Dalmia Cement (Bharat) Limited, Kadapa

KDP

Welcome All

Date : 13.09.2023

Mentor : **Sh. Mukesh Kumar Sinha**

Presenting Team Members

Mr. Kishore Muvvala - Leader

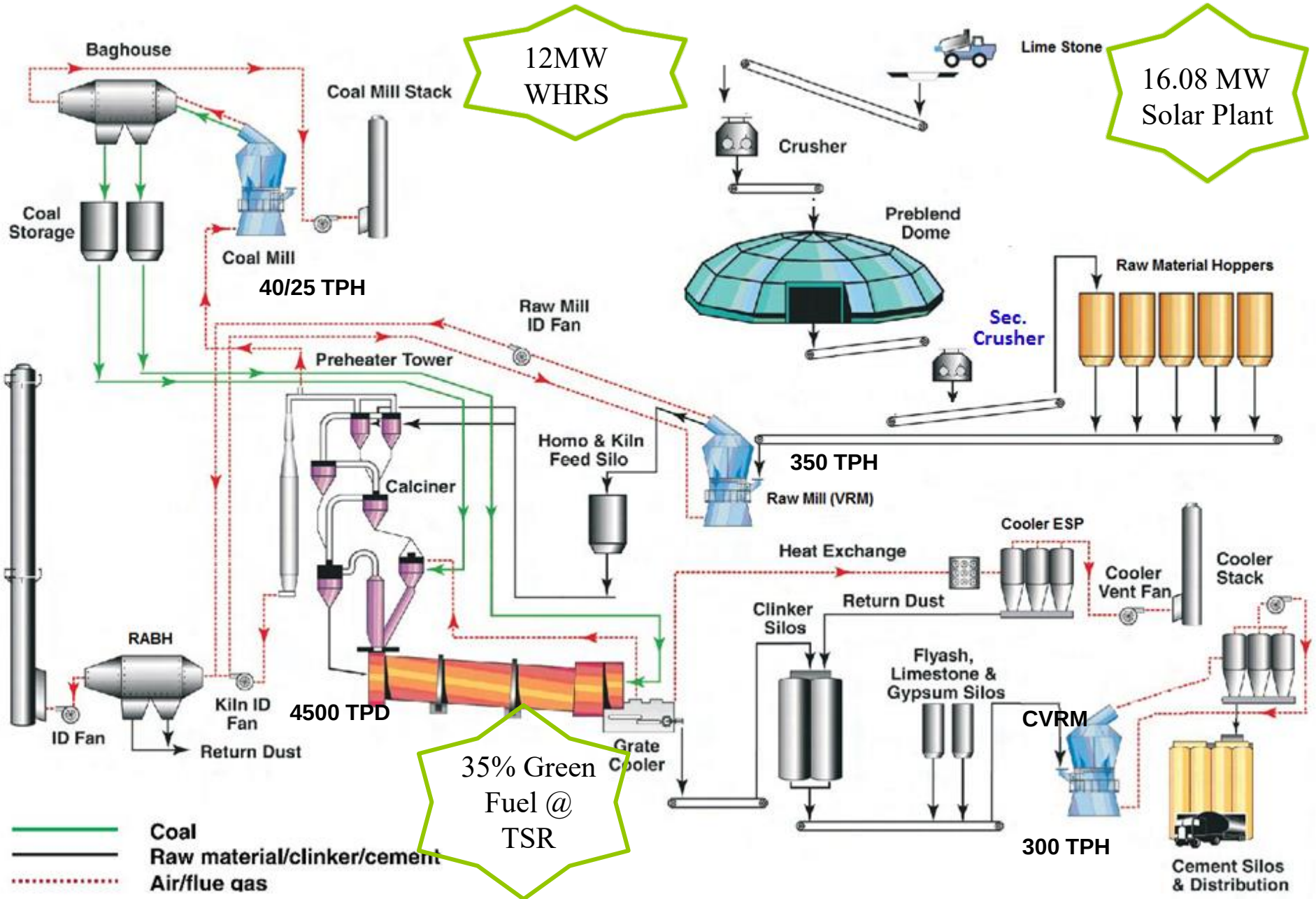
Mr. Santhosh Kumar - Energy Manager

Mr. Neeraj Pundir - Team Member

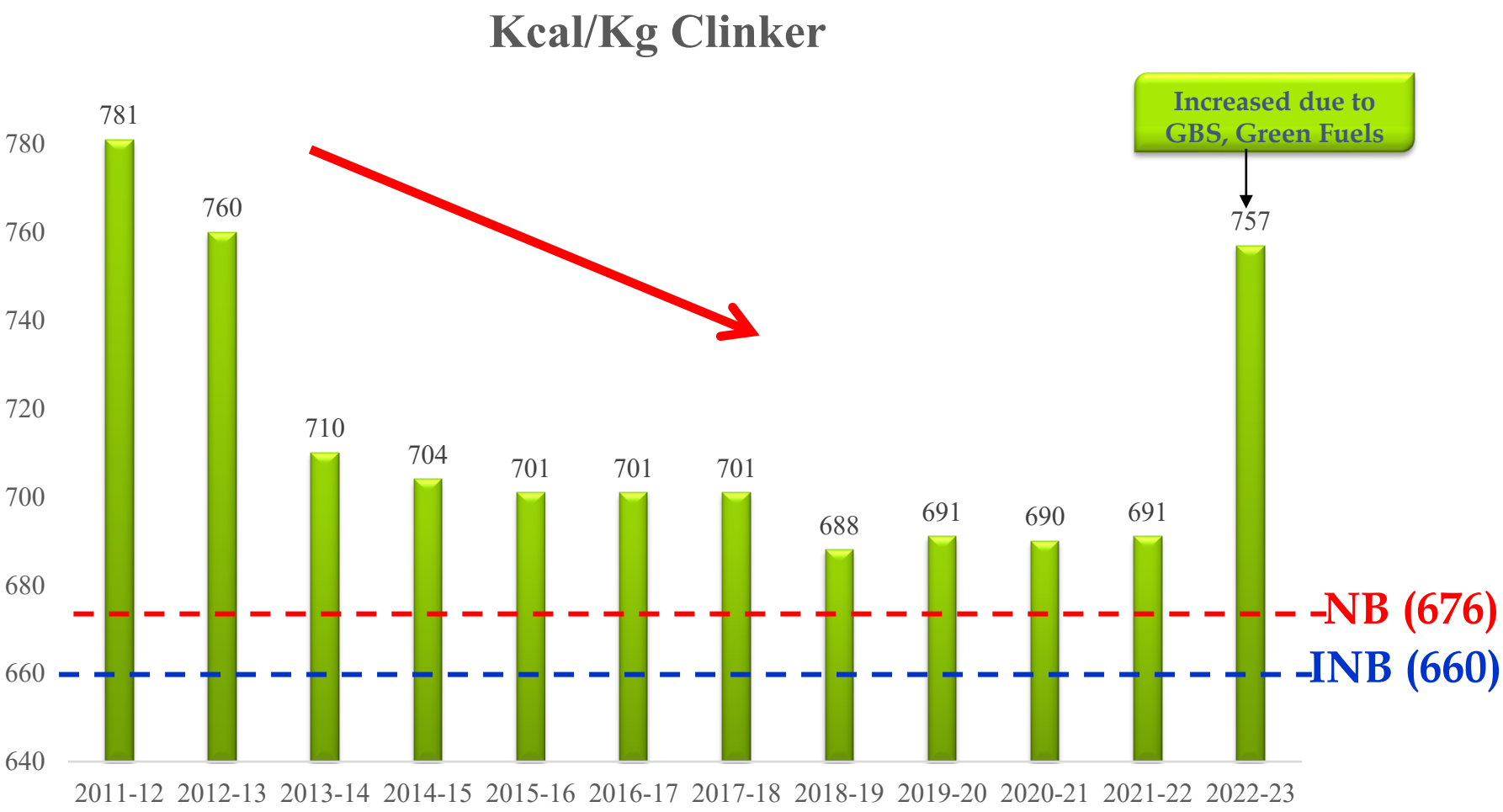
Company Profile

- We are 8 decades young company committed in nation building.
- Our Group are in Cement, Sugar, Power and Refractory.
- We established India's first Cement Plant with 250 TPD in 1939.
- Overall Cement Manufacturing Capacity 43.7 MTPA
- Kadapa Cement Commissioned in Dec 2008 with a Capacity of 2.5MTPA Cement.
- The Unit usage of green fuels @ 35% TSR, 50% of Green Power
- The Unit is Covered with 40 % of Green Belt.
- The Unit is Water Positive by 7 Times with Storage Capacity of 26 Lakh KL

Cement Manufacturing Process

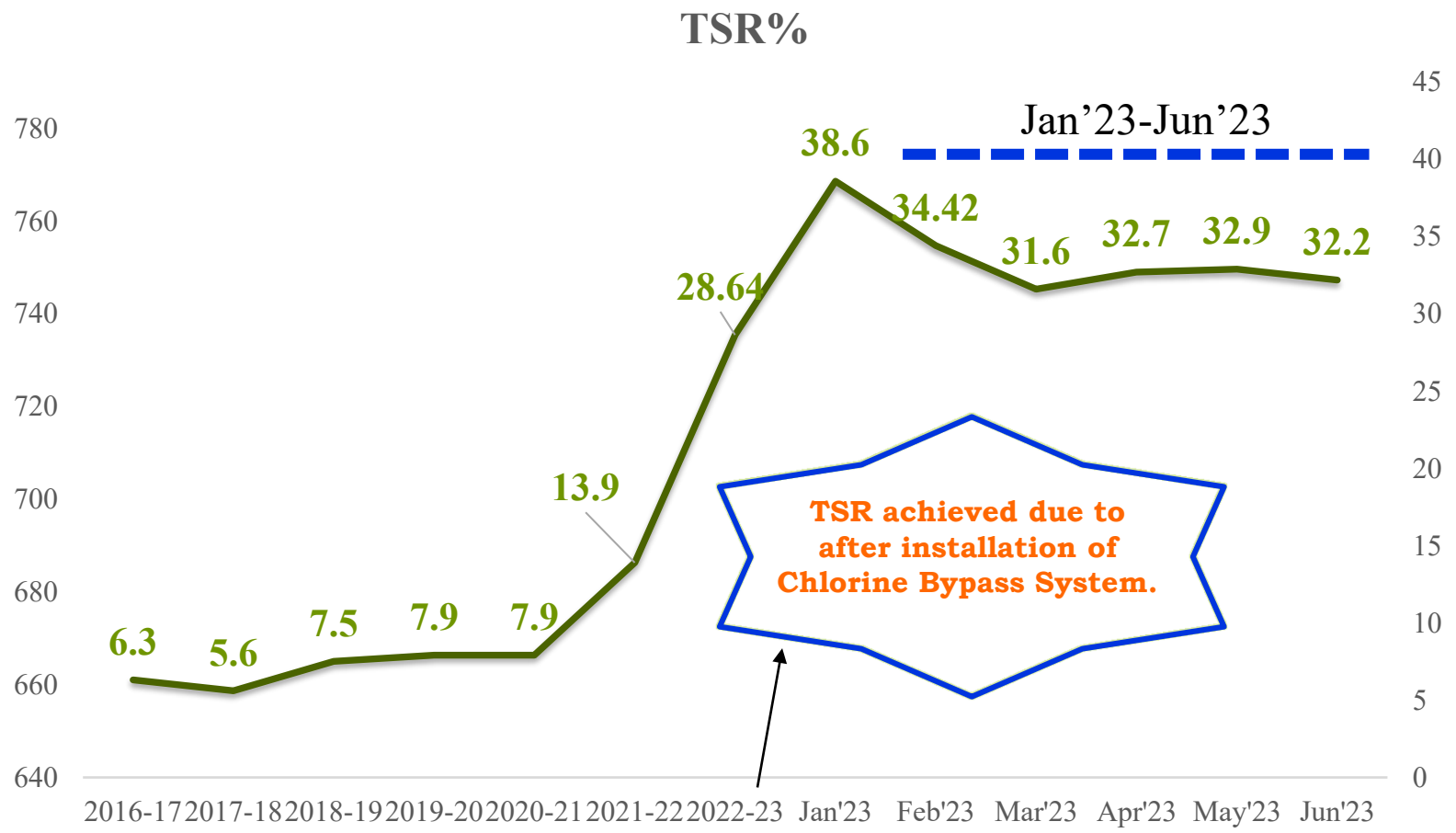


Sp. Thermal Energy Consumption Trend & Global Comparison



Thermal SEC : 686 Kcal / Kg Clinker
(Benchmarking Thermal SEC)

Sp. Thermal Energy Consumption Trend & Global Comparison



Green Fuels

Refuse Derived Fuel

Municipal Solid Waste

Car Interior Waste

Plastic Regrind Waste

Paper Mill Plastic Waste

Material Sizeing Screen

Solid Green Fuel Feed Extractor

Solid Waste Feeding Extractor Capacity: 25TPH

Covered Belt Conveyor for Solid Green Fuel Feeding

Liquid Green Fuel Handling

Liquid Storage Tank Capacities : 150KL

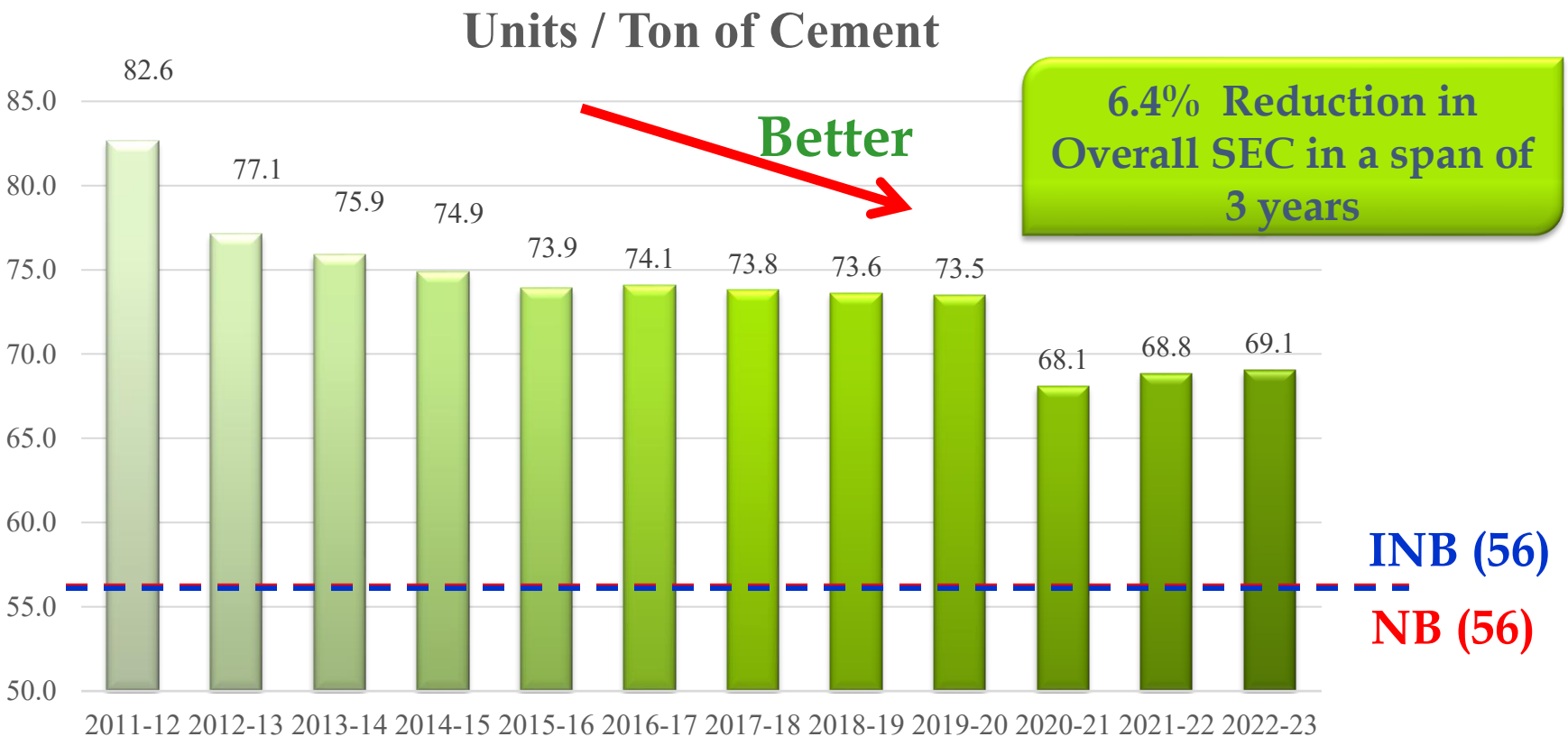
Usage Handling Capacity:100KL/Day

Liquid Green Fuel Handling-Signages

Gas Bypass System

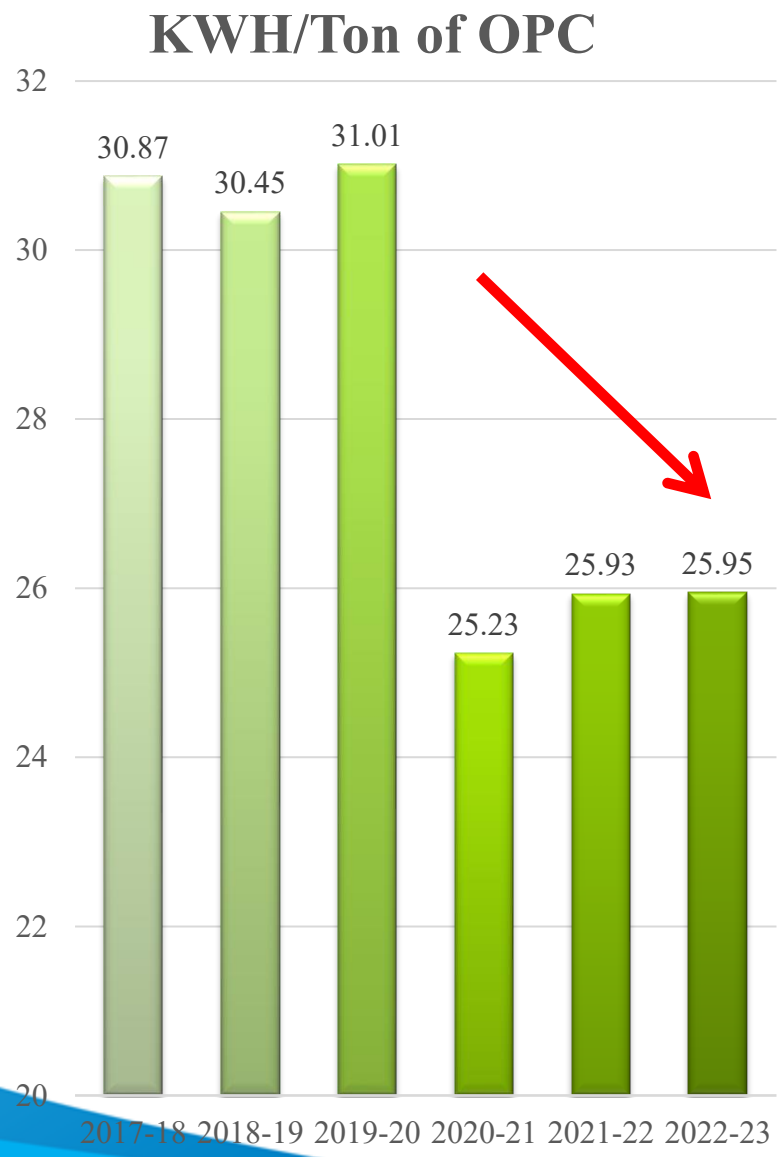
Sp. Electrical Energy Consumption Trend
(Upto Clinkerization)
KWH/Ton of Clinker

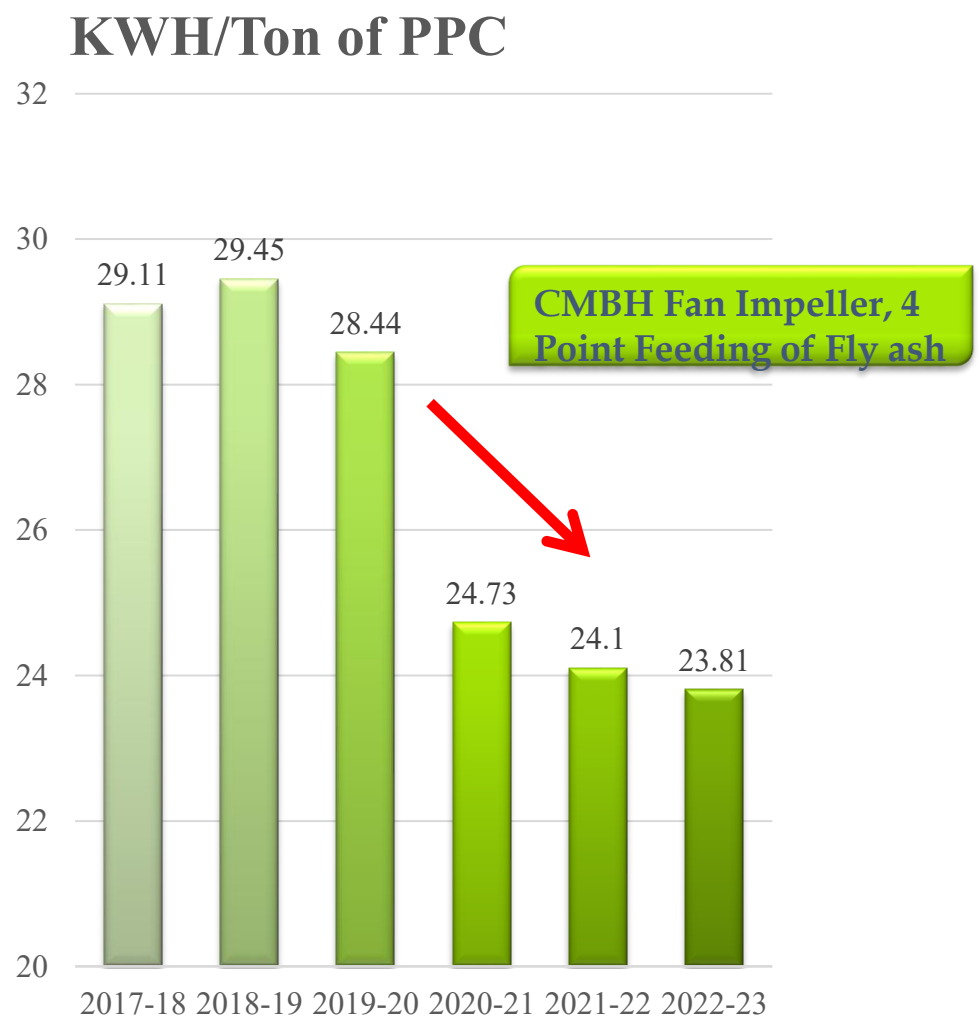
Sp. Electrical Energy Consumption Trend & Global Comparison
(Overall Cement)



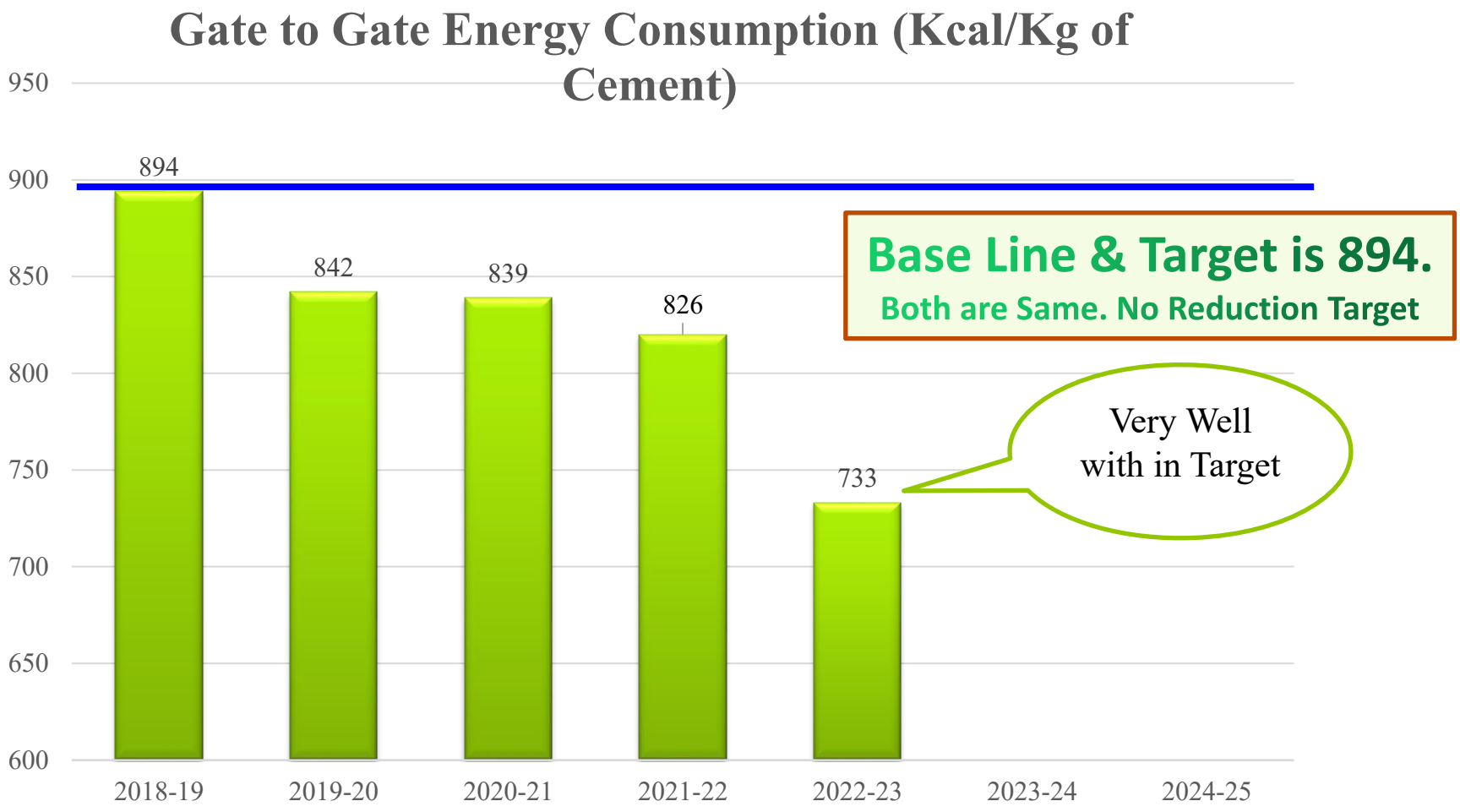
NB – National Benchmark
INB – International Benchmark

Sp. Electrical Energy Consumption
Cement Grinding - Variety wise (kWh/Ton)





DCBL – KDP Plant – PAT – 7 Cycle



KDP Encon Journey

MILESTONE

Commissioning

1. All Motors are Energy Efficient Series
2. More than 60% Motors are with VFD
3. All Process Fans with VFD and w/o Damper

FY 2016

FY 2016 – Liquid & Solid AFR
RABH & CM Fan Impeller Replaced

FY 2017

FY 2017 – Raw Mill Fan Impeller Replaced.
Kiln Burner & Pipe Modified

FY 2018

FY 2018 – Liquid Al. Fuel, RM Cyclone CFD & Modified, Clinker Cooler Modified

FY 2019

FY 2019 – Secondary Crusher
Cement Mill HAG, Flyash LP Compressor

FY 2020 & 21

FY 2020-CMBH Fan Impeller, 4 Point Feeding of Flyash, Cooler Optimisation

FY2021–Installation of Shredder, optimization of cement mill

FY 2022

FY2022- Installation of 12MW WHRS, 16.08 MW Solar Plant & 15% Gas Bypass system

FY 2023

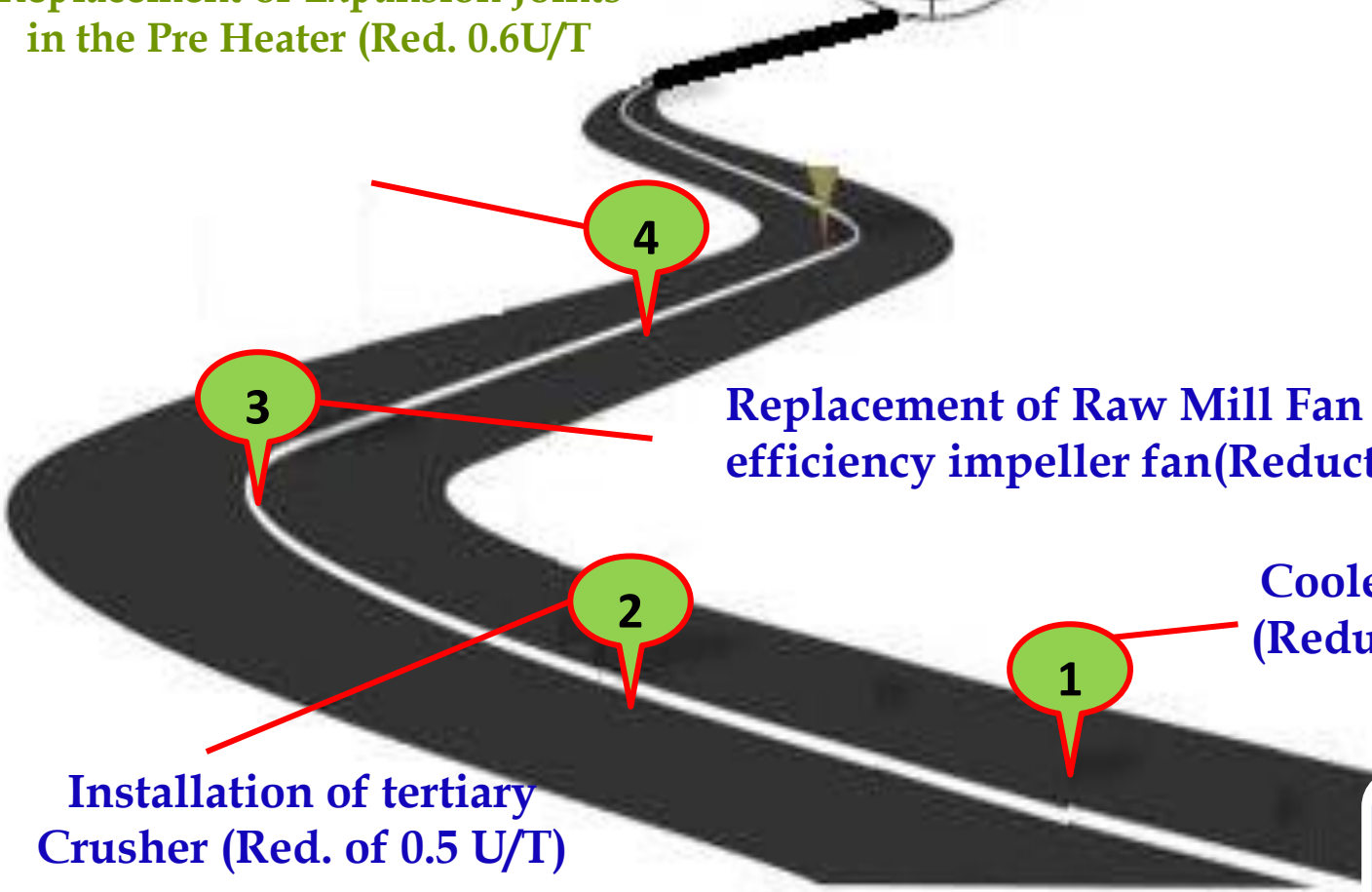
FY2023-Cooler upgradation,4 MW Solar, RM fan impeller replacement, Pyro upgradation

Road Map for Achieving Benchmark / Global Best – Electrical Energy

Short term
Long term

Target - 55.9 U/T of PPC_{equ}

Replacement of Expansion Joints in the Pre Heater (Red. 0.6U/T



Replacement of Raw Mill Fan with high efficiency impeller fan(Reduction of 1.0 U/T)

Cooler upgradation (Reduction of 1 U/T)

Installation of tertiary Crusher (Red. of 0.5 U/T)

Present 59.15 U/T of PPC_{equ}

Road Map for Achieving Benchmark / Global Best – Thermal Energy

Short term
Long term

Target – 740 Kcal/Kg of Clinker with 35% TSR

4 Raw mix Optimization (-1 Kcal/Kg Cl)

3 Replacement of expansion joint-3 (-2 Kcal/Kg Cl)

2 Replacement of existing Cooler with High Efficiency IKN Cooler. (-10 Kcal/Kg Cl)

1 Arrest system leakages (-1 kcal/kg Cl)

Present 757 Kcal/Kg of Clinker

Major Encon Projects planned

(FY 2023 to 2024)

Sl.No.	Name of the Energy Saving Project	Investment (INR Million)	Annual Electrical Saving (Million kWh)	Annual Thermal Saving (Kcal)	Annual Savings (INR Million)
1	VFD for another compressor GA-30 Compressor	0.05	0.0036	-	0.0216
2	Reduce the power consumption of RA Fan	0	0.72	-	4.32
3	Cooler Upgradation	200	1.8	-10	10.08
4	Auto mode operation of CT fans w.r.t to cooling water temperature	0	0.0164	-	0.1084

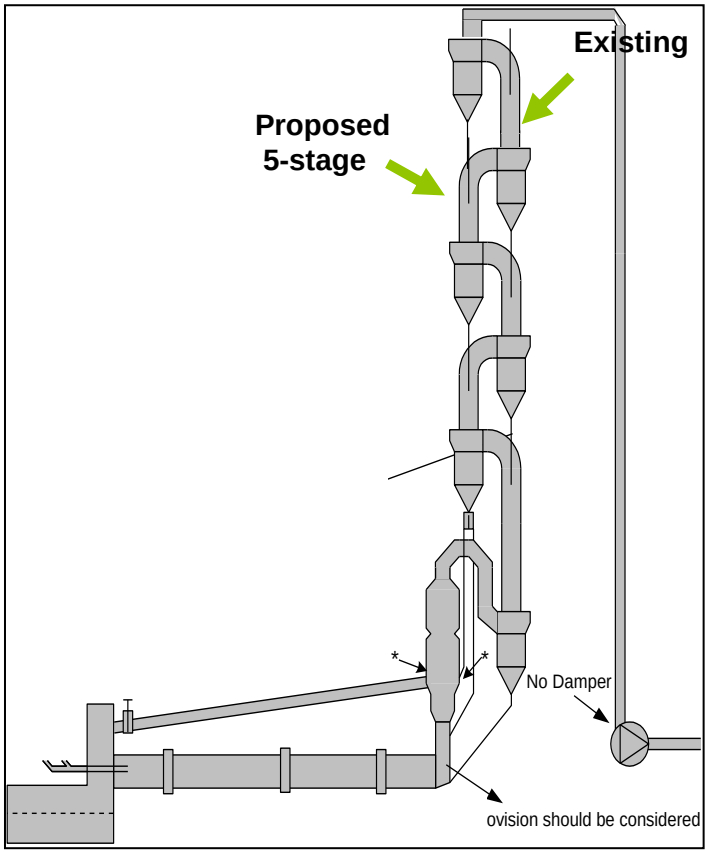
Summary of Energy Saving Projects in the Last 3 Years.

Year	No. of Energy saving projects	Investments (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million INR)	Savings (INR Million)	Impact on SEC (kWh/MT of Cement)
2022-23	5	23.5	1.40	-	9.19	
2021-22 (GBS, WHRS, 2 Additional cooler fans)	13	1846	71.18	33.35	522.46	0.75
2020-21	21	177	6.41	6.5	134	3.69

Innovative Project - 1

5-Stage Feeding option for Increasing the power generation in PH Boiler

- Existing Preheater feeding system is six stage feeding option resulting to low PH exit temperature around 265 deg C
- The heat required for Raw mill and Coal mill drying requires the temperature around 200 deg C post WHRS
- The dust leaving the six stage feeding option will be higher when compared to 5 stage feeding option in six stage preheater



Existing layout with additional Diverter

Innovative Project - 1

Option	UOM	6 Stage Feeding	5 Stage feeding
Pyro Capacity	TPD	6000	6000
PH O\L Flow	Nm^3/h	357500	366268
Sp. PH Fan O/L Flow	Kg/Kg Clk.	2.04	2.09
PH boiler inlet temp.	^oC	265	315
PH boiler outlet Temp.	^oC	140	165
Heat available from PH alone	Kcal./Kg Clk.	32.5	58.9
Power generation from PH alone	MW	2.1	3.8

Innovative Project - 2
Energy consumption optimization of HP BFP

Data before process optimization of HP BFP for energy saving		
PARTICULARS	**UOM**	**PARAMETERS**
TG Load	MW	9.4
Pump VFD	%	90
Current	AMP	101
Pump Discharge pressure	Kg/Cm2	27
AQC FCS CV Opening %	%	30
PH FCS CV Opening %	%	55
Energy Consumption by HP BFP	**KW**	**62**

Data after process optimization of HP BFP for energy saving		
PARTICULARS	**UOM**	**PARAMETERS**
TG Load	MW	9.3
Pump VFD	%	83
Current	AMP	82
Pump Discharge pressure	Kg/Cm2	23
AQC FCS CV Opening %	%	35-45
PH FCS CV Opening %	%	95
Energy Consumption by HP BFP	**KW**	**50**

- **HP BFP Ratings:- 90Kw & FLC 150 Amp**
- **Following steps are done to control Auxiliary power consumption in HP BFP, are as bellow:-**
- **BFP Discharge pressure reduced from 27 kg/cm2 to 23 kg/cm2.**
- **By optimizing both AQC & PH FCS CV opening %**
- **This reduces both VFD% & Current of the pump on same load**
- **Thus in total approximately 12 Unit/Hr energy will be saved.**
- **8460 Unit will be saved in month & in a year 103680 Unit will be saved.**

Innovative Project - 3
Implementation of Fly ash feeding in Kiln Inlet

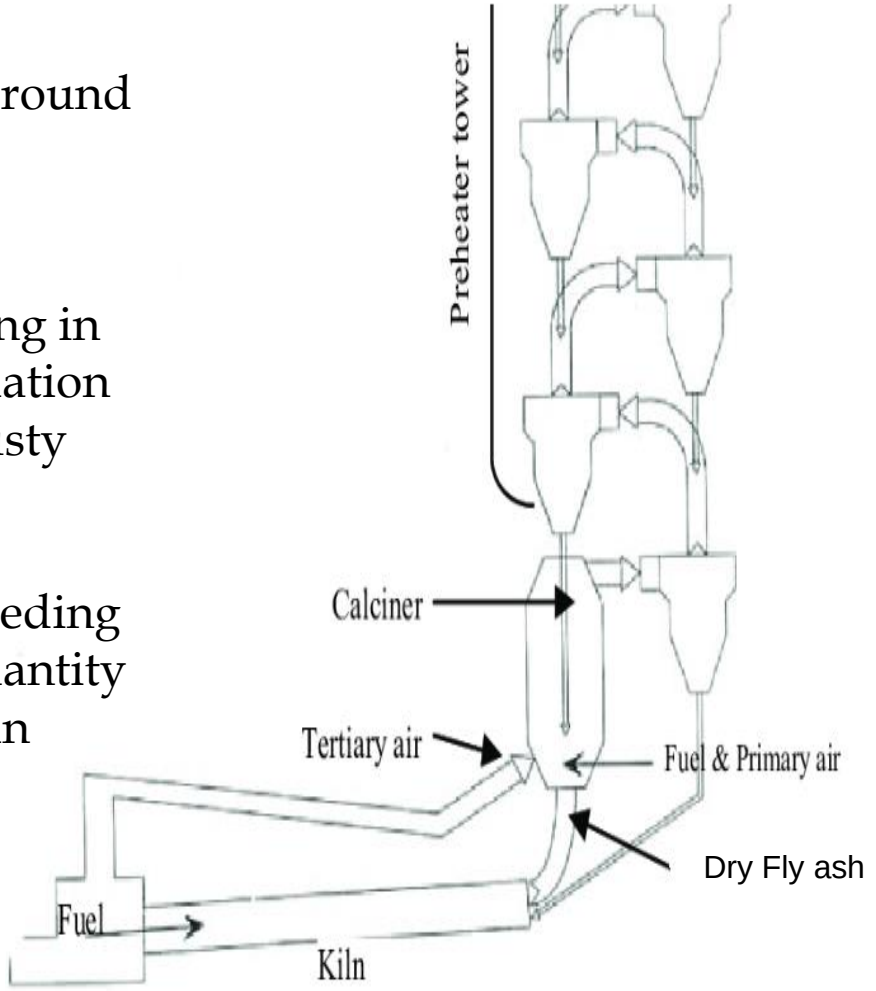
Introduction:

Whenever Solid fuel tripping kiln is disturbing due to ASH & LSF Mismatch

- Solid fuel running with 25 TPH with ash around 25-28%.

- Whenever Solid is tripping LSF is increasing in raw mix and Silica is reducing. Dust circulation is increasing slowly and Kiln is coming dusty condition.

- To avoid that we introduced dry fly ash feeding directly to Kiln inlet. Dry fly ash with a quantity of 5-6 TPH due to that ash is maintaining in system and Kiln is not disturbing



Innovative Project - 4
Implementation of Double flap for Solid feeding

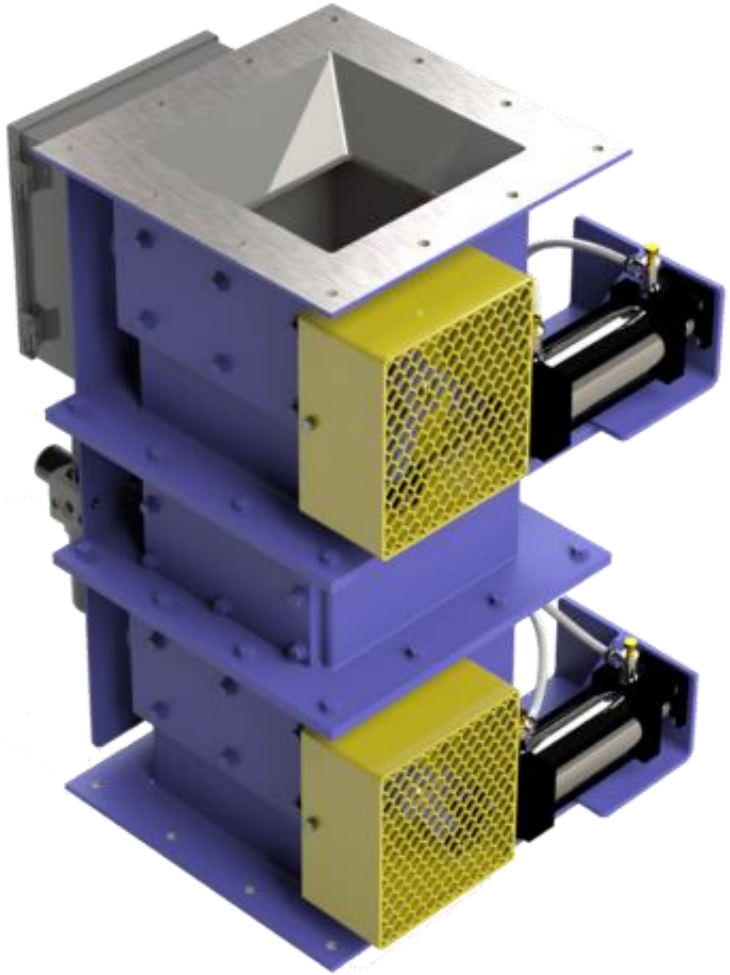
Introduction:

To feed continuously solid fuel in PC we had installed Double flap to arrest false air and stable feeding.

- Solid fuel feeding -600 TPD

- While solid is feeding in PC, PC temperature is varying rapidly due to fluctuations in Solid feeding.

- After installation of Double flap for solid feeding, Solid fluctuations is reduced and PC temperature control.



Renewable Energy Sources (2022-23)

Type of Renewable Energy Source	Installed Capacity in MWp	Savings	
		Energy Generated (Lakhs Unit)	Cost Saving (Rs. Lakhs)
GPP (WHRS)	12	534	3204
GPP Solar Power	16.08	220	1317
Bio Gas Plant	At Guest House	1800 m^3/Yr.	1.20

Waste Heat Recovery System & Gas Bypass System two distinct enablers which is contributing for 35% green fuel & 50% green Power

Dalmia Cement Committment

http://there100.org/dalmia-cement

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Group Profile

Affliations and Membership on Environment and Sustainability Domain (RE 100)

First Cement Plant in India Committed Volunteerly

United Nations - High-level Signing Ceremony of the Paris Agreement on Climate Change

knowledge speak

Mr. Mahendra Singhi,
MD & CEO, Dalmia (Cement) Bharat LTD.

Mr. Mahendra Singhi recently engaged with EPC World, where he spoke about how Dalmia Bharat is committed to reducing carbon dioxide emissions and investing in digital technologies to transform the business.

The story talks about the implementation of newer technologies and how it has enhanced the experience of various stakeholders.

Mr. Singhi also talked about the various initiatives the organization has taken to reduce CO_2 emissions and its growth plans.

Dalmia Cement Committed for Carbon Neutral by 2040

Dalmia Cement RE100 Committment & Action Plan

Sl.No	Description	Qty (Lakh Units/ Annum)	% of Energy Use	Remarks
1	Total Power Requirement / Consumption at Kadapa	1300	100	Annual Power Requirement
2	GPP Generation with 12 MW WHRS	600	46.2	Completed
3	16.08 MW Solar Plant within Premises	250	19.2	Completed
4	4 MW Solar	62	4.8	Completed
5	6 MW Wind	68	5.2	Under Survey
6	200MW Captive Solar(DCBL KDP Share 20MW)	320	24.6	Under Survey

100% Energy Independence by 2026

Road Map for RE 100%

Enhancement of Existing 2 transformers from 6.8 MVA to 9.25 MVA will provide gain of 15000 KW /day .

Off site solar extension for 3MWp .

Off site Wind power of 7MWp.

M/s. Hetero Wind Power(Tirumalayapalli,30 KM from our plant) has installed 63 Wind turbine each of 1.5 MW having total capacity of 94.5 MW.

In Process of making PPA with M/s Hetero & M/sAPTRANSCO .

We will explore the possibility to get captive agreement with M/s Hetero Wind Power for long term agreement.

Waste Consumption as Raw Material

Sl.No	Year	Waste as Raw Material	Quantity (Tons)	Replaced material	Waste as %	Total %
1	2020-21	Pond Ash	25418	Aluminus Laterite	0.84	2.16
2		Slag	28067	IronOre	0.92	
3		Red mud	12107	Aluminus Laterite & Ironore	0.4	
4	2021-22	Pond Ash	39394	Aluminus Laterite	1.64	2.06
5		Slag	2011	Aluminus Laterite & Limestone	0.08	
6		Redmud	8239	Aluminus Laterite & Ironore	0.34	
7	2022-23	Pond Ash	41755	Aluminus Laterite	1.49	3.374
8		Slag	3107	Aluminus Laterite & Limestone	0.11	
9		Redmud	34565	Aluminus Laterite & Ironore	1.24	
10		Wet Scraper Dust	5780	IronOre	0.21	
11		Tannery Sludge	911	Limestone	0.03	
12		Lime Sludge	12	Limestone	0.0004	
13		ETP Sludge	145	Limestone	0.005	
14		Boiler Ash	392	Wet Flyash	0.014	
15		Granite Dust	5287	Aluminus Laterite	0.19	
16		Iron Dust Waste Powder	2389	IronOre	0.085	

GHG Inventorisation

Carbon Foot Print Activities

Year	Scope 1 emissions CO_2e (MT)	Scope 2 emissions CO_2e (MT)	Scope 3 emissions CO_2e (MT)	kg CO_2e/MT of Cement	Mitigation Total Reduction in emission intensity since baseline year study CO_2e (MT)
2012 - 13 (Baseline Year)	731	70	28	829	Baseline Year
2013 - 14	722	76	24	822	7
2014 - 15	689	80	27	796	33
2015 - 16	706	77	10	793	36
2016 - 17	694	76	11	781	48
2017 - 18	698	75	13	786	43
2018 - 19	698	75	11	784	45
2019 - 20	697	74	10	781	48
2020 - 21	693	73	10	776	53
2021 - 22	686	72	10	768	61
2022 - 23	594	45	10	649	180
	ocess	Grid Power	Transport	Overall	7.3% Reduction from Base Line

Target : 649 kg CO_2 e/MT of Cement

Bamboo Plantation for Co2 Absorption & AFR Usage

Plantation Area : **35 Acres**

Green Supply Chain Project (FY 2022-23)

Sl.No.	Name of Project Implemented	Investment	Benefits
1	PLMS- Plant Logistics Management System	8Lakhs	Tracking of Truck Waiting time at different Location. Auto allocation of Order
2	RFID- Radio Frequency Interface Device	7 Lakhs	Helps in Tracking of track in the Plant & TAT Reduction of Man intervention and reduction of Error Helps in Reverse Logistic
3	TBPS-Transporter Bill Payment System	5 Lakhs	Bill process time reduction Tracking of invoice status.
4	End to End Project	2 Lakhs	Goods Transition Through Godown Eliminated Goods Direct Dispatch to customer Energy & Cost Savings in Logistics
5	Vehicle up Size	-	To reduce No of trips Energy & Cost Savings in Logistics
6	DD (Direct Dispatch)	-	Delivery to End customer to reduce handling in depots Energy & Cost Savings in Logistics
7	Conversion of diesel truck to CNG Truck	7 Lakh per truck	Environment friendly & economical
8	GPS	2K per truck	End to end tracking of truck movement, better planning, improve turn around time

Energy Monitoring System

Daily Power Consumption Report

Dalmia Cement (Bharat) Limited. Kadapa Project
Daily Power Consumption Report

	132Kv Main Incoming Units	374595	Kwhr		Avg PF:	0.990	Report Date:	XX.06.20XX
	DG Generation Units	0	Kwhr				Consumption Date:	XX.06.20XX
	Peak Hour Consumption	20715	Kwhr		(MD) KVA	22500	OLTC Opn. Count	9

Sl. No.	Section Description	Units Consumption	Running Hrs	Prodn.	Production Rate	Avg Kw	Guaranteed U/T of Matl.	Actual U/T of Matl.
1	LS Crusher		16.17	11445	707.79	628		
	LS Crusher Main Drive	3771				233	0.38	0.33
	LS Crusher Auxiliaries	1938				20	0.46	0.17
	211BC2 Long Belt	2386				14	0.42	0.21
	211BC2A Long Belt	2060				127		0.18
	LS Crusher & Transport-Total	10155					1.25	0.89
2	Raw Mill		16.92	7105	419.92	7106		
	Raw Mill Main Motor	63[illegible]8				3733	17.42	8.89
	Raw Mill Fan Motor	44678				2638		6.28
	Raw Mill Classifier	152				90		0.21
	MCC - 02 (LS Transport)	19[illegible]				116	2.07	0.28
	MCC - 03 (RM Grinding Aux.)	[illegible]936				410		0.98
	Additive Reclaimer	327				19		0.05
	LS Stacker & Reclaimer	1706				101		0.24
	RM Fan SPRS Recovery	0				0		0.00
	Total	120235					19.49	16.92
3	Coal Mill		14.33	577	40.27	877		
	Coal Mill Main Motor	5197				363	25.51	9.01
	Coal Mill Fan Motor	3577				250		6.20
	Coal Mill Classifier	272				19		0.47
	MCC - 07 (Coal Mill Grinding Aux.)	2169				151	16.73	3.76
	RMH & Coal Crusher	1349				94		2.34
	Total	12564					25.51	21.77

MODEL

Daily Energy Conservation Report

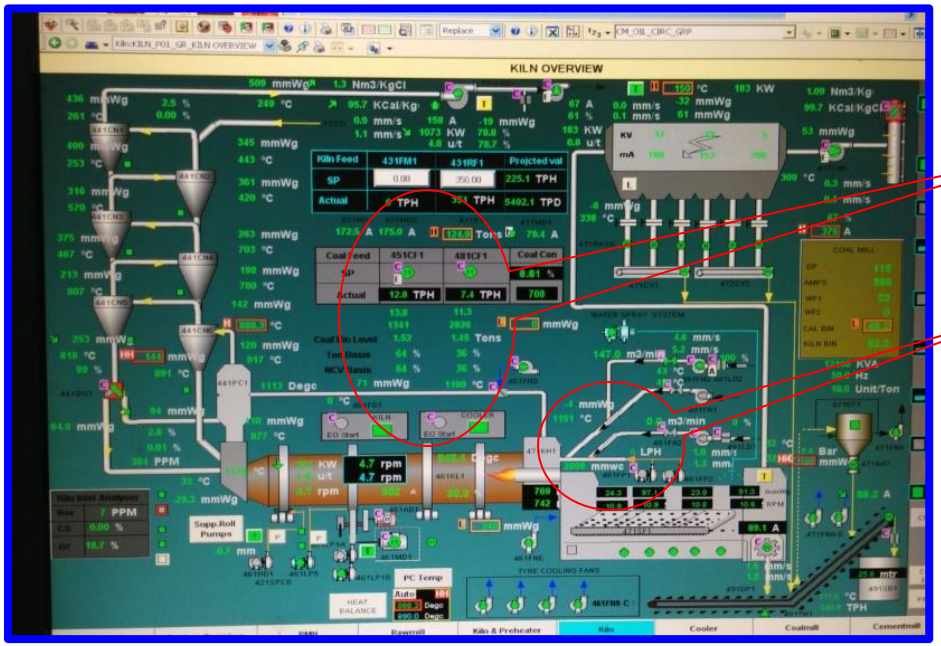
ENERGY CONSERVATION (IDLE POWER CONSUMPTION REPORT)

SECTION	SECTION DESCRIPTION	OPTIMUM SATRT UP TIME	ACTUAL RUNNING HOURS	XX.06.20XX IDLE RUNNING TIME	ENERGY IN KWH: IDLE /SHUT DOWN UNITS	ENERGY IN KWH: ACTUAL U/Ton	ENERGY IN KWH: WITHOUT IDLE RUNNING U/Ton	Kwh
LS CRUSHER	APRON FEEDER	0.00	16.17			0.89	0.86	
	CRUSHER MAIN DRIVE	0.17	17.67	1.33	106.40			80.00
	211BC2	0.50	17.92	0.00	0.00			145.00
	211BC2A	0.50	17.92	1.25	181.25			145.00
	MINES DEWATERING PUMP		66.00					
	IDLE/SHUT DOWN POWER				87.65			
	No of Start/ Stops 3.00							
Raw Mill	WEIGH FEEDER	[illegible]00	16.[illegible]			16.92	16.88	
	MAIN DRIVE	0.[illegible]	16.[illegible]	-0.05	0.00			150.00
	FAN	[illegible].30	16.90	-0.32	0.00			26000.00
	LS RECLAIMER FEED GROUP	12.20	16.50	4.30	335.40			78.00
	AD. RECLAIMER FEED GROUP	10.10	12.70	2.60	0.00			49.00
	TOTAL DCS IDLE / SHUT DOWN POWER				335.40			
	No of Start/ Stops 0.00 — Dcs Idle Power 331.00							
Coal Mill	WEIGH FEEDER	0.00	14.33			19.44	19.06	
	MAIN DRIVE	0.03	14.40	0.04	2.00			50.00
	FAN	0.17	14.70	0.13	32.50			250.00
	COAL STACKER FEED GROUP	3.30	3.30	0.00	0.00			54.00
	COAL RECLAIMER FEED GROUP	3.80	5.30	1.50	180.00			120.00
	RAW MATERIAL HANDLING				1349.00			
	TOTAL DCS IDLE / SHUT DOWN POWER				214.50			
	No of Start/ Stops 4.00 — Dcs Idle Power 75.00							

MODEL

Online Sp. Energy Monitoring

Online SEC Monitoring by CCR Operator and taking Immediate action during increase in SEC Indication

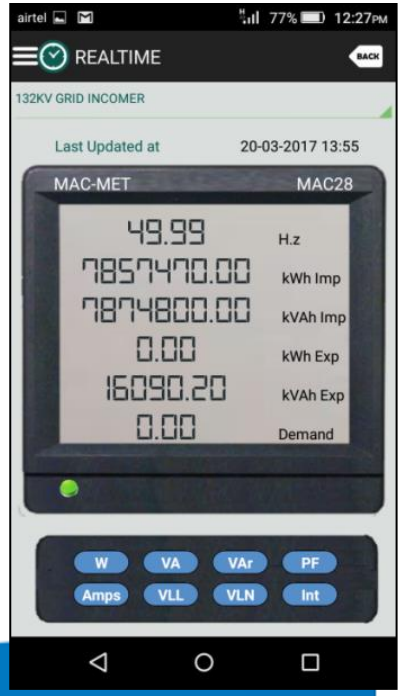


Online SEC of Electrical & Thermal Energy Consumption as per

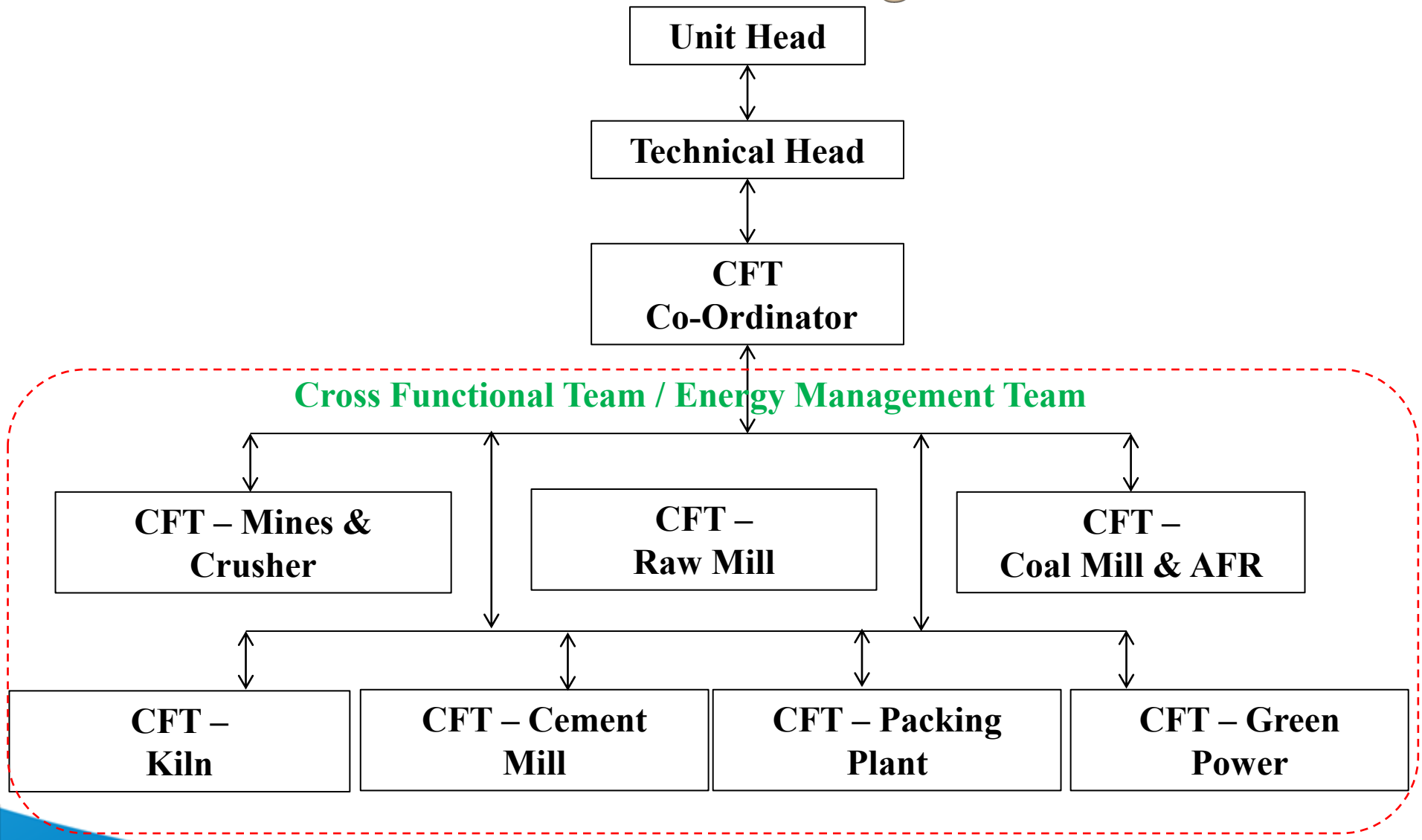
1. Sum of Electrical Power Consumption
2. Coal Feed Rate
3. Process Material Feed Rate

Cloud Based Energy Management System

Grid I/C Meter



Team Work, Employee Involvement & Monitoring



Environmental Projects

Theme : Water Pond Development & Rain Water Harvesting






Kadapa Plant is Water Positive

700%

Employees Involvement
Training – Summary (FY 2022-23)

Sl.No	Training Program	Internal / External	No.of participants	Duration (Hrs)
1	Heat & Mass Balance	Internal	12	4
2	Circulation Phenomena in Pyro Process	Virtual	13	2
3	MV Drives & SPRS-Slip Power Recovery System	External	13	4
4	Bag Filter (Over View ,operation & Maintenance)	Virtual	15	2
5	Basics of Fan Engineering	Virtual	12	3
6	Combustion Engineering	Virtual	13	2
7	Mill-Separation	Virtual	12	4
8	Motor Basics & Energy Saving	Internal	16	4

ISO Certifications

ISO 9001:2015


DNV·GL

MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of

Dalmia Cement (Bharat) Limited

Chinnakomerla (V), Jammalamadugu (Tq), Kadapa - 516 433, Andhra Pradesh, India

has been found to conform to the Quality Management System standard:
ISO 9001:2015

This certificate is valid for the following scope:
Manufacture of cement

ISO 14001:2015


DNV·GL

MANAGEMENT SYSTEM CERTIFICATE

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has been found to conform to the Environmental Management System standard:
ISO 14001:2015

This certificate is valid for the following scope:
Manufacture of cement

ISO 45001:2018


DNV·GL

MANAGEMENT SYSTEM CERTIFICATE

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Dalmia Cement (Bharat) Limited

Chinnakomerla (V), Jammalamadugu (Tq),Kadapa - 516 433, Andhra Pradesh, India

has been found to conform to the Occupational Health and Safety Management System standard:
ISO 45001:2018

This certificate is valid for the following scope:
Manufacture of cement

ISO 50001:2018


DNV

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Dalmia Cement (Bharat) Limited
Chinnakomerla (V), Jammalamadugu (Tq),Kadapa - 516 433, Andhra Pradesh, India

has been found to conform to the Energy Management System standard:
ISO 50001:2018

This certificate is valid for the following scope:
MANUFACTURE OF CEMENT

Turn Over & Investment

FY 2022-23

Rs. 184.6 Crores, 17%

Rs. 1084.7 Crores

Encon Investment

Greenco

1st Level Completed
2nd Level Under Progress

BEE – NECA Certificate

APSECM-Gold Award

CII-SR Best Solid Waste Management Award

Total 15 awards Received in FY 2022-23. Include CII Excellence Award

Environmental Projects

Theme : Water Pond Development & Rain Water Harvesting

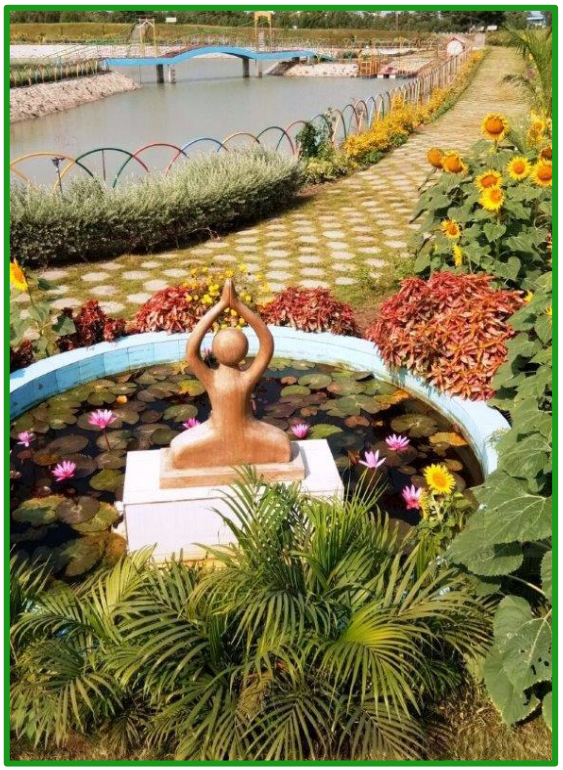





Kadapa Plant is Water Positive

700%





Thank you

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