Dalmia Cement (Bharat) Limited, Kadapa

Dalmia BHARAT GROUP

Welcome All

Date : 23.08.2022

Mentor : **Mukesh Kumar Sinha**

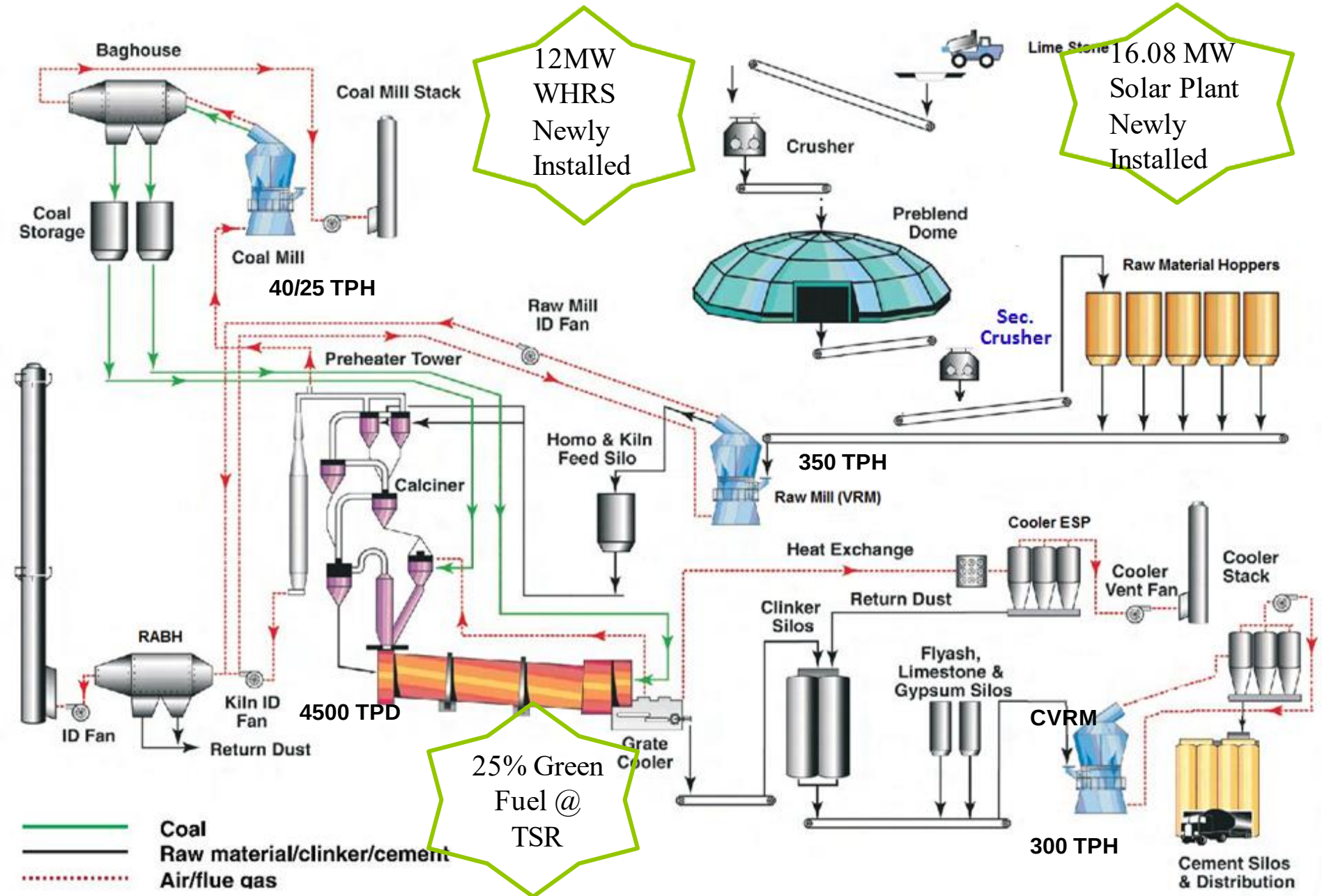
Presenting Team Members

Mr. Sreenivasa Reddy - Team Member
Mr. Santhosh Kumar - Energy Manager
Mr. A Raju - Team Member

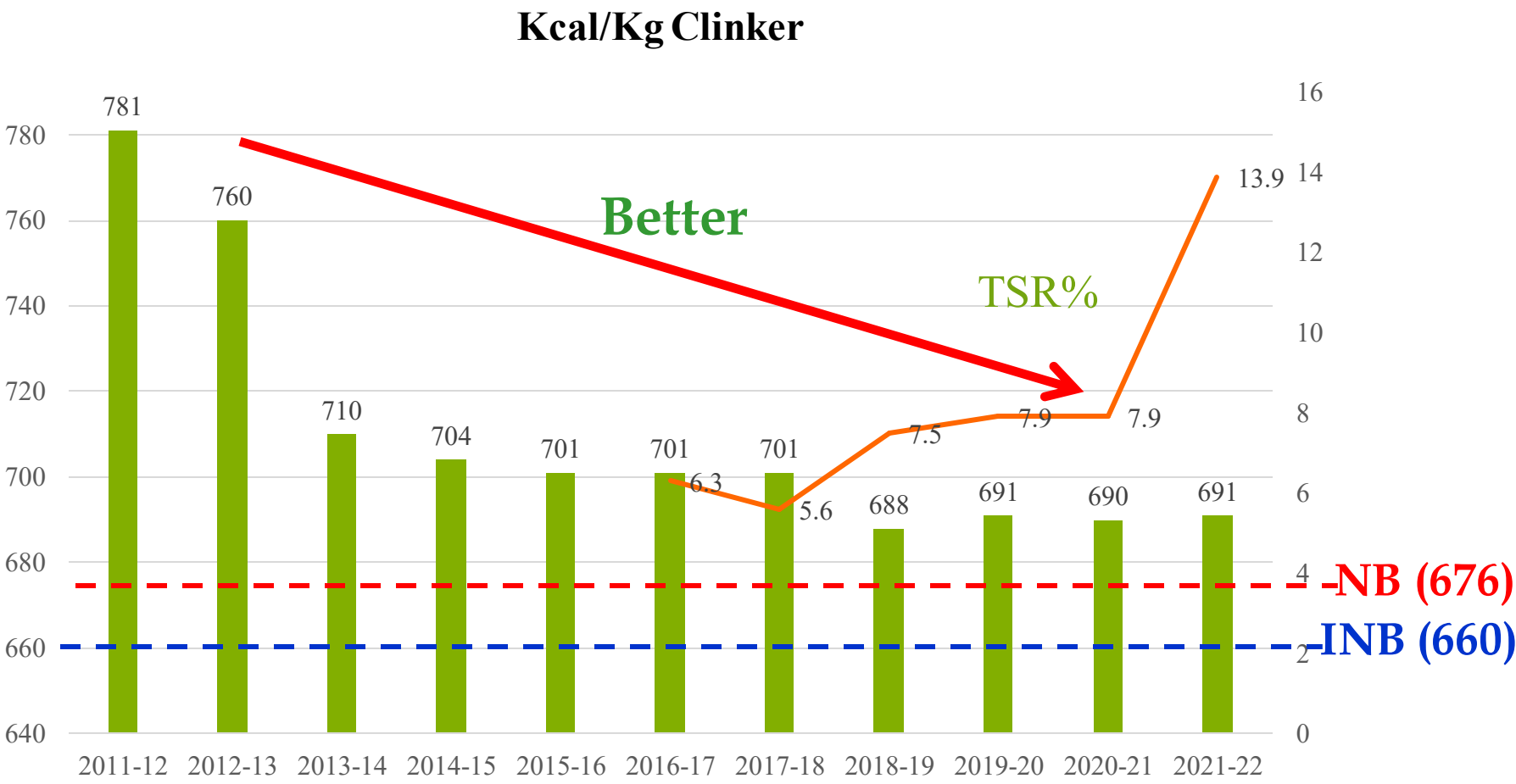
Company Profile

- 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 35.9 MTPA
- Kadapa Cement Commissioned in Dec 2008 with a Capacity of 2.5MTPA Cement.
- Kadapa Cement Works is the greenest plant of our group
- Kadapa Cement Works are committed for the best plant in cement sector.

Cement Manufacturing Process



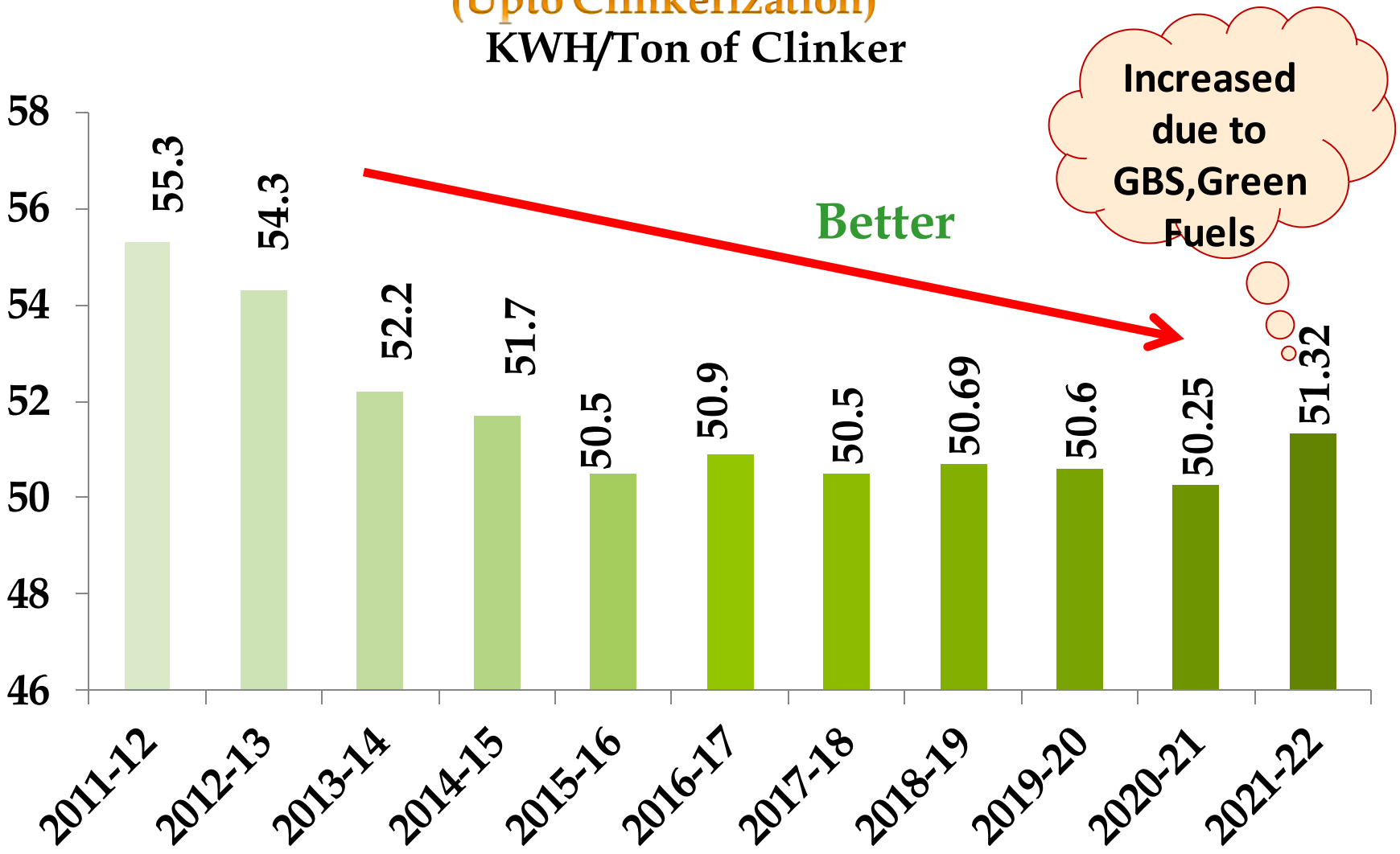
Sp. Thermal Energy Consumption Trend & Global Comparison



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

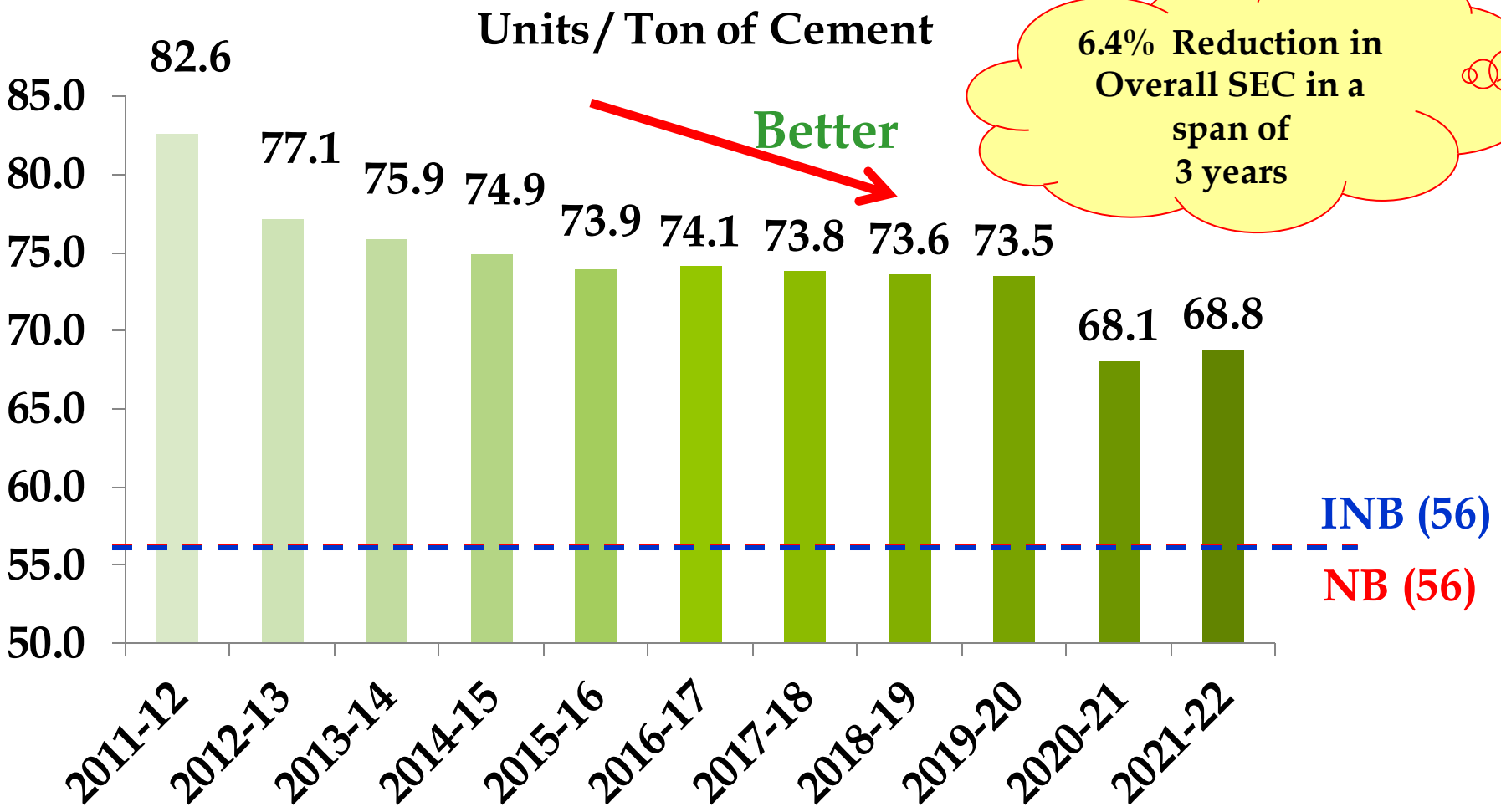
Sp. Electrical Energy Consumption Trend
(Upto Clinkerization)

KWH/Ton of Clinker



Electrical SEC without Kiln Start Stop : 51 U/TClinker

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

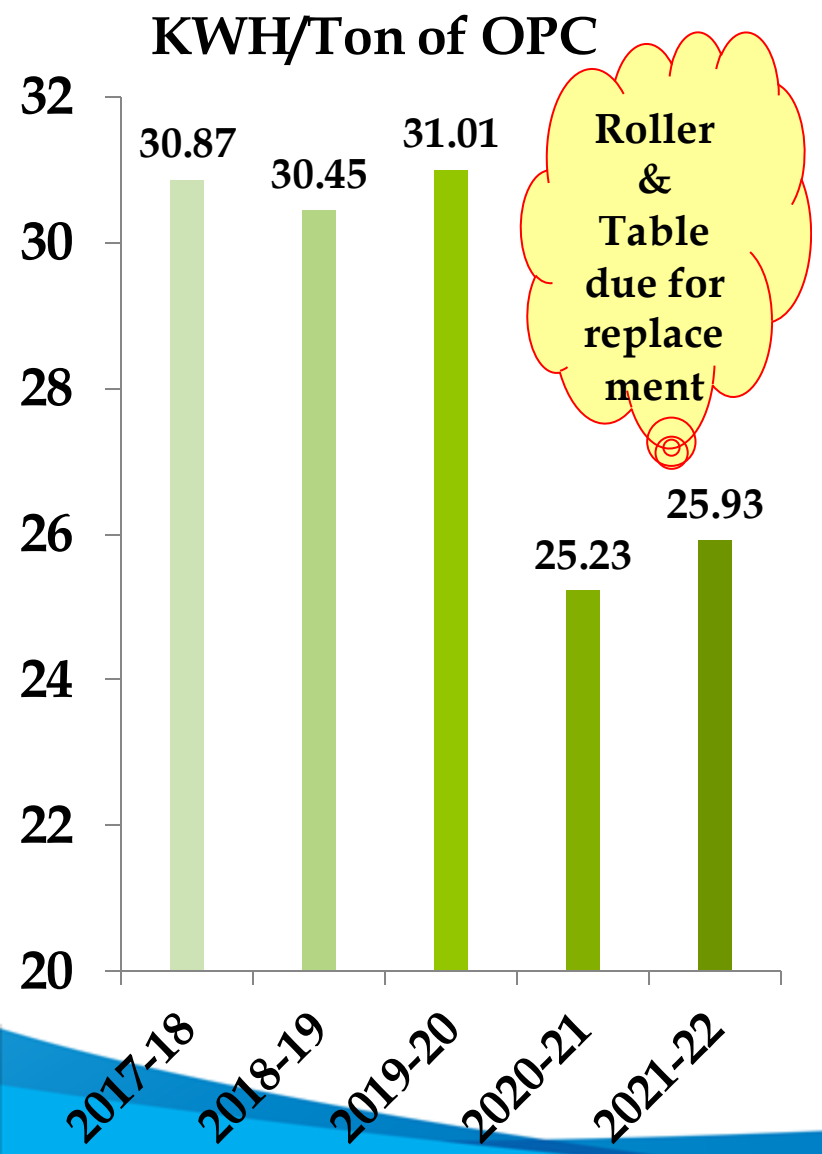


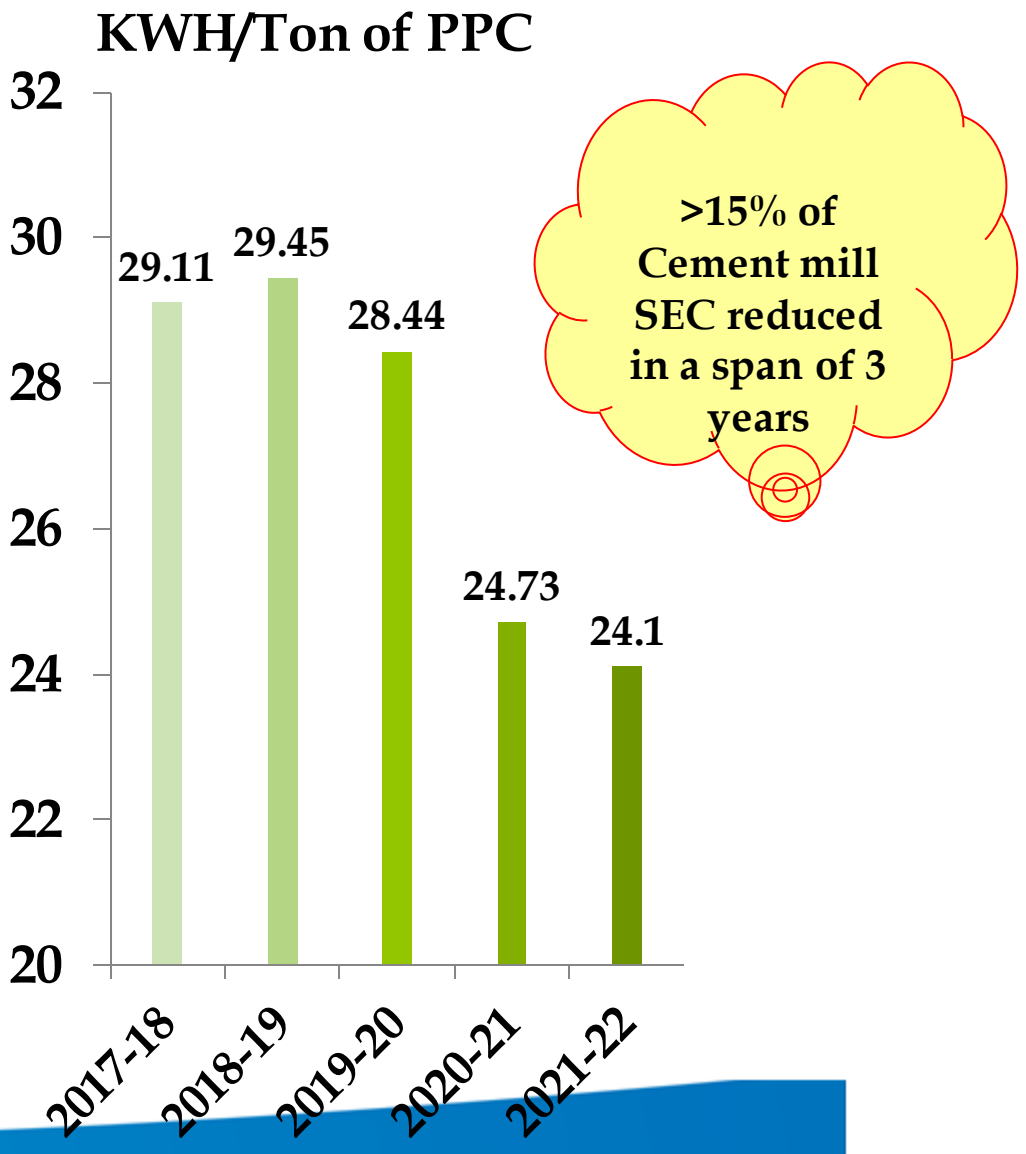
NB – National Benchmark

INB – International Benchmark

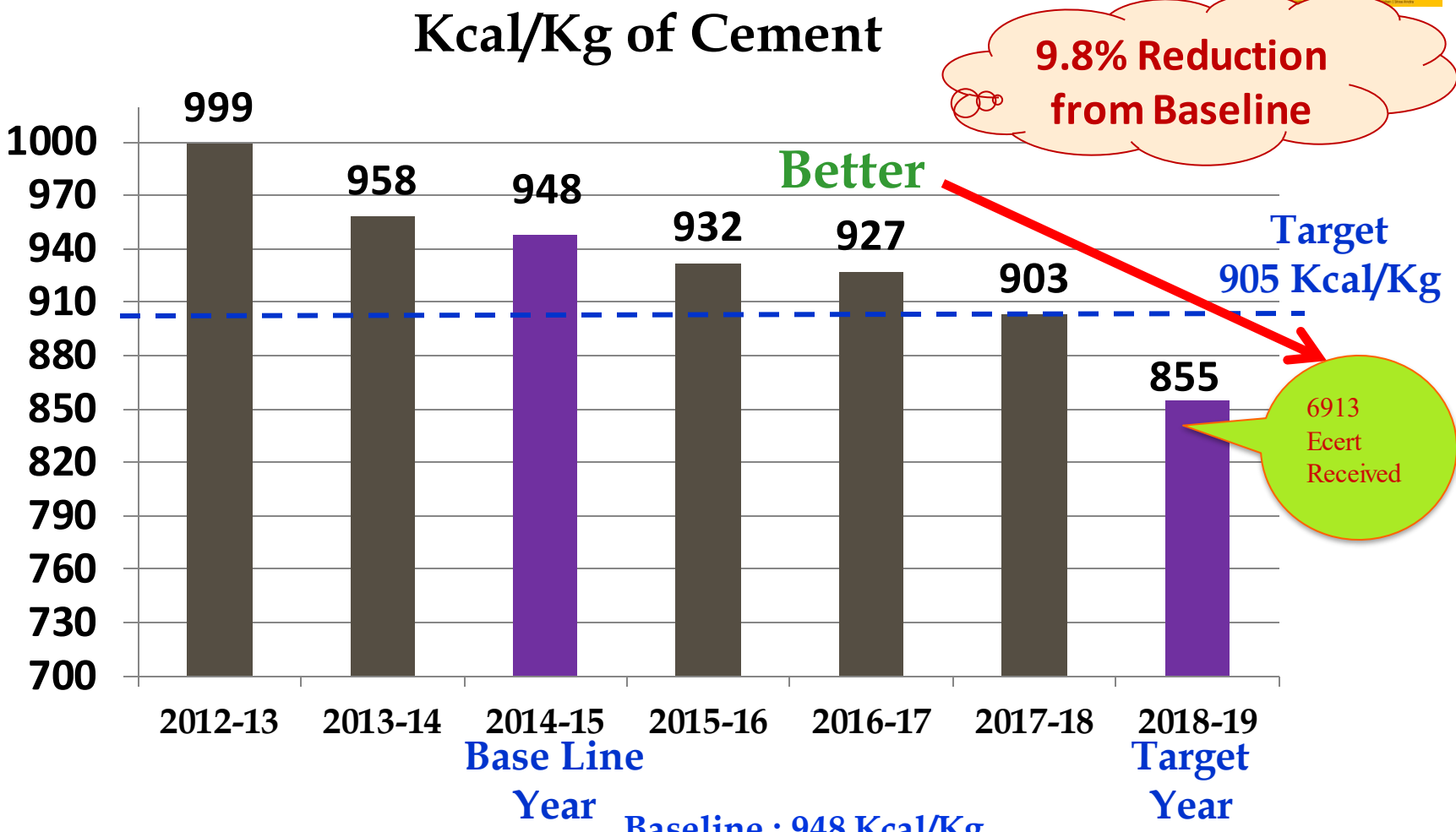
Sp. Electrical Energy Consumption

Cement Grinding- Variety wise (kWh/Ton)



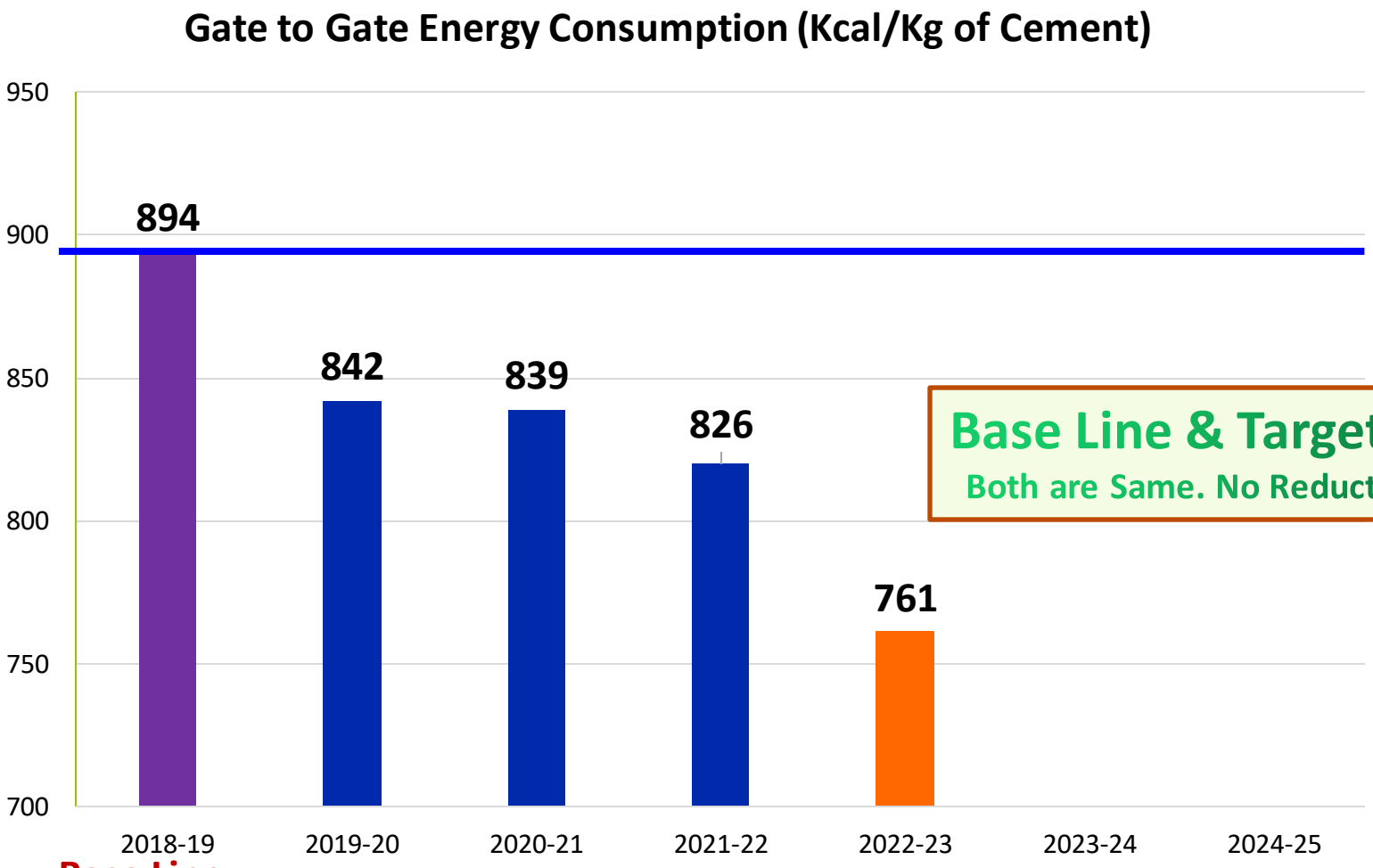


DCBL – KDP Plant – PAT – 2 Cycle

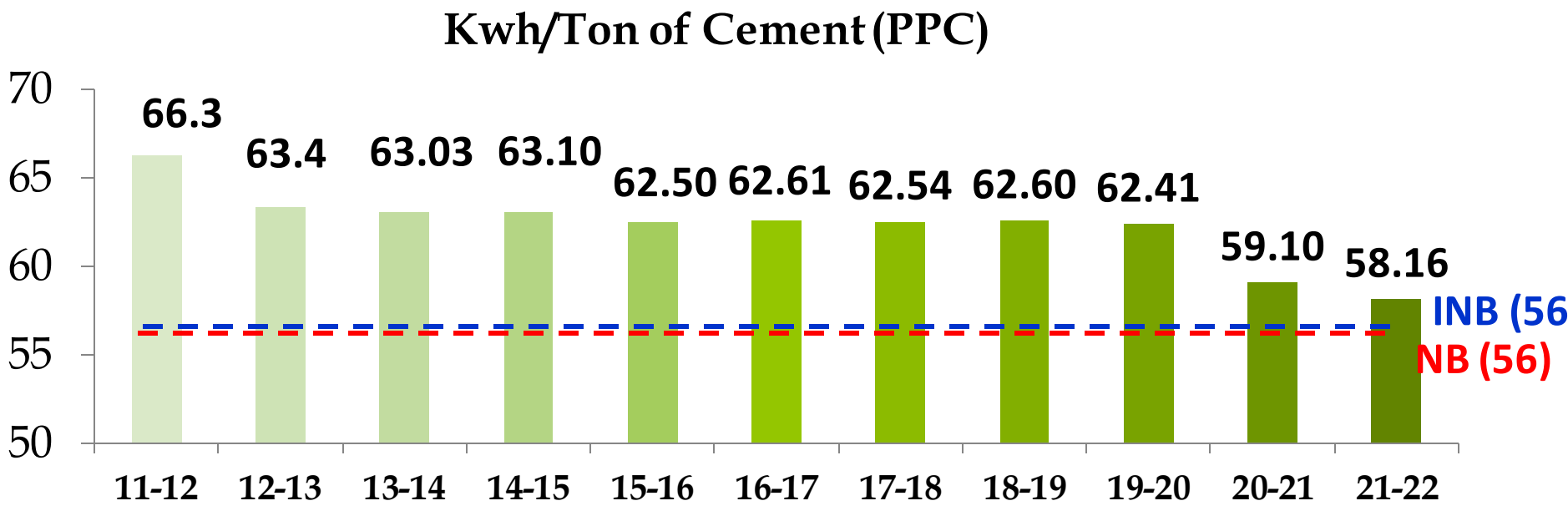


Baseline : 948 Kcal/Kg
Target : 905 Kcal/Kg
Achieved : 855 Kcal / Kg

DCBL – KDP Plant – PAT – 7 Cycle



KDP ›. Energy Consumption Trend & Global Comparison with Benchmark (Overall PPC)



Sp. Energy Consumption	DCBL Actual (FY 2021-22)	National Benchmark ***	International Benchmark ***
Specific Energy Consumption – Thermal (KCal/Kg of Clinker)	691	676	660 (Japan)
Upto Clinker SEC – Electrical (KWh/T of Clinker)	51.32	42.59	42.59 (India)
Overall Cement SEC – Electrical (KWh/T of Cement)	68.84	56.14	56.14 (India)
*** Source of Information : CII			

KDP
Encon Journey

Dalmia
BHARAT GROUP

MILESTONE

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

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

FY 2022

FY 2020 & 21 — FY2021–Installation of Shredder, optimization of cement mill

FY 2019 — FY 2020-CMBH Fan Impeller, 4 Point Feeding of Flyash, Cooler Optimisation

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

FY 2018

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

FY 2017

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

FY 2016

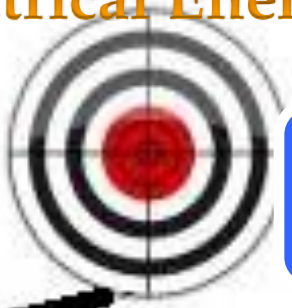
FY 2016 – Liquid & Solid AFR
RABH & CM Fan Impeller Replaced

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

KDP Road Map for Achieving Benchmark / Global Best Electrical Energy

Short term
Long term



Target - 55.26 U/T of PPC_{equ}

Cement Mill classifier & mill fan upgradation (Reduction of 0.8 U/T)

5

4 MW solar plant-Under Erection

4

3

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

2

Cooler upgradation (Reduction of 0.5 U/T)

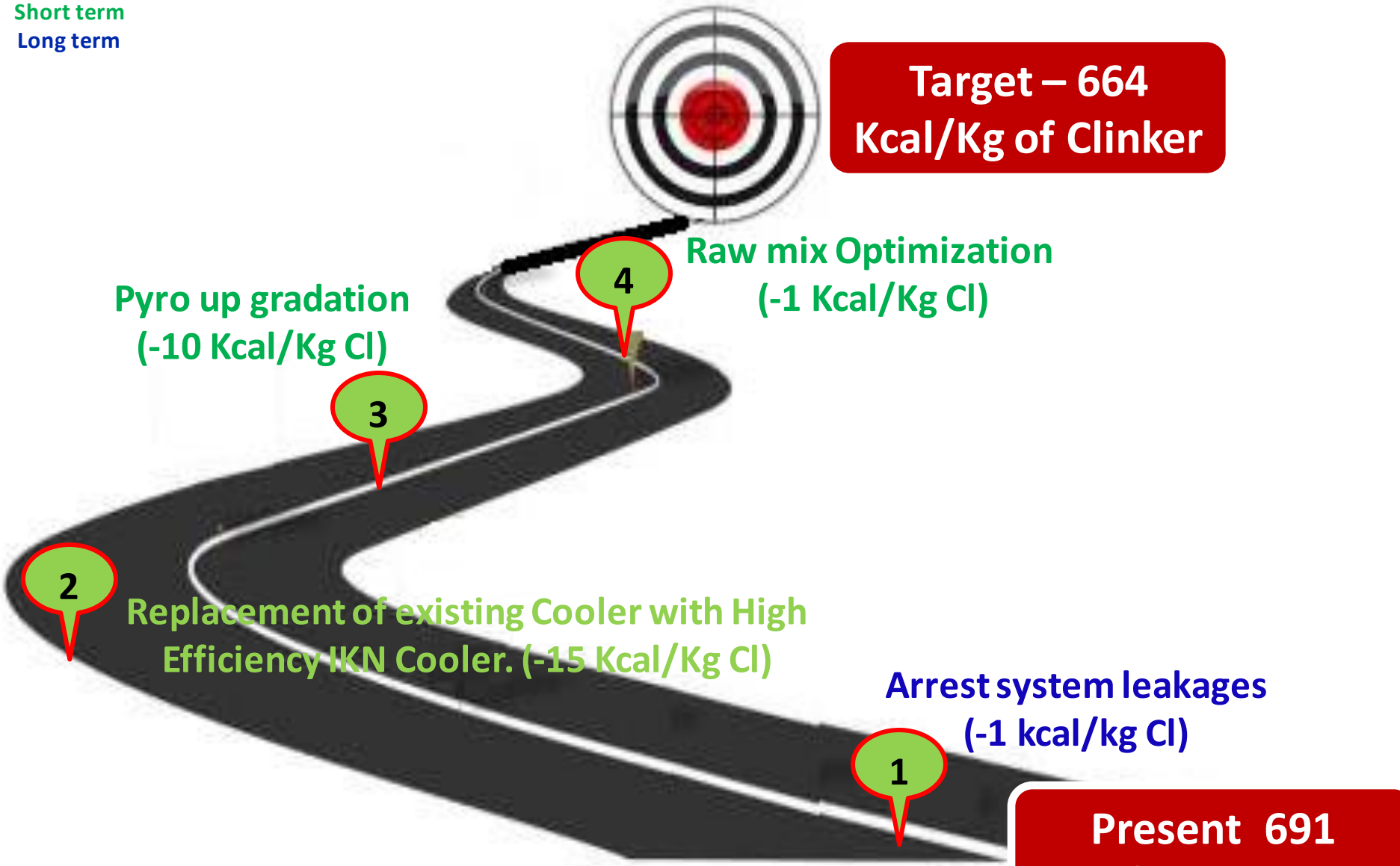
1

Cement Mill table & Rollers liners replacement (Red. of 0.6 U/T)

Present 58.16 U/T of PPC_{equ}

Road Map for Achieving Benchmark / Global Best – Thermal Energy

Short term
Long term



Major Encon Projects planned
(FY 2022 to 2023)

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	Replace the GRR of Cement Mill CA fan with VFD	15	1.48	-	8.88
2	Optimize coal phase density by reducing the volume of coal transport blowers	2	0.32	-	1.92
3	Optimize suction at venting points in Raw mill hopper area bag filter by reducing the fan speed	0.15	0.036	-	0.22

Highlighted Encon Projects

AQC Boiler – WHRS

Preheater Boiler – WHRS

Gas Bypass System

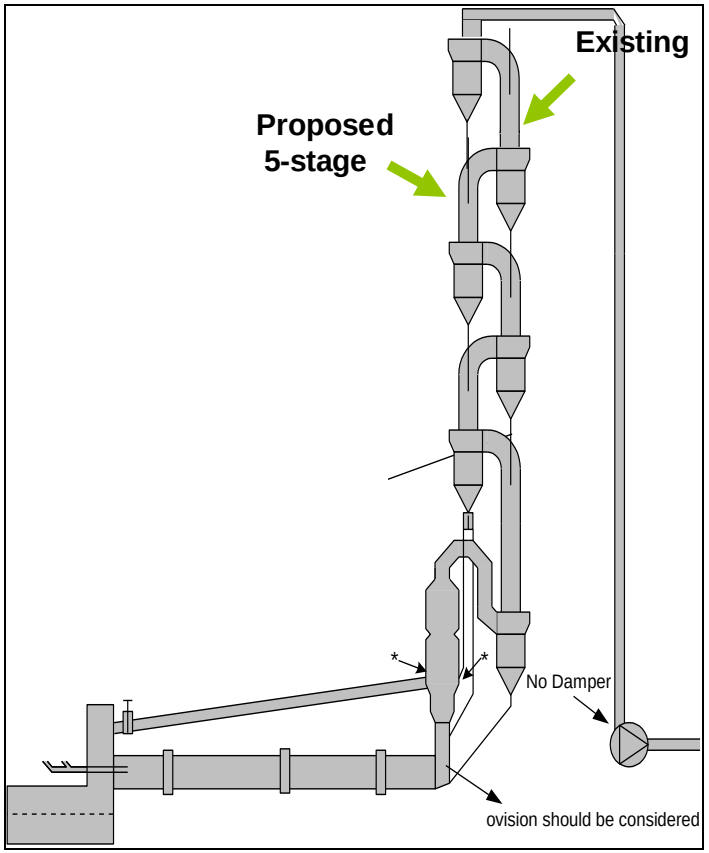
Summary of Energy Saving Projects in the Last 3 Years.

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)
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
2019-20	21	13.7	2.23	0.23	14.61	0.09

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

Increasing the AQC boiler power generation through compartment split in the rear end of the cooler

- The heat recuperation from the cooler is limited due to less input air due to higher cooler loading and width load of the cooler
- The total cooling air maximum available is 1.8 Nm^3/kg clinker after increase in the capacity of the first three cooler fans
- With optimum air flux in the cooler, The available input cooling air is 1.6 Nm^3/kg clinker for 6000 TPD

Parameters	UOM	Existing	Proposed
Total Cooling input	kg/kg clinker	1.55	1.8
Clinker Temperature	deg C	210	155
Excess air available for AQC	kg/kg clinker	I-0.5/II-0.471	I-0.5/II-0.76
Excess air temperature	deg C	I-500/II-310	I-500/II-270
Total Heat available to AQC alone	kcal/kg clinker	69	79
Power generation from AQC	MW	4.4	5.1

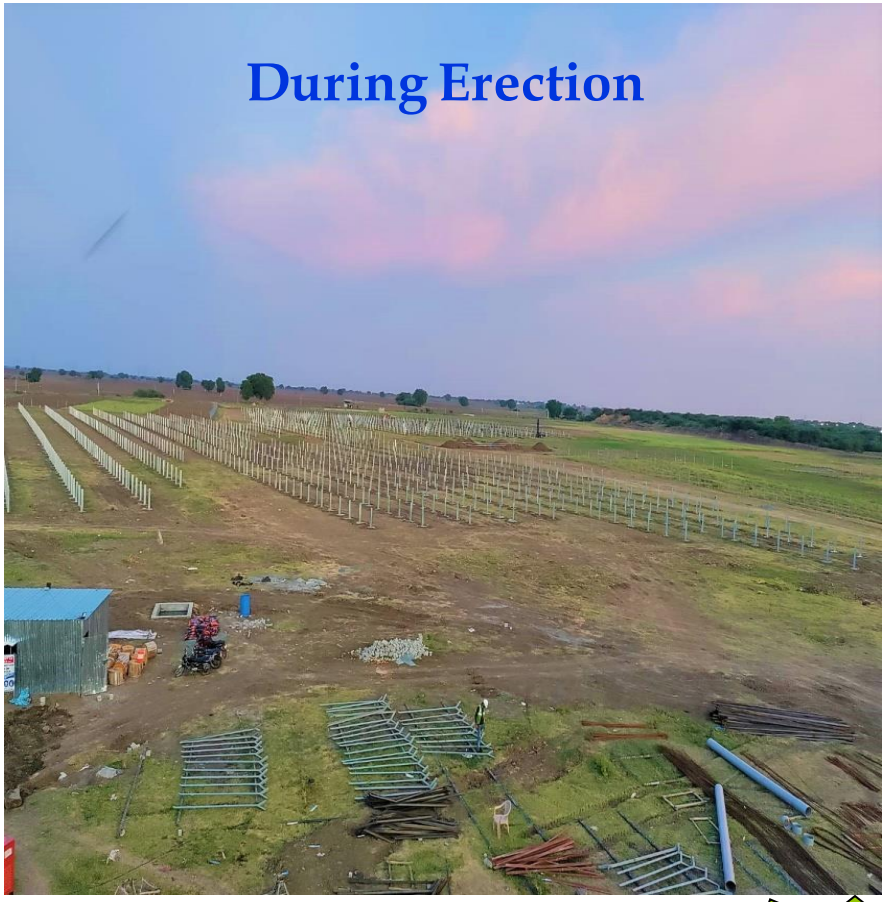
Renewable Energy Sources (2021-22)

Type of Renewable Energy Source	Installed Capacity in MW	Savings	
		Energy Generated (Lakhs Unit)	Cost Saving (Rs. Lakhs)
GPP (WHRS)	12	266.9	1601.4
GPP Solar Power	16.08	63.40	380.36
Solar REC	-	35.05	-
Non Solar REC	-	52.58	-
Bio Gas Plant	At Guest House	1800 m^3/Yr.	1.20

Renewable Energy

16.08 MW Solar Power Plant

During Erection



Commissioned Recently

4MW Solar under Erection

Dalmia Cement Committment

http://there100.org/dalmia-cement

(page 13)

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

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	Under Erection- Dec'22
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 2025

Waste Consumption as Raw Material

Sl.No	Year	Waste as Raw Material	Quantity (Tons)	Replaced material	Waste as %	Total %
1	2019-20	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	2020-21	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	2021-22	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	

Waste Consumption as Green Fuel
(FY 2021-22)

SI.NO	Name of the Fuel	QT in MT	GCV in Kcal/Kg	Percentage
1	Spent Solvent Liquid	1567	3820	0.56%
2	Process organic residue liquid	1283	4210	0.46%
3	Waste Process Salt	575	3518	0.20%
4	Waste Mix Solid	1765	3506	0.63%
5	Organic Residue Solid	431	3578	0.15%
6	Spent Carbon	304	3522	0.11%
7	Plastic Waste	10462	4116	3.71%
8	Plastic Waste –Multi Lauer Plastic	9137	5300	3.24%
9	R&FW	803	5245	0.28%
10	Rice husk	130	3902	0.05%
11	RDF	10316	4014	3.66%
12	RDF<70mm	179	3866	0.06%
13	FRP waste	614	6398	0.22%
14	FMG	34	2500	0.01%
15	Biomas Briquettes	52	5315	0.02%
16	Biomass waste	1029	3487	0.37%
17	Internal biomass	76	4910	0.03%
18	ETP Sludge	280	3042	0.10%
19	Paint Sludge	134	4445	0.05%

Total - 13.9 %

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
-	Process	Electricity	Transport	Overall	7.3% Reduction from Base Line

Target : 728 kg CO_2 e/MT of Cement
(4MWp Solar plant, Cooler Up gradation)

Bamboo Plantation for Co2 Absorption & AFR Usage

Plantation Area : **35 Acres**

Green Supply Chain Project (FY 2021-22)

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				[illegible]	0.46	0.17
	211BC2 Long Belt	2386				14[illegible]	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	44628				2638		6.28
	Raw Mill Classifier	152[illegible]				90		0.21
	MCC - 02 (LS Transport)	19[illegible]				116	2.07	0.28
	MCC - 03 (RM Grinding Aux.)	6936				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

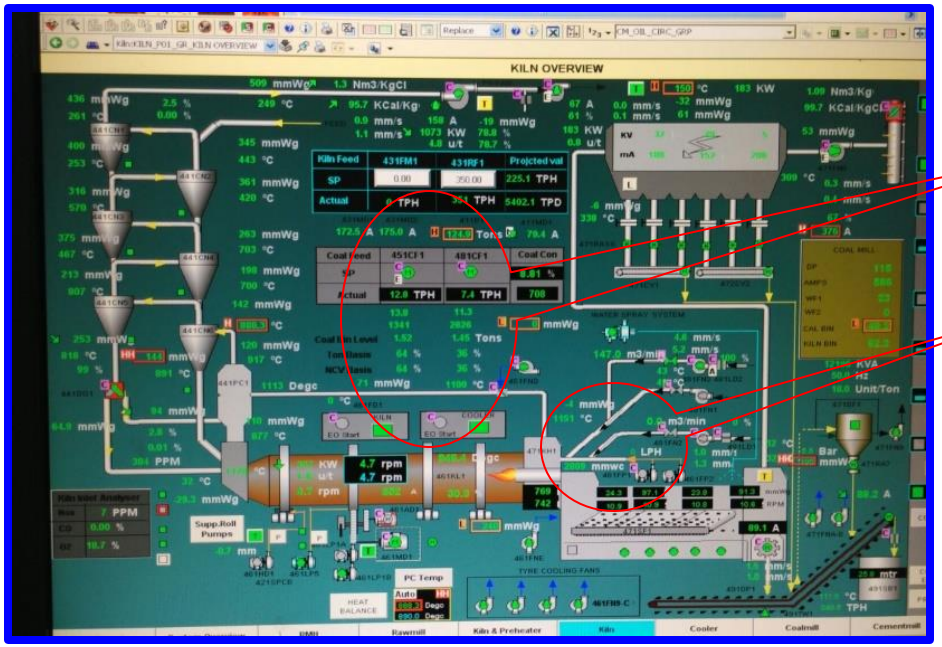
Daily Energy Conservation Report

ENERGY CONSERVATION (IDLE POWER CONSUMPTION REPORT)

SECTION	SECTION DESCRIPTION	OPTIMUM SATR T UP TIME	ACTUAL RUNNING HOURS	XX.06.20XX IDLE RUNNING TIME	ENERGY IN KWH IDLE /SHUT DOWN UNITS	ACTUAL U/Ton	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				[illegible]87.65			
	No of Start/ Stops 3.00							
Raw Mill	WEIGH FEEDER	[illegible]00	16.[illegible]2			16.92	16.88	
	MAIN DRIVE	0.0[illegible]	16.[illegible]0	-0.05	0.00			150.00
	FAN	[illegible].30	16.90	-0.32	0.00			2600.00
	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							

Online Sp. Energy Monitoring

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



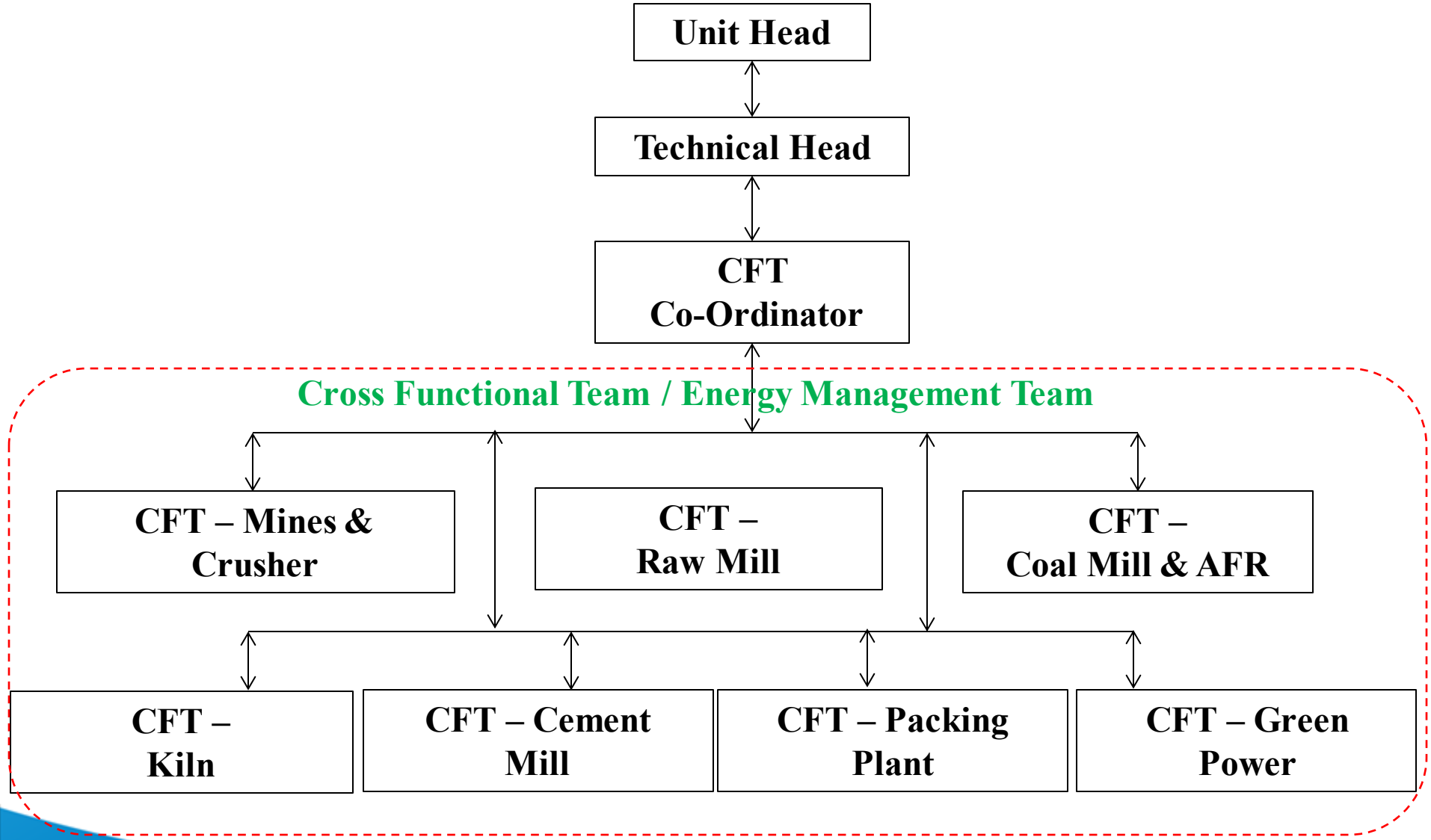
Online SEC of Electrical & Thermal Energy Consumption as per

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



Employees Involvement
Training – Summary (FY 2021-22)

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

ISO 14001:2015

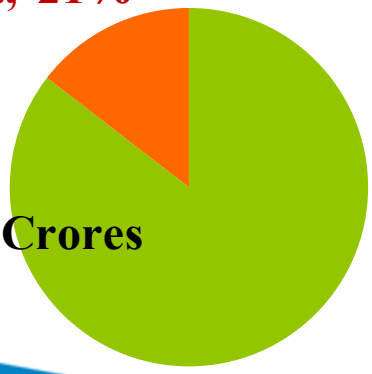
ISO 45001:2018

ISO 50001:2018

Turn Over & Investment

FY 2021-22

Rs. 236Crores, 21%



Rs. 1084.7 Crores

Encon Investment

Greenco

1st Level Completed
2nd Level Under Progress

KDP

Dalmia BHARAT GROUP

BEE – NECA Certificate

APSECM-Gold Award

CII-SR Best Solid Waste Management Award

Total 15 awards Received in FY 2021-22

KDP

Environmental Projects

Dalmia BHARAT GROUP

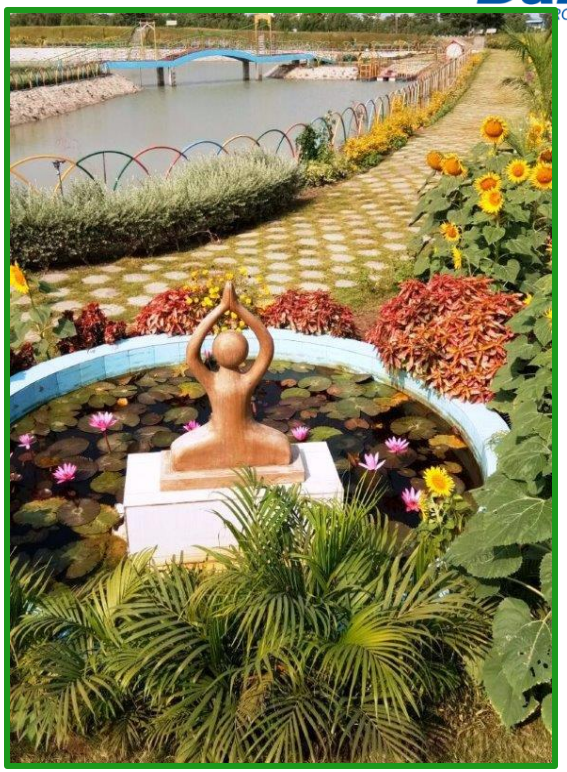
Theme : Water Pond Development & Rain Water Harvesting






Kadapa Plant is Water Positive

700%



Thank you

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