adani
Cement

Sindri Cement Works

CII National Energy Award for Excellence in Energy Management 2023

Presented By:

Mr.Atul Dutta(Plant Manager)

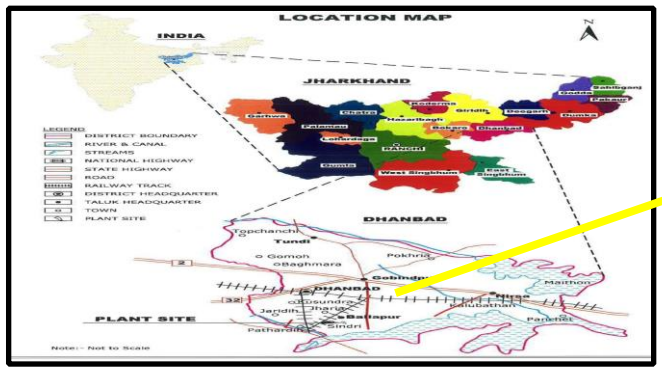
Mr.Rajeev Kumar(Head Engineering)

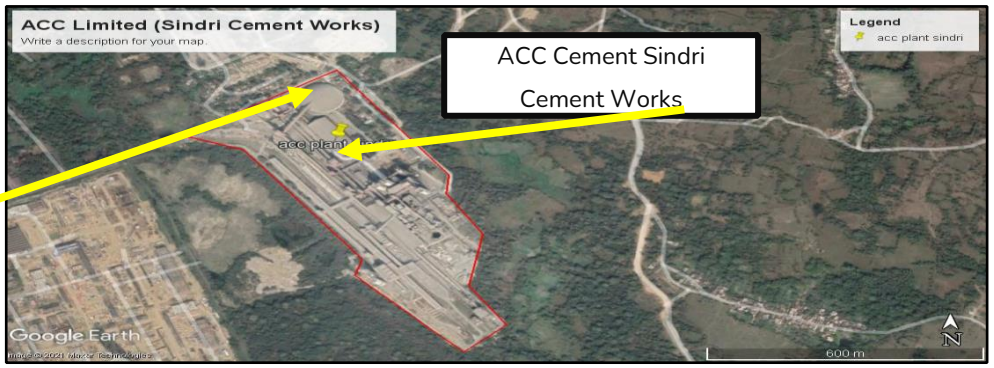
Mr.Kumud Sinha (DGM Production)

Mr.Suvadeep Chakraborty(Head Environment-Energy Manager)

1.Overview of Adani Cement & Sindri Cement Works

- Adani Cement is India's second largest cement manufacturer (capacity 67.5 MTPA) with 30 cement manufacturing units.
- Adani/ACC/Ambuja has a unique track record of innovative research, product development and specialized consultancy services. It has among the lowest carbon footprints in its class.
- Sindri Cement works (Grinding Unit) is one among the Cement Grinding Unit of ACC Limited which was commissioned in 1955.
- As on date stands Cement production is 4.5 MTPA with three production lines.
- Phase-1 installed in 1955,Phase-2 Installed in 2016 and Phase-3 Installed in 2021.
- ISO Certified by BIS under ISO 14001:2015, ISO 9001:2015 and ISO 45001:2018.
- 1.1 Times water positive.





1.Technical Details-Sindri Cement Works

Wagon Tippler

- Wagon Tippler : 24 trip/hr
- Make : FLS
- Material handled : Clinker / Slag

Truck Tippler

- Truck Tippler : 75 tph
- Make : Perfect hydrotech
- Material handled : Coal

Linear stacker reclaimer

- Gypsum & Coal Linear stacker & reclaimer
- Make: FLSmidth
- Coal storage : 2500 T
- Gypsum Storage : 4000 T

Circular stacker & reclaimer

- Slag dome with stacker & reclaimer
- Storage Capacity : 45000 T
- Stacker & reclaimer : FLS make
- Dome designed by Temcor

Fly Ash Silo

- Flyash Silo
- Capacity : 1 x 5000 T
- Design by FLSmidth

Blending Silo

- Blending silo : 2 nos x 5000 T
- Design by FLSmidth

Clinker Silo

- Capacity : 60000 T
- Designed by FLSmidth

Coal Mill

- Coal Mill (VRM) : 18 TPH
- Model : Atox 17.5
- Make : FLSmidth

Slag Mill(VRM-1)

- Slag VRM : 55 TPH
- Model : OK 27.4
- Make : Loesche

Cement Mills

- Cement Ball mill 2 nos. x 25 TPH 2 nos. x 10 TPH
- Make : Polysius

VRM-2

- Cement VRM : 260 TPH (PPC)
- Model : LM 56.3
- Make : Loesche

VRM-3

- Cement VRM : 230 TPH
- Model : TRMK 56.3
- Make : Sinoma-LNVT

1.Technical Details-Sindri Cement Works

Cement Silos

•Cement Silos : 8 nos.
•Capacity :
3 nos. x 5000 T
3 nos. x 2000 T
2 nos. x 675 T

Packer

- Packer machine :8 nos
- 2 nos x 180 TPH
  (Make : EEL)
- 4nos. x 240 TPH
  (Make : FLS ventomatic)
- 2nos. x 240 TPH
  (Make : Beumer)

Wagon Loader

•Wagon loading m/c : 16 nos.
•Capacity : 120 TPH each
•Make : FLS ventomatic

Wagon Loader

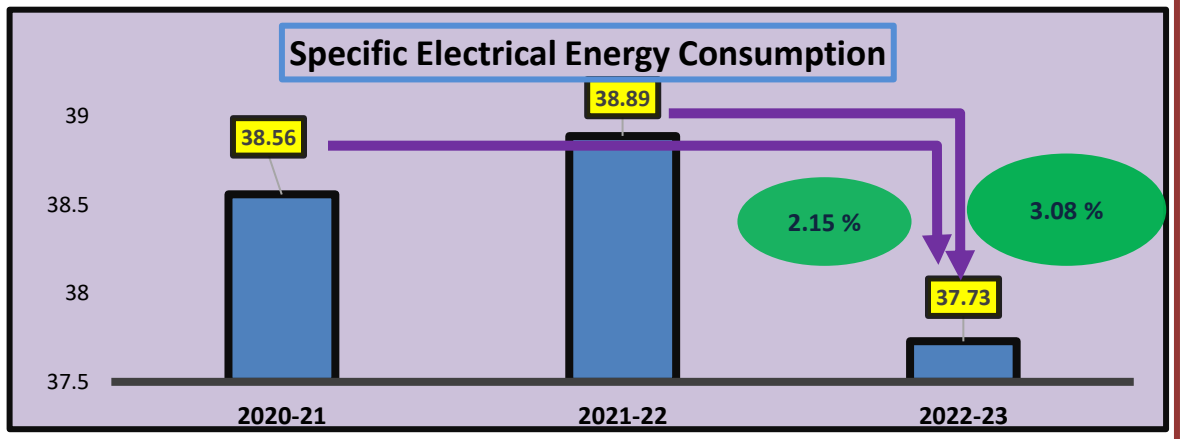
- Truck loading m/c.: 10 nos
- 4 nos. x 90 TPH
- (Make : FLS Ventomatic)
- 6 nos. x 120 TPH
- (Make :Beumer)

2.Specific Electrical Energy Consumption for last three financial years

Plant Overall Specific Energy Consumption:

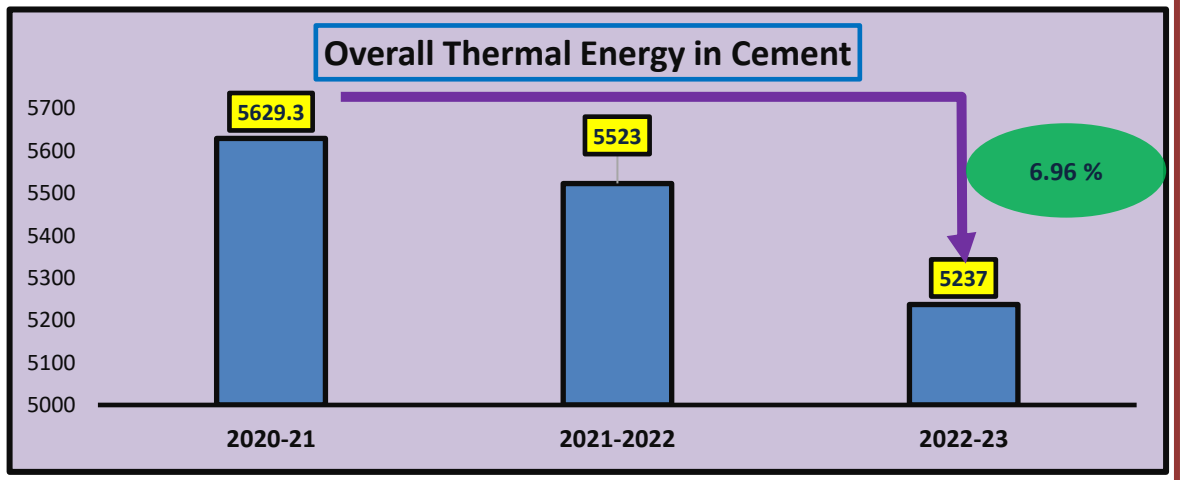
Specific Electrical Energy Consumption:

FY-Year	2020-21	2021-2022	2022-23
kWh/Ton Of cement	38.56	38.89	37.73
% Reduction	2.15% from 2020-21 & 3.08% from 2021-22		



Overall Thermal Energy in Cement:

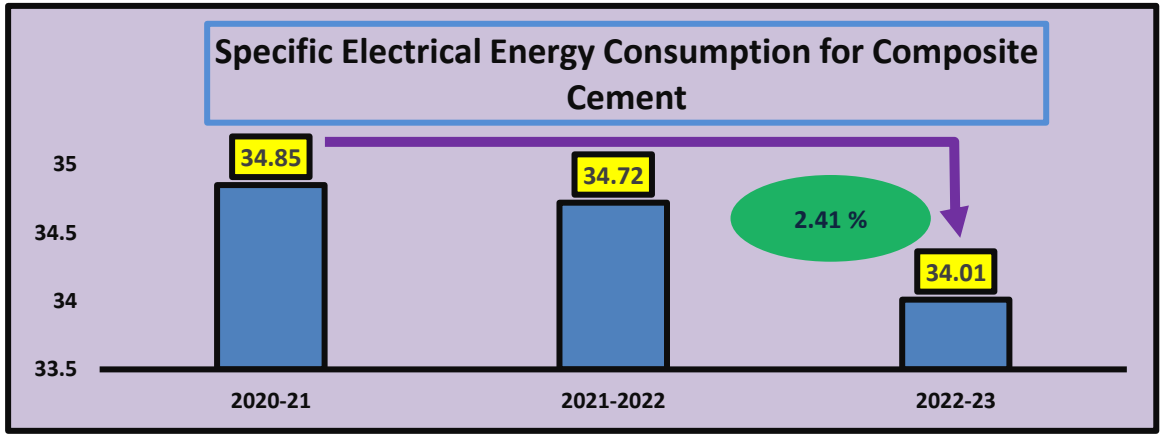
FY-Year	2020-21	2021-2022	2022-23
Kcal/kg	5629.3	5523	5237
% Reduction	6.97 % from 2020-21		



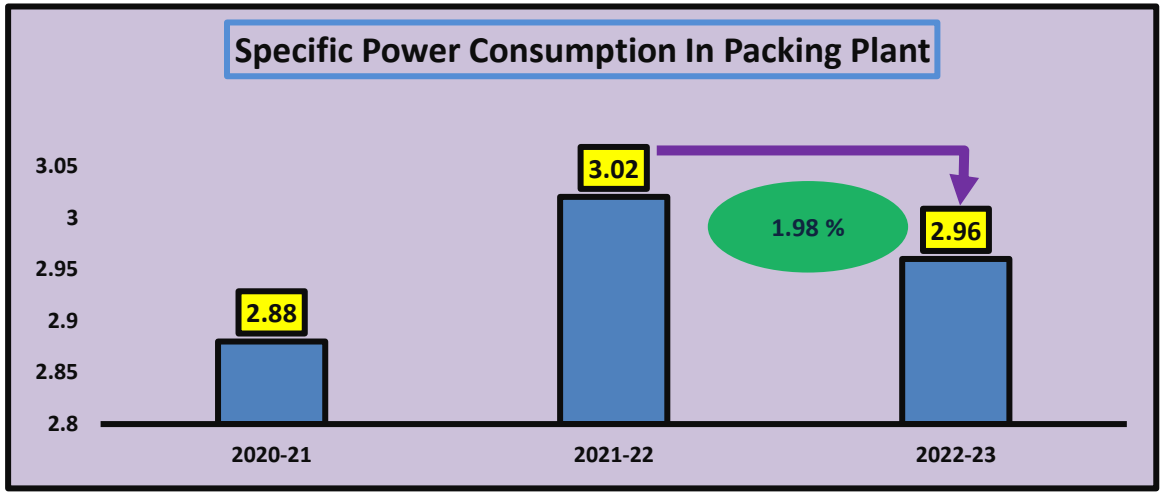
2.Specific Electrical Energy Consumption for last three financial years

Product Wise Power Consumption:

Specific Electrical Consumption for Composite Cement			
FY-Year	2020-21	2021-2022	2022-23
kWh/Ton Of cement	34.85	34.72	34.01
% Reduction	2.41% from 2020-21		



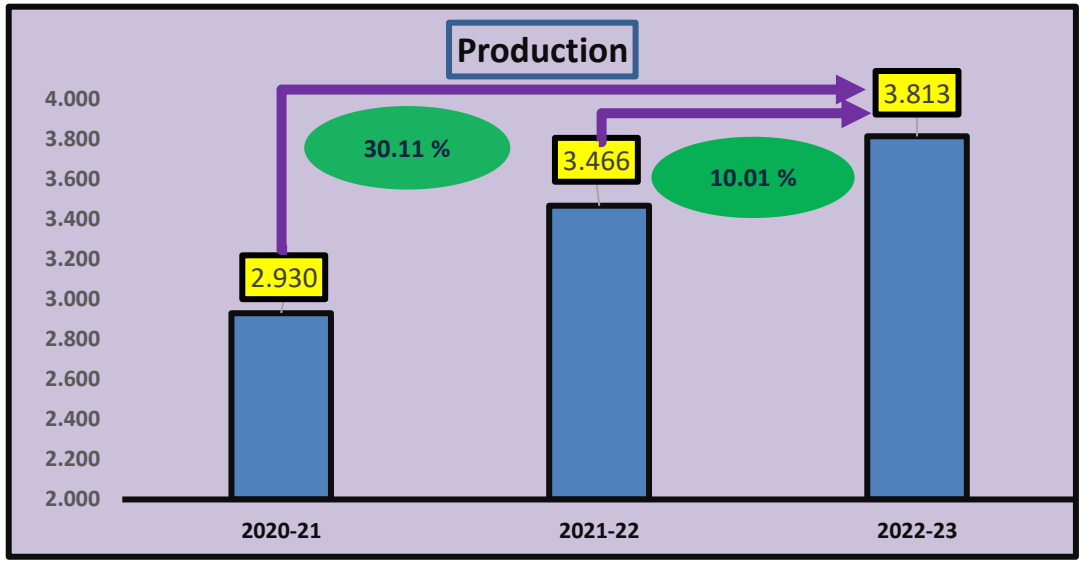
Specific Electrical Consumption for Packing Plant:			
FY-Year	2020-21	2021-2022	2022-23
kWh/Ton Of cement	2.88	3.02	2.96
% Reduction	1.98 % from 2021-22		



2.Production & Clinker Factor for last three financial years

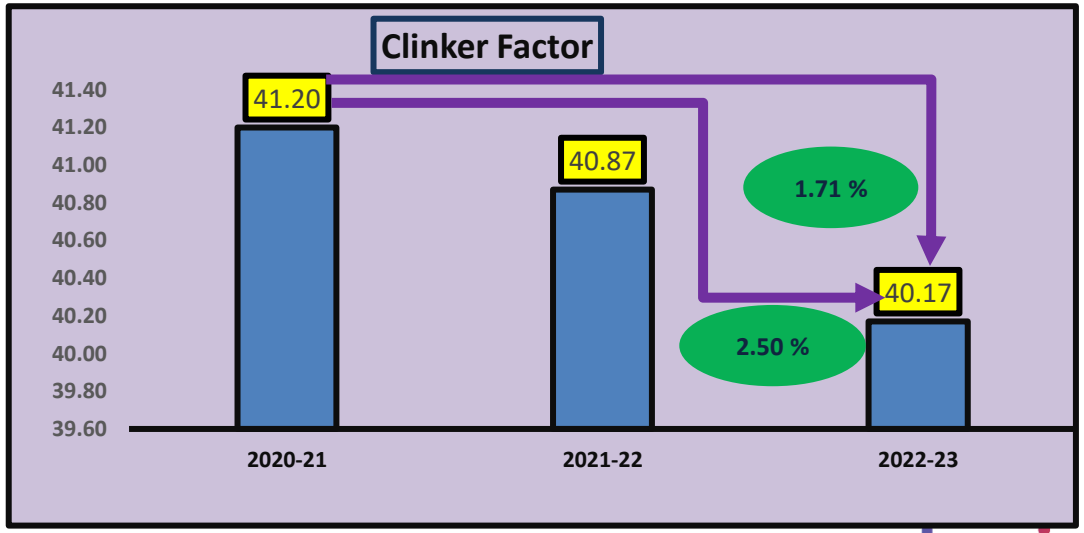
Production in MTPA:

FY-Year	2020-21	2021-2022	2022-23
MTPA	2.930	3.466	3.813
% Increase	30.11% from 2020-21 & 10.01% from 2021-22		



Overall Clinker Factor %:

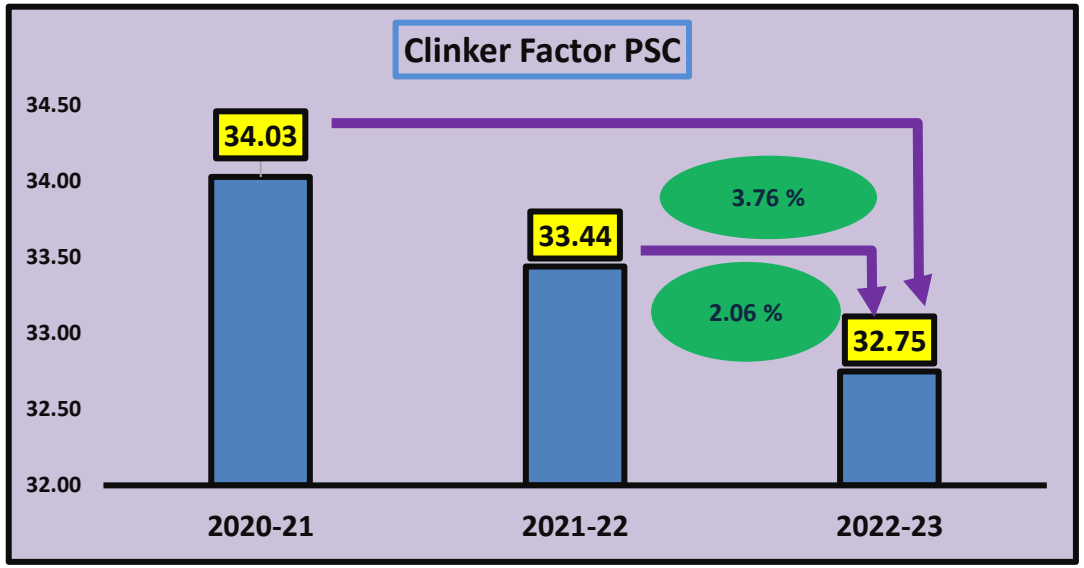
FY-Year	2020-21	2021-2022	2022-23
Clinker Factor %	41.20	40.87	40.17
% Reduction	2.50% from 2020-21 & 1.71% from 2021-22		



2.Clinker Factor Product Wise for last three financial years

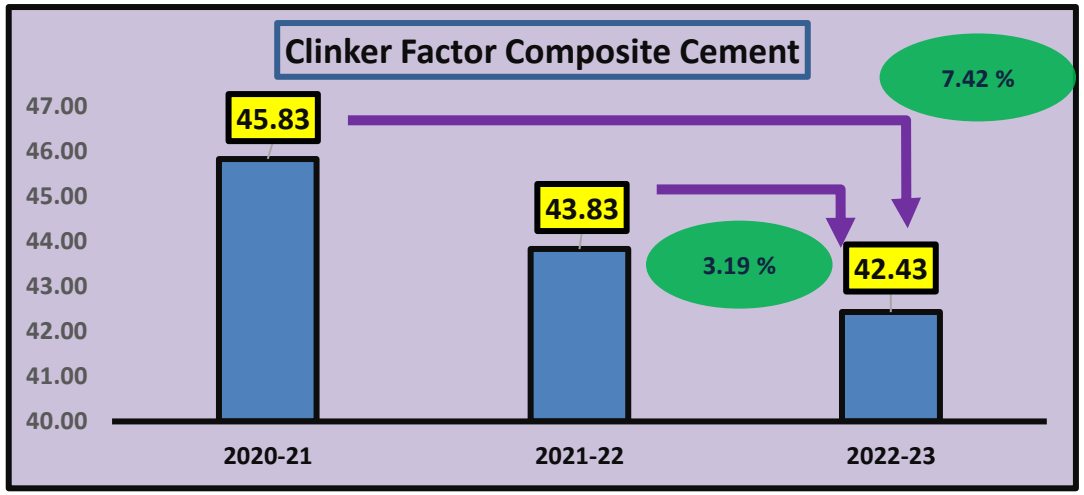
Clinker Factor % in PSC:

FY-Year	2020-21	2021-2022	2022-23
Clinker Factor %	34.03	33.44	32.75
% Reduction	3.76% from 2020-21 & 2.06% from 2021-22		



Clinker Factor % in Composite Cement:

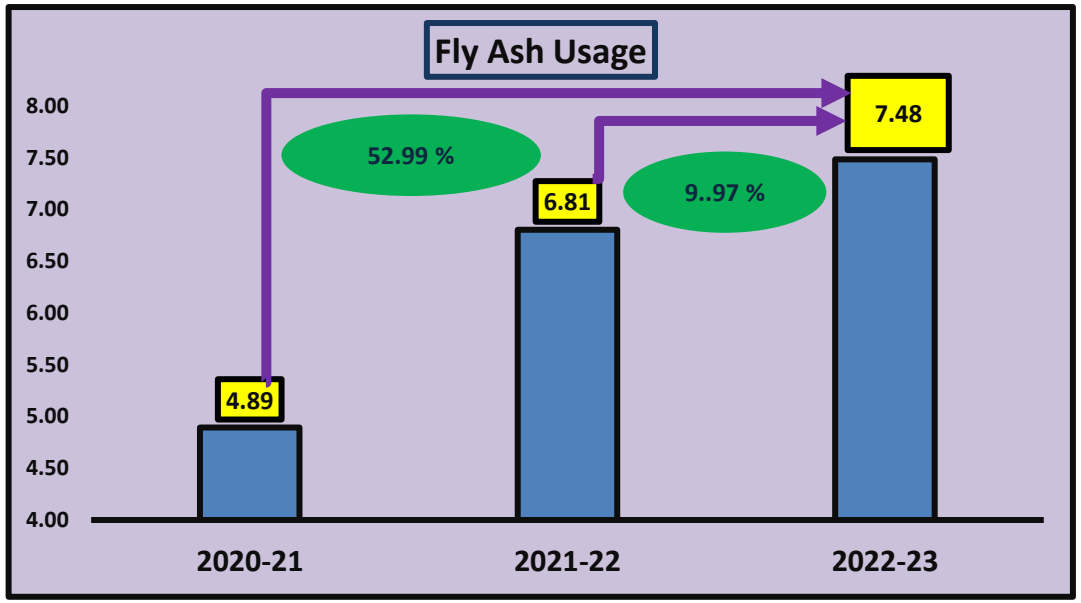
FY-Year	2020-21	2021-2022	2022-23
Clinker Factor %	45.83	43.83	42.43
% Reduction	7.42 % from 2020-21 & 3.19 % from 2021-22		



2.Slag and Fly Ash Consumption for last three years

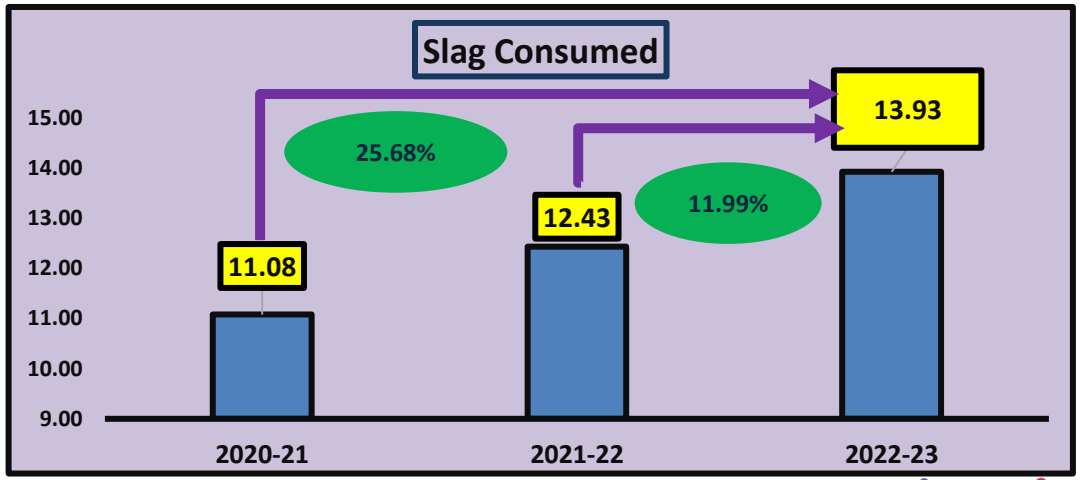
Fly Ash Usage in Lakh Tons:

FY-Year	2020-21	2021-2022	2022-23
Quantity in Lakh Tons	4.89	6.81	7.48
% Increase	52.99% from 2020-21 & 9.97% from 2021-22		



Slag Usage in Lakh Tons:

FY-Year	2020-21	2021-2022	2022-23
Quantity in Lakh Tons	11.08	12.43	13.93
% Increase	25.68 % from 2020-21 & 11.99 % from 2021-22		



3.Information on Competitors, National & Global benchmark

Name of Competitors	SEC Values
Plant-9	29.6
Plant-4	29.5
Plant-3	29.4
Plant-1	28.5

Room for improvement in our performance activities can be seen. Striving for the better results in FY 2023-24 and years ahead action plan has been developed and a process has been developed for achieving the bench marking figures.

Ref. Energy Benchmarking for Indian Cement Industry 6.0

3.Information on Competitors, National & Global benchmark

Working towards achieving targets for Energy Optimization, ACC Sindri has put consistent effort over the years on several initiatives which has helped to reduce their specific energy consumption.

ACC SINDRI will take the following further reduction measures such as

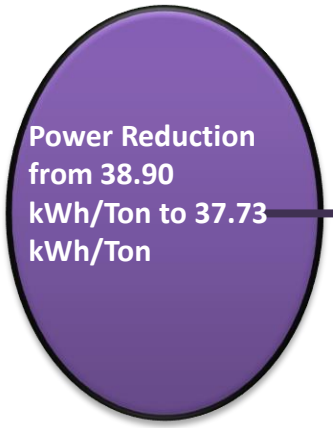
- Reducing in Thermal and Electrical Energy.
- Increasing renewable energy consumption.
- Adoption of new technologies.

No	Year	Title of Project	Annual Electrical Saving (Million kWh)	Annual Thermal Saving (Million Kcal)	Investment (Rs in Million)
1	2023-2024	Installation of VFD at dust bag filter fans at Crusher building, clinker silo and packing	0.15	0	1
2	2023-2024	Reduction in separator fan flow for cement mill 1, 2 and 4	0.396	0	
3	2023-2024	Optimize packing plant air compressors	0.18	0	1.2
4	2023-2024	Higher Air Infiltration of 26% in Cement Mill Circuit mill VRM 1	0.816	0	2
5	2023-2024	Grinding media regrading and Charging pattern optimization through B level study	1.2	0	2.5

4.Summay of Major Energy Saving projects implemented in last three years

Year	No of Energy saving projects	Investment (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)
FY 2022-23	5	3	2.528	0	11.61	1.12
FY 2021-22	3	0.2	1.28	0	5.816	0.69
FY 2020-21	3	0.02	0.312	0	1.4	0.10

4.Energy Saving projects implemented in last three years



Production Management

1. Grinding media regrading
2. Charging pattern optimization through B level study
3. Study and optimization of compressors and blowers.
4. False air reduction in circuit.
5. Installation of manual hopper in feeding circuit to improve the Productivity.
6. Cleaning of slag hopper through winbhip to increase the capacity and overall improve the efficiency.
7. Installation of air blaster and vibrator and gypsum hopper and mill feed RAL.
8. Replaced the DOL type with RDOL for feed RAL in VRM.
9. VRM-2 dam ring height adjustment for improvement of production efficiency.

Power Management

1. Checking of power factor of all capacitor banks of load centers
2. Checking of all LT capacitor banks
3. Monitoring of grid voltage on daily basis
4. Trend analysis of load verses power factor of 132KV substation in DCS for daily monitoring
5. Installation of VFD for power and operational optimization.
6. Installation Of LED in place of normal lamps

Operational Management

1. Page of Standby equipment's to be developed in CCR for auto change resulting in reduction of downtime.
2. Improve the idle running of equipment's.
3. Process optimization in VRMs and Ball Mill.
4. Increase the coordination among team members for improving the response time
5. Replacement of Sioma VRM weldeable roller and table liner to sinter cast

4.Energy Saving projects implemented in last three years

Energy Savings project executed for the FY-2022-23:

Sl No.	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 cementorKcal/Kg cement)
1	VRM-2 dam ring height adjustment for improvement of production efficiency	3	1.6	0	7.2	0.4
2	Installation of VFD at dust bag filter fans 663,664,665, 666 of vent	1.5	0.32	0	1.52	0.08
3	Installation of VFD AT DUST COLLECTOR fans 663,664,665 and 666	2.87	0.61	0	2.89	0.152
4	Charging pattern optimization through B level study in Cement Mill 4	1.0	1.2	0	5.4	0.3
5	Installation of air blaster and vibrator and gypsum hopper and mill feed RAL and other operational efficiencies.	0.5	4.0	0	1.8	0.2

4.Energy Saving projects implemented in last three years

Energy Savings project executed for the FY-2021-22:

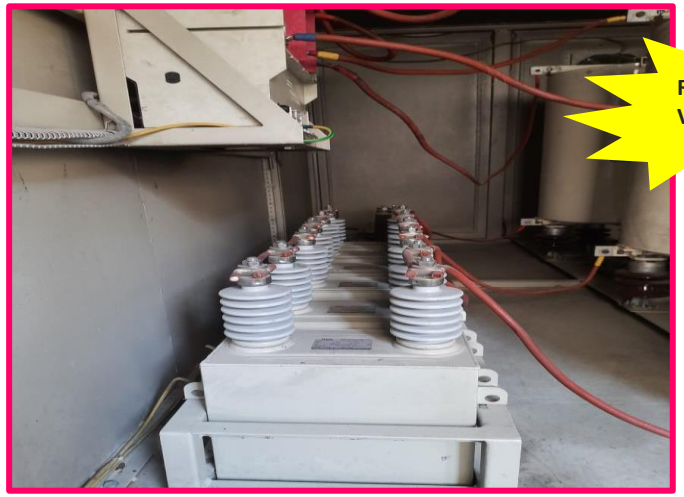
Sl No.	Name of Energy saving projects	Investments (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Impact on SEC/ SHC (Electrical kWh /MT cementorKcal/Kg cement)
1	Reduction of Air Infiltration of 7% in Cement Mill Circuit mill VRM 3	0.1	0.48	0	2.16	0.12
2	Reduction of Air Infiltration of 10% in Cement Mill Circuit mill VRM 2	0.1	0.8	0	3.5	0.20
3	Development of Page of Standby equipment's in CCR for auto change resulting in reduction of downtime and other operational improvement.	0	0.8	0	3.6	0.20

4.Energy Saving projects implemented in last three years

Energy Savings project executed for the FY-2020-21:

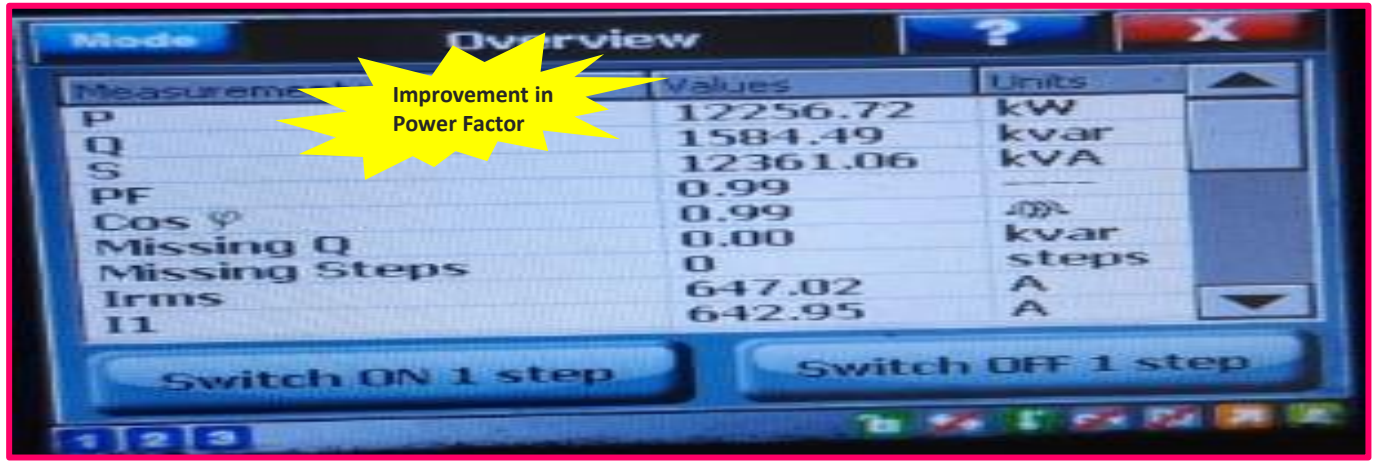
Sl No.	Name of Energy saving projects	Investments (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Impact on SEC/ SHC (Electrical kWh /MT cementorKcal/Kg cement)
1	Compressed air leakages arresting in air distribution compressor network	0.02	0.072	0	0.324	0.02
2	Reduction in idle running of the equipment's of material handling circuit	0	0.24	0	1.08	0.06
3	Installation of manual hopper in feeding circuit to improve the Productivity.	0.05	0.16	0	0.72	0.04

4.Energy Saving projects implemented in last three years



Replacement of Vacuum Card

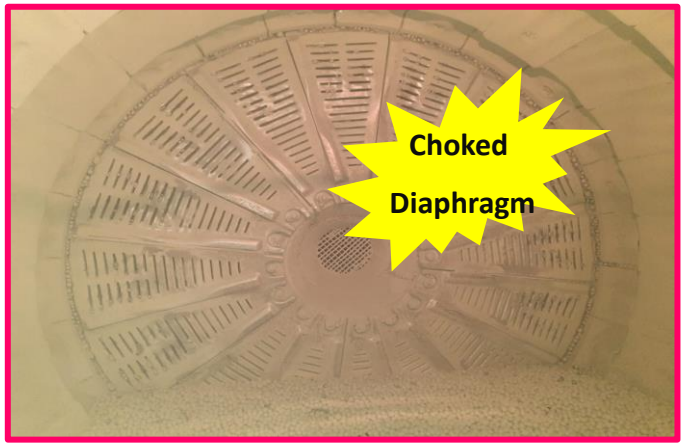
Replacement of Capacitor



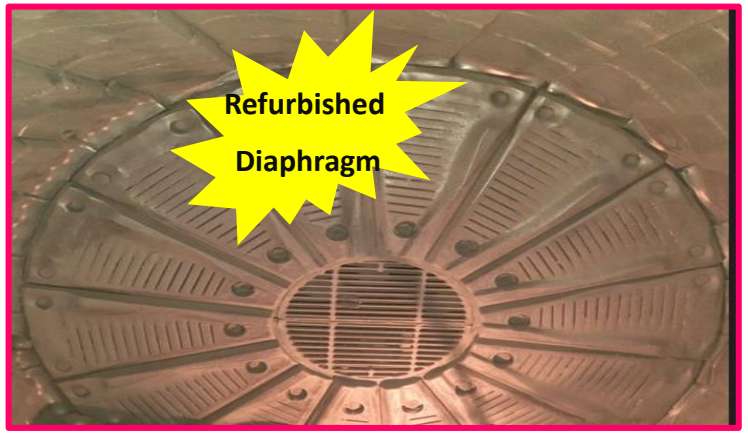
Improvement in Power Factor

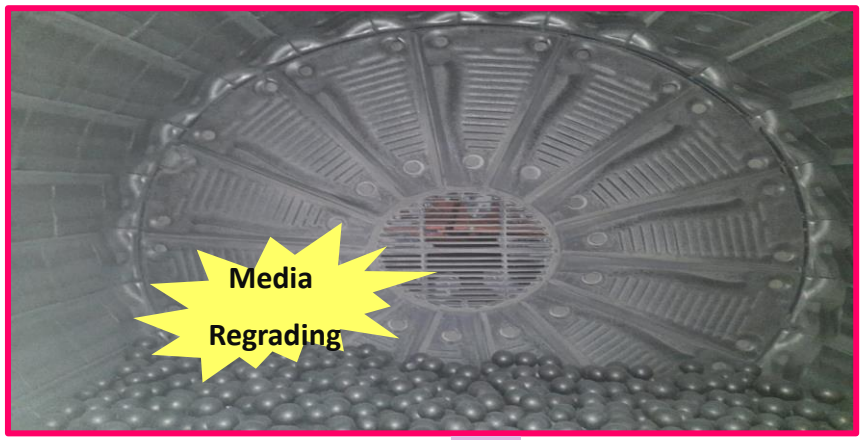
- 132KV substation reactive load not compensating as per load.
- Average power factor was poor.
- Vacuum contactor of capacitor bank found not working.
- Maximum Demand Reduced.
- Improvement of Power Factor from 0.97 to 0.99.
- From last three months power Average power factor achieved 0.99.

4.Energy Saving projects implemented in last three years



BEFORE





AFTER

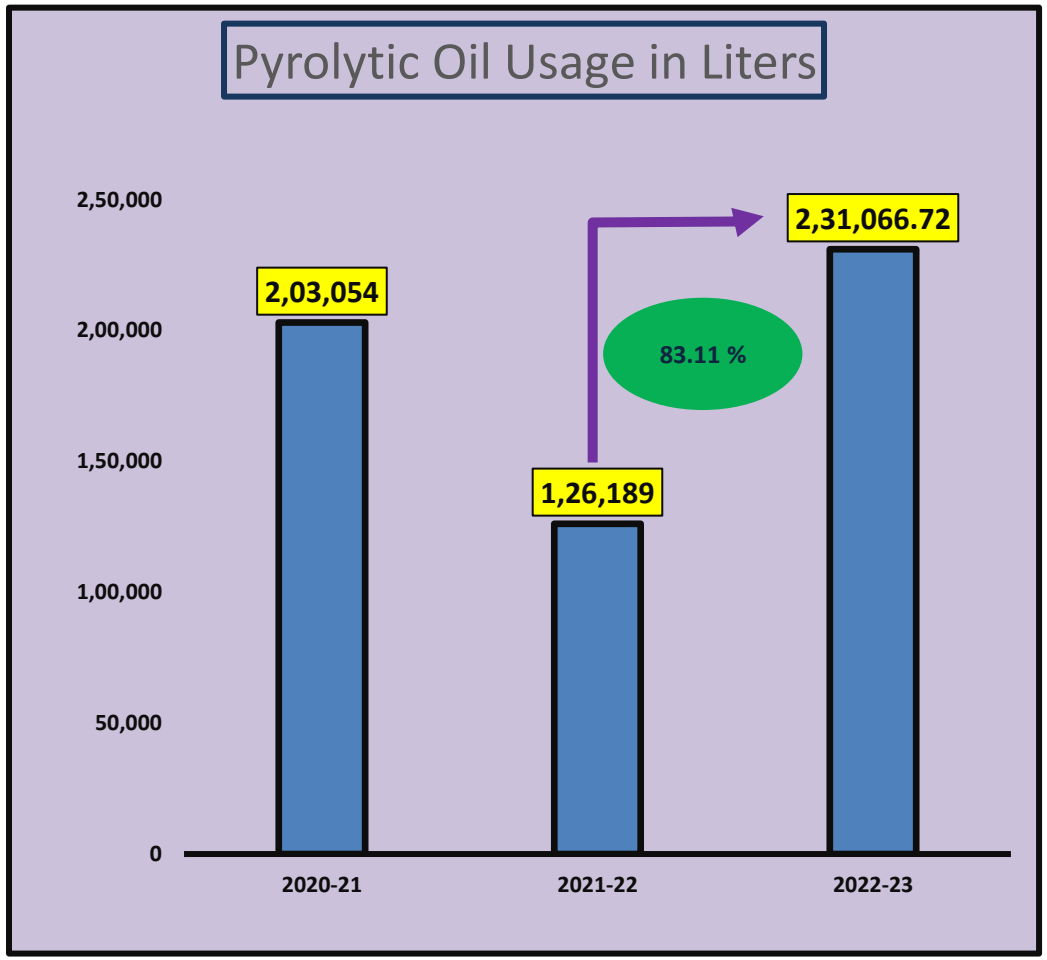
- Grinding media regrading was done to improve the performance of mill.
- Cement samples were collected from various points in the circuit.
- Results were discussed with the team.
- Flow measurement at various points were done.
- Grinding efficiency of the mill was targeted and ultimately the power consumption improved.

- The main motor load was on the higher side.
- The issue was discussed with the team.
- It was decided to reduce the dam ring height of VRM-2 was by 10 mm.
- This resulted in the savings of power in the mill main motor by 200 kW.
- Improvement in the reject of mill.
- The effect of varying dam ring height was found to be effective and overall efficiency improved.

4.Energy Saving projects implemented in last three years

Utilization of pyrolytic oil(Waste Oil) in HAG light up:

Pyrolytic oil consumption in liters:			
FY-Year	**2020-21**	**2021-2022**	**2022-23**
Quantity	**203,054**	**126,189**	**231,066.72**
% Increase	**83.11 % increase from 2021-2022**		



Benefits achieved:

- Saving achieved in per liter=97.06-62.9
  =**34 .16 R**s per liter
- Conservation of Deisel.

5.Innovative Projects implemented

1.UPGRADATION OF DIESEL FIRED HAG TO DIESEL CUM GAS FIRED:

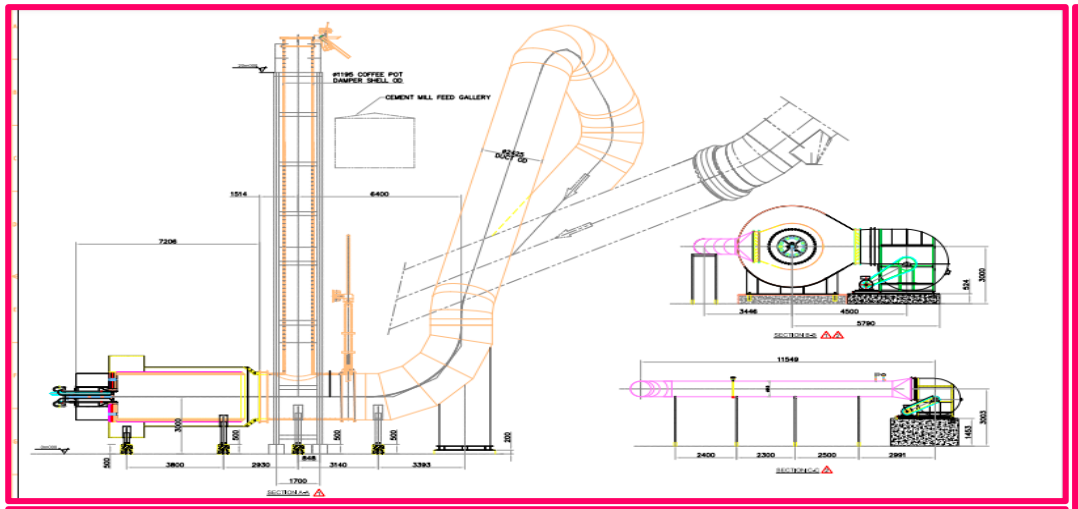
Natural Gas station used for firing in HAG

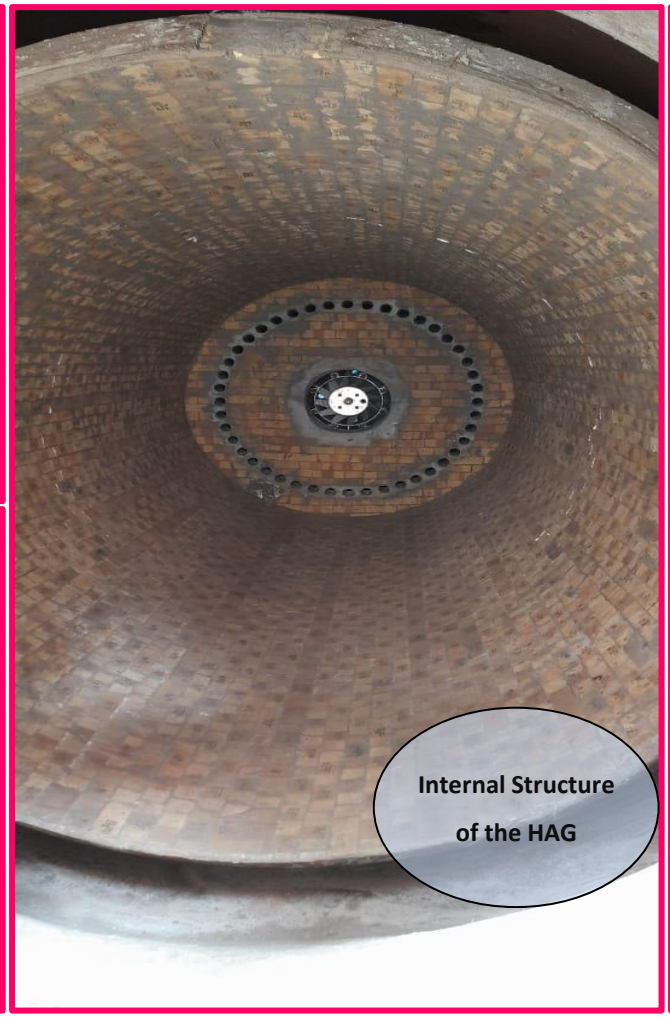
- Three HAG (Hot air generator) have been installed in plant.
- Two for VRM and one for Coal Mill. Coal Mill HAG operates completely on diesel.
- GAIL gas is developing Gas Pipe network for domestic as well as industrial uses in our plant surrounding,
- Agreement has been done with GAIL for providing gas.
- Gas connection provided on the last quarter of 2022.
- Coal Mill HAG gas was used in place of diesel with certain modification in HAG.
- Replacement of diesel with gas leads to the cost benefit and help in diesel Saving and necessary fossil fuel (Coal) was saved.
- In next phase the HAG for VRM will be installed and natural gas will be used
- Category C New concept (risks taken/self driven/beyond OEM.

Year of implementation:2023
Annual Savings: Rs 115.2 Lakhs
Investment: Rs 40 Lakhs

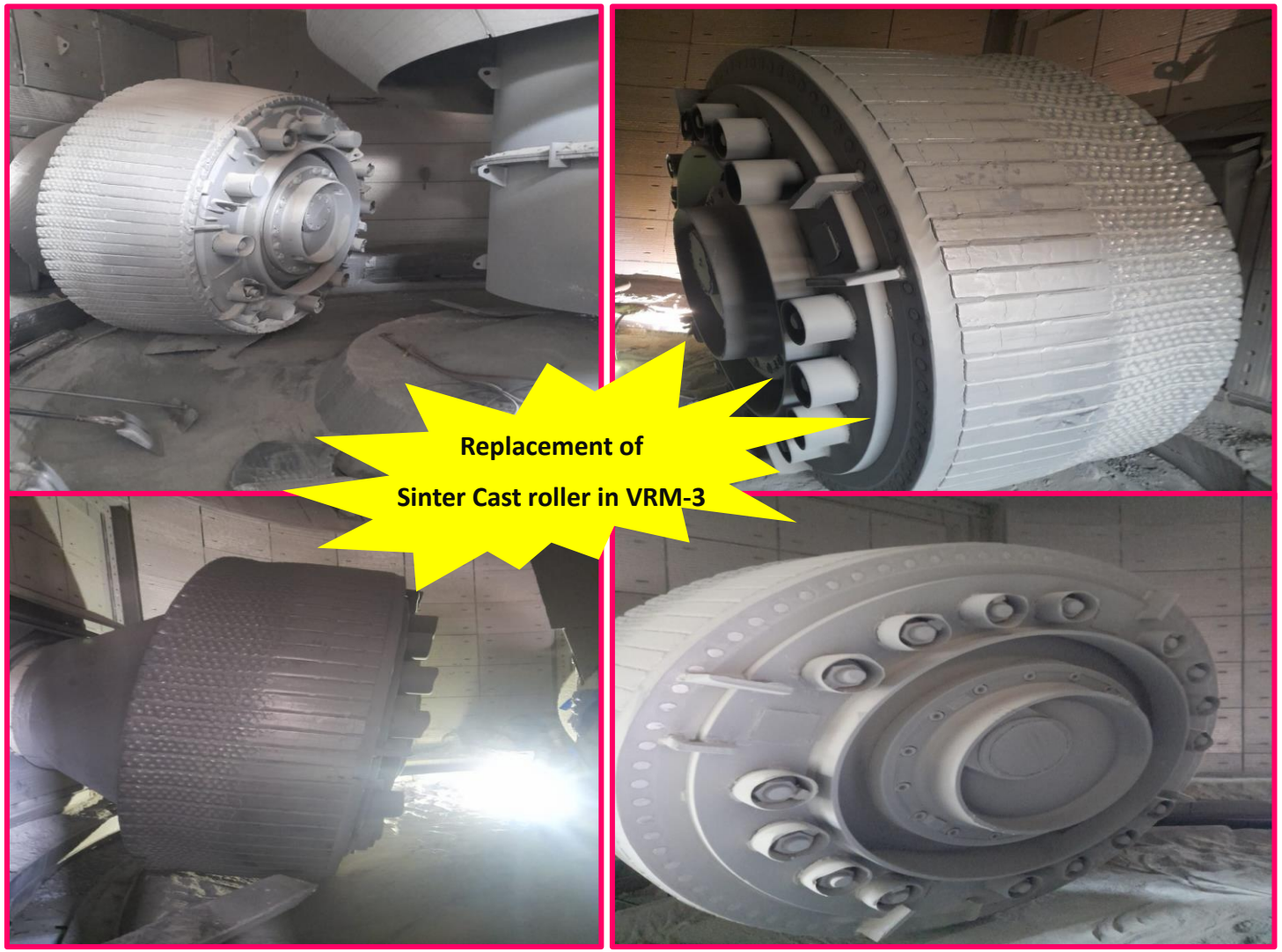
5.Innovative Projects implemented

1.UPGRADATION OF DIESEL FIRED HAG TO DIESEL CUM GAS FIRED:





2. Replacement of Sioma VRM weldeable roller and table liner to sinter cast:



Sinter Cast installation in VRM-3 resulted in:

- Reduction of number of days major shut down
- Less wear and tear and reduction in total number of days by 4-5.
- Major shutdown needed to be taken once in a year.
- This resulted in improvement of volume and thereby reduction in specific energy consumption.

Year of implementation:2022
Annual Savings: Rs 65.34 Lakhs
Investment: Rs 220 Lakhs

6. Utilisation of Renewable Energy sources

- Solar power plant has been installed in two phases for colony lighting(Onsite).
- 20 KW in 2020 and 30 KW in 2021. Rs 36 Lakhs
- RPO is not applicable as power from grid is utilized.

Onsite Generation				
Year	Technology	Installed Capacity (KW)	Consumption (million kWh)	% of overall electrical energy consumption
FY 2022-23	Solar	20KW+30 KW	0.12	0.08
FY 2021-22	Solar	20kW+30 KW	0.10	0.07
FY 2020-21	Solar	20 KW	0.05	0.01

Emissions intensity of last three years (Kg CO2 / Ton of Product)

Year	Scope 1 Emission	Scope 2 Emission	Scope 3 Emission	Total Emission
2022-23	16.67	28.82	50.13	95.62
2021-22	19.9	30.15	47.21	97.26
2020-21	21.1	32.14	46.88	100.12

The scope of the emission includes for Scope-1,Scope-2 and Scope-3.

Scope 3 GHG Categories

Category 1 - Purchased goods and services

Category 3 - Fuel- and energy-related activities

Category 4 - Upstream transportation and distribution

Category 7 - Employee commuting

Category 9 - Downstream transportation and distribution

ACC, Sindri's Carbon reduction journey and future targets

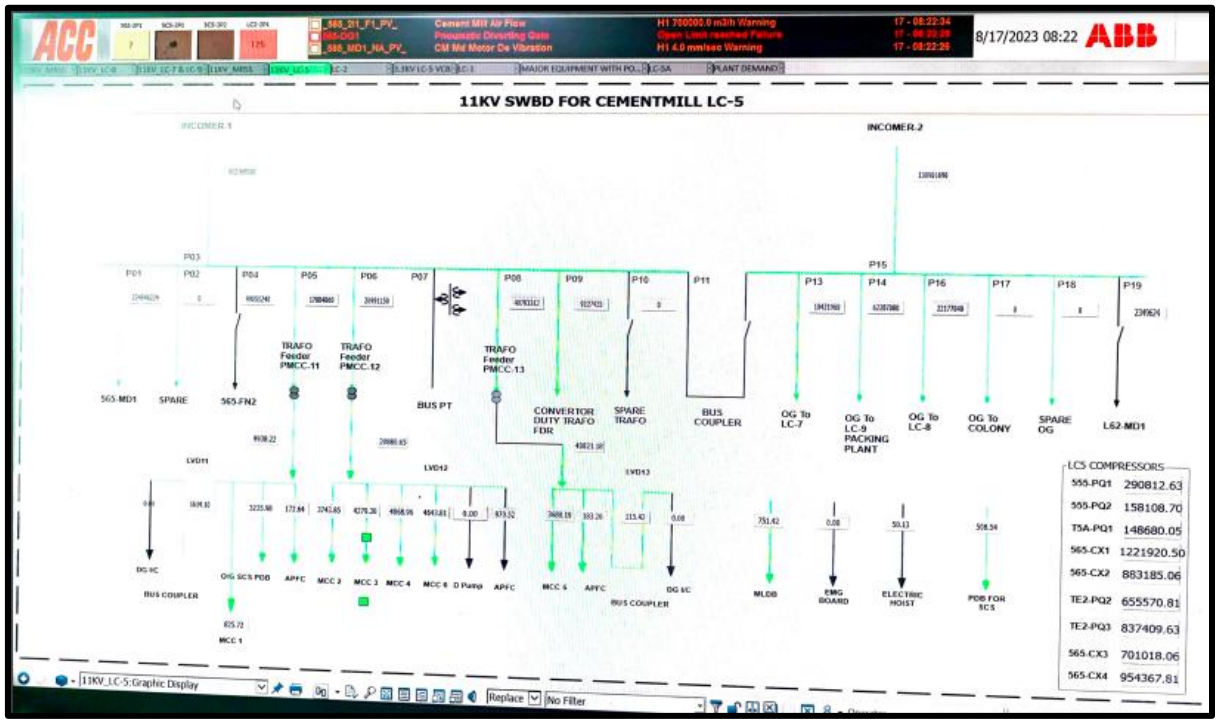
- ACC has been measuring its carbon footprint, since 2005, as per the World Council for Sustainable Development- Cement Sustainability Initiative (WBCSD-CSI) standards and CSI protocol.
- ACC has played significant role in developing the low carbon technology roadmap for cement sector
- ACC Cement Sindri is continuously working towards reduction of CO2 emissions under the umbrella of Company's decarbonisation program through various initiatives such as: **reduction in Clinker Factor (CF) by increasing usage of fly ash and/or alternative raw materials, Reducing Thermal and Electrical energy consumption with various energy efficiency initiatives and carrying out the plantation activity towards carbon sequestration.**

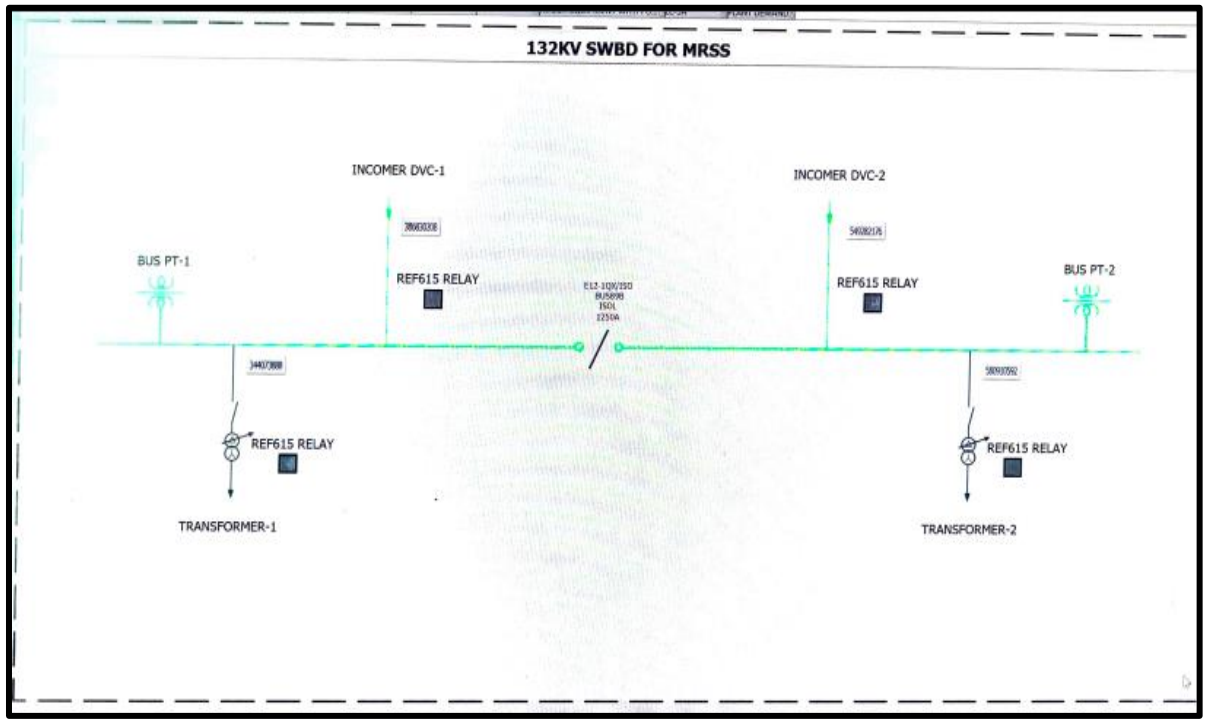
Public Disclosures:

- For more than a decade now, ACC has also been disclosing its climate related data through Carbon Disclosure Project (CDP) environmental disclosure.

- ACC also discloses its CO2 performance through its annual integrated report which can be accessed herehttps://www.acclimited.com/newsite/annualreport2022/ACC_2022.pdf

8.EMS System





- Centralized and continuous monitoring of energy consumption is being done.
- The data of the EMS is available in the TIS which can be seen on real time basis.
- The concerned areas graph wise can be depicted.
- Three phases with old feeders creates problem of communication in the sub MCCs.

8.Learning from other programs

- The Jharkhand Government in association with the State Pollution control Board has constructed a task force under the banner of “Jharkhand Nav-Nirman ki Or agrasar”.
- Cement industries efforts towards consumption of Fly ash and slag as blending materials in the cement manufacturing help in reducing our CO2 emissions
- Conserving the precious mineral i.e., Limestone which is becoming a scarce resource

9.Net Zero Commitment

SCIENCE BASED TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

info@sciencebasedtargets.org
www.sciencebasedtargets.org

Approved science-based target

The Science Based Targets initiative has validated that the corporate greenhouse gas emissions reduction target(s) submitted by

ACC Limited

have been deemed to be in conformance with the SBTi Criteria and Recommendations (version 4.2). The SBTi's Target Validation Team has classified your company's scope 1 and 2 target ambition and has determined that it is in line with a well-below 2°C trajectory.

The official target wording is:

ACC Limited commits to reduce scope 1 GHG emissions 21.3% per ton of cementitious material by 2030 from a 2018 base year. ACC Limited also commits to reduce scope 2 GHG emissions 48.4% per ton of cementitious material within the same timeframe.*

**The target boundary includes biogenic emissions and removals from bioenergy feedstocks*

Date of issue: Jul, 2021

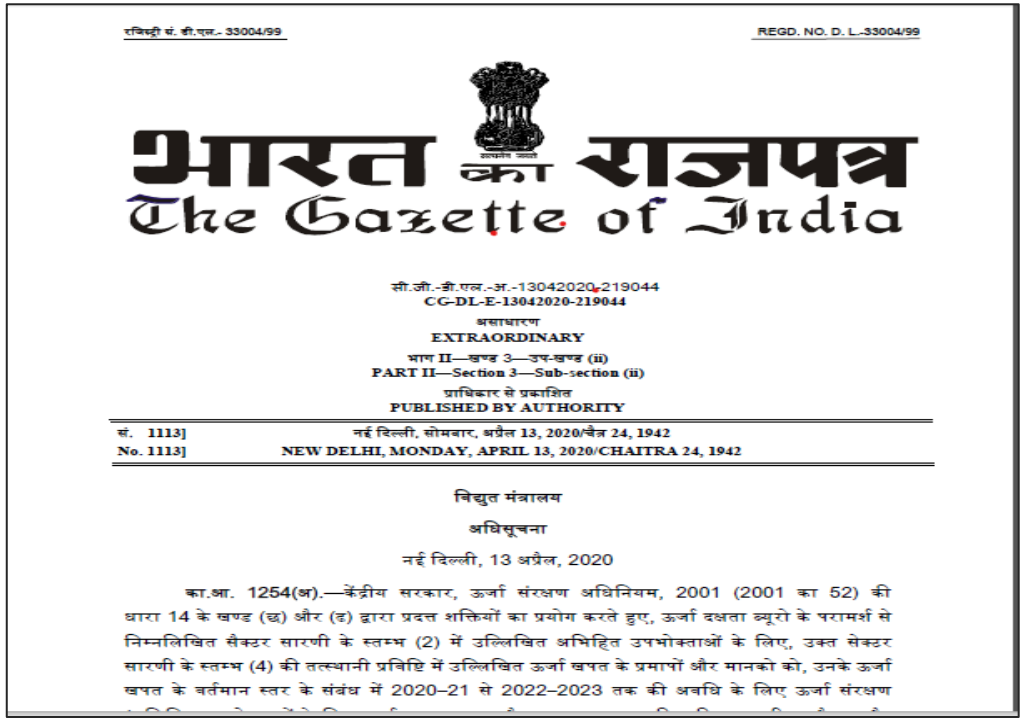
Certificate Number: ACCL-IND-001-OFF

An initiative by CDP WORLD RESOURCES INSTITUTE WWF

Net Zero Pledge and Science Based Target Initiative (SBTi):

- During July 2021, ACC Ltd. became the first company in the Indian construction sector to sign the ***Net Zero pledge*** and join the **"Business Ambition for 1.5°C"** where ACC commits to set a long term science based target to reach net zero value chain GHGs emissions by no later than 2050 and to set interim science based targets (SBTs) in line with the criteria and recommendations of the Science Based Target Initiative (SBTi).
- As per validated SBT, ACC Ltd. has committed to reduce their specific **Scope-1 GHG emissions by 21.3%** and specific **Scope-2 GHG emissions by 48.4%** by 2030 from a 2018 base year.
- These targets cover greenhouse gas emissions from company operations (scopes 1 and 2) and are consistent with reductions required to keep the global warming to well-below 2°C.

10.Major Achievements



रजिस्ट्री सं. डी.एल.- 33004/99 REGD. NO. D. L.-33004/99

भारत का राजपत्र
The Gazette of India

सी.जी.-डी.एल.-अ.-13042020-219044
CG-DL-E-13042020-219044

असाधारण
EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (ii)
PART II—Section 3—Sub-section (ii)

प्राधिकार से प्रकाशित
PUBLISHED BY AUTHORITY

सं. 1113] नई दिल्ली, सोमवार, अप्रैल 13, 2020/चैत्र 24, 1942
No. 1113] NEW DELHI, MONDAY, APRIL 13, 2020/CHAITRA 24, 1942

विद्युत मंत्रालय

अधिसूचना

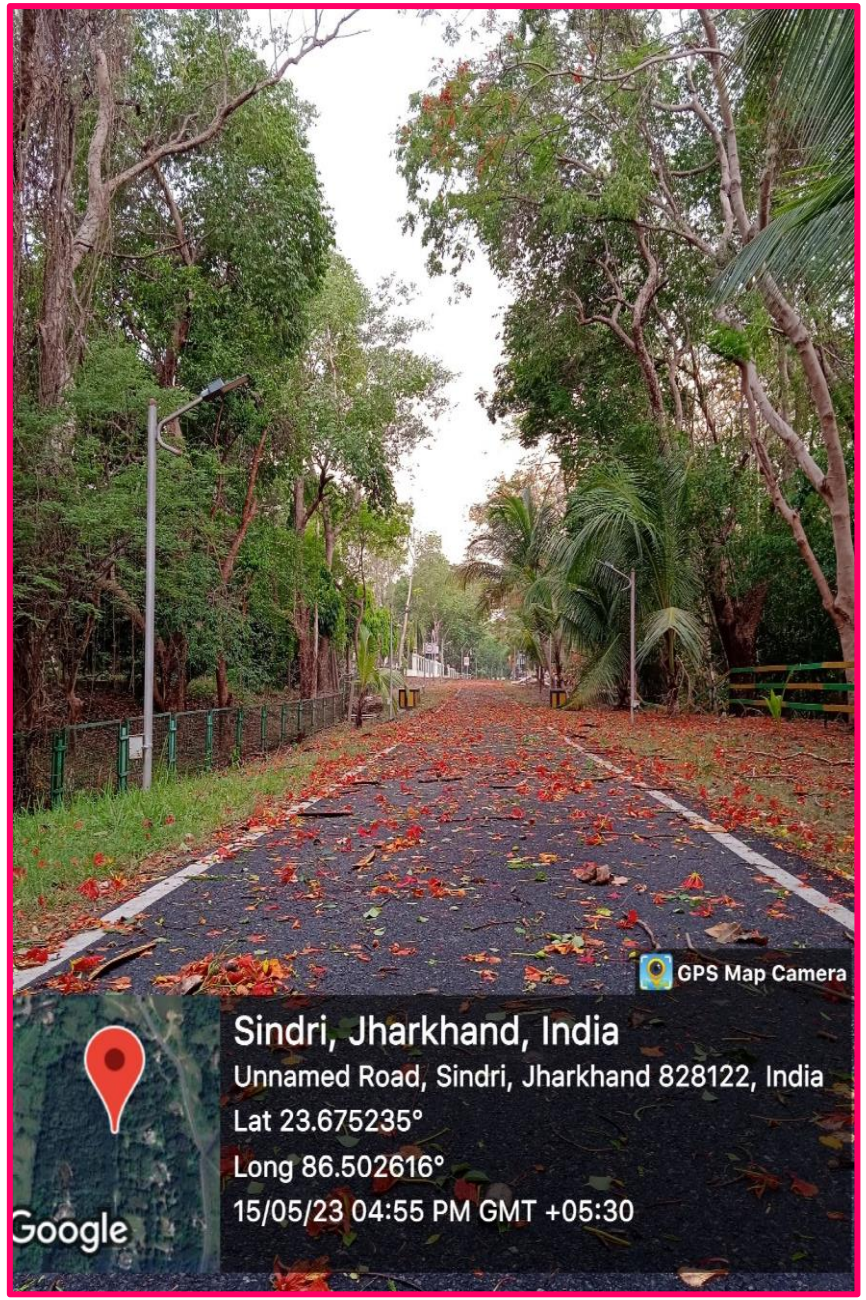
नई दिल्ली, 13 अप्रैल, 2020

का.आ. 1254(अ).—केंद्रीय सरकार, ऊर्जा संरक्षण अधिनियम, 2001 (2001 का 52) की धारा 14 के खण्ड (छ) और (ढ) द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए, ऊर्जा दक्षता ब्यूरो के परामर्श से निम्नलिखित सैक्टर सारणी के स्तम्भ (2) में उल्लिखित अभिहित उपभोक्ताओं के लिए, उक्त सेक्टर सारणी के स्तम्भ (4) की तत्स्थानी प्रविष्टि में उल्लिखित ऊर्जा खपत के प्रमापों और मानकों को, उनके ऊर्जा खपत के वर्तमान स्तर के संबंध में 2020–21 से 2022–2023 तक की अवधि के लिए ऊर्जा संरक्षण

	Name, address and State	Registration number	Specific energy consumption (TOE/Ton of equivalent product)	Equivalent Major Product Output (Ton)	Specific energy consumption (TOE/Ton of equivalent product)
29.	ACC Limited - Sindri Cement Works, P.O. Sindri, District Dhanbad, Jharkhand 828124	CGU0029JH	0.0182	2816720	0.0171

	Specific energy consumption		
a.	Specific energy consumption (baseline)	0.0182	toe/ton or Net kCal/kWh
b.	Production (baseline)	2816720	ton or Million kWh
c.	Revised target SEC (from 7.b)	0.0171	toe/ton or Net kCal/kWh
d.	Target after normalisation, if any	0.0171	toe/ton or Net kCal/kWh
e.	Achieved specific energy consumption	0.0170	toe/ton or Net kcal/kWh
f.	**Energy savings certificates**	**+282**	**nos.**

PAT cycle VI M & V was conducted on June-2023.There was reduction of 6.96 % in terms of the baseline data. The Plant specific energy consumption in the PAT cycle VI was 0.0170 against Baseline data of 0.0182 toe/Ton



THANK YOU

ACC Ambuja Cement

adani Cement