HEIDELBERGCEMENT

"22nd National Award for Excellence in Energy Management 2021"

HeidelbergCement India Ltd.-Unit Jhansi

Mr Sunil Kumar, Plant Head

Mr Manoj Vaish, SGM(Production)

Mr Shailendra Agrawal, GM(E&I)

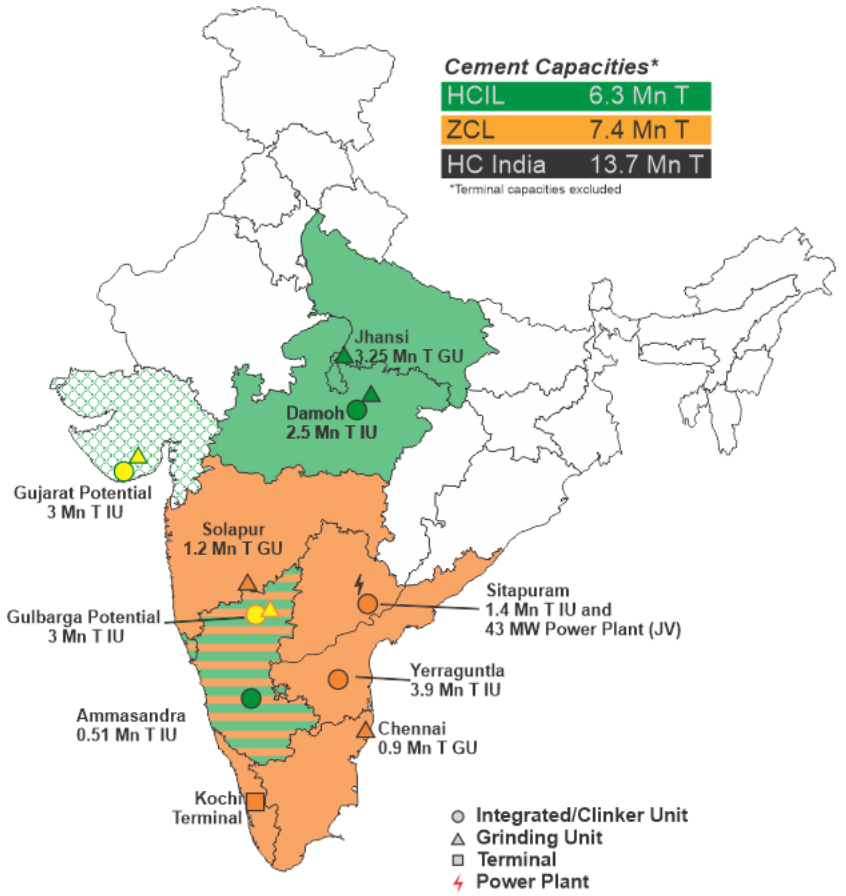
Brief introduction on Company/Unit HeidelbergCement Group

HEIDELBERGCEMENT

Worldwide Presence

- 53,000 employees
- Leading market positions in aggregates, cement, and ready-mixed concrete
- 3,000 production sites in more than 50 countries
- Cement capacity 184 mt (incl. joint ventures)
- Aggregates resources and reserves 19.2 bnt

Presence in India

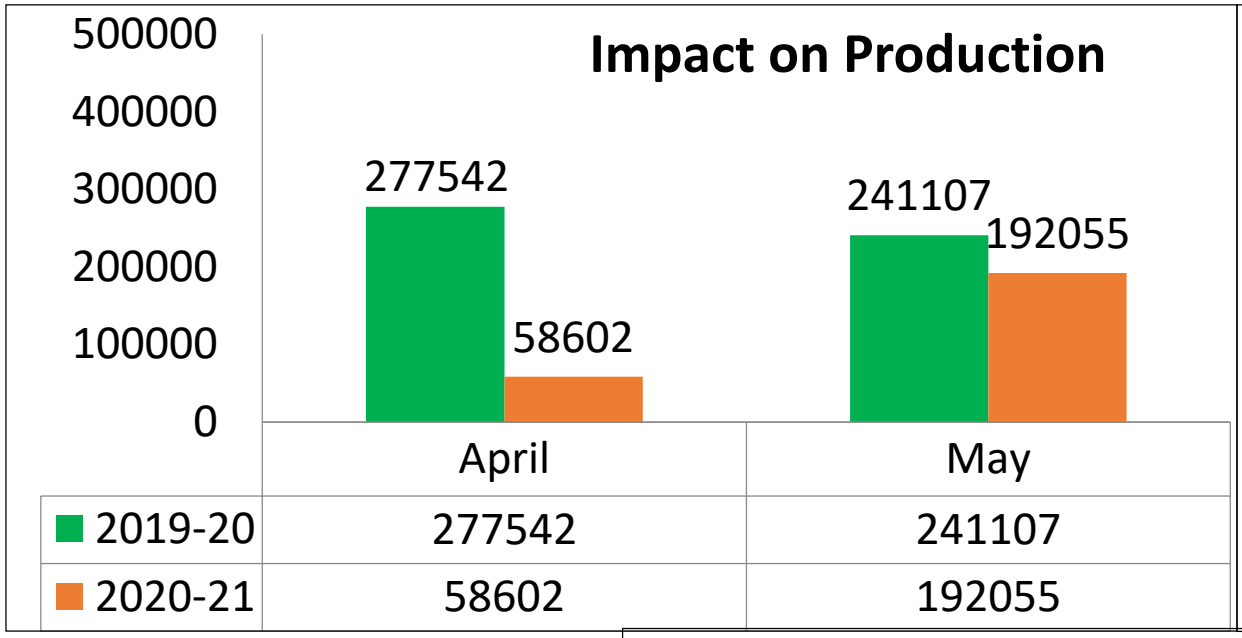


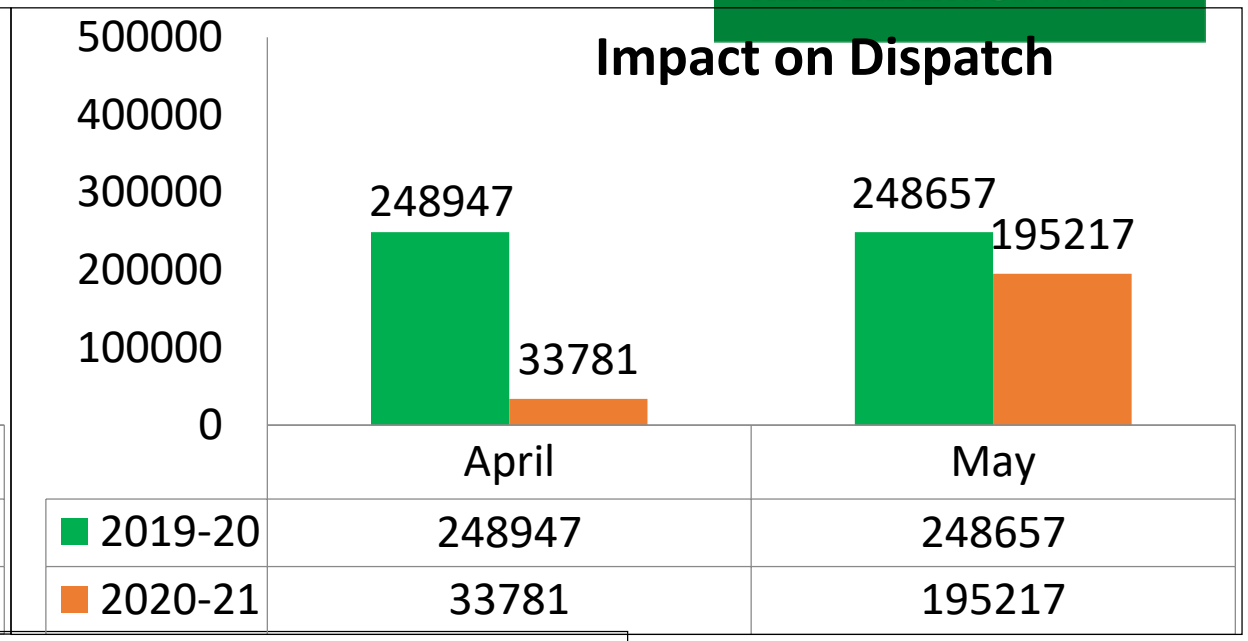
HeidelbergCement India Limited – Unit Jhansi

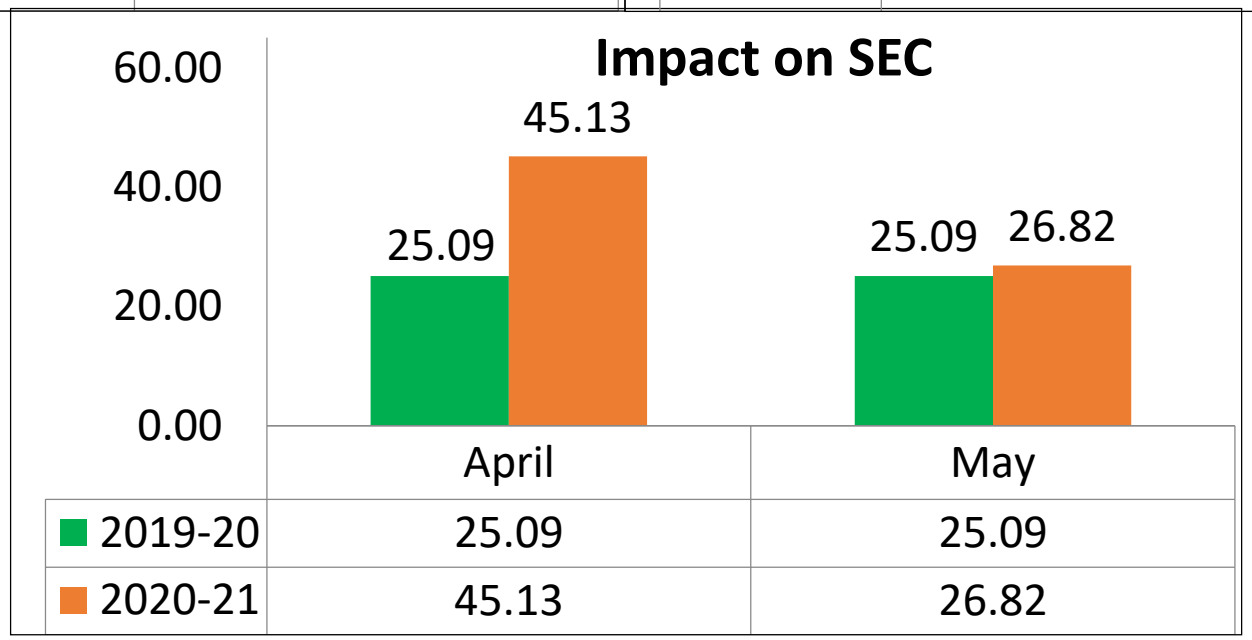
- Jhansi Cement Grinding & Packing Unit installed in 1989, initial capacity
- of 0.5 MTPA
- 100 % PPC Manufacturing, Near to Power Plants (PTPP 920 MW & LPP 1920 MW)
- Capacity Expanded to 2.7 MTPA by installing VRM in 2013
- Capacity Expanded to 3.25 MTPA by upgrading High efficiency Separator and debottlenecking of Ball Mill in 2020

Major Equipment	Installed Capacity	Make
Cement Mill -1 (Ball Mill)	162 TPH	KHD Humbolt
Roller Press	200 TPH	KHD Humbolt
Cement Mill -2 (VRM)	215 TPH	Loesche
Packer – 4 Nos.	4 * 250 TPH	EEL/FLS
Wagon Tippler	1000 TPH	Metso
Wagon Loading Machine	8 * 120 TPH	EEL / FLS

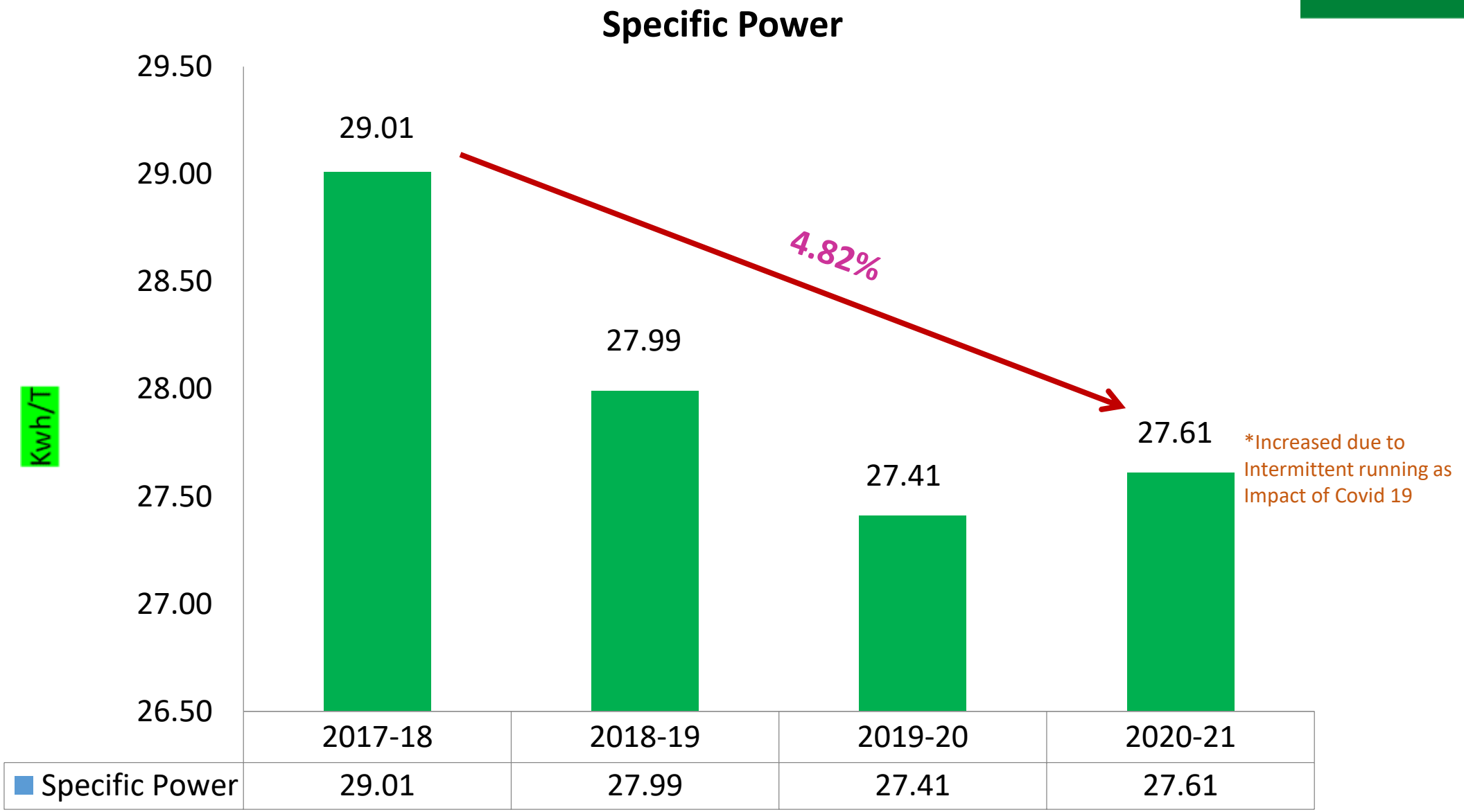
Impact of Covid-19







Overall Specific Power Consumption Kwh/T



*Increased due to Intermittent running as Impact of Covid 19

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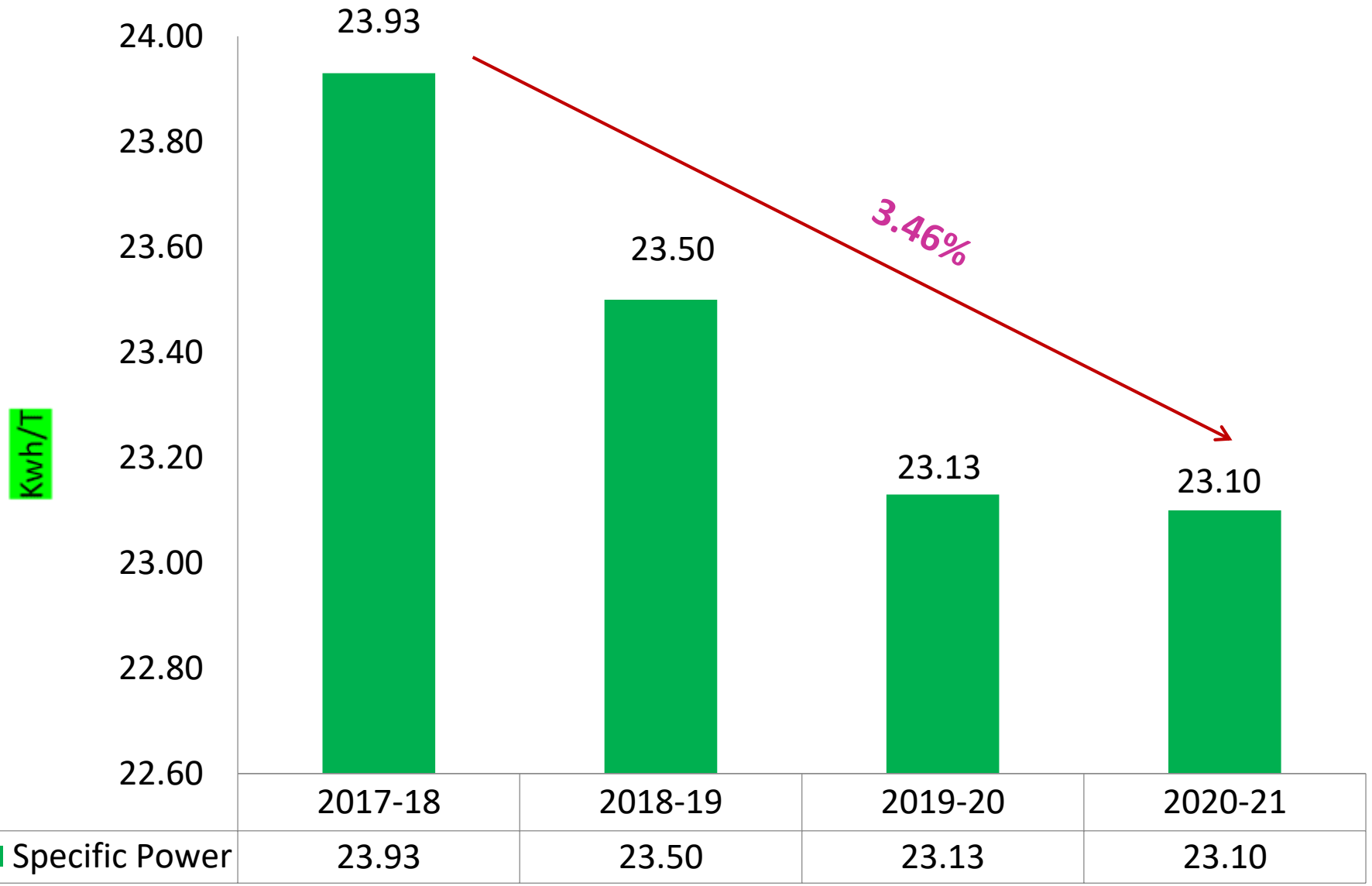
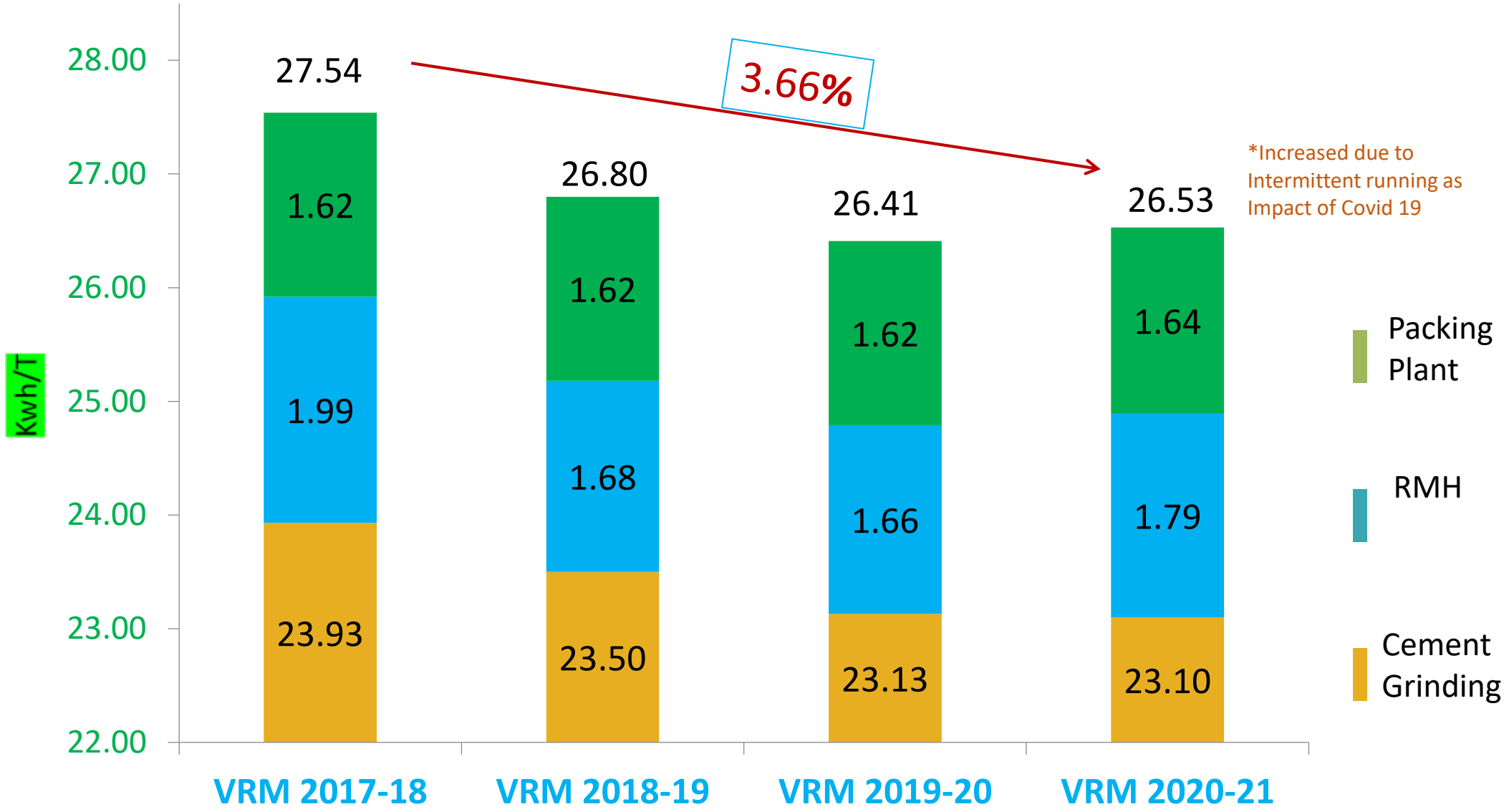
Cement Mill – 2 VRM Grinding Only -SPC (KWh/Ton)



	2017-18	2018-19	2019-20	2020-21
Specific Power	23.93	23.50	23.13	23.10

Cement Mill – 2 VRM: Overall SPC (KWh/Ton)



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Cement Mill -1 :Ball Mill Only Grinding SPC (KWh/Ton)

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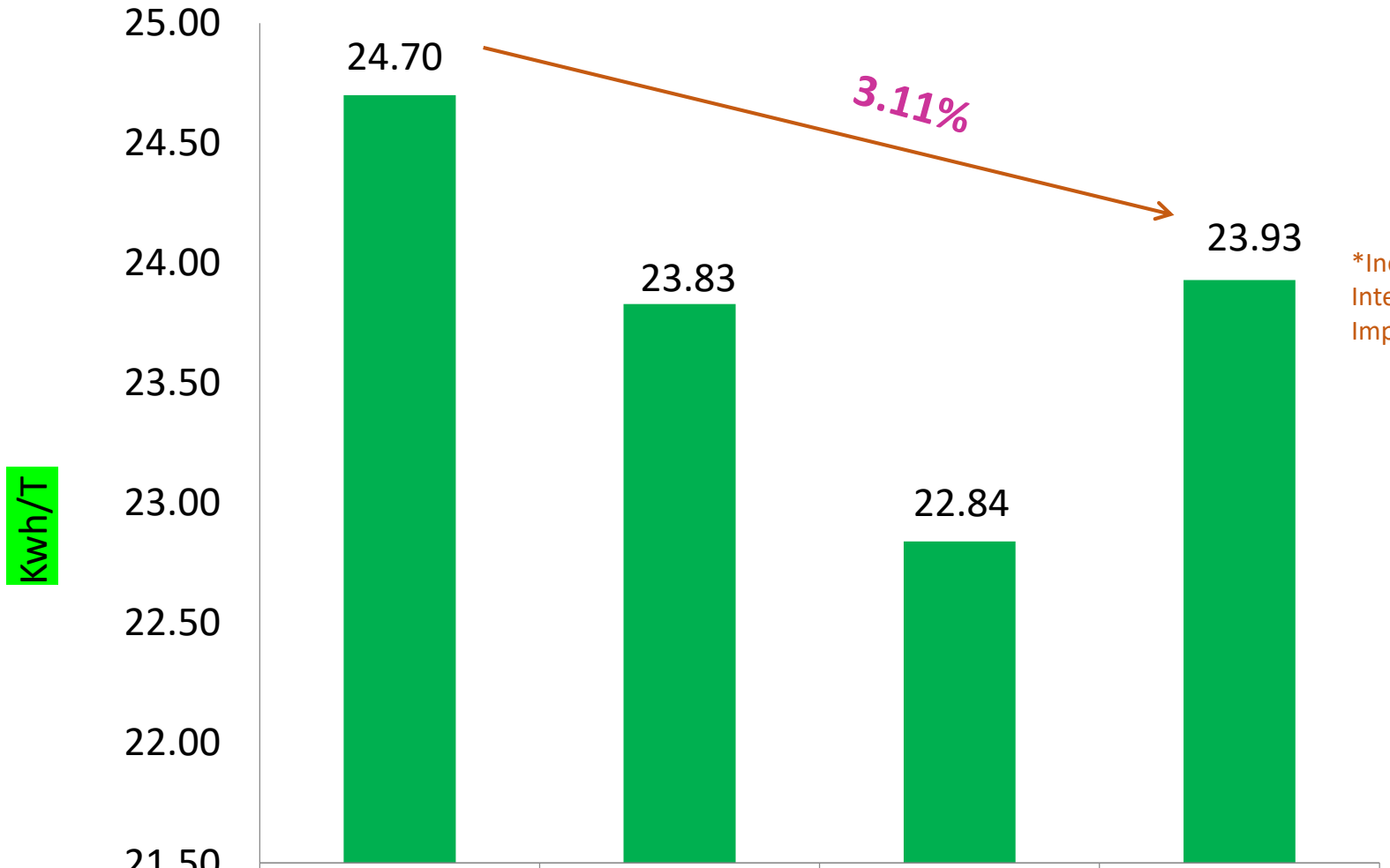
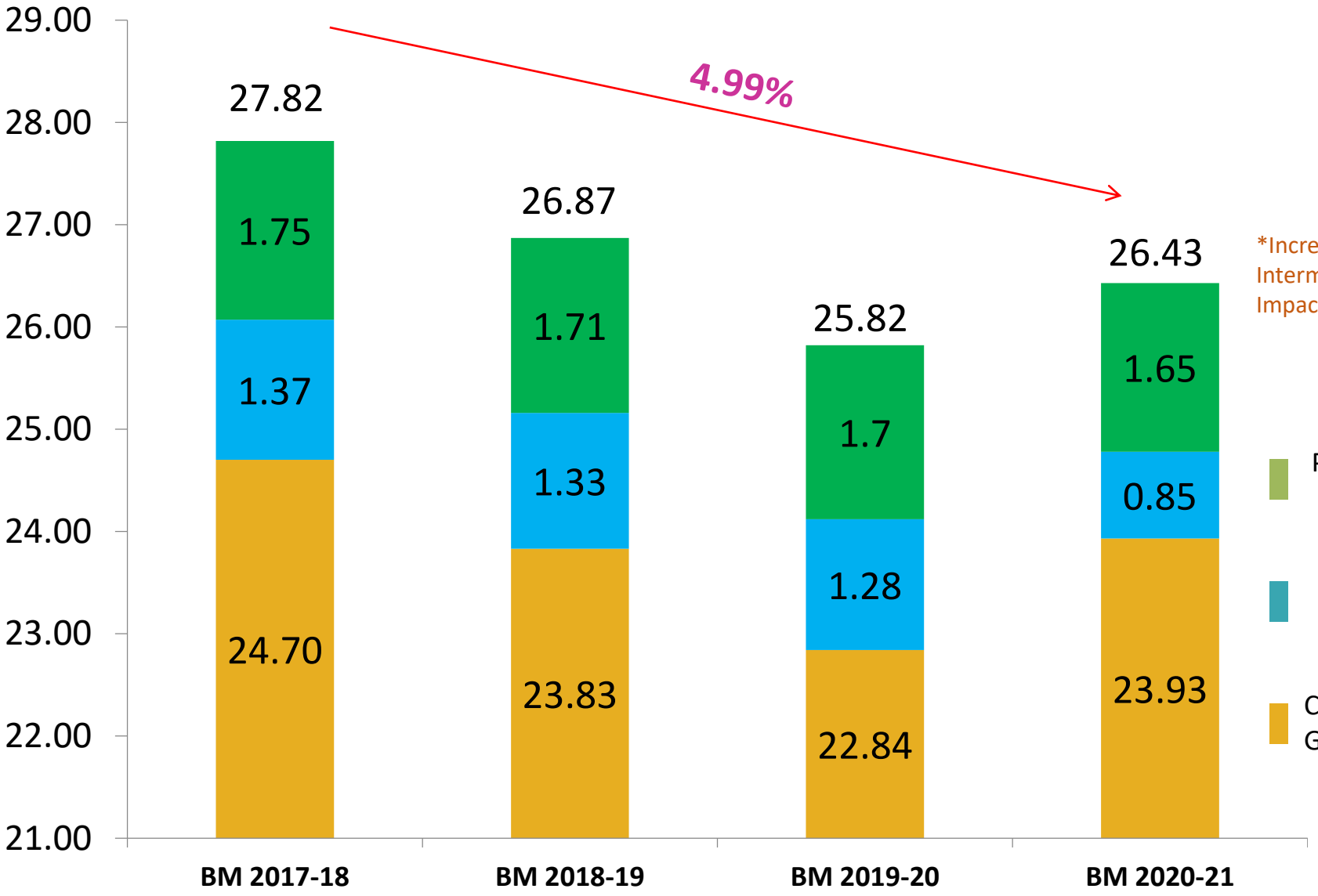


	2017-18	2018-19	2019-20	2020-21
Specific Power	24.70	23.83	22.84	23.93

*Increased due to Intermittent running as Impact of Covid 19

Cement Mill 1 Ball Mill– Overall SPC (KWh/Ton)



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Specific Power Comparison with Benchmark

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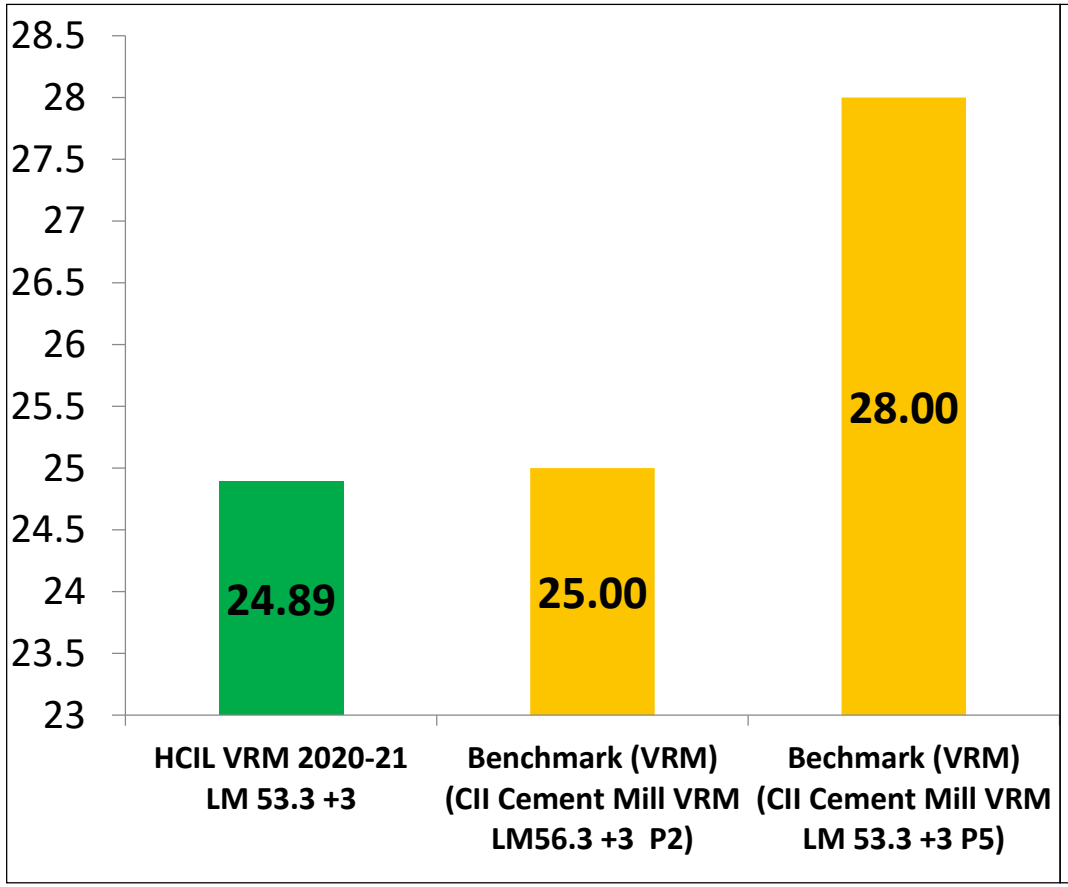
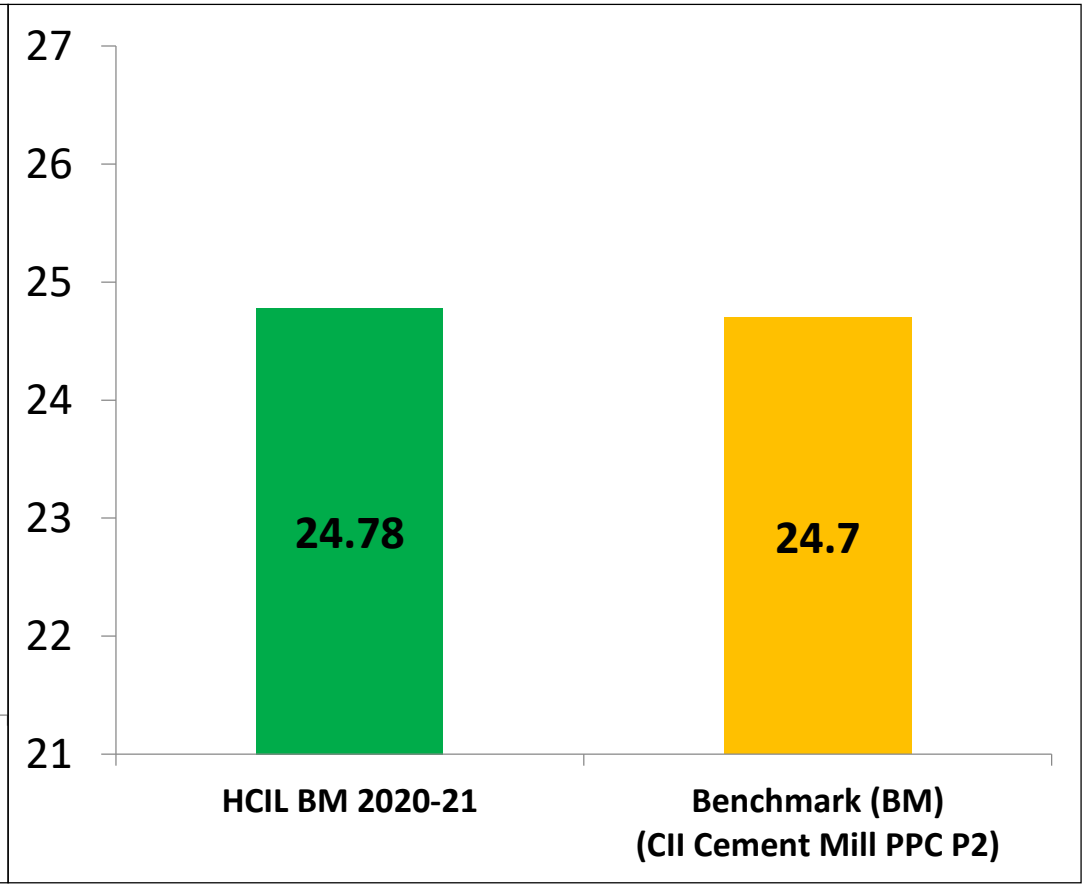
VRM Best in Industry



Ball Mill Best in Industry



National Bench Marking CII for Cement Mill VRM

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3.8 Cement Mill - VRM

Parameter	Unit	Plant 1	Plant 2	Plant 3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Plant 10
Overall SEC	kWh/MT Cement	29.9	25.0	25.9	25.3	28.0	29.1	29.2	29.9	33.2	31.9
Mill model		LM 56.3+3	LM 56.3+3	MP5600 BC	LOESCHE 56.3+3	LM 53.3.3	OK 36.4	OK 36.4	LOESCHE 56.3 + 3	OK 42.4	LM 56.3+3
Product Variety		PPC / OPC	PPC	OPC/PPC	OPC/PPC	OPC/ PPC / PSC	OPC/ PPC / PSC	OPC/ PPC / PSC	OPC/PPC	PSC/PPC	PSC
Rated output	TPH	250 in PPC With 4000 Blaine	250	300 @ 3600 blaine	285 in PPC With 3800 Blaine	170 OPC/ 135 PSC/ 215 PPC	185 OPC /190 PSC/150 PPC	170	270 /305	215 TPH PSC	220 TPH PSC
Operating output	TPH	285 TPH-PPC 260 TPH-OPC	260	305 @ 3550 Blaine	220 OPC 285 PPC	215 OPC/ 179 PSC/ 177 PPC	178 OPC /183 PSC/ 126 PPC	160	245 /310	230 PSC 330 PPC	260 with 3680 blaine

National Bench Marking CII for Cement Mill Ball Mill with Roller Press

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3.10 Cement Mill - Ball Mill with Pregrinder

Parameter	Unit	Plant 1	Plant 2	Plant 3	Plant 4	Plant 5	Plant 6	Plant 7
Overall	kWh/MT Cement	23.70	24.70	25.30	25.30	25.40	26.30	30.10
Rated capacity	TPH	225	161	170	225	225	225	165
Operating capacity	TPH	250	201	185/ 210	250	250	250	165-175
Ball mill dimension		4.6 x 14.5	4.2 x 11	3.8 x 11.6	4.6 x 14.5	4.6 x14.5	4.4 x 16	3.8 x 11.5
Product Variety		OPC / PPC	OPC/PPC	OPC/PPC	OPC / PPC	OPC / PPC	OPC / PPC	OPC/PPC
Mill ventilation velocity	m/sec		1.0	0.9				0.6
Product Blaine	cm^2/gm	2600/3500	2850	2800/3800	2600/3500	2600/3500	2600/3500	2750/3300
Mill discharge residue, +45µ	%		20	29				24
Mill discharge Blaine	cm^2/gm	2300	2500	OPC 1682 PPC 1921	2300	2400	2300	2500
Circulating load	%	2.5	2.0	3.0	2.5	2.4	2.4	1.5
% fly ash / % slag	%	32	31	28	32	32	32	32

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List of Energy Saving Projects with Payback 2018-19

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No	Title of Project	Annual Electrical Saving (kWh)	Annual Electrical Cost Saving (Rs million)	Annual Thermal Cost Saving (Rs million)	Total Annual Savings (Rs million)	Investment Made (Rs million)
1	Replacement of Conventional lights with LED lights	90000	0.65	0	0.65	0.147
2	Raw material Handling Bag filters Optimization	40320	0.3	0	0.3	0
3	Packing plant Bag filter Optimization	83160	0.62	0	0.62	0
4	Optimization of Fly ash Silo bin aeration Blower	230400	1.72	0	1.72	0.21
5	VRM Optimisation	1688000	12.6		12.6	

List of Energy Saving Projects with Payback 2019-20

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No	Title of Project	Annual Electrical Saving (kWh)	Annual Electrical Cost Saving (Rs million)	Total Annual Savings (Rs million)	Investment Made (Rs million)
1	Modification in truck loaders, installation of luffing arrangement of 1.5 KW to reduce operation of hoisting lowering motor 15 KW	57600	0.4032	0.4032	0.05
2	To install old solar plates with inverter for substation lighting	70000	0.511	0.511	0.15
3	To control plant lighting from DCS	72000	0.504	0.504	0.01
4	To install occupancy sensor for office lighting	36500	0.2555	0.2555	0.0245
5	Monitor & optimise compressor power on daily basis	64000	0.448	0.448	0.025
6	Installation of Energy Chain Arrangement in place of festooning cables in wagon & truck loading machines	160000	1.12	1.12	1

List of Energy Saving Projects with Payback 2020-21

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No	Title of Project	Annual Electrical Saving (kWh)	Annual Electrical Cost Saving (Rs million)	Total Annual Savings (Rs million)	Investment Made (Rs million)
1	Installed the pneumatic cylinder in manual gate and hard wire automation done of manual gate by separate level switch	72000	0.54	0.54	0.03
2	Stopped one Bag Filter (22 KW)fan with RAL of Packing Plant by connecting venting line from other Bag filter	70000	0.53	0.53	0.05
3	Replacement of Conventional lights with LED lights	129806	0.97	0.97	0.87
4	Installation of screw compressors in place of vane compressors for dry fly ash unloading	200000	1.5	1.5	22
5	Installation of high efficiency Separator in Ball Mill	769805	5.77	5.77	150

Innovative Project
Installation of High Efficiency Compressor for Flyash Unloading

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Problem:

As our production capacity has been increased with various modifications in mill, installed vane compressors were not meeting our Dry Flyash unloading requirement.

Average unloading rate in dry season at VRM Silo (2 Nos Vane compressors each 950 m3/hr + 1 no reciprocating compressor 1100m3/hr) which combined output of around 90 TPH. Current VRM Dry Flyash requirement is 98 TPH. There was no margin available for unloading to meet the requirement. Also maintenance cost of these vane compressors is very high as its spares are imported from FLS USA.

Solution:

A preliminary study was conducted by Plant team for effective evacuation of large size Fly Ash bulkers to Flyash silo for VRM. 3 nos. of new high efficiency screw compressors for Flyash unloading (each ~1500m3/h) were installed.

After installing new compressor it doubles our Flyash unloading capacity to meet the requirement

Innovative Project
Installation of High Efficiency Compressor for Flyash Unloading

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COMPARISON OF OLD COMPRESSOR & NEW COMPRESSOR -Rainy Season

Old Compressor									New Compressor							
S.No	DATE	VEHICLE	START	STOP	COMPRESSOR	Tot. TIME Minutes	Tons	Unloading Ton/Minutes	DATE	VEHICLE	START	STOP	COMPRESSOR	Tot. Time Minutes	Tons	Unloading Ton/Minutes
1	01.08.20	UP82 T 3936	12:00	1:00	20	60	24.5	0.41	01.09.20	UP82 T 3936	3:50	4:20	60	30	26.79	0.89
2	04.08.20	UP93 AT 1759	4:35	5:20	1	45	22.3	0.50	02.09.20	UP93 AT 1759	5:32	6:00	50	28	27.18	0.97
3	09.08.20	MP 19 HA 5030	12:05	1:10	1	65	40.11	0.62	03.09.20	MP 19 HA 5030	6:50	7:40	50	50	42.3	0.85
4	12.08.20	RJ 09 GA 8036	9:50	11:50	1	120	53.59	0.45	03.09.20	RJ 09 GA 8036	2:30	3:40	50	70	51.31	0.73
5	13.08.20	UP 93 AT 4271	11:30	12:45	20	75	25.3	0.34	04.09.20	UP 93 AT 4271	2:05	2:45	60	40	31.29	0.78
6	14.08.20	UP93 AT 3937	1:15	2:20	20	65	27.6	0.42	04.09.20	UP93 AT 3937	11:45	12:20	60	35	27.92	0.80
7	15.08.20	UP 93 AT 1760	1:15	2:30	10	75	20.24	0.27	05.09.20	UP 93 AT 1760	2:40	3:20	60	40	25.64	0.64
8	16.08.20	RJ 09 GA 9065	1:20	4:00	1	160	48.79	0.30	06.09.20	RJ 09 GA 9065	7:35	9:00	50	85	55.38	0.65
9	21.08.20	UP 93 CT 4571	5:15	6:50	1	95	48.49	0.51	07.09.20	UP 93 CT 4571	9:30	10:30	60	60	49.37	0.82
10	22.08.20	UP 93 AT 2007	2:10	3:25	1	75	22.94	0.31	07.09.20	UP 93 AT 2007	3:00	3:50	50	50	22.09	0.44
11	24.08.20	UP 93 AT 1601	2:25	4:32	20	130	48.62	0.37	08.09.20	UP 93 AT 1601	9:10	10:22	50	72	55.27	0.77
12	25.08.20	UP 93AT 4322	12:00	1:00	10	60	20.81	0.35	08.09.20	UP 93AT 4322	1:00	1:30	60	30	23.47	0.78
13	26.08.20	UP 93 AT 2471	12:15	1:10	20	55	30.97	0.56	08.09.20	UP 93 AT 2471	3:59	4:25	60	26	27.34	1.05
14	27.08.20	UP 93 AT 1844	5:15	6:30	20	75	24.58	0.33	10.09.20	UP 93 AT 1844	11:44	12:16	60	30	25.48	0.85
15	28.08.20	UP 93 AT 1975	11:10	12:15	20	65	21.95	0.34	10.09.20	UP 93 AT 1975	1:10	1:35	60	25	23.87	0.95
Avg Unloading Ton/Minutes								0.40	Avg Unloading Ton/Minutes							0.80

Utilisation of Renewable Energy sources –

Sr No.	On site	FY	UOM	Renewable Energy Consumption MWH	%
On Site					
1	Solar	2017-18	MWH	75	0.12
2	Solar	2018-19	MWH	102	0.27
3	Solar	2019-20	MWH	175	0.53
4	Solar	2020-21	MWH	175	0.53
Off Site			MWH	%	
5	Solar	2018-19	MWH	108	2
6	Solar	2019-20	MWH	791	2
7	Non solar	2019-20	MWH	2912	6
8	Non solar	2020-21	MWH	3319	8

Utilisation of Renewable Energy sources

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Sr. No.	Project Description	Status	Saving in Kwh per year	Saving in Kg of CO2 eq.
1	Installed 7.5 Kw Solar system at 5 locations	Completed	14600	11.97 K
2	Installed transparent sheets in plant building to use day light	Completed	11242	9.21 K
3	Installation of Turbo Ventilators (36 Nos.)	Completed	18000	14.76 K
4	Installation of 2 MW solar system	Under study	4500000	3690 K
5	Long term PPA signed for purchase of 15 MW solar power	Completed	-	400000K

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GHG Emission reduction & Target

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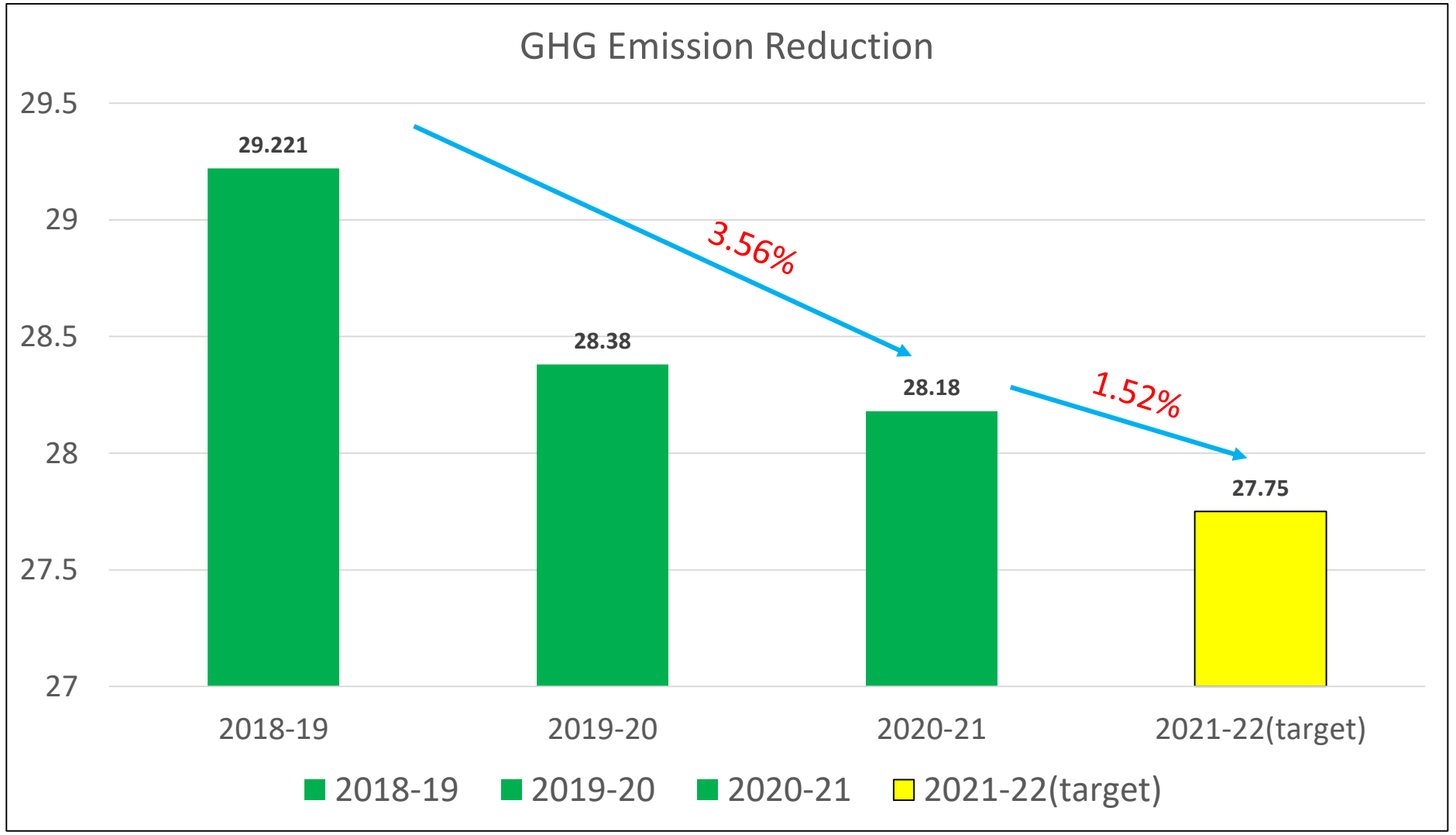

GHG Emission Intensity Reduction Scope 1& 2

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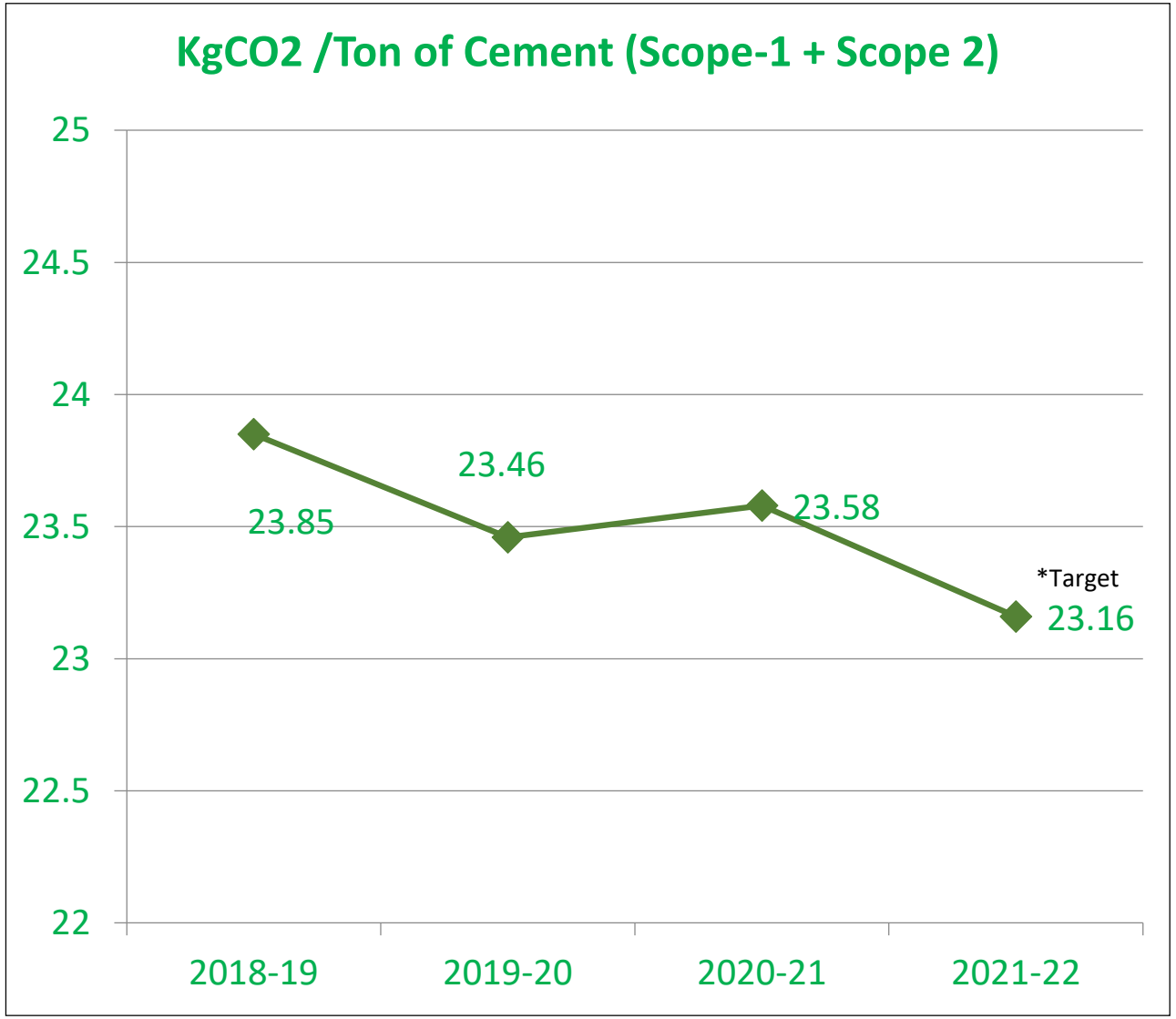

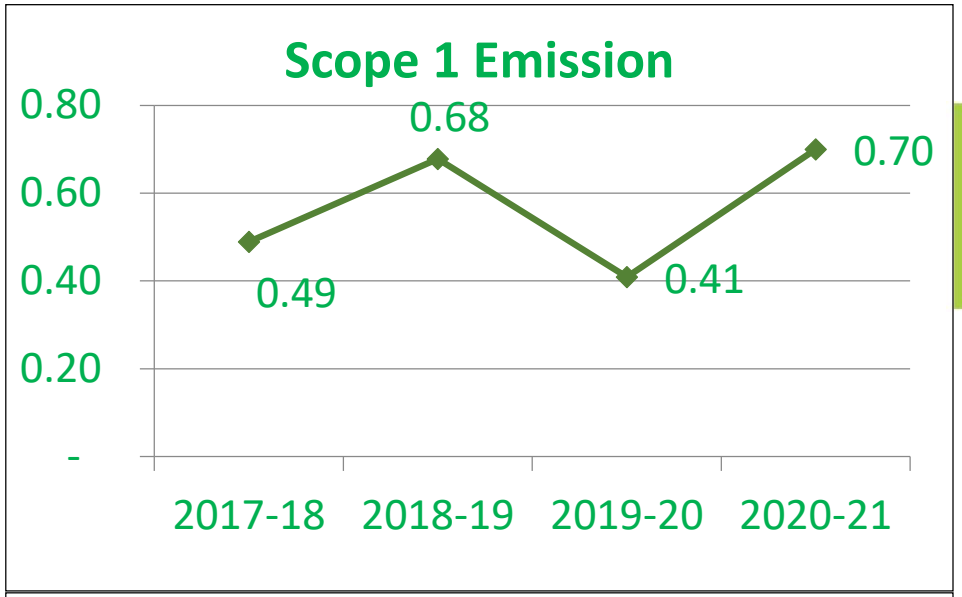

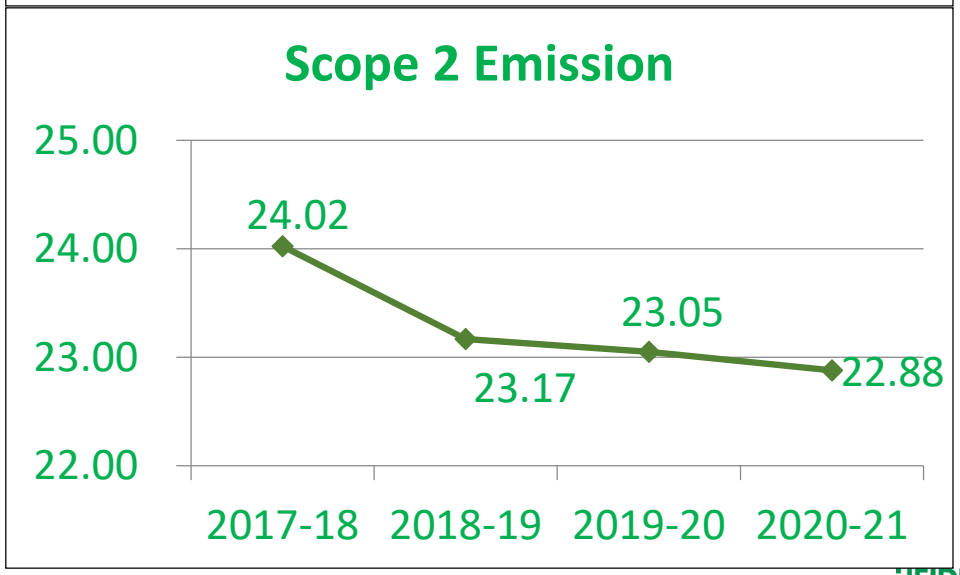

Green Supply Chain – Procurement Process

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Procurement

- Green Procurement
  - Implementation of SAP for paper less Procedure
  - Bravo Portal for Inquiry System
  - E-waste disposal system
  - Procurement of Latest Technology Products
    - Procurement of LED Lights
    - Procurement of 5 Star Rated Electrical Products
- Supplier Selection
  - Suppliers with focus on Green energy
  - Eco friendly products
  - Focus on green packaging & Transportation

Green Supply Chain – Project Implemented

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Sr No.	Projects Implemented	Investment Made	Benefits Achieved	Description
1	Maximization of fly ash blending up to 35%	30 Million	Ensuring availability of dry fly ash	- Long term contract Power plant - -O&M contract for dry fly ash system maintenance
2	More despatch from rake (65% :35% ratio)	75 Million railway siding	Ease of dispatch bulk quantity and availability of 2 point loading	Railway siding has been developed to engage more rakes and avoid congestion
3	100 % Reverse Logistic for Raw Material, Two way transportation	Engaging dedicated trucks	Freight saving - 100 Rs./ Ton	Clinker from Damoh plant to Jhansi and reverse loading dry fly ash from Jhansi PTPP to Damoh plant
4	Mobile Sales Force Application	2 Million	Live detail sales accounting	Handy Sales Portable for Dealer detail
5	Magma Tool	1 Million	Paper less and Ease access land record	Land record Management compilation of all land details
6	On line portal for Rake Planning Application	0.25 Million	Fast speed rake demand management	Rake planning application for rake demand, Customer care and logistic integration

Energy Monitoring System

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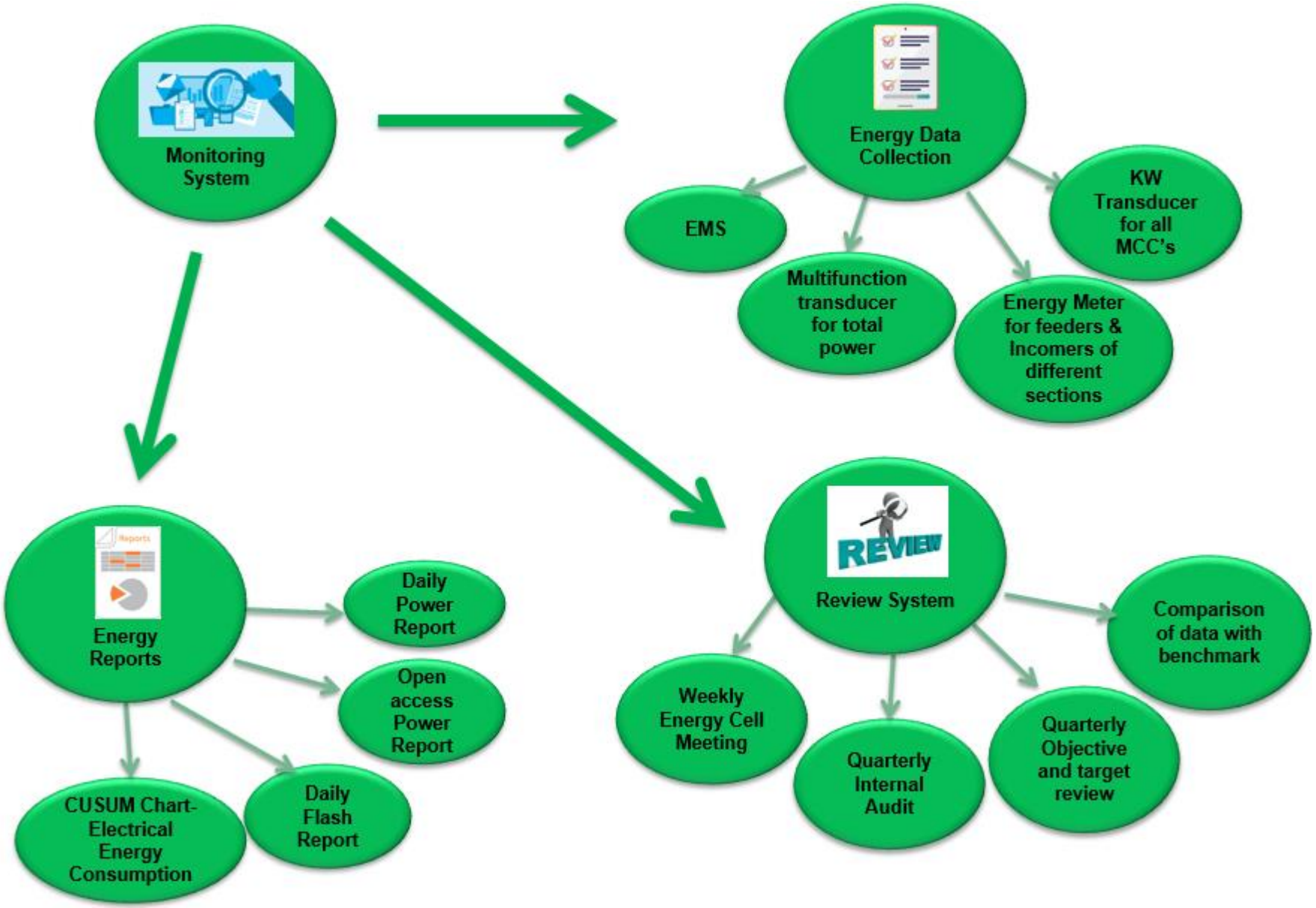

Energy Target setting

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-Short term & long term goals which are Specific, measurable, assignable and realistic
- Annual specific energy targets (best power achieved and energy Project considered) for the specific year.
- Long term (3 to 5 year) targets are being set on the basis of Capital expenses plan for the coming years, statutory guidelines for environment , availability of raw material, process related change etc..

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JHANSI UNIT

FORECAST JULY 2021 (month wise)

		FORECAST					Estimate							FJ-2021
PARTICULARS		**Jan-21**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec-21**	**YTD**
PPC-Ball Mill	**Kwh/t**	25.05	24.85	25.06	25.57	25.54	25.15	25.25	25.25	25.25	25.15	25.15	25.15	**25.18**
PPC-VRM	"	25.04	25.12	25.30	25.84	25.22	25.15	25.15	25.15	25.15	25.15	25.15	25.15	**25.21**
Avg	"	25.04	25.03	25.22	25.74	25.27	25.15	25.19	25.19	25.19	25.15	25.15	25.15	**25.20**
Power-Cement Packing														
-Packing-ball Mill	**Kwh/t**	1.67	1.57	1.58	1.78	1.98	1.69	1.69	1.69	1.69	1.69	1.69	1.69	**1.68**
-Packing-VRM	"	1.67	1.57	1.58	1.78	1.98	1.66	1.66	1.66	1.66	1.66	1.66	1.66	**1.68**
Avg	"	1.67	1.57	1.58	1.78	1.98	1.67	1.67	1.67	1.67	1.67	1.67	1.67	**1.68**
Auxilary														
-Auxilary-Ball Mill	**Kwh/t**	0.86	0.61	0.72	0.81	1.92	0.68	0.80	0.88	0.76	0.87	0.81	0.67	**0.80**
-Auxilary-VRM	"	0.37	0.30	0.33	0.47	0.35	0.46	0.54	0.60	0.52	0.60	0.55	0.46	**0.45**
-Auxilary-avg.	"	0.52	0.41	0.46	0.60	0.60	0.54	0.64	0.71	0.61	0.70	0.65	0.54	**0.57**

Daily Energy Monitoring System & Review

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Description	Frequency
Review of Energy Consumption	Daily
Section wise review of energy consumption with team	Weekly
Plant Head Review meeting	Weekly
Energy Management Cell Meeting	Monthly
Capex Review of Encon Projects	Monthly

Daily Power report

Jul-20

GRINDING UNITS - PPC	Meas Point	Mesuring Points name		1	2	3	4	5
HT (Ball Mill)	103143	HT CM-1	- Kwh	31580	59390	55210	58840	57960
HT (R Press)	103144	HT- RP	- Kwh	1890	3570	3130	3530	4250
LT(BM)	103136	LT-CM1	- Kwh	10950	20630	19530	20290	19890
HT (VRM)	103145	HT-CM-2(VRM)	- Kwh	93440	89770	91490	93950	84750
HT (BH)	103147	HT-BAG HOUSE FAN VI	- Kwh	45250	45870	45430	45890	41540
LT (VRM)	103137	LT-CM2(VRM)	- Kwh	22890	24070	23640	23310	18490
Total Ball Mill			- Kwh	44420	83590	77870	82660	82100
Total VRM			- Kwh	161580	159710	160560	163150	144780
Raw material (Ball Mill)	103142	RMATERIAL CM-1	- Kwh	610	940	1070	840	1120
Raw material (VRM)	103148	RMATERIAL-CM-2(VRM)	- Kwh	8980	6190	6150	6810	5970

CUSUM Chart - Thermal Energy Consumption

Month	VRM Cement Production Actual(Tons)	VRM Cement Production Plan (Tons)	Fuel Consumption(Actual) Litres	Fuel Consumption Plan(Litres)	(Actual - Plan) Litres	CUSUM(Litres)
May-18	145,994	131,800	2,300	3,954	-1654	433857
Jun-18	148,545	135,900	1,600	4,077	-2477	431380
Jul-18	147,151	127,000	6,700	12,700	-6000	425380
Aug-18	112,890	125,400	3,800	11,286	-7486	417894
Sep-18	157,200	131,100	85,900	10,488	75412	493306
Oct-18	177,617	130,300	33,100	3,909	29191	522497
Nov-18	134,454	131,100	78,800	3,933	74867	597364
Dec-18	166,301	144,300	322,200	4,329	317871	915235
Jan-19	152,722	158,500	4,500	4,755	-255	914980
Feb-19	124,073	158,500	4,000	4,755	-755	914225
Mar-19	132,789	158,500	2,500	4,755	-2255	911970
Apr-19	184,196	158,500	900	4,755	-3855	908115
May-19	144,733	158,500	1,700	4,755	-3055	905060

CUSUM Chart-Electrical energy consumption

Daily Flash Report

Awareness for Reducing Energy Consumption

-Plant head addressing team to increase awareness towards reduction in energy consumption

Energy Committee

HEIDELBERGCEMENT

Engineer
- Shift
- Maintenance
- Inspector

- Section In charge VRM
- Section In charge BM
  Section In-charge PP

HOD (Mechanical)

HOD (Production & QC)

- Section In charge Mill

Unit/Tech Head

HOD (E&I)

Energy Manager

Misc.

Engineer
- Shift
- Maintenance
- Monitoring Cell

- Section In charge VRM
- Section In charge BM
  Section In-charge PP

- MCC Head
- Packing Plant Head
- QC Head

Engineer
- Shift
- Maintenance
- Monitoring Cell

ISO 50001 Certificate

- Certified to ISO 50001 – ENERGY MANAGEMENT
- External & Internal Yearly audit from Certified agencies (TUV) & trained auditors

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

CERTIFICATE

The Certification Body
of TÜV SÜD South Asia Private Limited

certifies that

HEIDELBERGCEMENT
Diamond Cements
Village: Madora, P.O. Baratha Kalan, Baragaon,
Jhansi-Kanpur Highway, District. Jhansi,
Uttar Pradesh - 284 121, INDIA

has implemented an Energy Management System
in accordance with ISO 50001:2011
For Scope of

GRINDING OF CEMENT

The certificate is valid in conjunction
with the main certificate From 2019-05-03 until 2021-08-31
Subject to successful completion of annual periodic audits
The present status of this Certificate can be obtained on www.tuv-sud.in
Further clarifications regarding the scope of this certificate may be obtained by consulting the certification body

Certificate Registration No. 99 104 00808/04

Date of Initial certification : 2019-05-03

Certification Body
of TÜV SÜD South Asia Private Limited, Mumbai
Member of TÜV SÜD Group

TÜV SÜD South Asia Pvt. Ltd. • TÜV SÜD House • Saki Vihar • Andheri (East) • Mumbai – 400072 • Maharashtra • India

Award & accolades

HEIDELBERGCEMENT

Award - Green CO GOLD Unit by CII

CII - Sohrabji Godrej Green Business Centre

hereby certifies that

Heidelberg Cement

Jhansi

has successfully achieved the standards as required for the following level of certification under the GreenCo - Green Company Rating System which is valid for a period of 3 years

GreenCo Gold

September 2018

Jamshyd N Godrej	Pradeep Bhargava	L S Ganapati	K S Venkatagiri
Chairman	Chairman	Chairman	Executive Director
CII-Godrej GBC	GreenCo Rating System	GreenCo Assessor Panel	CII-Godrej GBC

CII-Green Products and Services Council

Mycem (Portland Pozzolana Cement)