21st National Award for Excellence in Energy Management 2021

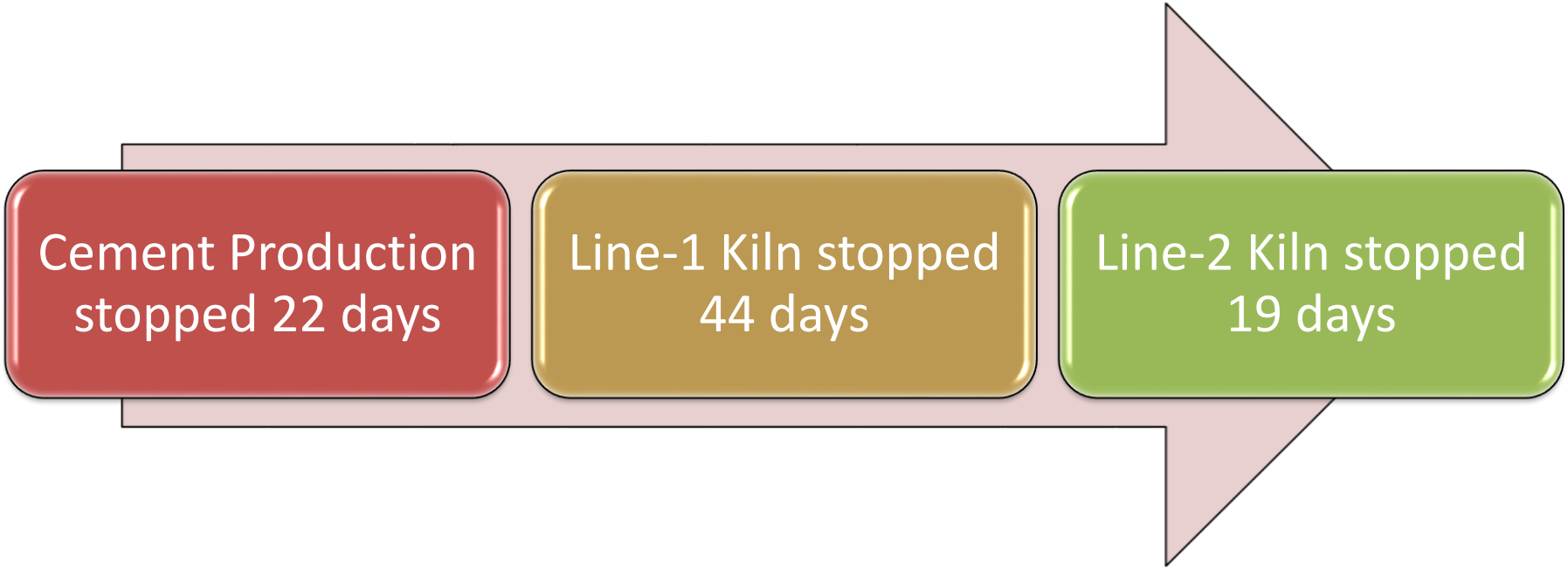
UltraTech Cement Limited

Unit: Dalla Cement Works

Presenters:

1. Prasnth Tripathi -FH-Technical
2. Shishir Pali -HOD Technical Services
3. Neeraj Pundir-SH WCM

Impact of COVID 19



Note- No major Impact on Plant Production & Dispatch

Company Profile

2020-21
- WHRS project with 13.5 MWH started

2019-20
- PPCWR cement grade grinding started

2017-18
- **12th June UTCL took over from Jaypee & Production started on 29th June'2017.**

2008-09
- Line-2 commissioned with 1.5 MTPA clinker

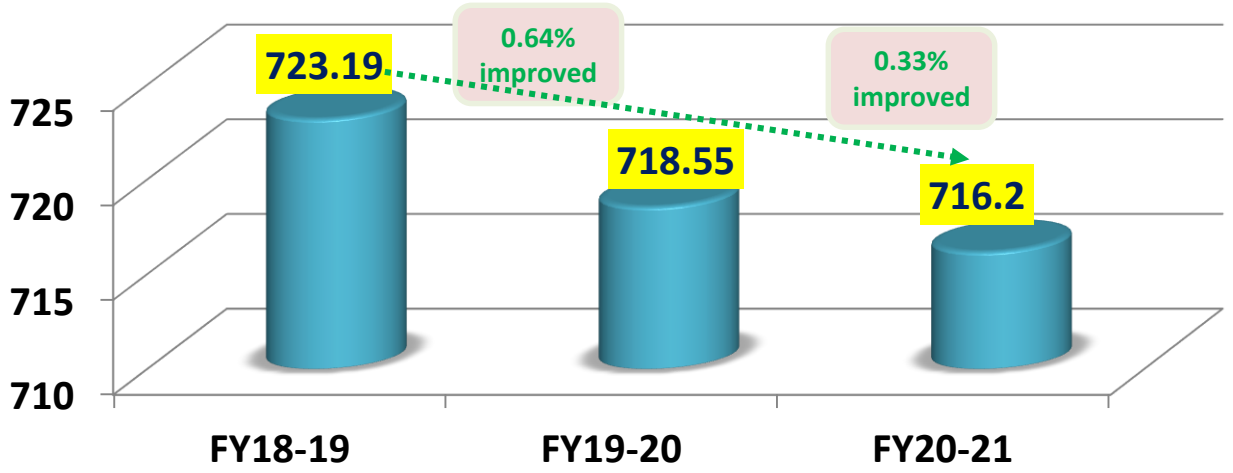
2006-07
- ***M/S Jaiprakash associates ltd. acquired the company started line-1 with 0.5 MTPA***

1973-74
- Expanded with most modern and biggest plant of Asia in 1974 and inaugurated by Hon'ble former Prime Minister of India Late Smt. Indira Gandhi.

1972
- **Dalla cement plant started by Govt of India.**

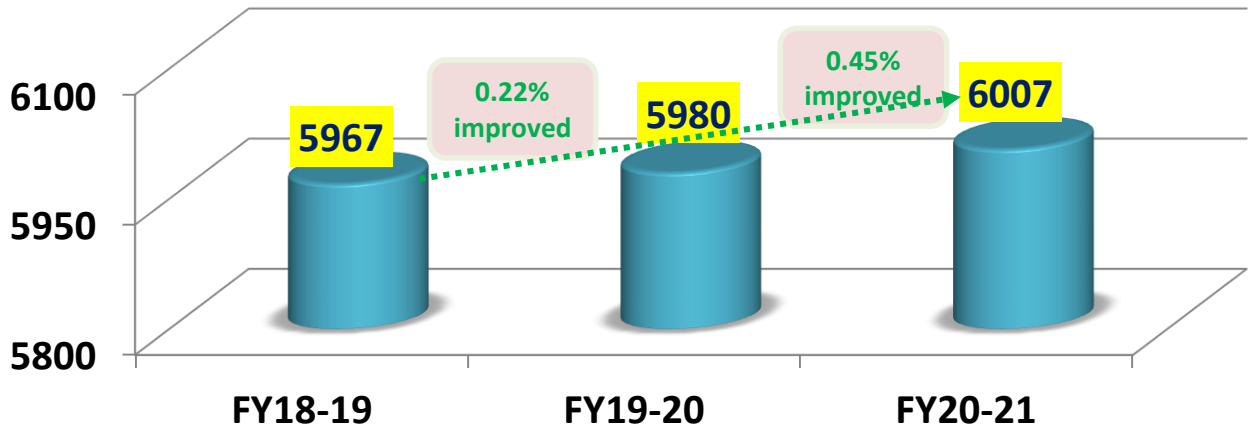
PLANT PERFORMANCE

Specific Heat Consumption



GOOD

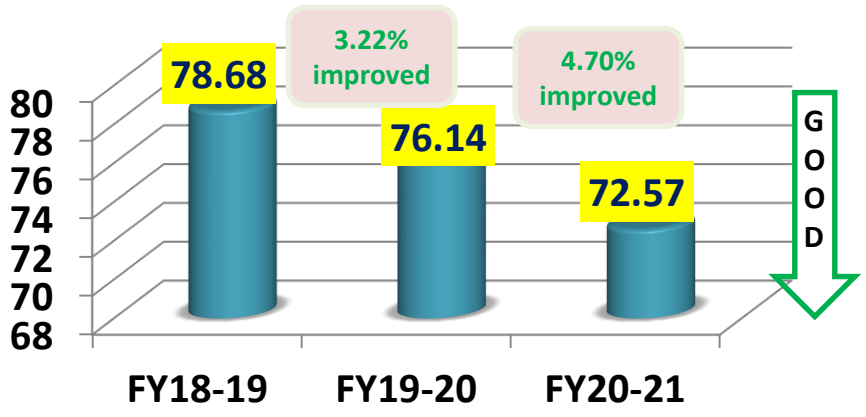
Kiln TPD



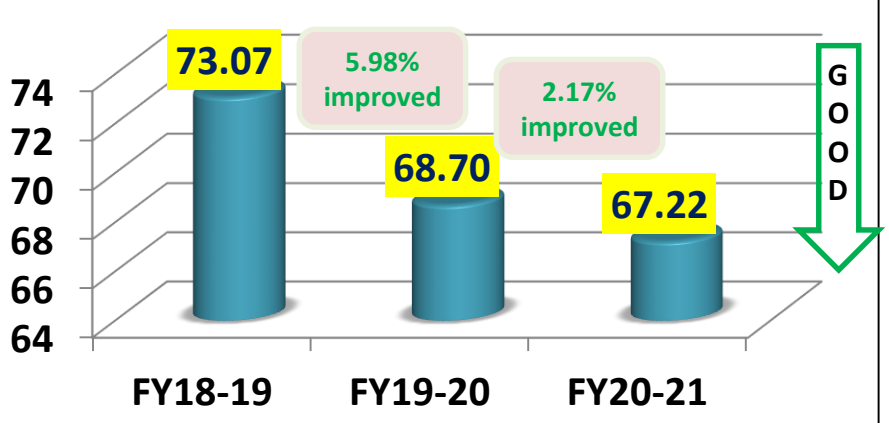
GOOD

PLANT PERFORMANCE

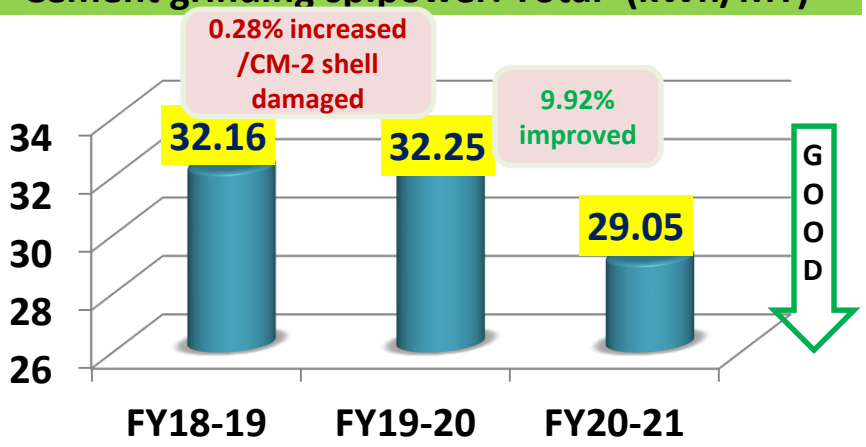
Overall Sp. Power Cons. (KWH/MT cement)



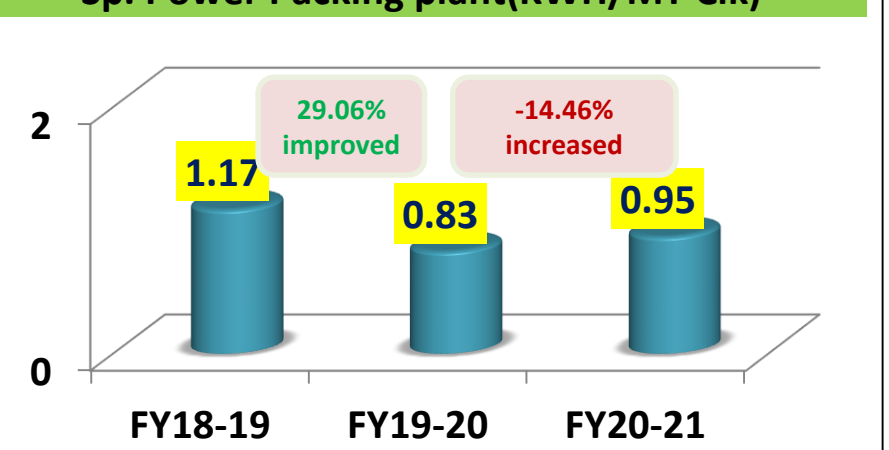
Sp. Power Up to Clinkerisation (KWH/MT Clk)



Cement grinding sp.power: Total- (kWh/MT)

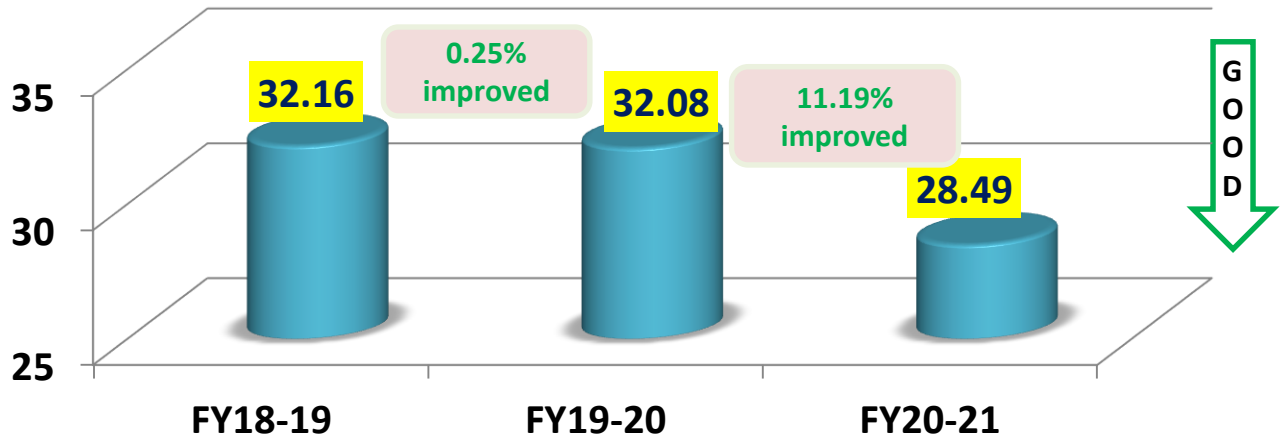


Sp. Power Packing plant(KWH/MT Clk)

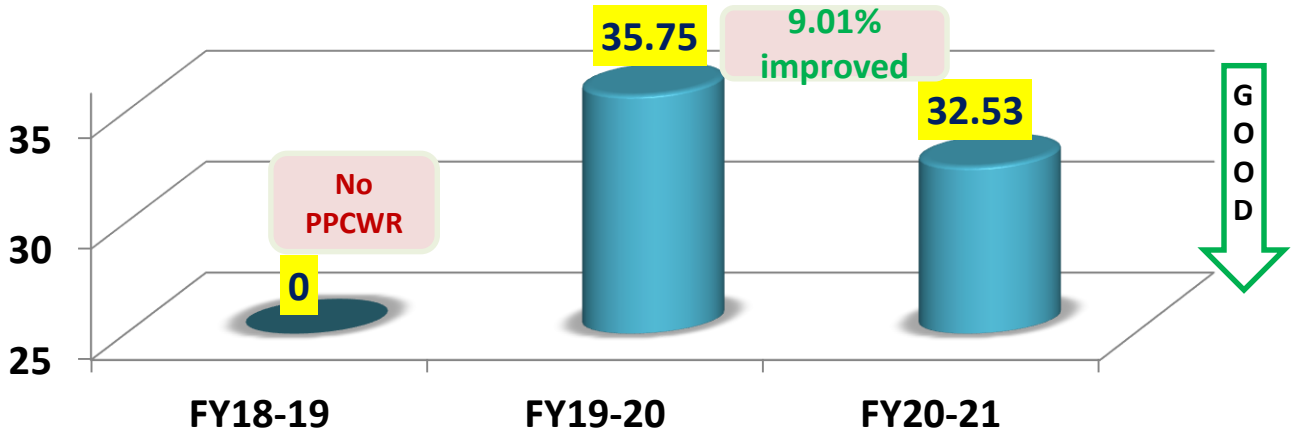


PLANT PERFORMANCE

Cement grinding sp.power: PPC- (kWh/MT)



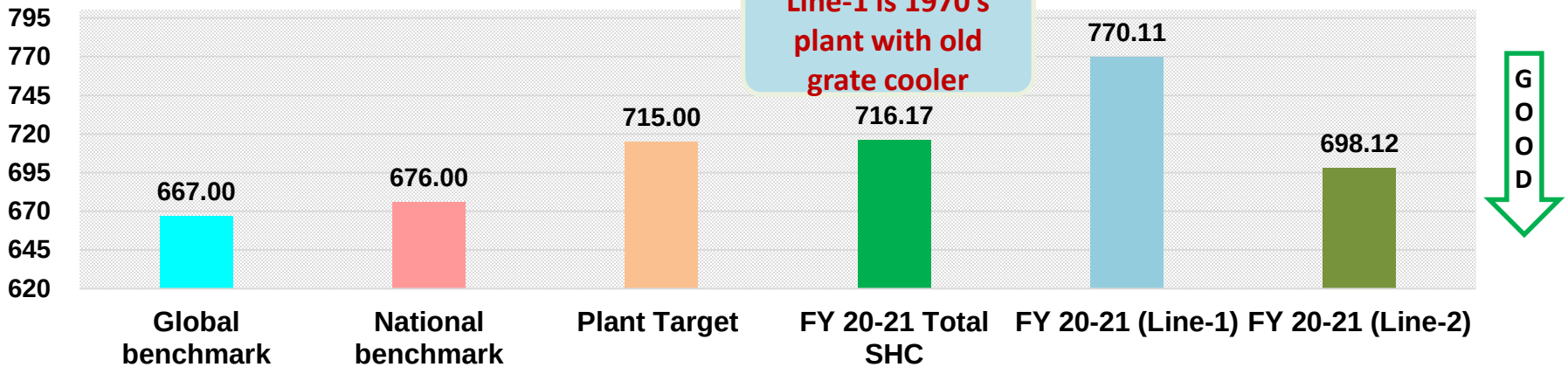
Cement grinding sp.power: PPCWR- (kWh/MT)



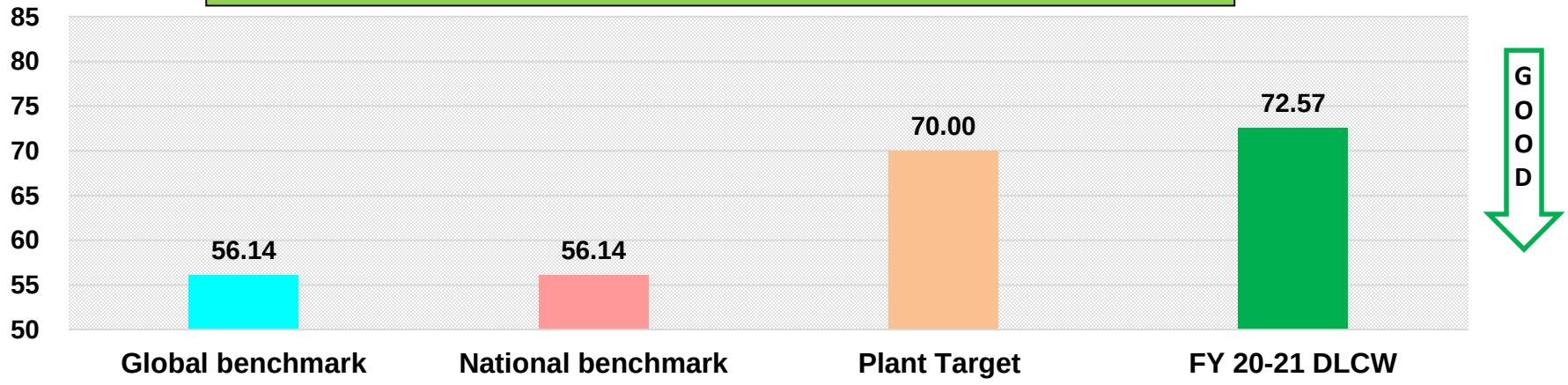
Unit Energy Performance Comparison

With benchmark (Year 2020-21)

Sp. Heat Consumption (Kcal/kg clinker)



Overall sp. Power Consumption (kWh/MT cement)



Ref. For National Benchmark : - CII Energy benchmarking for cement Industry Ver-5, May 2021

Ref- For International Benchmark Report of Industrial Energy Efficiency Benchmarking Report for Cement Sector by United Nations Industrial Development Organization (UNIDO).

Road Map for Benchmarking- FY22 projects

Action Plan	Status
Retrofitting/ replacement/ In-house modification of Energy efficient fans at Major Fans.	Proposal in progress
Increasing TSR by executing CAPEX for AFR feeding system	Capex approved/ordering started
Exploring for replacement existing Cooler with high efficiency cooler	Line-2 completed & Line-1 proposal in progress.
Retrofitting old reciprocating compressor to high efficiency screw compressor	Audit completed / proposal in progress
Upgradation line-1 preheater for 2250 TPD capacity.	Proposal in progress.
Increasing fly ash addition in PPCWR from 30 to 32% and reduction of conversion factor.	Continuously improved
Increasing Line-2 VRM output & reduction SPC by addition of RP rejects to VRM	Project started

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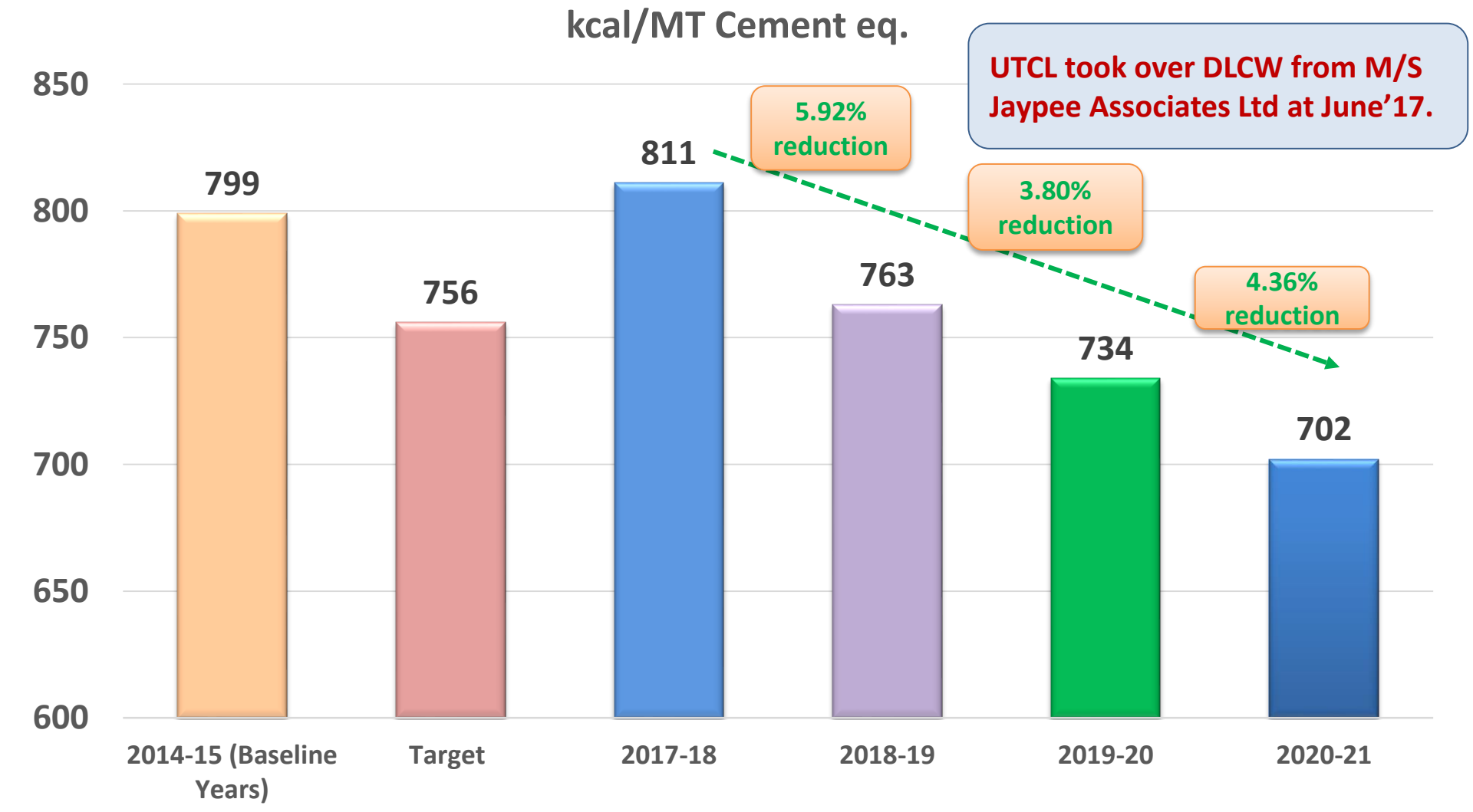
PAT Status-DLCW after UTCL

GtG energy consumption status



Achieved 7.14% reduction in FY 2020-21 from given target

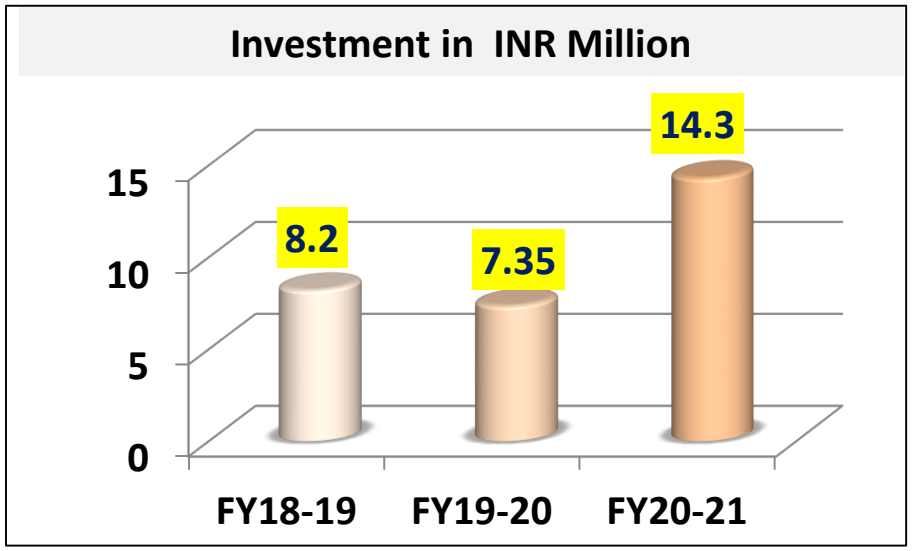
5.SUMMARY OF ENCON MEASURES TAKEN IN LAST THREE YEARS

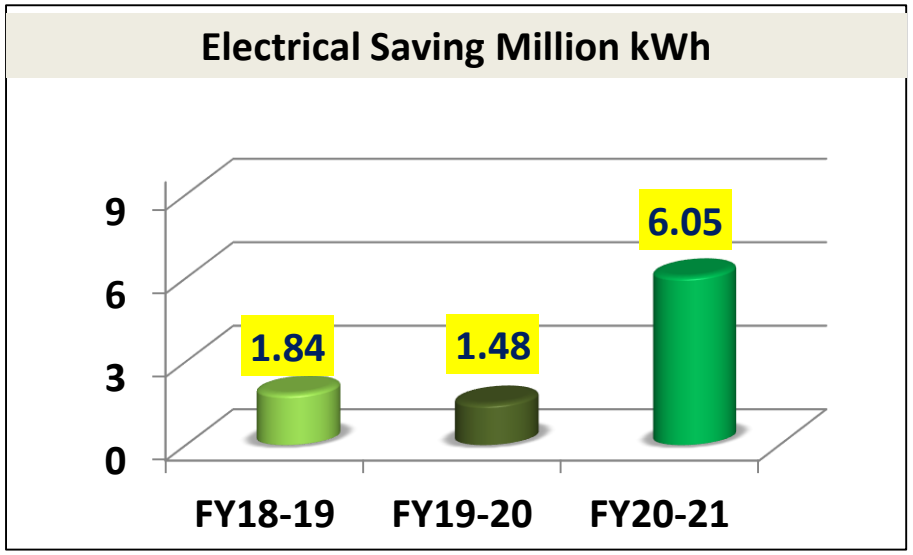
Energy Saving Sheet

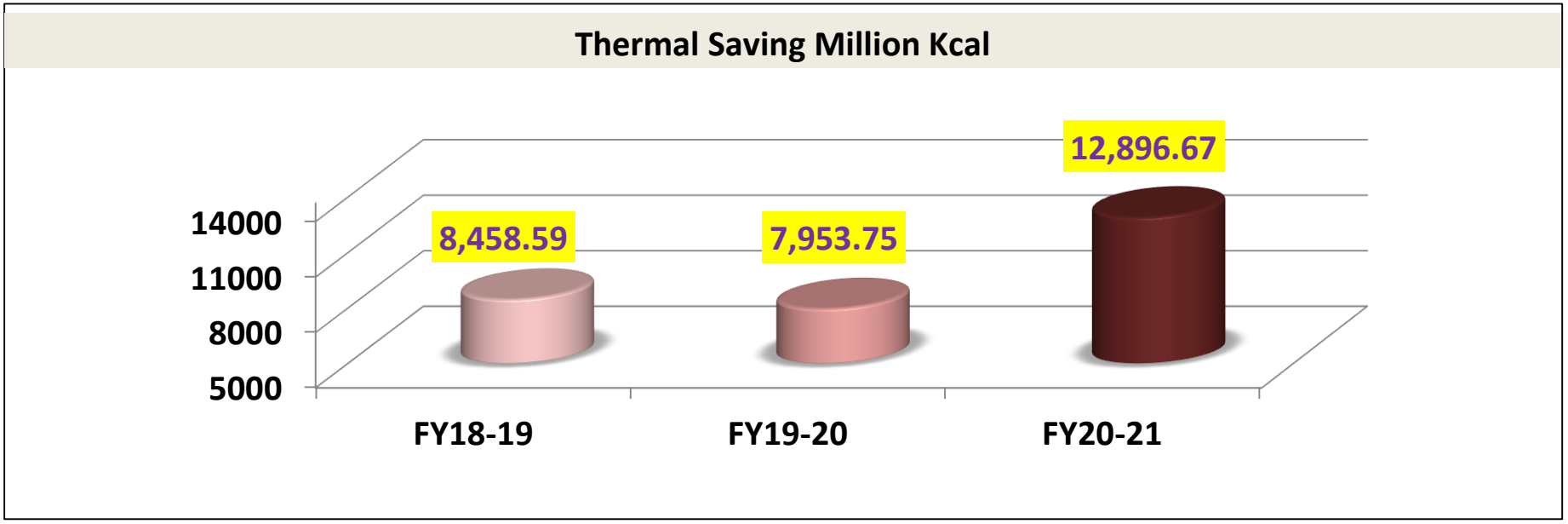
5.Energy saving initiatives in Last Three Years

Year	No of energy saving projects	Investments (INR Million)	Electrical Saving (Million kWh)	Thermal Saving (Million Kcal)	Saving (INR Million)	Impact on electrical kWh/MT cement, Thermal (Kcal/kg clk)
FY 2018-19	13	8.20	1.84	8458.59	17.65	SEC reduced 8.65% (7.45 kWh/MT cmt) from previous FY and 6.74 kcal/kg clk saving of thermal energy.
FY 2019-20	17	7.35	1.48	7953.75	15.52	SEC reduced 3.22% (2.53 kWh/MT cmt) from previous FY and 4.41 kcal/kg clk saving of thermal energy.
FY 2020-21	15	14.30	6.05	12896.67	40.84	SEC reduced 4.70% (3.58 kWh/MT cmt) from previous FY and 2.38 kcal/kg clk saving of thermal energy.

Unit Performance – Last Three Years







Project 1- Energy saving by smoke chamber modification

Objective:-

Reduction in electrical & thermal energy.

Backdrop:-

Line-1 Kiln is having 4 stage suspension preheater without any secondary firing arrangement in preheater so Kiln output couldn't get increased due to single firing system & also higher velocity at kiln inlet due to small smoke chamber design.

Due to very old civil structure (i.e. 40 years old) of preheater building, addition in cyclones stages & modification of risers were not possible during annual shutdown.

Line-1 pre clinkerisation sp. power consumption was higher 83.72 kWh/MT clk.

Line-1 sp. heat consumption also higher 783.75 kcal/kg clinker.

Higher Preheater exit temperature & lower kiln output due to old design

Project 1- Energy saving by smoke chamber modification

Approach:

- For improving the performance of line-1 Kiln, a cross functional team formed & discussed the best possible modification within annual shutdown.
- Based on the discussion team proposed to modify the kiln smoke chamber by 500 mm of size enlargement and secondary firing in kiln inlet.
- During the annual shutdown (April'20) of Line-1 kiln area following jobs done-
  - Area enlargement of smoke chamber.
  - Installation of secondary firing in smoke chamber.

  After the modification done, it was decided to run the kiln without secondary firing for optimum Sp. Heat Consumption & kiln output and we get the benefit of ~50 TPD without increase in heat.

  We continued with enlarged area for optimizing the feed.

Project 1- Energy saving by smoke chamber modification

Results:

- Kiln output increased by 44 TPD from previous FY
- Achieved saving in sp.heat consumption by 13.64 kcal/kg clk from previous FY
- Achieved saving in kiln sp. power cons. is 4.21 kWh/MT clk from previous FY

Parameter	UOM	Before (FY 2019-20)	After (FY 2020-21)	Saving
Production	MT	423987	447829	23842
Output	TPD	1481	1525	44
Sp.heat Cons.	Kcal/Kg clk	784	770	13.64
Total Sp.power Cons.	kWH/MT Clinker	30.47	26.26	4.21
Line-1 Pre Clinker SPC	kWH/MT Clinker	83.72	76.25	7.47
Cost of power	Rs/Kwh			3.5
Cost of heat	Rs/MCV			1150
Saving in (INR Lakhs/Annum) from energy saving				136.22

Benefits Achieved:

- Saving: 136.22 Lakh INR.
- ROI within 2 Months.
- GHG Emission reduced by 8.94 kgCO_2/MT Clk.
- PH exit temperature reduced by ~17 Deg C.

Project 2- Energy saving grinding media optimisation

Objective:-

Electrical energy saving by optimising grinding media in open circuit ball mill for cement grinding.

Issues:-

- Unit have 02 nos. very old design open circuit ball mills with capacity of 35 tph in PPC grade
  - Main drive itself consumes 85% of total cement grinding power consumption. To reduce Sp.power in cement grinding either main drive load should be reduced or mill output to be increased in same loading.
  - Mill auxiliary specific power consumption including mill vent fan was on higher side due to low output.

Project 2- Energy saving grinding media optimisation

Approach:

Brainstorming session done with departmental teams and Team finalised the following ideas for grinding media optimisation & production improvement and the same was implemented.

1) 15 mm grinding media removed & 17 mm & 20 mm increased in second chamber of mill. Media loading reduced by 6% from previous (33% to 27%).

2) Higher percentage of Line-2 clinker mixed as C_3S is higher in Line-2 clinker.

A.LINE POWER

RESOURCE	SUB SECTION	YTD_TPH	YTD/MT_CMT	YTD_LOAD_KW
NPPCWR:TOTAL		27.333	35.747	977.094
SD_POST	SHUTDOWN POST PWR		0.145	
TOTAL			0.145	
Cement mill:Overall	Before	30.669	32.245	

A.LINE POWER

RESOURCE	SUB SECTION	YTD_TPH	YTD/MT_CMT	YTD_LOAD
SUB TOTAL		29.441	32.429	954.754
NPPCWR:TOTAL		29.377	32.527	955.569
SD_POST	SHUTDOWN POST PWR		0.029	
TOTAL			0.029	
Cement mill:Overall	After	33.104	29.049	

Project 2- Energy saving grinding media optimisation

Results:

- Cement Mill output increased by 2.44 TPH from previous FY
- Achieved saving in cement grinding sp.power consumption by 3.20 kWh/MT Cement from previous FY

Parameter	UOM	Before (FY 19-20)	After (FY 20-21)	Saving
Production	MT	443864	509804	65940
Output	TPD	30.67	33.10	2.44
Total Sp.power Cons.	kWH/MT Cement	32.25	29.05	3.20
Cost of power	Rs/Kwh			3.5
Saving in (INR Lakhs/Annum) from energy saving				57.03

Benefits Achieved:

- Saving: 57.03 Lakh INR.
- ROI with in 5 Months.
- GHG Emission reduced by 2.62 kg CO_2/MT Cement

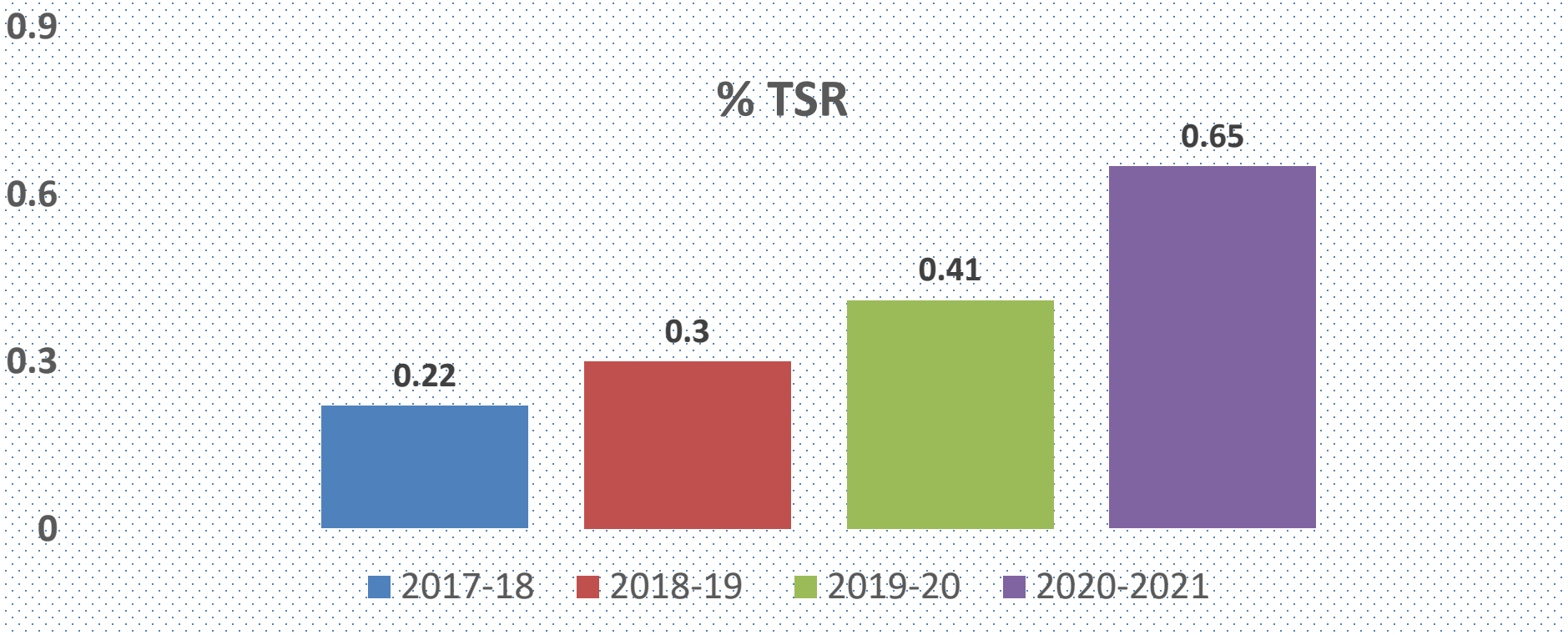
Utilization of Renewable Energy sources

Year FY	Technology (Electrical)	Type of Energy	Onsite/ off site	Installed capacity (MW)	Generation (Million kWh)	% Of overall elect energy
FY 2018-19	-	-	-	-	-	-
FY 2019-20	-	-	-	-	-	-
FY 2020-21	-	-	-	-	-	-

- Solar lights installed in colony street lights
- Solar water heater installed in colony guest houses 12 KW
- WHRS project (13.5 MW) erection in progress, Expected commissioning Aug'2021
- Proposal submitted for 2.5 MW Solar plant

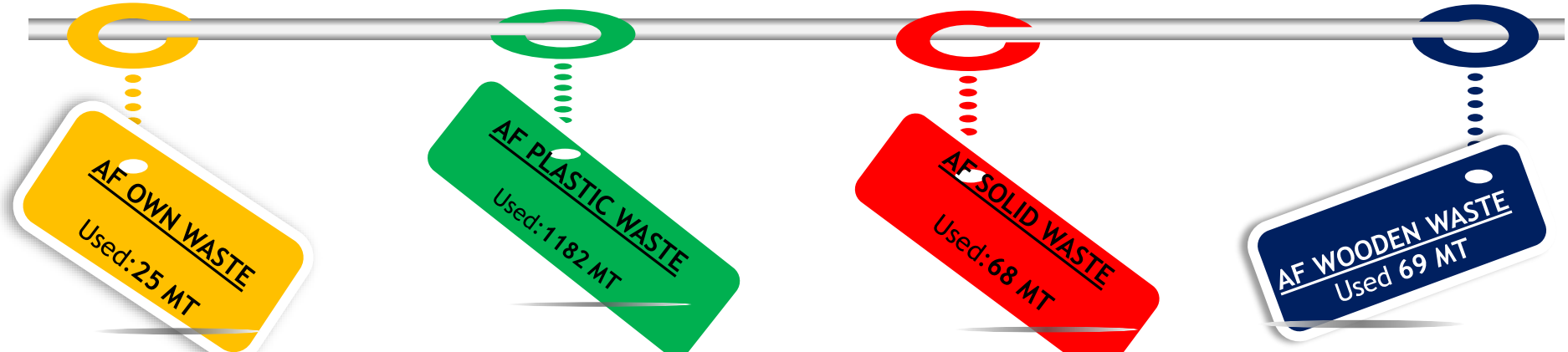
Utilisation of Waste Material as Fuel

S.No.	Year FY	Total Alf fuels Quantity (MT)	Wt. Avg NCV (kcal/kg clk)	Waste as percentage of total fuel
1	FY 2018-19	3006	1284	0.30
2	FY 2019-20	3070	1878	0.41
3	FY 2020-21	2930	2840	0.65



Utilisation of Waste Material as Fuel FY 2020-21

FY 2020-21-UTCL DALLA CEMENT WORKS							
COAL	QTY	NCV	Heat (Mkcal)	QTY (Total)	NCV (kcal/kg)	Heat (Mkcal)	AFR in Heat %
CARBON POWDER	25.00	6,111.69	152.79	2,930	2840	8322.58	0.65
CLOTH WASTE	81	3,523.97	285.44				
FMCG WASTE	1,378.89	2,139.34	2949.91				
MSW RDF	101.56	2,897.28	294.25				
OWN WASTE	24.7	2,639.36	65.19				
PLASTIC WASTE	1,182.13	3,442.05	4068.95				
SOLID WASTE	67.78	3,794.03	257.16				
WOODEN DUST	69.02	3,606.00	248.89				

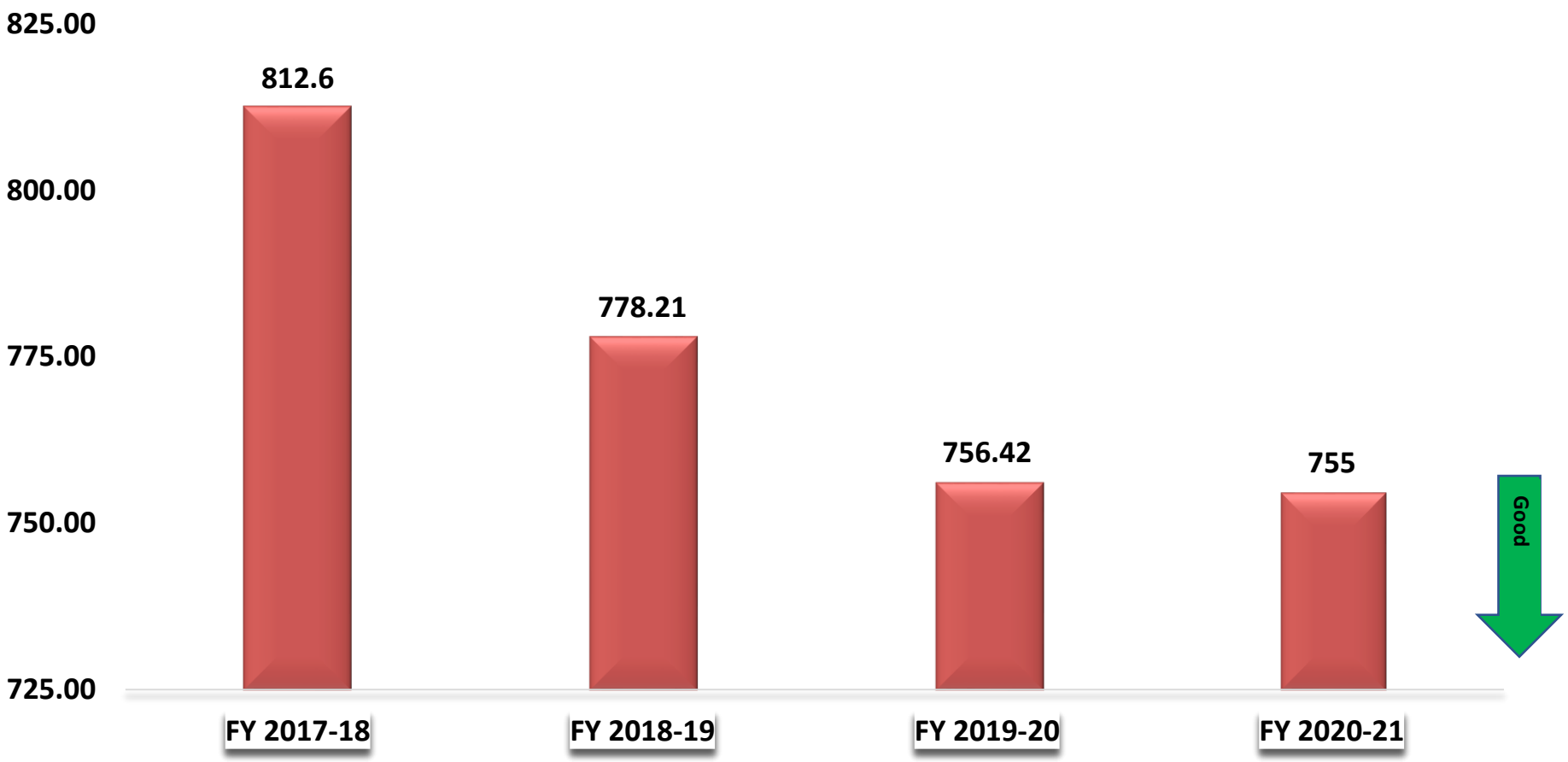


Utilisation of Waste Material as Additive

Waste material used as Alternative Raw Material (Additive)				
Sl.No	Waste Material	Quantity Used (MT)		
		FY 2018-19	FY 2019-20	FY 2020-21
1	Fly Ash Dry	90,292	97,484	1,11,959
2	Fly Ash TPP	52,725	53,602	53,998
3	Fly ash TPP Coarse	9,920	1,868	8,398
4	Pond ash	0	0	423
5	Chemical Gypsum	98	5,685	6,222
6	Gypusm imported	14,409	6,293	5,999
7	Gypsum Phoshpo	392	693	0
8	Red mud	64,262	79,671	86,347
9	Iron refines	2,168	337	0
Total		2,34,266	2,45,634	2,73,345
% Waste used against natural resource consumption		11.30	11.37	9.51

GHG Inventorisation

CO2-Emissions-kgCO2/MT Cement



CO2 Emissions (kg CO2/ton of Cementitious product)

CO_2 Emission Reduction Action Plan

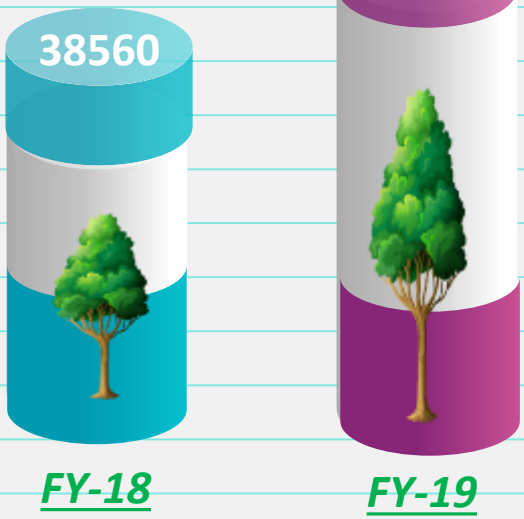
Target Reduction for CO2 emission intensity by 25% by 2025

Action Plans	Status
Increasing fly ash addition up to 32% in PPCWR	Started
WHRS installation (13.5 MWh)	Erection in progress
Increasing alterative fuel consumption up to 10% TSR from 1%	Ordering in Progress
Installation OLBC to reduce diesel consumption and TAT	Project finalised
Installation 2.5 MWh Solar plant in plant boundary	To be finalised
Upgradation Line-1 cooler to reduce Thermal energy consumption	Audit completed & Proposal in progress.

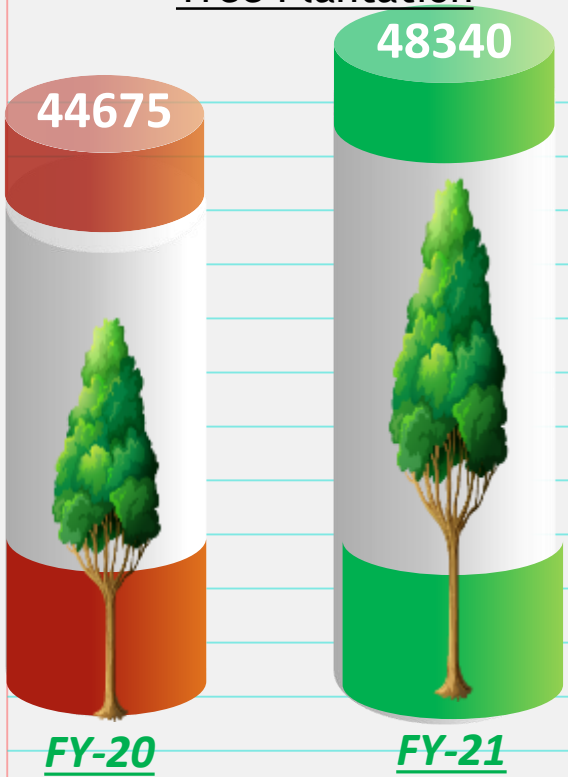
Green Belt Development (Plant, Colony & Mines)

1

Tree Plantation



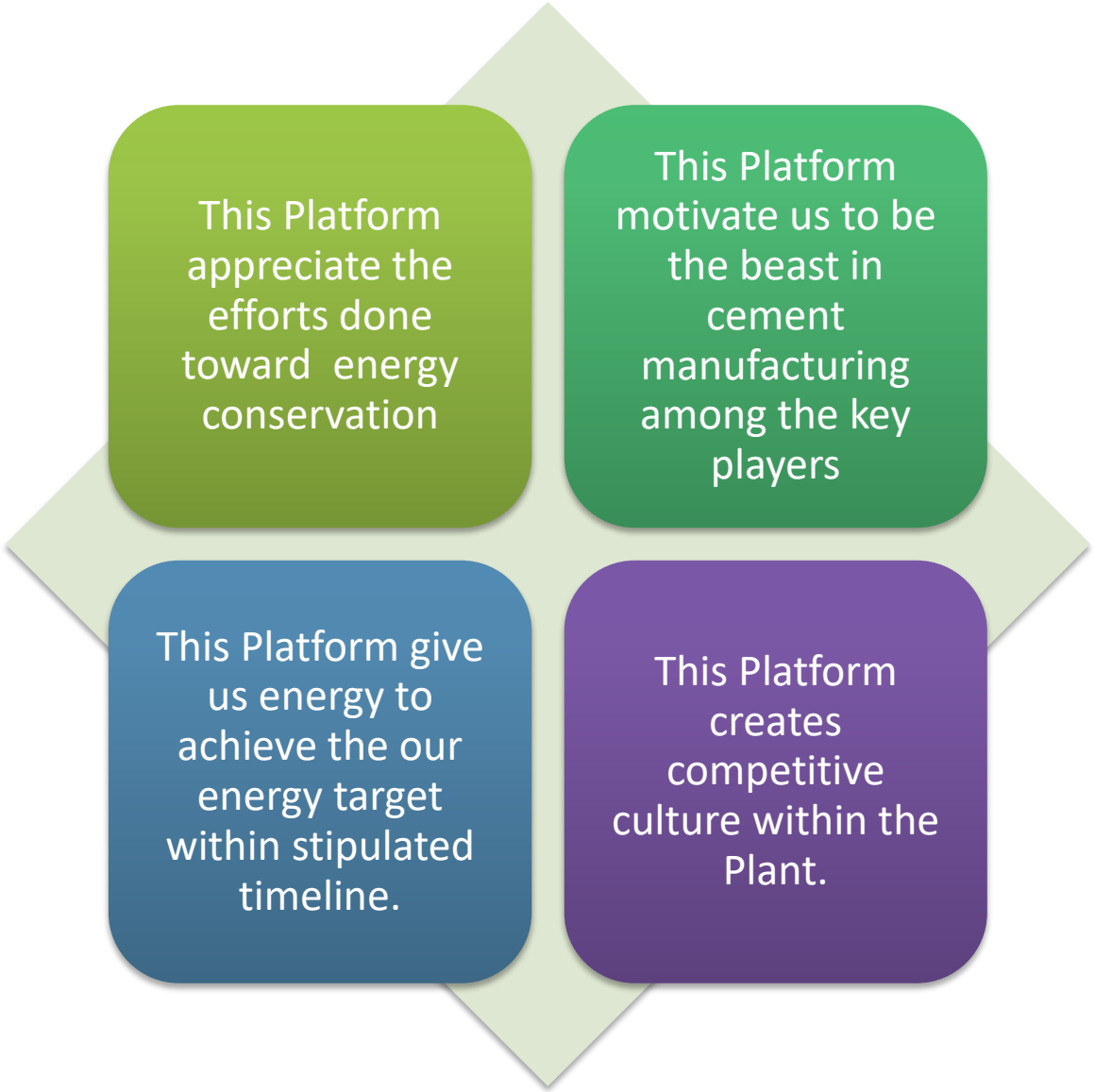
Tree Plantation



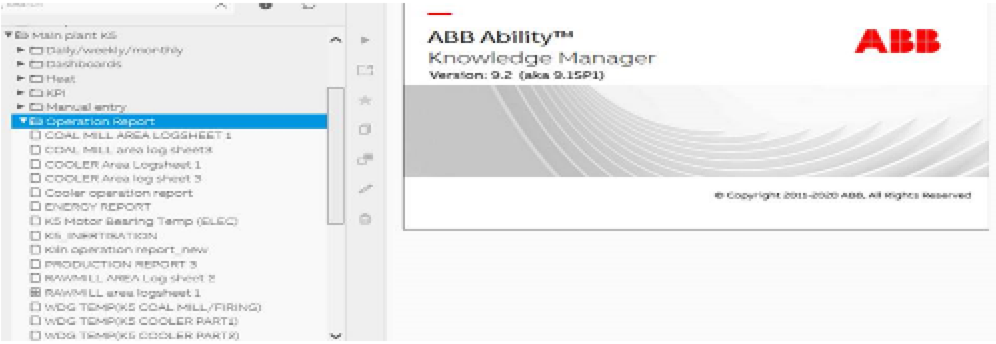
Up to FY 2020-21 survived Trees 38621 Nos.

Cumulative Survival rate = 79.895%

Learning from CII Award

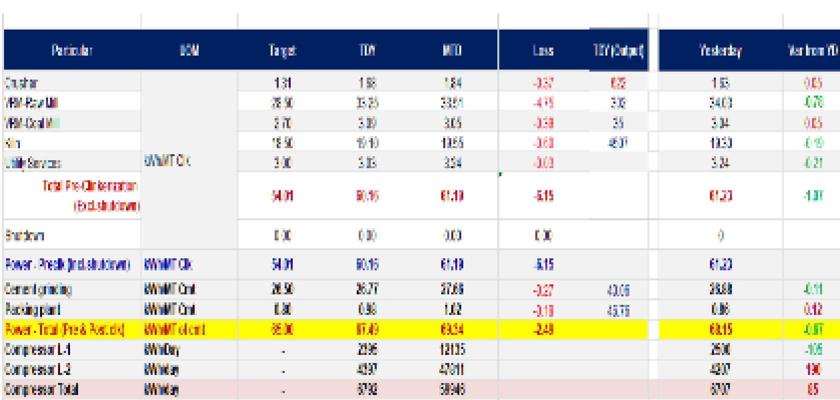


Team Work, Employee involvement & Monitoring



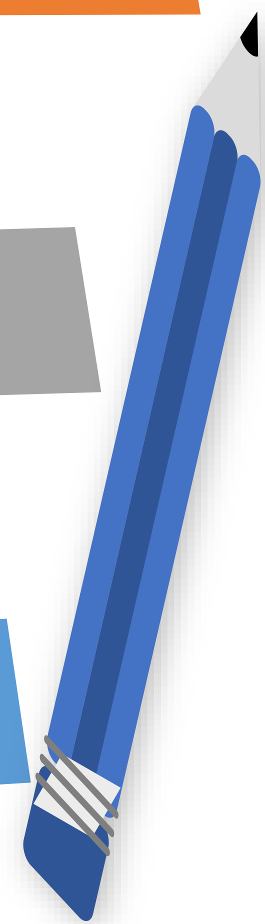
Online process parameter & Energy monitoring through KM

Energy Consumption (SPC & SHC) monitoring through CCR Desk

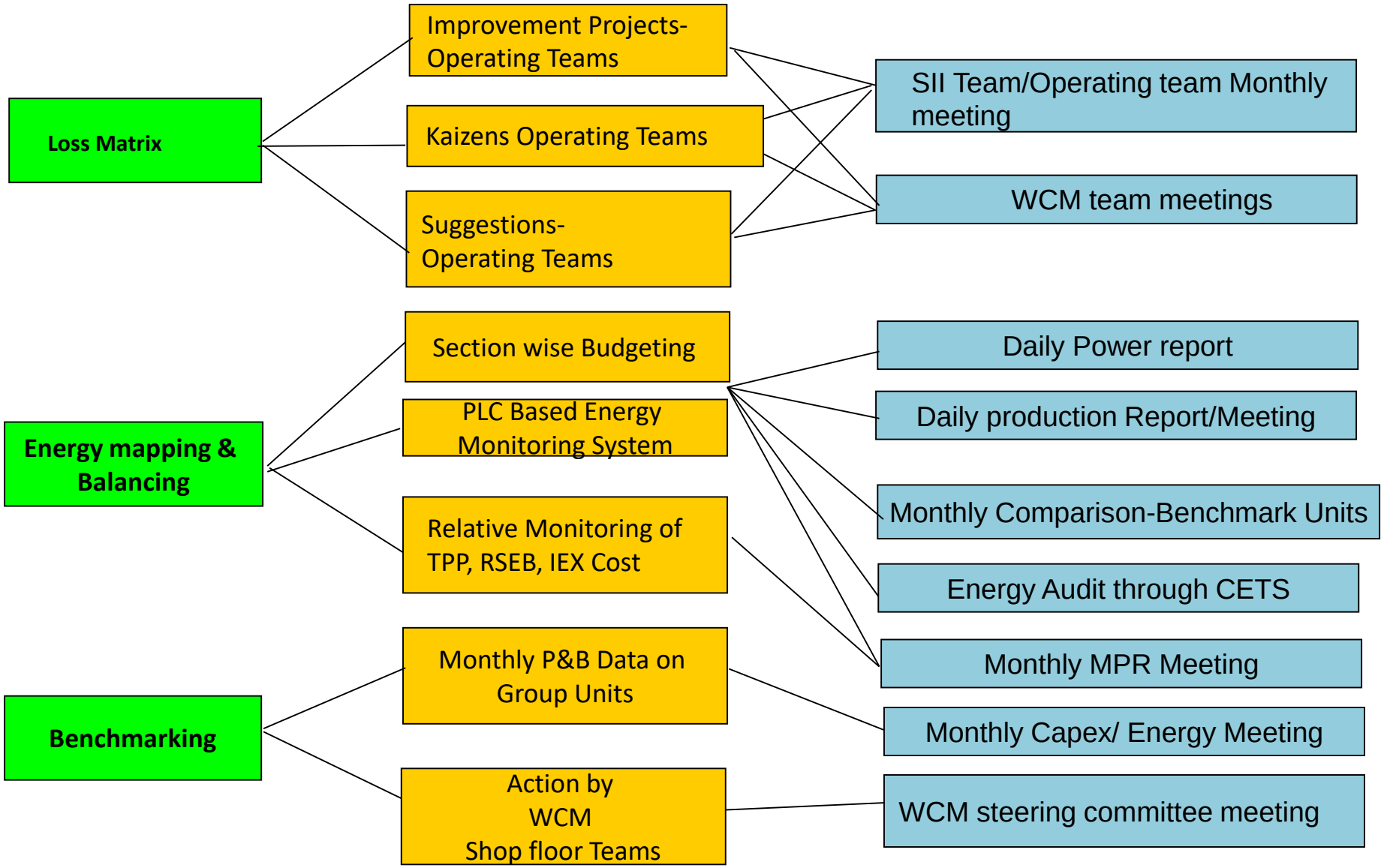


Particular	UOM	Target	TDY	MTD	Loss	TDY (Output)	Yesterday	Var from YD
Crusher		1.31	1.68	1.84	-0.37	0.72	1.63	0.05
VRM-Raw Mill		28.90	33.25	33.51	-4.15	3.00	34.03	-0.78
VRM-Coal Mill		2.70	3.09	3.05	-0.38	35	3.14	0.05
Kiln		18.50	19.10	19.55	-0.60	45.07	19.33	-0.19
Utility Services	kWh/MT Clk	3.00	3.03	3.24	-0.03		3.24	-0.21
Total Pre-Clinkerisation (Excl. shutdown)		54.01	60.16	61.10	-6.15		61.23	-1.07
Shutdown		0.00	0.00	0.00	0.00		0	
Power - Preclk (incl. shutdown)	kWh/MT Clk	54.01	60.16	61.19	-6.15		61.23	
Cement grinding	kWh/MT Cmt	26.90	26.77	27.66	-0.27	40.06	26.88	-0.11
Packing plant	kWh/MT Cmt	0.80	0.98	1.02	-0.18	45.75	0.96	0.12
Power - Total (Pre & Post clk)	kWh/MT of cmt	65.00	67.49	69.34	-2.49		68.15	-0.87
Compressor L-1	kWh/Day	-	2296	12135			2500	-105
Compressor L-2	kWh/day	-	4397	47011			4207	190
Compressor Total	kWh/day	-	6793	59146			6707	85

Daily Production Report and Power consumption Report.



Approach, Deployment & Review- Improvement Projects /Kaizen/Suggestions



Involvement of Employees and Recognitions

Mechanical Workshop

Power Plant

Wage board Employee Interaction

Mines Function

System Adopted

intertek
Total Quality. Assured.

CERTIFICATE OF REGISTRATION

This is to certify that the management system of:

UltraTech Cement Limited
(Unit: Dalla Cement Works)

Main Site: SH 5, Kota, Post Dalla,
Distt Sonebhadra-231207, Uttar Pradesh, India

has been registered by Intertek as conforming to the requirements of:

DIN EN ISO 50001:2018

The management system is applicable to:

Manufacture and marketing of clinker & cement at Dalla site including operation of lime stone mines as well as captive power plant.The EnMS covers all energy consumed by the company.

The EnMS covers all energy consumed by the company.

Certificate Number:
2020-0070550

Initial Certification Date:
20 December 2017

Date of Certification Decision:
20 May 2021

Issuing Date:
20 May 2021

Valid Until:
19 December 2022

DAkkS
Deutsche Akkreditierungsstelle
D-ZM-16055-01-00

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ISO 5001 : 2018

We are proud to achieve the certification without any major observations

National Energy Conservation Award 2017 (First Prize)

Dalla Cement Works awarded as “Excellent Energy Efficient Unit” under CPP Cat.

“21st National Energy Management Award Summit 2020”