

**CHITTOR
CEMENT
PLANT**



**24th CII NATIONAL AWARD FOR
EXCELLENCE IN ENERGY MANAGEMENT 2023**

**Mr. Ashish Vyas
Mr. Jay Bulani
Mr. Abhinav Dave**

**HOD- Quality
Deputy Manager- Process
Assistant Manager- Production**

1.1 NUVOCO-AT A GLANCE



Nirma Group entered the Cement business through a greenfield cement plant in Nimbol, Rajasthan

2014

- Nirma group acquired Lafarge India Limited, which entered India in 1999.
- Rechristened from Lafarge India Limited to Nuvoco Vistas Corp. Ltd.

2016-2017

- Merger of Nimbol Cement undertaking of Nirma Limited with Nuvoco Vistas Corp. Ltd.
- Acquired NU Vista Limited (formerly Emami Cement Limited)
- Commissioned the first Solar Power Plant at Bhiwani Cement Plant, Haryana

2020

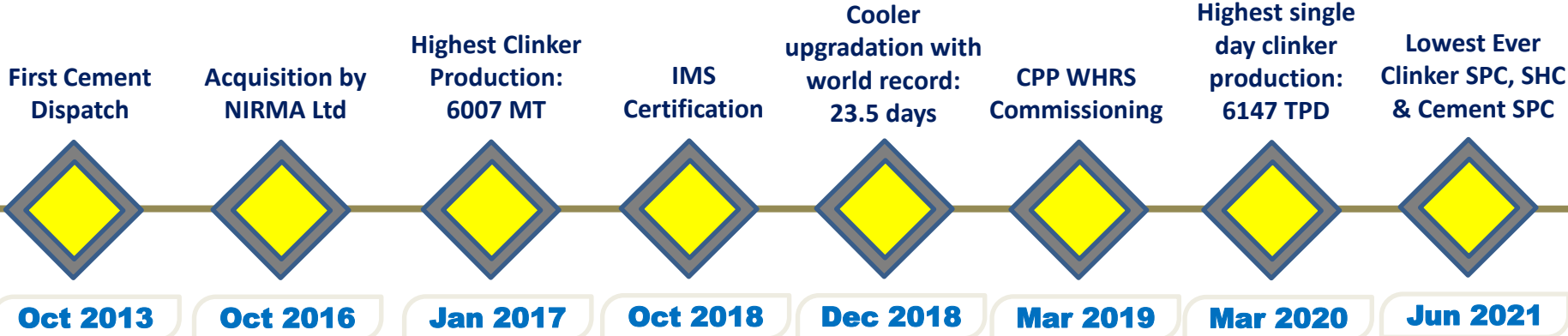
Commissioned the first Captive Power Plant (CPP) and Waste Heat Recovery (WHR) in Chittorgarh Cement Plant

2019

2021

- Received the first-ever Patent Certificate for 'Water Resistant Cement Composition' for Duraguard Waterseal Cement.
- Equipped with CPPs and WHRs across all integrated units
- Expanded the brownfield cement grinding capacity at Jojobera Cement Plant by 1.5 MMTPA
- Launched IPO and listed equity shares on BSE and NSE, successfully 2020

1.2 GENESIS OF THE CHITTOR CEMENT PLANT



PRODUCTS

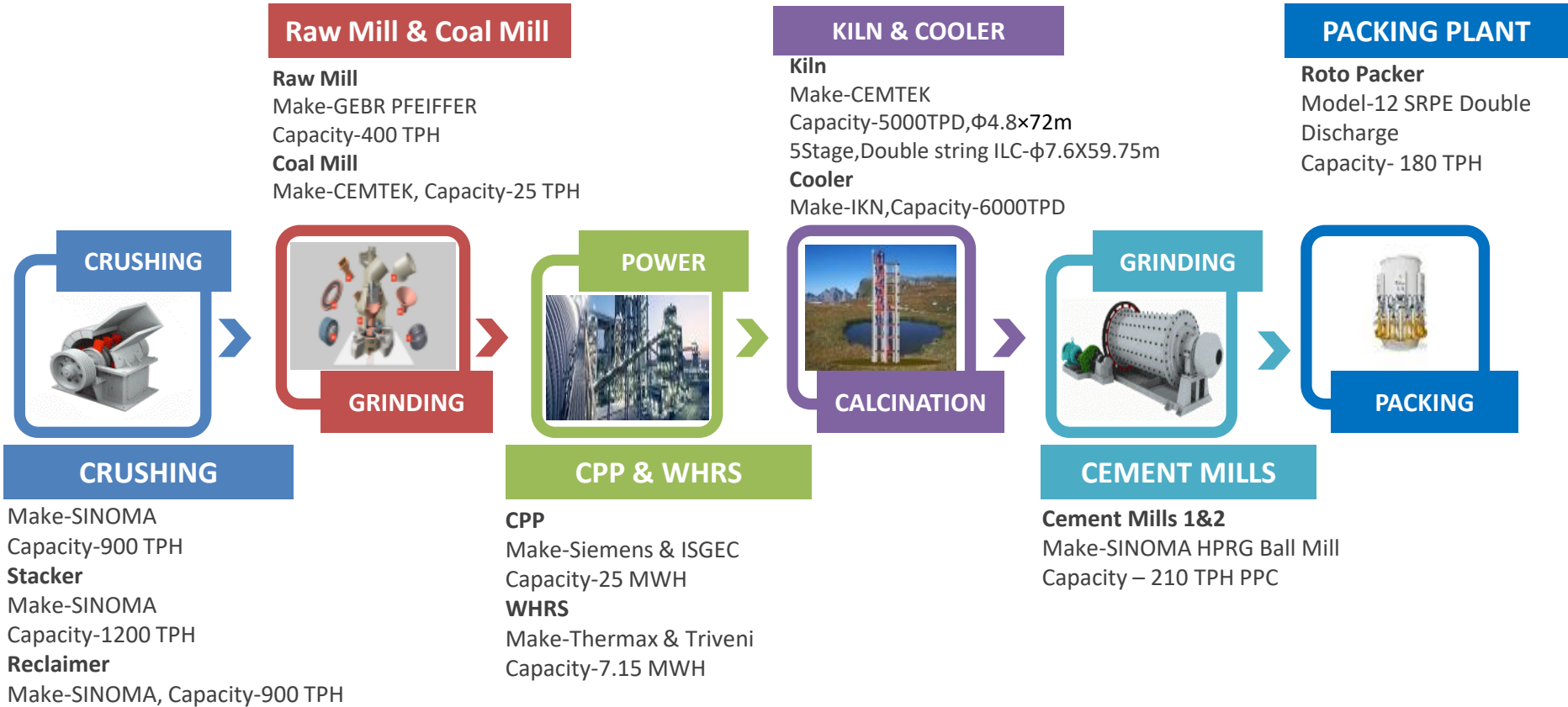


Clinker Capacity
19,40,000 MTPA



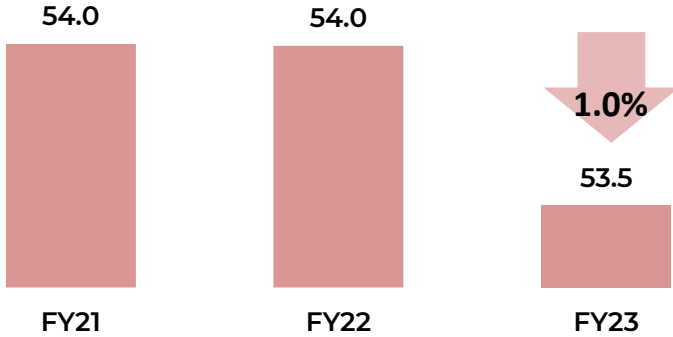
Cement Capacity
26,00,000 MTPA

1.3 PROCESS FLOW DIAGRAM

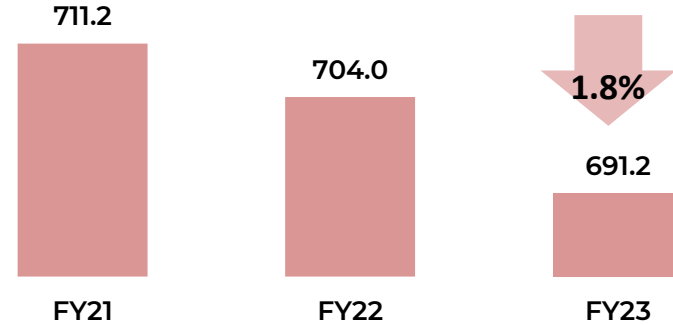


2.1 SPECIFIC ENERGY CONSUMPTION HISTORY

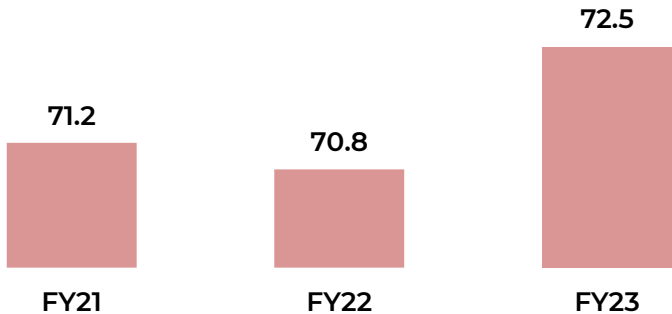
Sp. Electrical Power (Clinkerization) (Kwh/T)



Sp. Thermal Power (Clinkerization) (Kwh/T)



Sp. Electrical Power (Overall Cement) (Kwh/T)

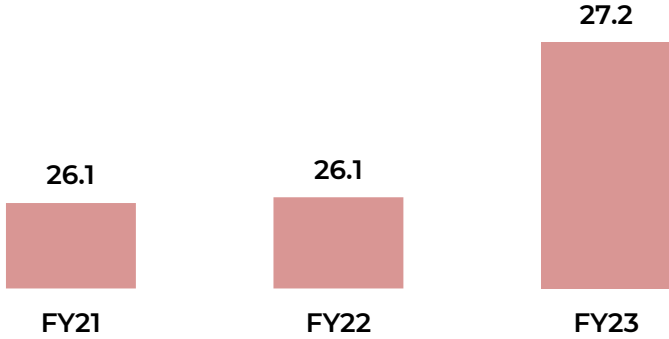


- SPC- Power consumption reduction in Raw Mill and Coal Mill due to liners replacement and process optimization work.
- SHC- Addition of fuel catalyst.

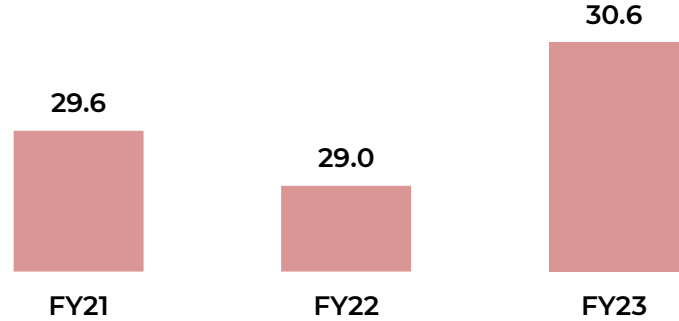
2.1 SPECIFIC ENERGY CONSUMPTION HISTORY



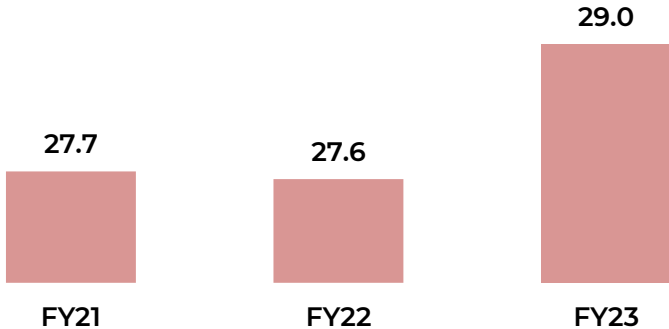
Sp. Electrical Power (Cement Grinding-PPC) (Kwh/T)



Sp. Electrical Power (Cement Grinding-OPC) (Kwh/T)



Sp. Electrical Power (Total Grinding) (Kwh/T)



4.1 ENERGY SAVING PROJECTS SUMMARY



Year	No of Energy Saving Projects	Investment (INR Million)	Electrical Savings (Million Kwh)	Thermal Savings (Million Kcal)	Total Saving (INR Million)	Impact on SEC/ SHC (Electrical kWh /MT cement or Kcal/Kg cement)- TOE
FY 2020-21	20	6.42	8.13	22.92	69.50	2502
FY 2021-22	3	32.67	5.90	25.12	131.09	3570
FY 2022-23	13	71.69	12.95	126.25	300.71	15125

4.2 ENERGY SAVING PROJECTS FY2020-21



S.No.	Name of Energy Saving Projects	Investment (INR Million)	Electrical Savings (Million Kwh)	Thermal Savings (Million Kcal)	Total Saving (INR Million)	Impact on SEC/ SHC (Electrical kWh /MT cement or Kcal/Kg cement)- TOE
1	CPP Specific Heat Rate Reduction	Inhouse	-	21.91	29.94	1701.11
2	Raw mill power saving by fan optimization	Inhouse	3.07	-	14.43	264.00
3	Total Cement grinding SPC reduction	Inhouse	2.95	-	13.87	253.71
4	Cyclone feed pipe relocation	Inhouse	-	1.01	1.37	102.24
5	VRM table cone installation	Inhouse	0.77	-	3.63	66.42
6	Compressor running optimisation	Inhouse	0.39	-	1.85	33.79
7	CPP ACC Fans VFD optimization	Inhouse	0.25	-	1.16	21.30
8	CPP PA fan and SA fan loading Optimisation	Inhouse	0.21	-	1.00	18.37
9	Cooler BH purging pipe nozzle length increased	Inhouse	0.20	-	0.96	17.59
10	ACW VFD Panel installation	1.62	0.13	-	0.59	10.88
11	CPP Transport circuit optimization	0.11	0.05	-	0.23	4.20
12	CEP VFD Optimization	Inhouse	0.04	-	0.18	3.38
13	CPP AQC DCC Running optimisation	Inhouse	0.03	-	0.15	2.71

4.2 ENERGY SAVING PROJECTS FY2020-21

S.No.	Name of Energy Saving Projects	Investment (INR Million)	Electrical Savings (Million Kwh)	Thermal Savings (Million Kcal)	Total Saving (INR Million)	Impact on SEC/ SHC (Electrical kWh /MT cement or Kcal/Kg cement)- TOE
14	Wall Seal Blower VFD installation	1.94	0.01	-	0.04	0.74
15	Raw mill BH fan inlet duct area enlargement	Inhouse	0.01	-	0.04	0.67
16	CHP Circuit start stop sequence taken in Auto mode	Inhouse	0.01	-	0.03	0.53
17	CT Fan start-stop logic for running hour optimization.	Inhouse	0.0036	-	0.02	0.31
18	Fuzzy system installation in CM-1	2.75	0.0013	-	0.01	0.11
19	Primary air pipe modification	Inhouse	0.0007	-	0.0032	0.06
20	Light switch Operation given outside WTP.	Inhouse	0.0005	-	0.0023	0.04

4.3 ENERGY SAVING PROJECTS FY2021-22

S.No.	Name of Energy Saving Projects	Investment (INR Million)	Electrical Savings (Million Kwh)	Thermal Savings (Million Kcal)	Total Saving (INR Million)	Impact on SEC/ SHC (Electrical kWh /MT cement or Kcal/Kg cement)- TOE
1	Coal catalyst for SHC reduction	32.67	-	25.12	89.80	3063.06
2	WHRS Generation improvement	Inhouse	5.54	-	38.75	476.03
3	Raw Mill Power optimization by Nozzle ring area modification	Inhouse	0.36	-	2.54	31.22

4.4 ENERGY SAVING PROJECTS FY2022-23



S.No.	Name of Energy Saving Projects	Investment (INR Million)	Electrical Savings (Million Kwh)	Thermal Savings (Million Kcal)	Total Saving (INR Million)	Impact on SEC/ SHC (Electrical kWh /MT cement or Kcal/Kg cement)- TOE
1	Use of Alternative fuels	Inhouse	-	126.25	213.96	14011.64
2	WHRS generation improvement	7.25	4.32	-	28.94	371.52
3	Raw Mill Shell and roller liner replacement	29.53	3.15	-	21.12	271.13
4	Cement mill-1 liner Replacement	16.07	2.04	-	13.70	175.87
5	Cement mill-2 liner Replacement	12.89	1.26	-	8.42	108.02
6	Coal Mill Shell and roller liner replacement	5.15	0.68	-	4.57	58.69
7	Modification in OPC dispatch transport circuit	Inhouse	0.67	-	4.46	57.21
8	Raw mill fan inlet casing area enlargement	0.80	0.37	-	2.47	31.76
9	Modifications of Vacuum line and VFD installation of ACC fans	Inhouse	0.23	-	1.56	19.98
10	VFD installation at ACW Pumps	Inhouse	0.10	-	0.69	8.87
11	Non process bagfilter elimination from bulker loading circuit	Inhouse	0.06	-	0.43	5.57
12	De rating of Cement Silo root blower	Inhouse	0.04	-	0.26	3.34
13	De rating of CPP compressor	Inhouse	0.02	-	0.12	1.60

4.5 PROJECTS PLANNED IN FY 2023-24



S.No.	Name of Energy Saving Projects	Investment (INR Million)	Total Saving (INR Million)	Target Date
1	Optimization through Online Plant analytics services	5.10	54.45	31 st Mar'24
2	Raw Mill hydraulic cylinder to be replaced	6.05	10.06	31 st Aug'23
3	PH fan inlet area enlargement	3.00	3.05	31 st Oct'23
4	Crusher rotor replacement to reduce downtime and increase efficiency	9.50	2.95	31 st Jul'23
5	Ball Mill outlet diaphragm replacement	1.50	1.38	31 st Oct'23
6	Compressed air pressure reduction in packing plant from 6.0 Kpa to 5.5 Kpa	Inhouse	0.66	31 st Jul'23

5.1 INNOVATIVE PROJECTS - 1

- Ball mill liner replacement with thin liners.

The worn-out shell and head liners in the ball mill have been replaced with thinner liners. Newly installed liners are lighter in weight and features a boltless locking arrangement. This design allows for quick removal and installation, while also consuming less electrical power.

The project, which can be replicated under similar conditions, resulted in a saving of approximately 1.0 in specific power consumption. This translates to a monetary saving of around 1.4 crore rupees.

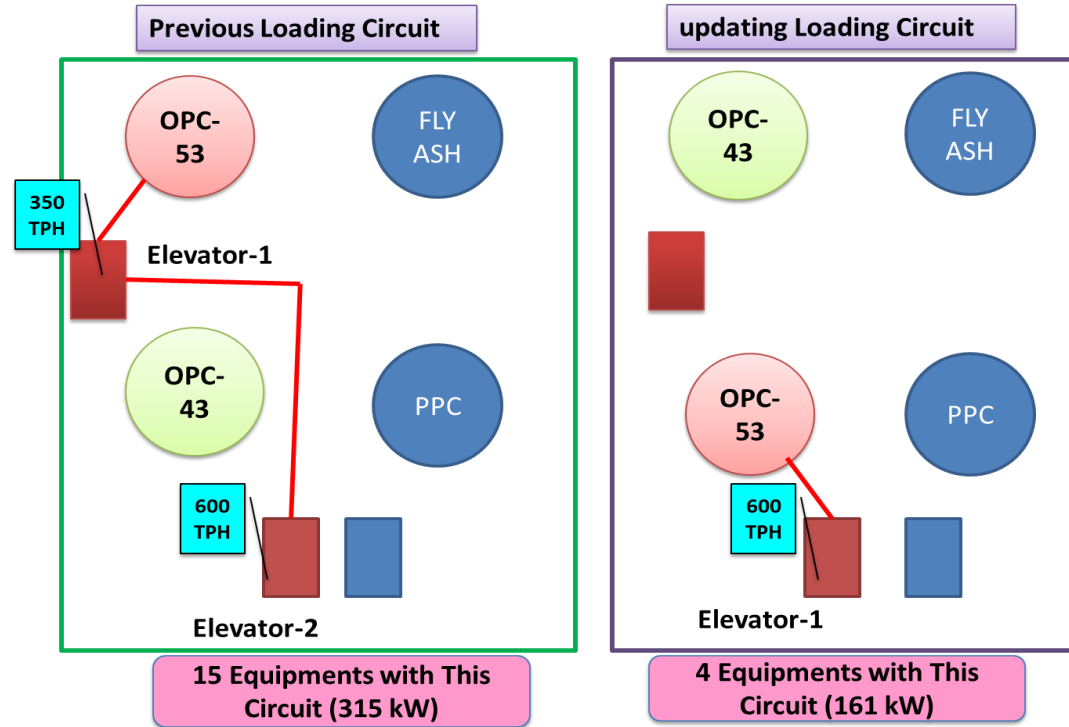


5.2 INNOVATIVE PROJECTS - 2

- OPC-53 and OPC-43 silo interchange for power reduction

Transport circuit for OPC-53 dispatch was longer compared to the OPC-43, on a contrary OPC-43 dispatch much lower compared to OPC-43- leading to higher power consumption due to running of 15 equipments.

Both the silos switched to each other leading to reduction of equipment running from 15 nos. to 4 nos. - power saving of 154 Kw.



6.1 UTILIZATION OF RENEWABLE ENERGY SOURCES

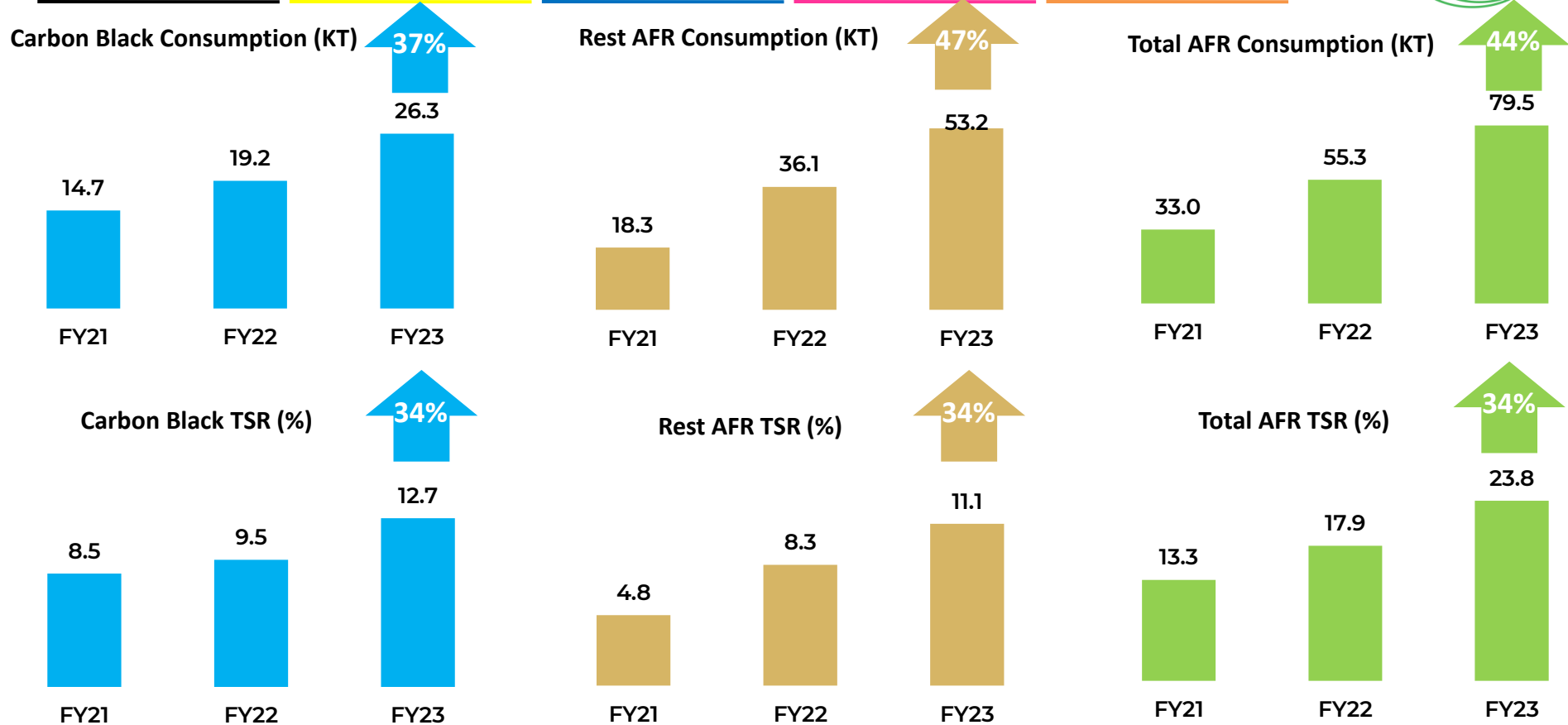


Year	Technology	Installed Capacity (MW)	Consumption (Million Kwh)	% of Overall Electrical Energy Consumption
FY 2020-21	Solar	0.50	0.594	0.40
FY 2021-22	Solar	0.50	0.552	0.33
FY 2022-23	Solar	0.50	0.689	0.40

S.No.	Year	% RPO Achieved
1	FY 2020-21	16.55
2	FY 2021-22	18.48
3	FY 2022-23	19.95

Onsite 500 KW Solar Power Plant; commissioned in FY 2018-19

7.1 WASTE UTILIZATION AND MANAGEMENT



7.2 WASTE UTILIZATION AND MANAGEMENT

S.No.	Year	Waste as a Fuel	Quantity (MT)	GCV	Waste as % of Total fuel
1	FY 2020-21	Carbon Black, Municipal waste, Biomass, Liquid waste, Plastic waste	33036	4463	13.3
2	FY 2021-22	Carbon Black, Municipal waste, Biomass, Liquid waste, Plastic waste	55264	4051	17.9
3	FY 2022-23	Carbon Black, Municipal waste, Biomass, Liquid waste, Plastic waste	79450	3938	23.8

7.3 INFRASTRUCTURE FOR AFR CO-PROCESSING

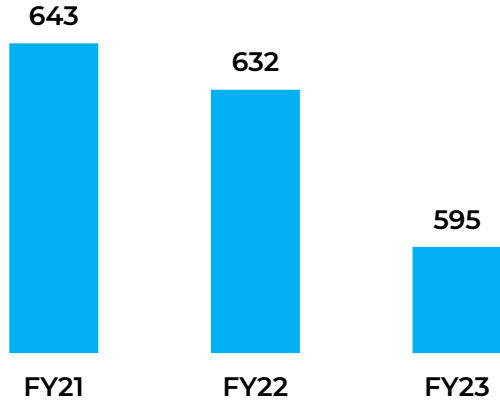


- Year: Nov 2015
- Storage capacity: 900 m³
- The System consist of:
 - We are authorized from Rajasthan State Pollution Control Board to use total 23 types of Hazardous and nonhazardous waste
 - The waste considered for feeding through this system are biomass, Shredded Farm Produce, Plastic waste, RDF/MSW, TDI Tar, FMCG Reject and Solid HW Blend
 - One Feed Hopper with Apron feeder with feeding capacity of 15 TPH
 - Corrugated feeding conveyor belt
 - Proper fire fighting system with fire detector/alarm Sprinkler/ Fire Hydrant System
 - Flame Proof electrical fittings & devices
- Liquid Solvent: Pumping Capacity: 2 Kl/hr

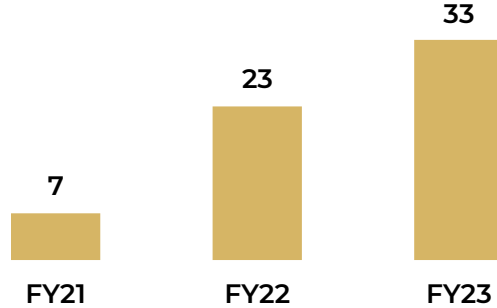
8.1 GHG INVENTORISATION



CO2 Intensity (Scope-1)



CO2 Intensity (Scope-2)



CO2 Intensity (Total)



- Scope-1 & 2 have considered for overall calculation of CO2 intensity (Kg CO2/MT Cement)
- Under ESG Agenda of the organization- *POP (Protect Our Planet)*, team has pledged to reduce CO2 emission by 2% over previous year actual emission.

8.2 GHG INVENTORISATION

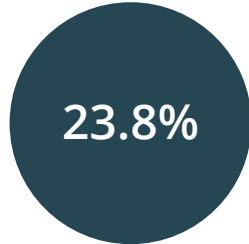
■ Increase in Alternative Fuel TSR% (Total Substitution Rate) by 78.3%



FY21



FY22



FY23

■ Increase in WHRS net power generation by 51.6%



FY21



FY22



FY23

■ Increase in Renewable Energy (Solar Power Generation) by 16.3%



FY21



FY22



FY23

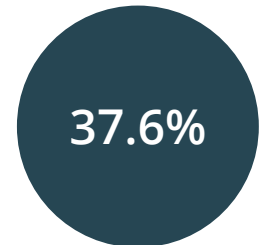
■ Increase in Dry Fly Ash and Pond Fly Ash Usage by 71.8%



FY21



FY22



FY23

8.2 GHG INVENTORISATION

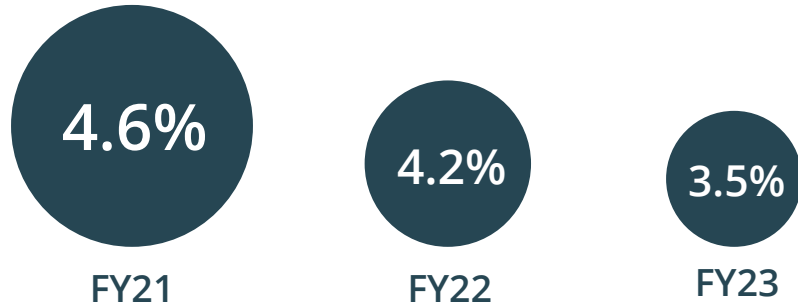
- Reduction in Thermal Energy Consumption by 2.8%



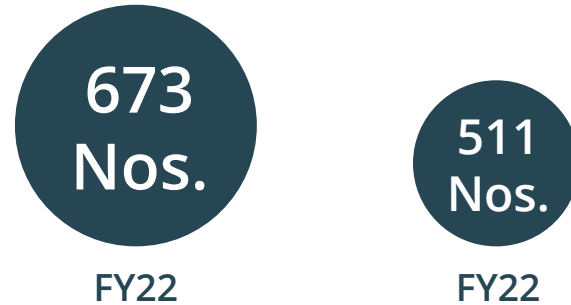
- Reduction in Thermal Energy Consumption by 0.8%



- Reduction in WHRS Aux Power Consumption by 24.7%



- Reduction in Overall Paper Consumption by 24.1%



9.1 ENERGY MANAGEMENT SYSTEM POLICY

Daily Review of Energy Consumption

Monthly Energy Meeting Schedule

Energy Meeting Chaired by Plant Head

Attended by HODs and Section Incharges

Monthly Energy Management Review

Date: 19.07.2023

Rev: 03



Chittor Cement Plant

“Team URJA”

Energy Management System (EnMS) Policy

(Incorporating the requirements of ISO 50001:2018)

Chittor Cement Plant having realized its potential to achieve performance excellence and competitive advantage through energy conservation, commits to adapt, initiate, propagate, and optimize its processes to contribute towards sustainable and cost-effective operations to reduce power & heat consumption.

In support of our ambitions for Energy Conservation, Chittor Cement Plant shall:

- ❖ Comply with all the applicable legal & other requirements related to energy efficiency, use and consumption;
- ❖ Ensure the line manager's responsibility for continuously seeking new and innovation ways to continually improve energy efficiency of our operations;
- ❖ Ensure availability of information and necessary resources to achieve objectives and targets;
- ❖ Conduct energy audits and implement energy management plans at all possible areas of the plant;
- ❖ Train employees, employed directly or indirectly, on energy conservation and other alternative resources of energy;
- ❖ Maximize renewable energy utilization while prioritizing long-term energy security in the overall energy mix;
- ❖ Continue to increase usages of alternate fuel;
- ❖ Support design activities that consider energy performance improvement;
- ❖ Support procurement of energy efficient products and services that impact energy performance;
- ❖ Engage with vendors & suppliers having expertise in energy saving.



JEETENDRAKUMAR JAIN

VP-CCP

9.1 ENERGY MANAGEMENT - EXISTING SYSTEM



- Chittor Cement Plant has adopted IP21 (A product of ASPENTech Co.) for day-to-day energy consumption monitoring.

ASPENTech is a well-known software platform that offers advanced analytics and process control solutions to optimize energy usage and reduce energy consumption. By adopting ASPENTech as an energy consumption monitoring system, your organization has benefitted in several ways:

- *Real-time monitoring and data analysis*
- *Process optimization*
- *Predictive maintenance*

- Furthermore, we have adopted the methodologies decided and circulated by BEE (Bureau of Energy Efficiency) for Monitoring and Verification (M&V) and Mandatory Energy Audit (MEA).

- *Energy Auditing*
- *Quarterly data collection & Data submission*
- *Mandatory Energy Audit*
- *Measurement & Verification*

9.2 GREEN SUPPLY CHAIN POLICY

Vehicle tracking and distance reduction through GPS

Raw Material purchase through wagons

Increase in cement dispatch through bulkers and railways

Reverse logistics- Raw material utilized for cement transport

Reverse logistics- OPC cement to Fly Ash

Date: 19.07.2023

Rev.: 02



Chittor Cement Plant



Green Supply Chain Policy

Chittor Cement Plant is committed to fostering the Green Consciousness through an inclusive approach that encompasses the activities of its Supply Chain Partners (SCPs), Viz. Vendors, Contractors, Service providers and Distributors.

We Shall,

- ❖ Incorporate environmental regulatory compliance & environmental performance as the key criteria in evaluation of SCPs;
- ❖ Encourage Green manufacturing through conservation of natural resources; minimize waste generation, environmental emissions, adopting energy efficient processes, products and services;
- ❖ Stimulate reverse logistics, recycling, redevelopment, reselling, and similar techniques to deliver greater value from materials and products;
- ❖ Encourage SCPs to implement Environment, Health & Safety Management Systems and considering suppliers who acquire ISO14000, ISO18000 and/or ROHS directive;
- ❖ Support training and capacity building programs that propagate awareness of environment conservation and green practice;

JEETENDRA KUMAR JAIN

VP-CCP

9.3 GREENCO & ISO 50001 CERTIFICATION



- GreenCo Certification- Chittor cement plant has registered for GreenCo certification. The preliminary introductory session has been completed, and preparations are in progress for the site visit and audit.
- ISO 50001 Certification- Chittor cement plant has voluntarily participated in the implementation of ISO 50001 certification. Site visit and detailed audit preparations have been completed. Documentation preparations are underway before sending the final site audit invitation.

9.4 LEARNING FROM CII & SIMILAR AWARDS



Prestigious awards, such as the CII National Energy Award and similar accolades, are renowned for recognizing organizations that have showcased exceptional practices across various dimensions of business, including sustainability, innovation, quality, and leadership. Gaining insight into the best practices of these award-winning companies can offer valuable understanding of how successful strategies are conceived and executed.

By delving into the innovative approaches adopted by the winners, we can cultivate a deeper comprehension of creative thinking, the formulation of unique solutions to challenges, and the nurturing of an innovative culture within our own organization.

Participation in events related to these awards or attendance at award ceremonies presents opportunities to network with professionals representing diverse industries.

Moreover, studying how these award-winning companies have successfully navigated challenges and disruptions imparts lessons in adaptability and resilience. Understanding their responses to shifting market dynamics and unforeseen events can assist organizations in formulating strategies to navigate uncertain times.

10.1 NET ZERO COMMITTEMENT

Nuvoco Vistas Corp Ltd is driving the initiative "(POP) Protect Our Planet" as part of its ESG (Environmental, Social, and Governance) agenda, which aligns with its vision of "Building a safer, smarter, and sustainable world."

The company firmly believes that preserving our resources and minimizing carbon footprints form the bedrock of a sustainable future. In line with this philosophy, initiatives like DEN (Digitally Enabled Nuvoco) represent the next step in reducing and eventually eliminating paper consumption, promoting the transition to digital transactions.

Nuvoco has taken a pledge to minimize the usage of single-use plastics and instead opt for sustainable alternatives, starting from the 1st May'23.

The company is dedicated to reducing its carbon footprint across all its locations through sustainable water consumption practices and the implementation of initiatives aimed at decreasing both electrical and thermal power consumption.

AWARDS & ACCOLADES



Jun'23

Golden Peacock Award 2023
for Energy Efficiency



Jan'23

OHSSAI 7th Annual HSE &
Sustainability Awards 2022



Dec'22

Rajasthan Energy Conservation
Award 2022



Dec'22

NCCBM International Award 2022
In Circular Economy



Dec'22

46th Mines Safety Week
Awards



Sep'22

SEEM National Energy
Management Award 2021 in
Platinum Category



Sep'22

India Green Manufacturing
Challenge 2022 in Gold
Category



Jul'22

Workplace OHSE Excellence
Award 2021 by WSO

Building a SAFER, SMARTER and SUSTAINABLE WORLD.

THANK YOU!!



INTEGRITY



ENTREPRENEURSHIP



COLLABORATION



CARE



**OPERATIONAL
EXCELLENCE**

Contact:
Mr. Jay Bulani
jay.bulani01@nuvoco.com
+91 7508510623