CHITTOR CEMENT PLANT

NUVOCO
Shaping a new world

22nd CII NATIONAL AWARD FOR EXCELLENCE IN ENERGY MANAGEMENT 2021

Mr. Sanjay Tyagi	SVP (Plant Head)
Mr. Ravish Galav	AVP (Operation Head)
Mr. Dharmendra Chaudhary	Manager (Process)

NUVOCO -AT A GLANCE

1999 – Commencement of operations in India with acquisition of cement business of Tata Iron & Steel Company Ltd. in Jharkhand.

2001 – Acquisition of the cement business of Raymond Ltd, Chhattisgarh.

2006 – Construction of a new clinker line at Sonadih plant in Chhattisgarh to increase total cement production capacity by 3MT.

- 2008 – Acquisition of L&T's ready-mix concrete business.
- 2009 – Commissioning of the Mejia grinding unit in West Bengal.
- 2011 – Expansion of operations in East.

2008-2011

2012 – Inauguration of Construction Development and Innovation Centre (CDIC) in Mumbai.

2013-2015

- 2013 – Inauguration of Chittorgarh (Rajasthan) and Bhiwani (Haryana) cement plants.
- 2015 – Commissioning of the Sonadih Railway Line.

2016-2017

- 2016 – Transfer of shares from LafargeHolcim to Nirma Limited.
- 2017 – Launch of new name, 'Nuvoco Vistas Corp. Ltd. (formerly Lafarge India Limited)'.

2018

- Associated with Royal Challengers Bangalore as Principal Partner.
- CDIC received NABL Accreditation.

2019 – Commissioning of first CPP (Captive Power Plant) and WHR (Waste Heat Recovery) in Chittorgarh Cement Plant

2020

- Integration of Nirmax Cement Ltd.
- Acquisition of Nu Vista (formerly Emami Cement Ltd.)

1.2 GENESIS OF THE CHITTOR CEMENT PLANT

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Oct 2013	Oct 2016	Jan 2017	Oct 2018	Dec 2018	Mar 2019	Mar 2020
First Cement Dispatch	Acquisition by NIRMA Ltd	Highest Clinker Production: 6007 MT	IMS Certification	Cooler upgradation with world record: 23.5 days	CPP WHRS Commissioning	Highest single day clinker production: 6147 TPD against 5000 TPD design

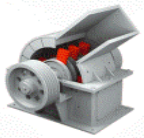
PRODUCTS

Clinker Capacity
19,40,000 MTPA

Cement Capacity
26,00,000 MTPA

1.3 PROCESS FLOW DIAGRAM

CRUSHING



CRUSHING

Make-SINOMA
Capacity-900 TPH
Stacker
Make-SINOMA
Capacity-1200 TPH
Reclaimer
Make-SINOMA, Capacity-900 TPH

Raw Mill & Coal Mill

Raw Mill
Make-GEBR PFEIFFER
Capacity-400 TPH
Coal Mill
Make-CEMTEK, Capacity-25 TPH

GRINDING

POWER

CPP & WHRS

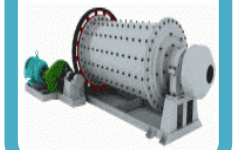
CPP
Make-Siemens & ISGEC
Capacity-25 MWH
WHRS
Make-Thermax & Triveni
Capacity-7.15 MWH

KILN & COOLER

Kiln
Make-CEMTEK
Capacity-5000TPD,Φ4.8×72m
5Stage,Double string ILC-ϕ7.6X59.75m
Cooler
Make-IKN,Capacity-6000TPD

CALCINATION

GRINDING



CEMENT MILLS

Cement Mills 1&2
Make-SINOMA HPRG Ball Mill
Capacity – 210 TPH PPC

PACKING PLANT

Roto Packer
Model-12 SRPE Double Discharge
Capacity- 180 TPH

PACKING

2.0 IMPACT OF COVID-19

Impact on Annual Production Performance

Annual clinker production reduced by 11.3% and cement production by 6.7% over FY20 due to lockdown in Apr-May'21 and lesser cement demand in following months compared to FY20 Y-o-Y Basis.

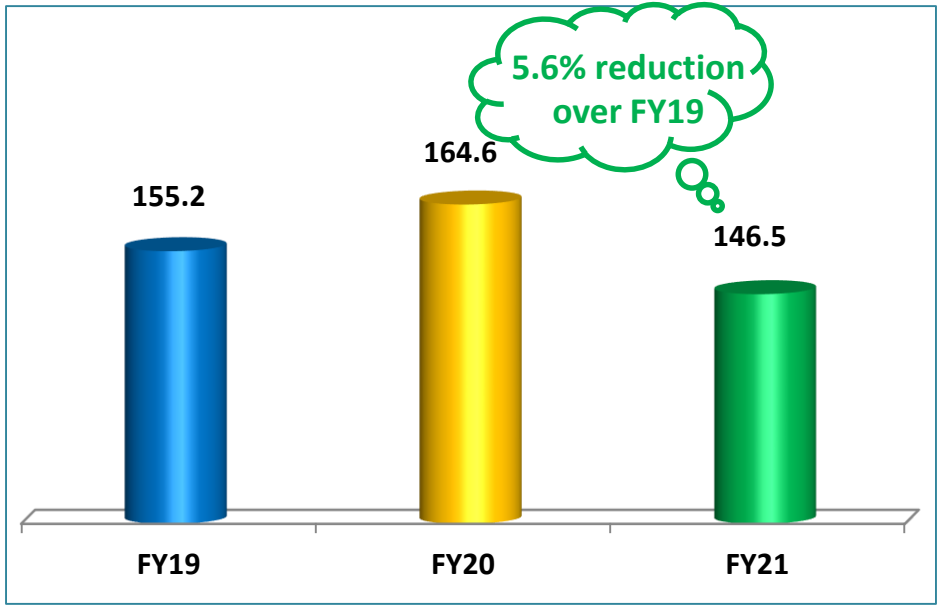
Impact on Sp. Energy Consumption

- Clinkerization SEC increased by 1.4% over FY20 due to lesser clinker production and low utilization.
- Along with Utilization factor reduced by 7% over FY20.

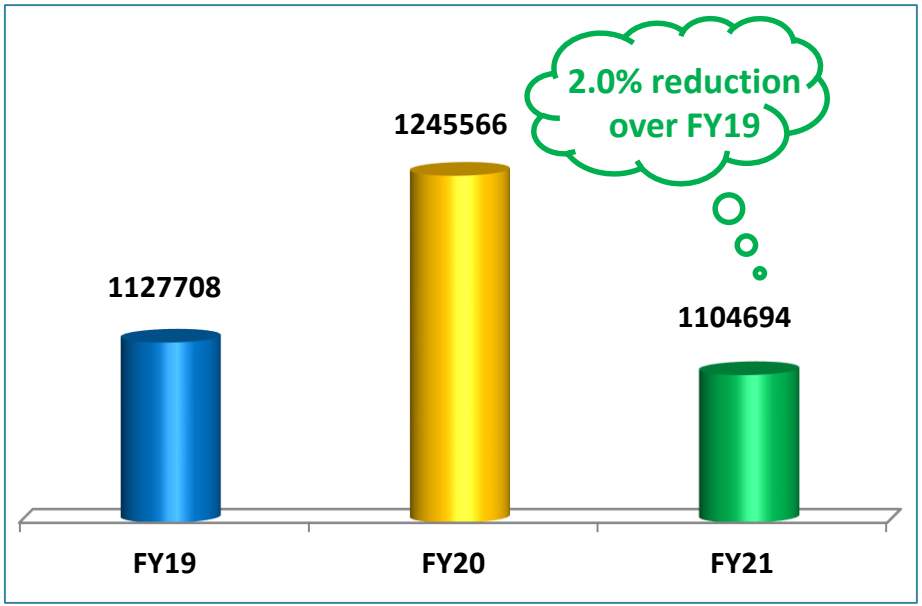
Measures taken by Plant Team

- Morale boost sessions organized for mental and physical wellbeing.
- Production planning realigned with sales volume to minimize the

3.1 ENERGY CONSUMPTION HISTORY



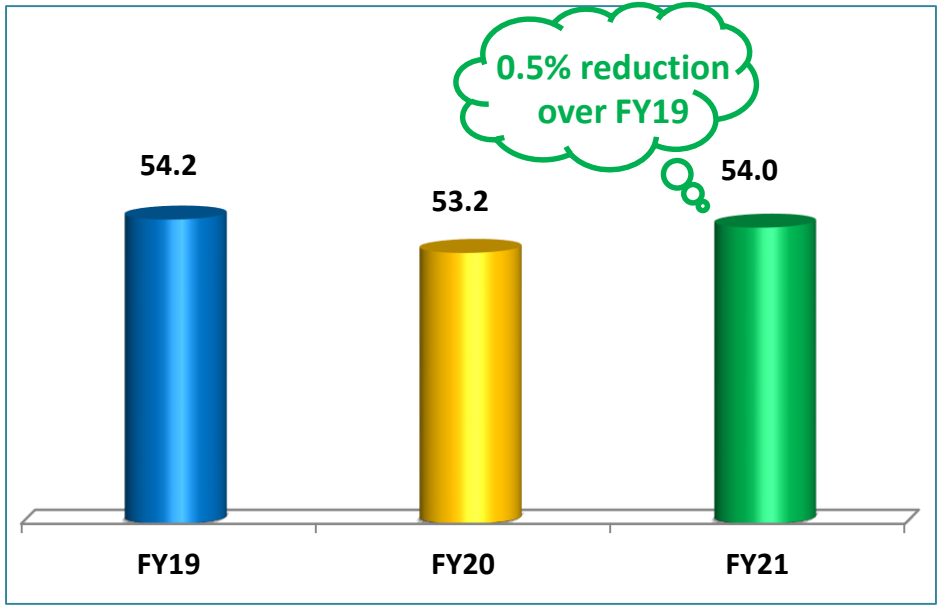
Electrical Energy Consumption (Mil Kwh)



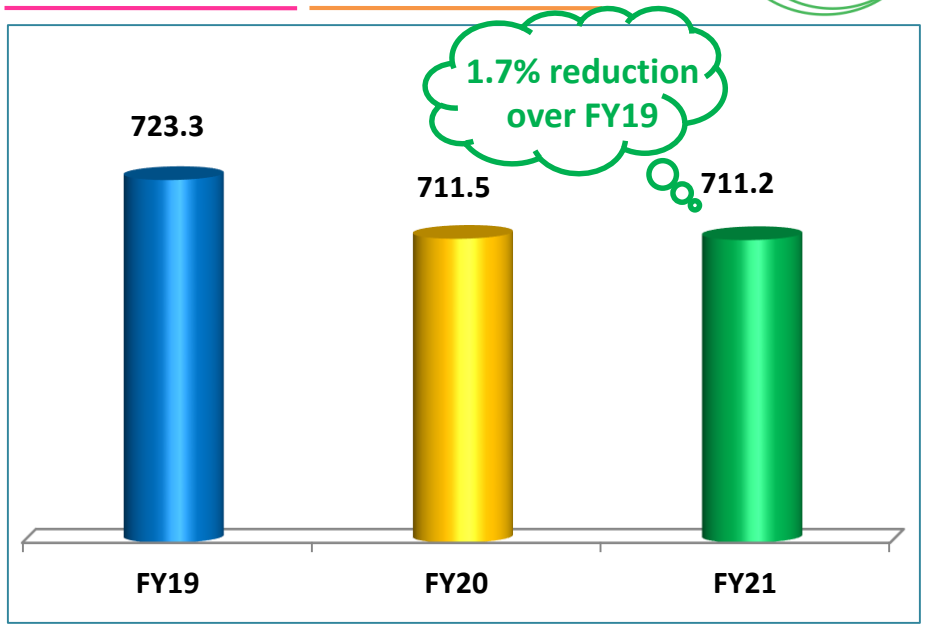
Thermal Energy Consumption (Mil Kcal)

Overall energy consumption reduced due to no operation in Apr-May'20 and lower Utilization as demand at lower side in following months.

3.2 SPECIFIC ENERGY CONSUMPTION



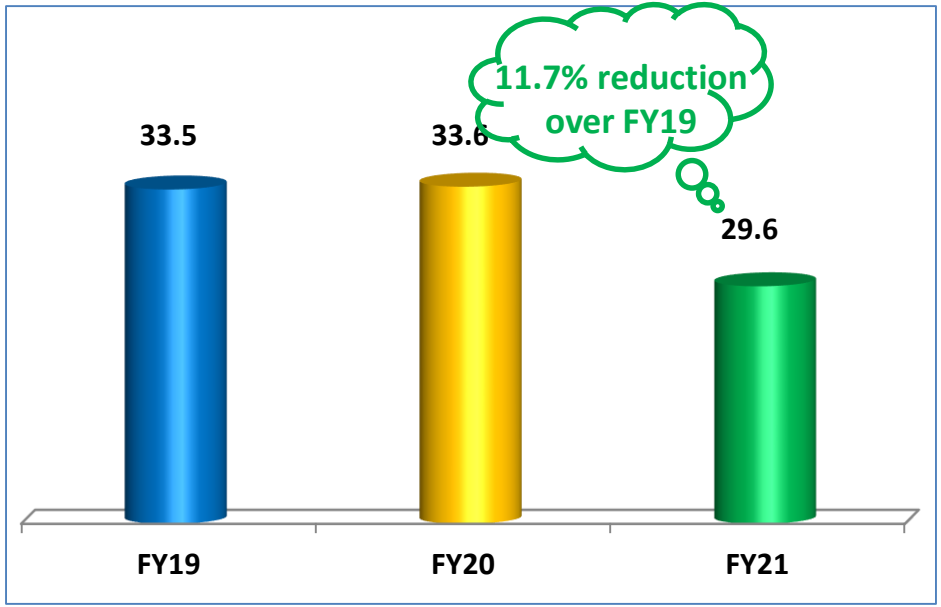
Pre Clinkerization Sp Energy (Kwh/T Clk)



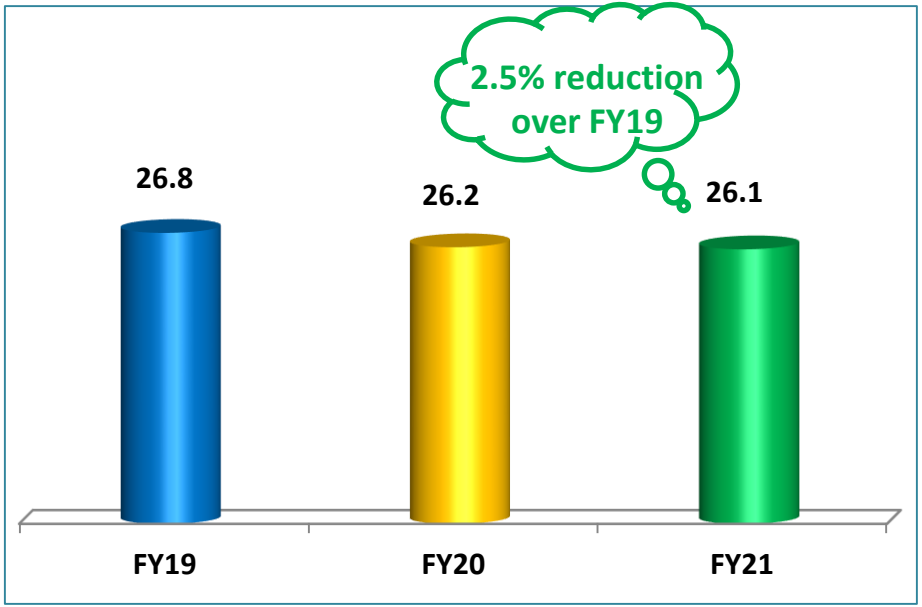
Pre Clinkerization Sp Energy (Kcal/Kg Clk)

Specific electrical energy consumption at higher side due to lesser clinker production as well as low utilization factor.

3.3 SPECIFIC ENERGY CONSUMPTION

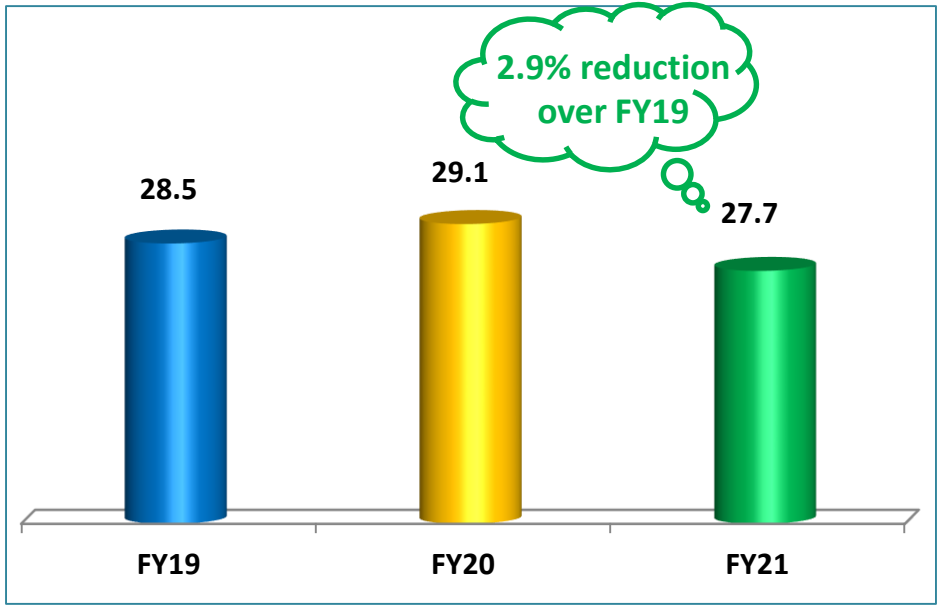


Specific Electrical Energy (Kwh/T Cem-OPC)

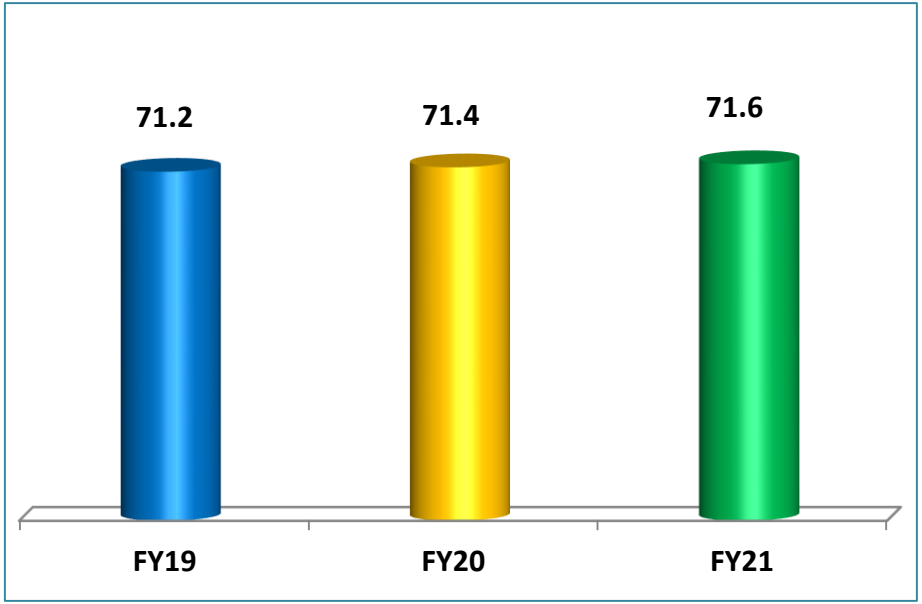


Specific Electrical Energy (Kwh/T Cem-PPC)

3.4 SPECIFIC ENERGY CONSUMPTION



Post Clinkerization Sp. Energy (Kwh/T Cem)



Overall Sp. Energy (Kwh/T Cem)

4.0 PROJECTS PLANNED FOR FY22

S. No	Title of Project	Annual Electrical Saving (Million kWh)	Annual Thermal Saving (Million Kcal)	Investment (Million INR)
1	CM main bag house (DC68) DP reduction by old bags replacement	0.14	0	6.0
2	Separator Reject Split to BM & RP Proposal (Gravel gate)	0.28	0	6.0
3	Ball mill shell liner replacement	1.78	0	10.0
4	Cement Mill separator upgradation	1.21	0	10.0
5	Application of Heat resistance paint in PH remaining area	0.00	501	2.0
6	Coal Mill Separator seal gap reduction by using felt (12 mm to 5mm)	0.08	0	0.0
7	PH false air reduction	0.22	0	0.0
8	Cooler vent duct bypass modification	0.06	0	7.0
9	Vortex breaker installation at Preheater cyclone outlet	0.10	0	8.0
10	Coal mill BH fan impaller retrofitting to enhance fan efficiency	0.11	0	3.0
11	Kiln operation optimization by Process expert system	0.08	1894	6.0
12	Raw mill productivity enhancement by separator modification	0.82	0	19.0
Total		4.88	2395	77.00

5.1 ENERGY SAVING PROJECTS FY19

S.No	Title of project	Electrical Million Kwh	Thermal Mkcal	Saving (million INR)	Investment (Million INR)
1	Use of fuel catalyst for improved burnability	0	1121	9.18	8.5
2	VFD installation in 3 major drives	0.12	0	0.91	0
3	Preheater Fan Inlet casing enlargement.	0.13	0	1	0
4	Raw Mill table to body gap reduction.	0.04	0	0.34	0
5	Raw Mill Fan Inlet casing enlargement and damper removal.	0.11	0	0.83	0
6	Cooler ID fan retrofitting.	0.09	0	0.69	5.11
7	Non Process Bag filter Damper Removal.	0.07	0	0.55	0
8	Cooler Fan inlet ducts modification and Bell mouth.	0.13	0	1.03	0
9	VFD was installed in 7 Fans in CM section for Power saving.	0.28	0	2.16	3.19
10	VFD installation in 3 kiln tyre cooling fans	0.28	0	2.16	0
11	Pre Heater ID Fan damper removal for pressure drop saving.	0.28	0	2.16	0
12	Installation of Smart Nozzle type Air blaster in kiln Inlet.	0.08	0	0.61	1.72
13	Enlargement of Kiln Inlet Area by 3.3 %.	0.32	0	2.44	0
14	Cooler up gradation	0	925	10.03	250
15	Maximizing alternate fuel	0	10424	113.07	0
16	Heat Resistant Paint on Preheater cyclones	0	381	4.13	1.93
17	Cement Mill Separator Fan high efficiency impeller installation	0.87	0	6.73	6.56
	Total	2.8	12851	158.03	277

5.2 ENERGY SAVING PROJECTS FY20

S.No	Title of project	Electrical Million Kwh	Thermal Mkcal	Saving (million INR)	Investment (Million INR)
1	DBC Replacement	0	208	2.08	20.4
2	C4B feed pipe relocation (height decreased)	0	102	0.86	0
3	C5A & C5B discharge pipe dia increased to avoid cyclone jamming	0	50	0.85	0.62
4	CM-2 Separator BH gratings beneath of bags has removed to reduce pressure drop	0.01	0	0.07	0
5	Polymer liner installation in all discharge chute to avoid jamming and to reduce idle running of belts.	0.07	0	0.37	0
6	CM1 Dy. Separator Static vanes replacement	0.07	0	0.37	0
7	LS Crusher main motor V belt loosened to reduce main motor power consumption	0.02	0	0.13	0
8	Off standard silo discharge chute modification(one dedusting BF stopped)	0.05	0	0.27	0
9	Reduction of purging pressure in all major bag house (From 6.5 to 4.5 kg)	0.37	0	2.02	0
10	Cooler BH four chamber isolation & all four discharge RAL stopped	0.08	0	0.46	0
11	Kiln Shell Cooling fans (2 Nos.) conventional impeller replacement with FRP impeller	0	0	0.02	0.09
12	New separate compressor provision for Cooler blasters	0.1	0	0.55	1.2
13	VFD installation In CM 1 BH fan & CM-2 BH fan	0.17	0	1.59	14.82
14	DCD by pass damper replacement	0.08	0	0.45	7.87
15	CM2 Bag house fan damper removal	0.02	0	0.11	0
16	Cooler Stack height increased	0.08	0	0.46	4.71
	Total	1.13	360	10.66	49.71

5.3 ENERGY SAVING PROJECTS FY21

S.No	Title of project	Electrical Million Kwh	Thermal Mkcal	Saving (million INR)	Investment (Million INR)
1	C3A feed pipe relocation (height decreased)	0.00	125	0	0
2	Cooler BH purging pipe nozzle length enhancement	0.20	0	0.96	0
3	Raw mill table cone installation for proper material distribution beneath of rollers	0.77	0	3.63	0
4	Primary air pipe bend reduction (modification)	0.00	0	0.00	0
5	Raw mill BH fan inlet duct area enlargment	0.01	0	0.04	0
6	Fuzzy system installation in CM-1	0.00	0	0.01	0
7	Raw mill power reduction by fan optimization	3.07	0	14.43	0
8	Total Cement grinding SPC reduction from 29.1 to 27.7 kwh/t cem	2.95	0	13.87	0
9	Compressor running optimization	0.39	0	1.85	0
10	PA fan and SA fan loading Optimisation	0.21	0	1.00	0
11	ACW VFD Panel installation	0.13	0	0.59	1.62
12	BC-09 replacement Work	0.05	0	0.23	0.11
13	AQC ACC Running optimization	0.03	0	0.15	0
14	CT Fan start-stop logic for running hour optimization.	0.00	0	0.02	0
15	CEP VFD Optimization by lowering down CEP discharge pressure	0.04	0	0.18	0
16	CHP Circuit start stop sequence taken in Auto mode	0.01	0	0.03	0
17	ACC Fans VFD minimum locking reduced to 30 % from 40 %.	0.25	0	1.16	0
18	Light switch Operation given outside WTP.	0.00	0	0.00	0
19	Wall Seal Blower VFD installation	0.01	0	0.04	1.94
20	Specific Heat Rate Reduction	0.00	2722	0	0
	Total	8.13	2847	38.19	3.67

5.4 ENERGY SAVING PROJECTS FY21

Particulars	No of Projects Implemented	Electrical Energy Saved (Million Kwh)	Thermal Energy Saved (Million Kcal)	Total Saving (Million INR)	Total Investment (Million INR)
FY19	17	2.80	12851	158.0	277
FY20	16	1.13	360	10.7	49.71
FY21	20	8.13	2847	38.2	3.67
Total		12.06	16058	206.88	330.38

6.1 INNOVATIVE PROJECT FY21

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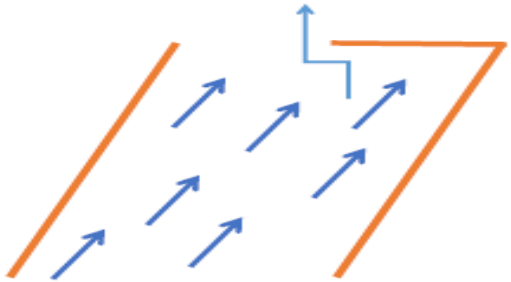
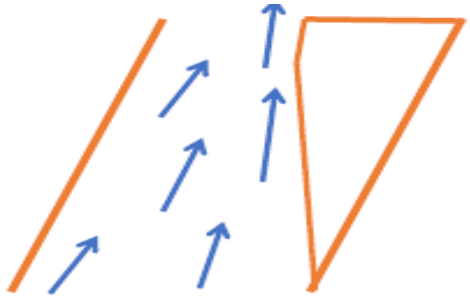
Challenge was to reduce the raw mill main drive power as well as to streamline the hot air flow through the nozzles.

Modification done to eliminate the turbulence through the nozzle blocks by welding a plate along with the edges of the nozzle dummy plate and bottom portion of the nozzle ring

This modification not only streamline the airflow in more laminar way but also reduced the main drive load by 40 Kwh reflecting to savings of ~1.2 Lac INR per month.

6.2 INNOVATIVE PROJECT FY21





Before Modification

After Modification

7.1 GREEN AND CLEAN ENERGY

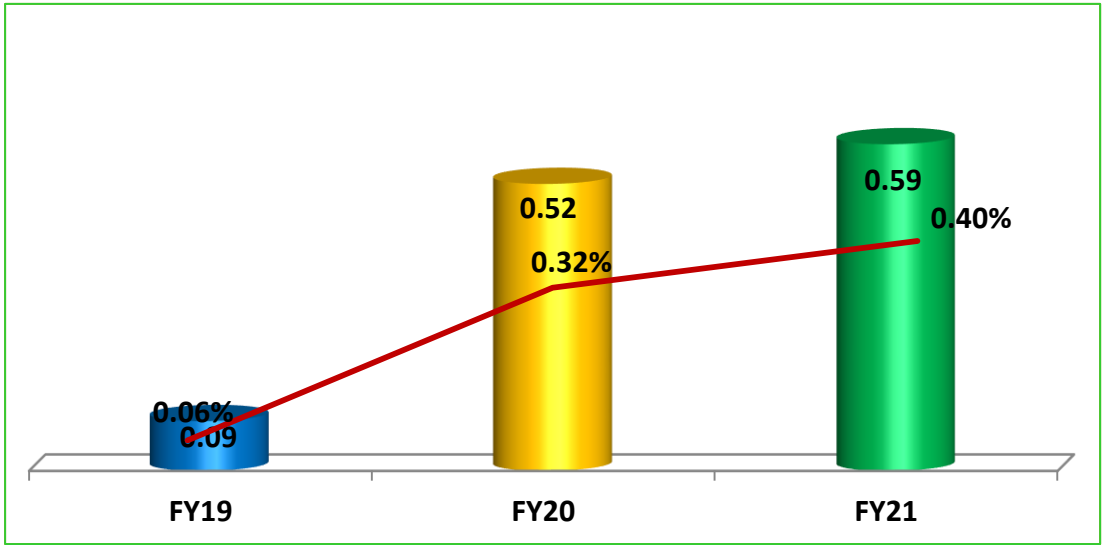
WHRS

- Total Generation Capacity- 7.15 MWh
- Commissioned in FY20
- Total 30.7 mill MW Generation in FY20
- Total 34.7 mill MW Generation in FY21

Solar Plant

- Total Generation Capacity- 0.50 MWh
- Commissioned in FY19
- Total 0.52 mill MW Generation in FY20
- Total 0.59 mill MW Generation in FY21

7.2 GREEN AND CLEAN ENERGY



Solar Power Generation (Mil MW) & Share in Total Energy

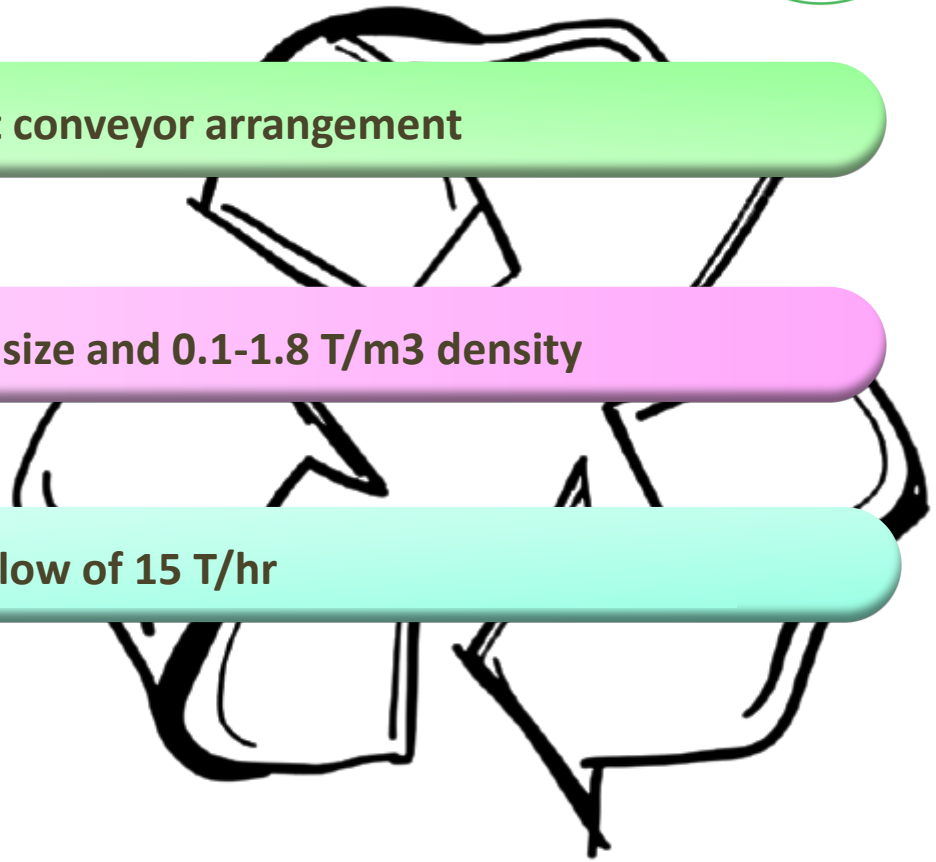
**Solar Plant Commissioned in FY19 (Capacity: 0.50 Mwh)*

8.1 WASTE MANAGEMENT SYSTEM

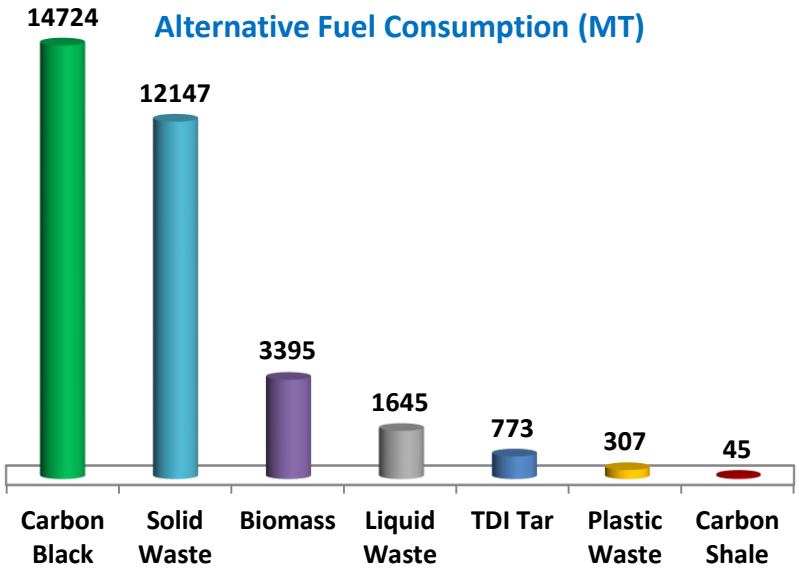
Apron feeder with corrugated belt conveyor arrangement

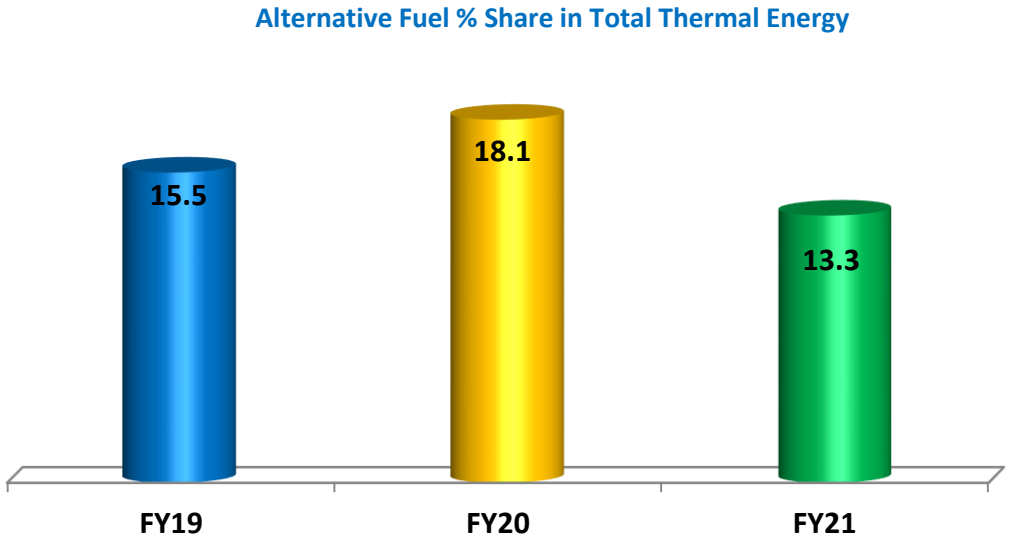
Feasible for material of 5-50 mm size and 0.1-1.8 T/m3 density

Can handle upto nominal mass flow of 15 T/hr



8.2 WASTE UTILIZATION





*4.8% reduction in FY21 due to material availability constraint after lockdown

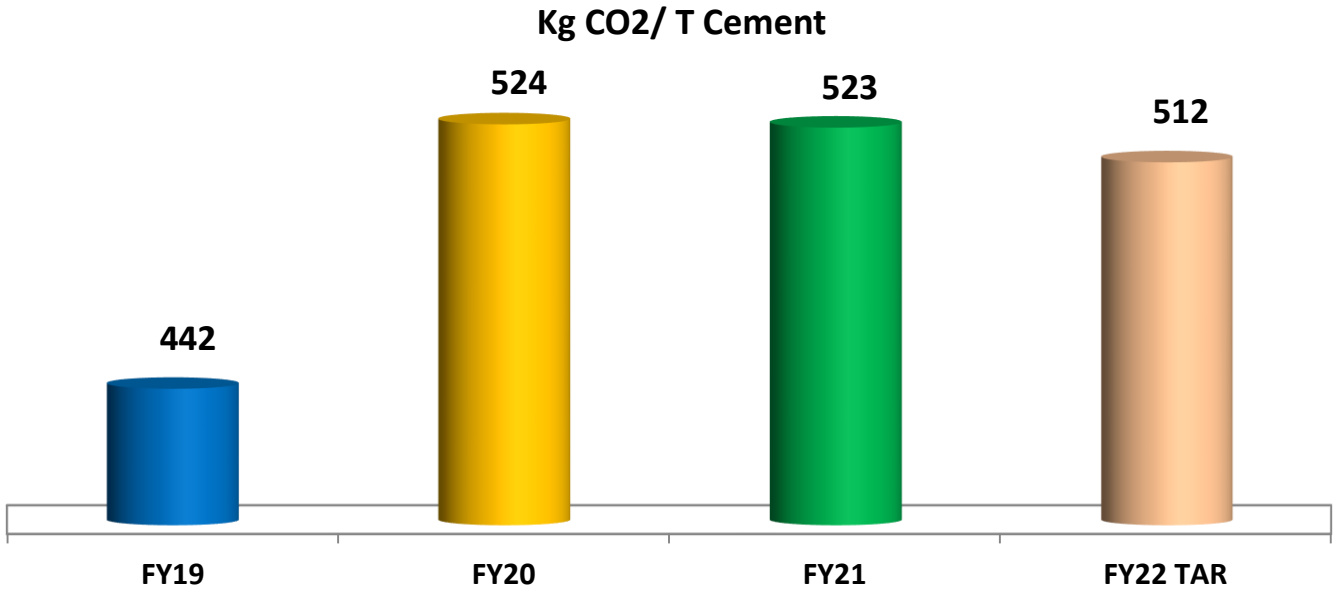
9.0 LEARNING FROM CII ENERGY AWARD 2020

- A great platform for all cement plants to come together to showcase their performance
- Institution to learn from each other's experiences and alleviate the apprehensions
- Easygoing approach of the presenters as well as jury to create a comfort zone
- Sustainable approach and smart supply chain management will decide tomorrow's leaders
- Prime goal is to deliver the superior products to customer with least impact on the environment
- Aim should be to reduce waste generation and develop the infrastructure for future
- Innovation in operations and sustainable approach towards natural resources goes hand in hand

10.1 GHG EMISSION REDUCTION

AGENDA

To Reduce Carbon Footprint by **2%** Over FY21 Actuals.



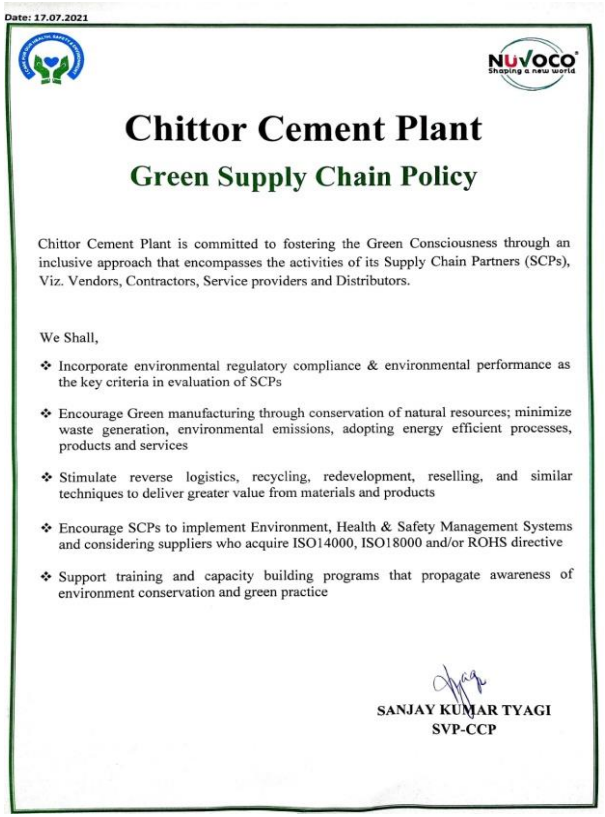
10.2 GHG INVENTORISATION ACTION PLAN

REDUCTION IN ELECTRICAL POWER CONSUMPTION	• *3.6% reduction in clinkerization Power over FY21* • *Reduction of 2.8% in Cement grinding Power over FY21*
REDUCTION IN THERMAL POWER CONSUMPTION	• *Reduction by 0.8% in Specific Heat Consumption over FY21*
INCREASE IN ALTERNATE FUEL CONSUMPTION	• *24.5% increase in %TSR of AFR over FY21*
ADDITIVE INCREASE IN PPC CEMENT	• *36.8% Increase in Pond Fly Ash in PPC over FY21* • *Incorporation of CPP ash and CPP Bed Ash in Cement Grinding*
REDUCTION OF CLINKER FACTOR IN CEMENT	• *5.5% Reduction in clinker factor over FY21* • *33.6% addition of Fly Ash in PPC*
STRENGTHEN GREEN SUPPLY CHAIN	• *PPC loading through bulkers* • *Strengthen reversal logistics* • *Raw material transport via wagons*
OPTIMIZATION OF WHRS GENERATION	•*21% increase in WHRS Generation over FY21* • *2.6% reduction in Aux Power*

11.0 GREEN SUPPLY CHAIN MANAGEMENT

PROJECTS IMPLEMENTED

- ***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: 17.07.2021

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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

SANJAY KUMAR TYAGI
SVP-CCP

12.1 ENERGY MANAGEMENT SYSTEM

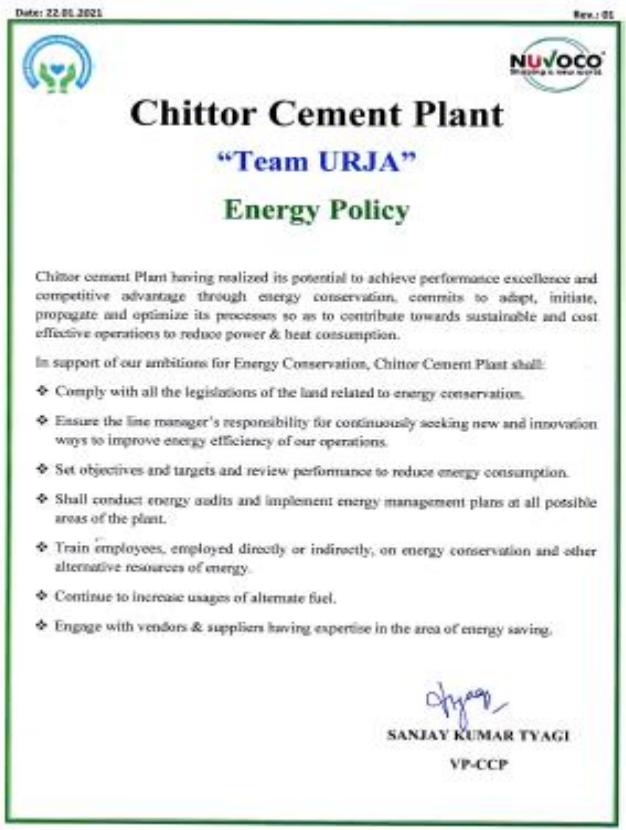
Daily Review of Energy Consumption

Monthly Energy Meeting Schedule

Energy Meeting Chaired by Plant Head

Attended by HODs and Section Incharges

Monthly Energy Management Review



Date: 22.01.2021 Rev.: 01

Chittor Cement Plant

"Team URJA"

Energy Policy

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 so as 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 legislations of the land related to energy conservation.
- Ensure the line manager's responsibility for continuously seeking new and innovation ways to improve energy efficiency of our operations.
- Set objectives and targets and review performance to reduce energy consumption.
- Shall 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.
- Continue to increase usages of alternate fuel.
- Engage with vendors & suppliers having expertise in the area of energy saving.

SANJAY KUMAR TYAGI

VP-CCP

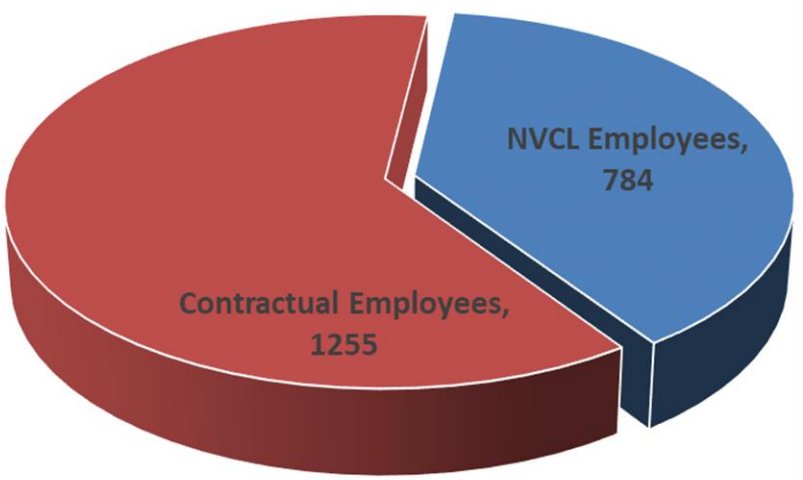
12.2 EMPLOYEES PARTICIPATION

Suggestion Box Scheme

Suggestion Box Scheme aims to give opportunity to employees of all segment for participation in continuous improvement process by giving their innovative and creative ideas and ensuring their implementation for achieving business excellence.

OBJECTIVE

- To develop creative and constructive attitude
- To enhance performance culture and bring improvement
- To create sustainable development solutions to issue in hand
- To generate sense of belonging
- To eliminate losses and implementing best practices
- To improve employee participation
- To achieve business excellence



Number of suggestions collected under Suggestion Box Scheme in FY 2020-21; Total 2039 Suggestions

12.3 APPROACH FOR ENERGY CONSERVATION

- Identified Energy Saving proposal is scrutiny by Plant Head.
- Energy saving proposal which having Marginal Investment or No investment is approved by plant head after screening through Energy Management Committee on monthly basis.
- Energy saving proposal which involve high capex, require approval of Industrial Director through Plant Head recommendation.

12.4 EMPLOYEES ENGAGEMENT & APPRECIATION

PROUD MOMENTS

National:

Energy:
- 21st National Energy Efficiency Unit Award-2020 for Excellence in Energy by CII.
- Won SEEM National Energy And Management Award 2020 in Gold Category.

Health:
- Arogya World Healthy Workplace Awards.

Safety:
- Silver award at ICC National OH&S Awards 2020.
- Platinum award at ICC National OH &S Awards 2019.
- Winner of “Special Commendation for Golden Peacock OH&S Award” 2019.

Human Resource:
- Received award for Innovative HR Practices in HR Summit 2019-20.

CSR:
- FICCI award for project ‘Aakriti’.

State:

Energy:
- 2nd prize - Efficient energy conservation at 10th Rajasthan Energy Conservation Award 2019.

Safety:
- Health, Safety & Welfare Award from Labour Ministry, Govt. of Rajasthan 2019.
- Second Prize in State Safety Award successively for second year in large scale industries.

CHITTOR CEMENT PLANT AWARD GALLERIES

PROUD MOMENTS

Awards in MEMC (MINES ENVIRONMENT & MINERAL CONSERVATION)

- 1st Waste Dump Management
- 1st Environment Monitoring
- 2nd Systematic and Scientific Development
- 3rd Overall Performance
- 3rd Sustainable Development
- 3rd A forestation

Awards in 43rd MSCSW

- 1st Welfare Amenities & Activities
- 2nd Maintenance Of Mine Plans, Section & Statutory Records
- 2nd Mine Lighting And Electrical Installation
- 3rd Overall Performance
- 3rd General Opencast Workings & Layout
- 3rd Safety Management – Occupational Health & Safety, First Aid And Vocational Training

THANK YOU FOR YOUR ATTENTION!!

INTEGRITY

ENTREPRENEURSHIP

COLLABORATION

CARE

OPERATIONAL EXCELLENCE

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