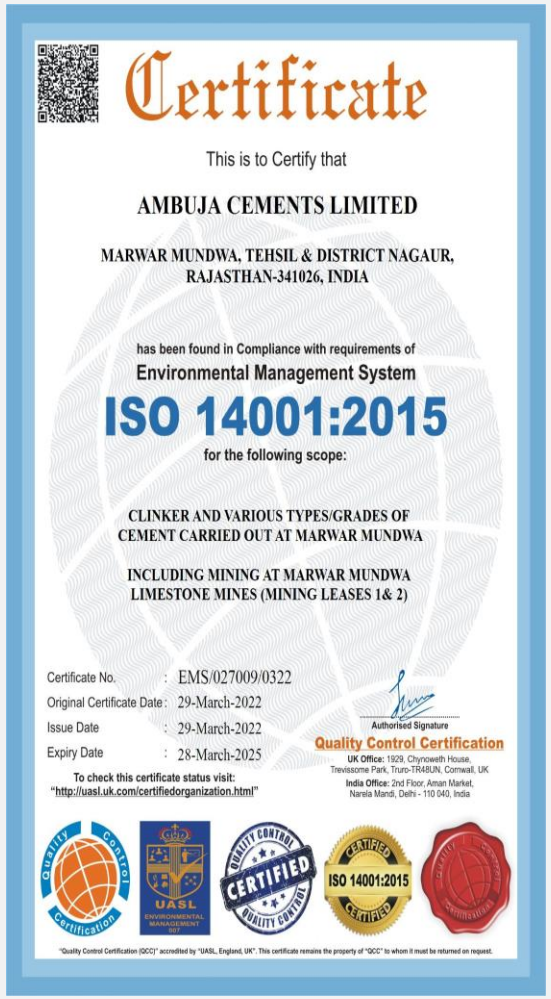
INCLUDING MINING AT MARWAR MUNDWA LIMESTONE MINES (MINING LEASES 1& 2)

Certificate No. : OHSMS/027011/0322
Original Certificate Date : 29-March-2022
Issue Date : 29-March-2022
Expiry Date : 28-March-2025

To check this certificate status visit: "http://uasl.uk.com/certifiedorganization.html"

Authorised Signature
Quality Control Certification
UK Office: 1929, Chynoweth House, Trevissome Park, Truro-TR48UN, Cornwall, UK
India Office: 2nd Floor, Aman Market, Narela Mandi, Delhi - 110 040, India

"Quality Control Certification (QCC)" accredited by "UASL, England, UK". This certificate remains the property of "QCC" to whom it must be returned on request.



Certificate

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AMBUJA CEMENTS LIMITED

MARWAR MUNDWA, TEHSIL & DISTRICT NAGAUR, RAJASTHAN-341026, INDIA

has been found in Compliance with requirements of

Environmental Management System

ISO 14001:2015

for the following scope:

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Energy Management Systems

ISO 50001:2011

for the following scope:

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Quality Management System

ISO 9001:2015

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E.mail-indra.singh@adani.com
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