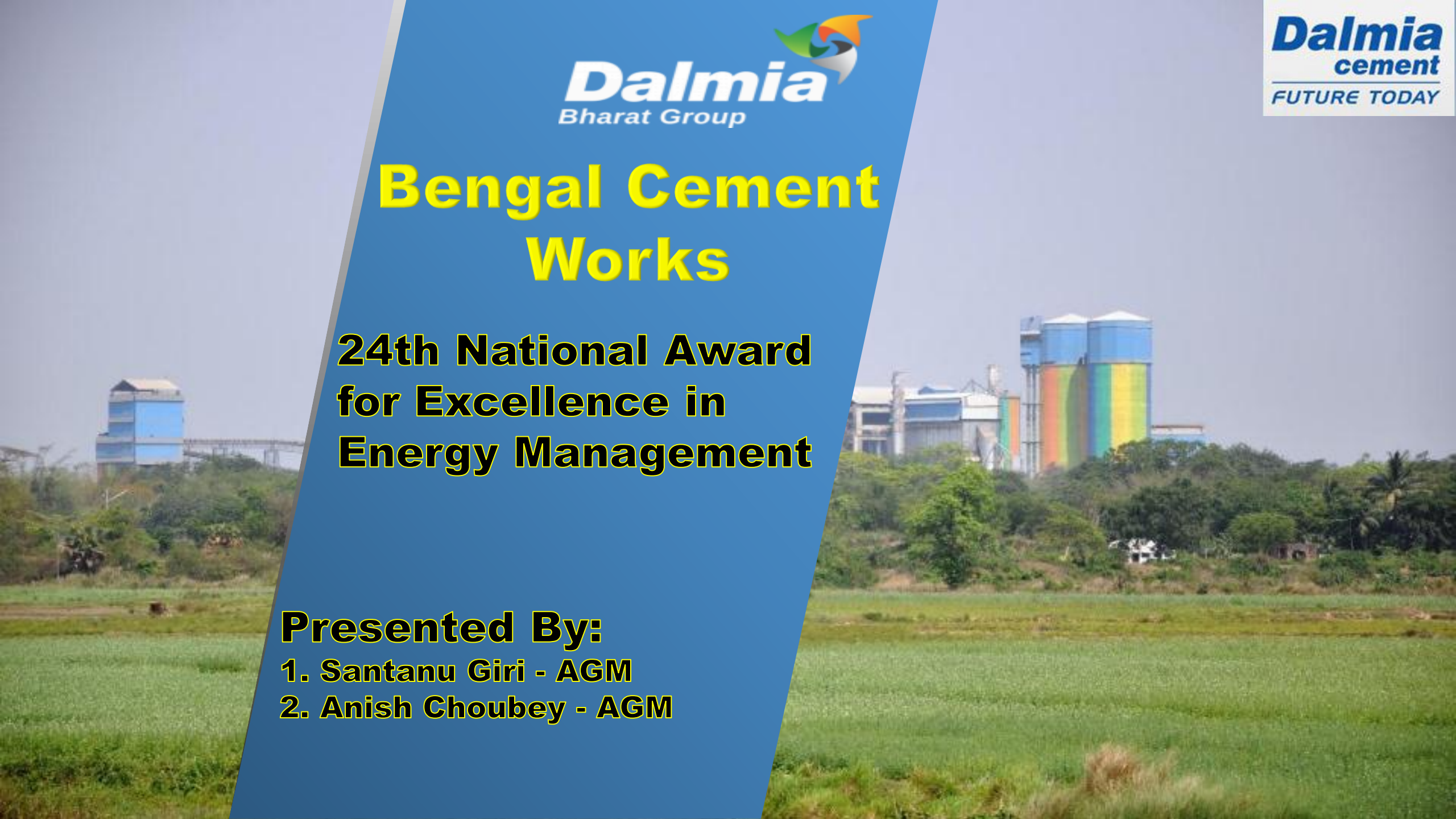


Dalmia Bharat Group

Bengal Cement Works

24th National Award for Excellence in Energy Management

Presented By:

1. Santanu Giri - AGM
2. Anish Choubey - AGM

Dalmia cement
FUTURE TODAY

1.Company Profile: Rich Heritage

The Group was established in 1939 and has a rich heritage of serving the country for more than 75 years

Cement

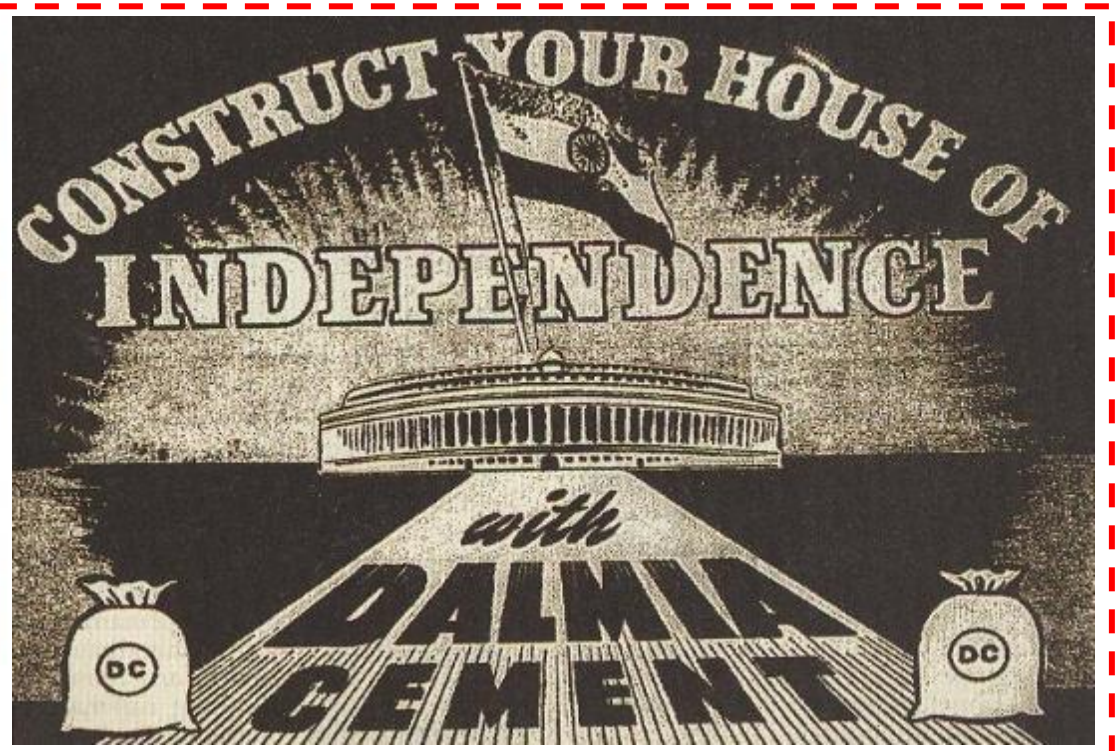
Sugar

Refractories

Power

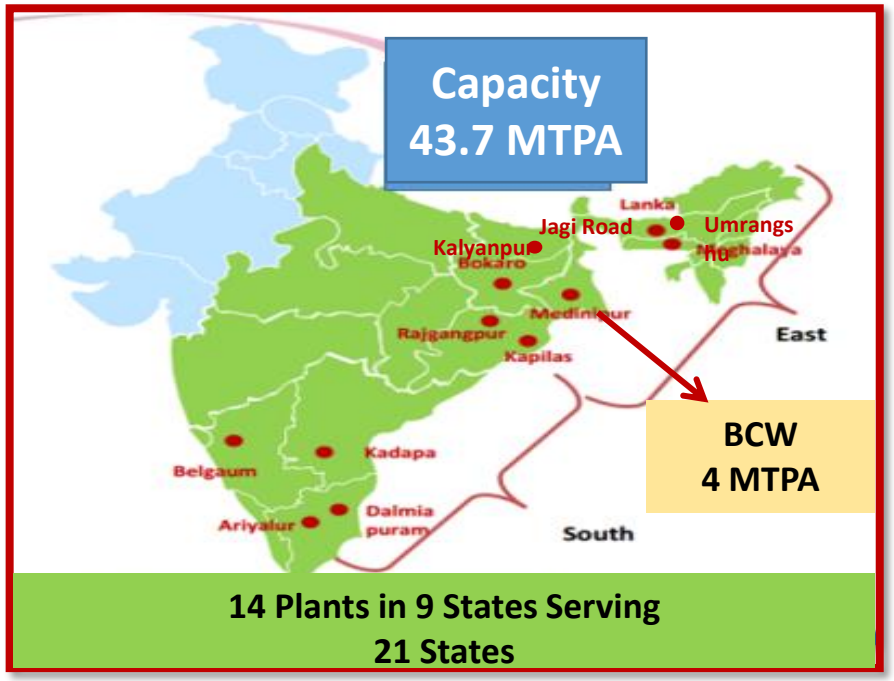
Dalmia advertisement on 15th August 1947

Re-published on 60th independence day by Times Of India



2

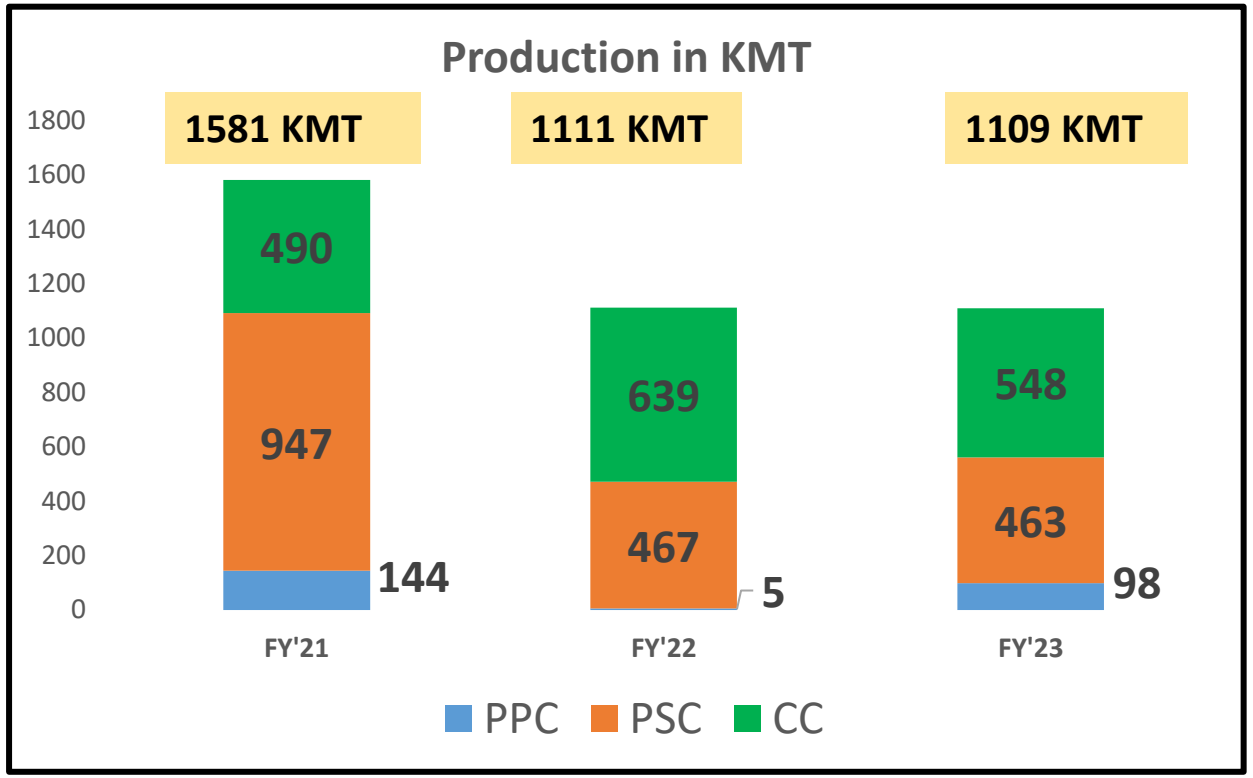
1.Company Profile In Brief



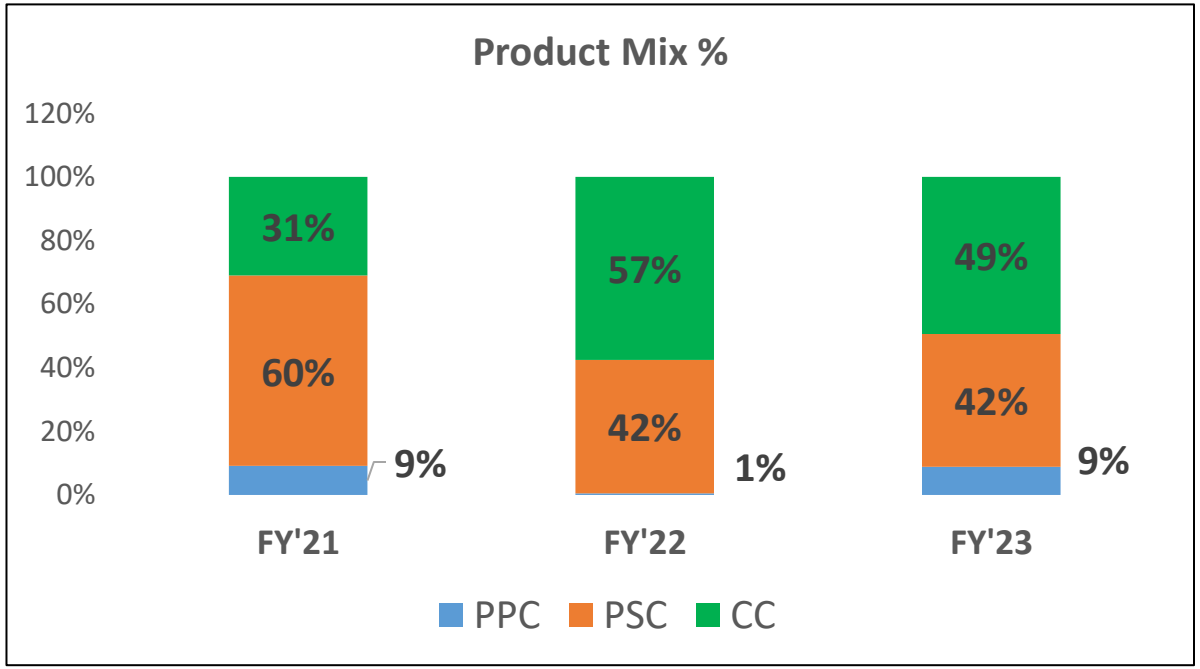
- ✓ *4th Largest Cement Manufcturer in India*
- ✓ *43.7 Mn Tons of Installed Cement capacity*
- ✓ *210 MW of Thermal Captive Power Plant*
- ✓ *100 MW Solar Captive Power Plant*
- ✓ *70.4 MW Waste Heat Recovery System*

- Bengal Cement Works,situated at West Midnapur district in West Bengal. Mill-1 was commissioned **on 27th March, 2014 is having capacity of 1.75 MTPA & Mill-2 was rump up stage 2.25 MTPA (Utilization only 39%)**
- Presently operating with **FLS OK MILL. Mill-1 OK 42.4 & Mill-2 OK 66.6**
- Manufacture **PSC, Composite & PPC** in inter- grinding mode.
- **Onsite Captive Solar PV Power Plant of 10.1 MWp (8.85MW)** capacity installed in Mar'2016 **5.5 MWp & 4.6 MWp** in Dec'2020
- Catering to the entire pockets of West Begal **with 95% road despatches & 5% through rakes.**

Journey : Production



- **Since Sept'2017, started manufacturing Composite cement - A sustainable carbon positive approach towards green cement production.**
- **Within 4 year of operation the product share of Composite cement increased from 6% to 50 %**
- **Replaced the highest clinker factored cement - PPC**



Major Highlights

- ✓ 8 % **reduction in CO2 emission over last year**
- ✓ 14.75% **reduction of packing plant Electrical Energy** in Last 3 years
- ✓ 5.3% **reduction of Electrical Energy** in Last 3 years
- ✓ 19 % of the **total power consumption substituted by Solar Power**

2021-22	2022-23
315.58 Kg CO2 per MT of Cement	289.42 Kg CO2 per MT of Cement

8%
Reduction Co2 emission
19%
Electrical energy substitute by solar

Energy Mapping

FY 2022-23

ELECTRICAL ENERGY

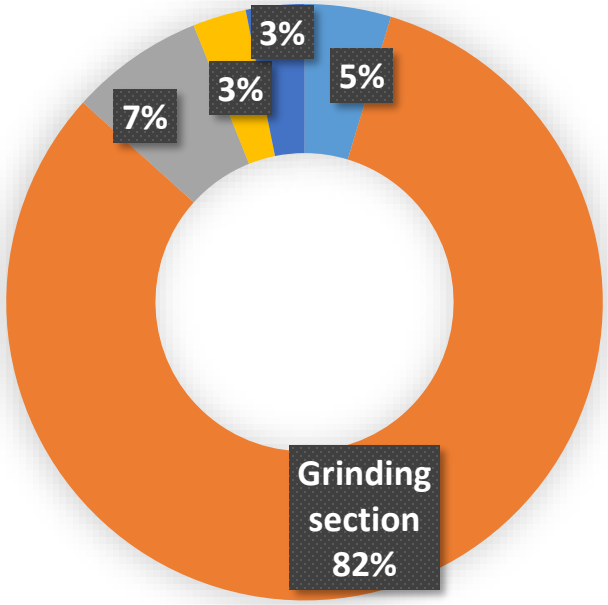
39.06 MKWH

FROM GRID

81 %

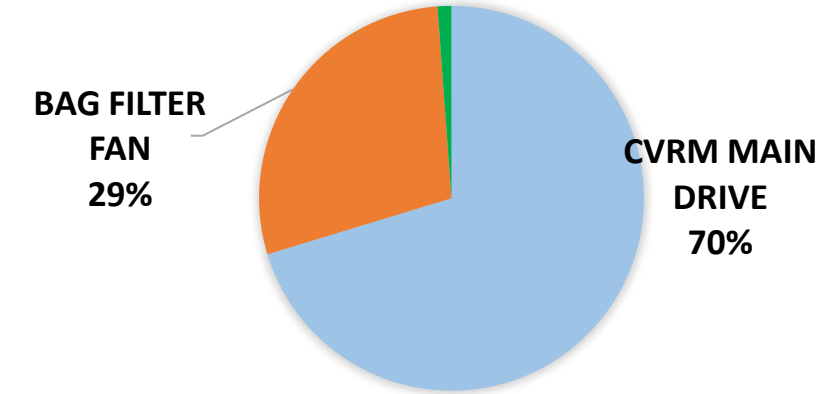
FROM 5 MW SOLAR POWER PLANT

19 %



- Raw material
- Main grinding drive
- Auxiliary
- Compressor
- Packing house

Classifier 1%



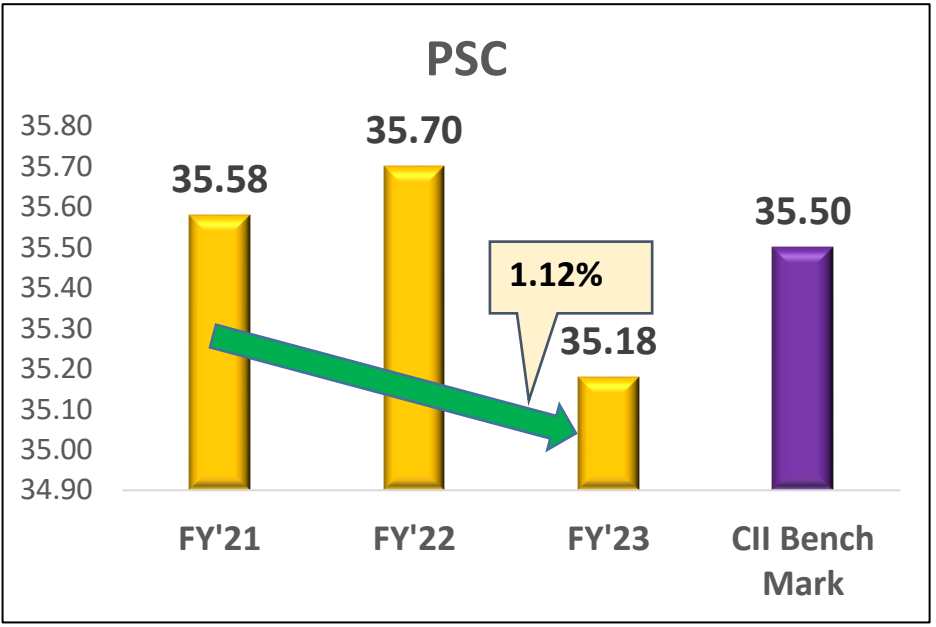
THERMAL ENERGY FROM COAL & F.OIL

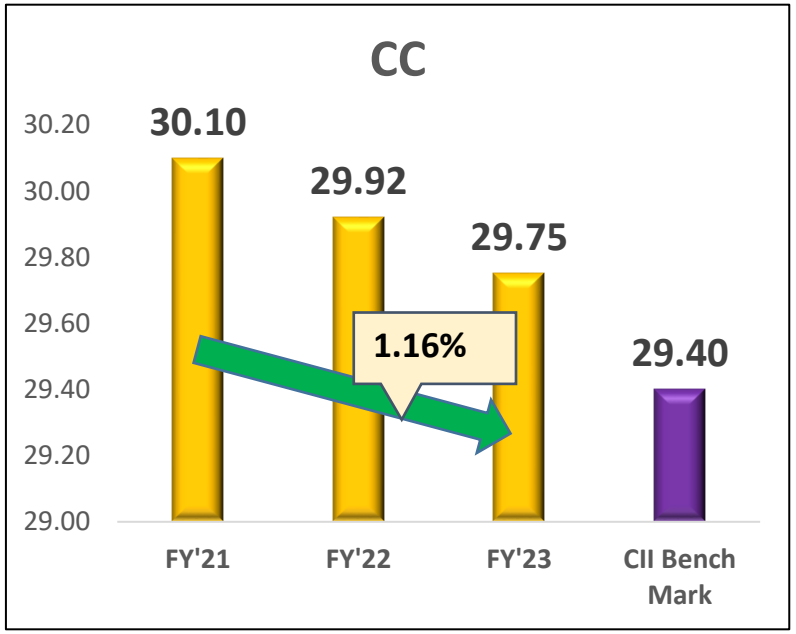
56406 MKCAL

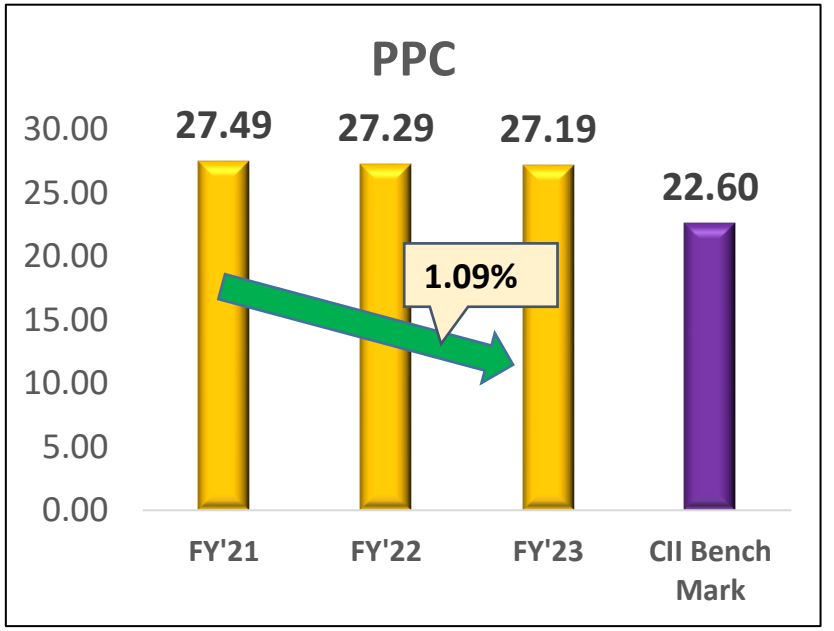
CVRM & COAL MILL

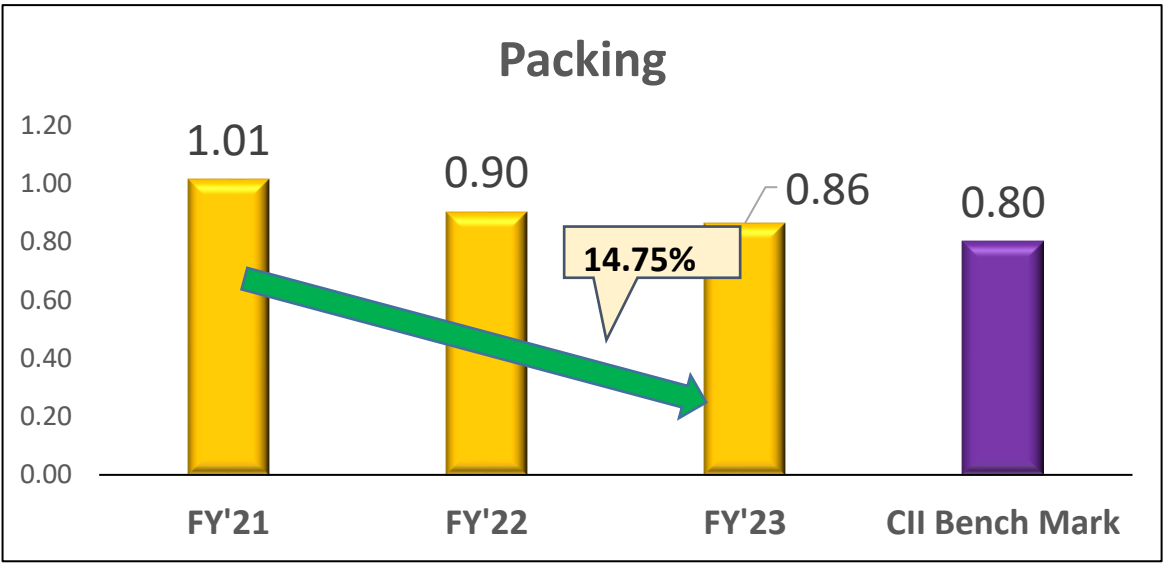
100 %

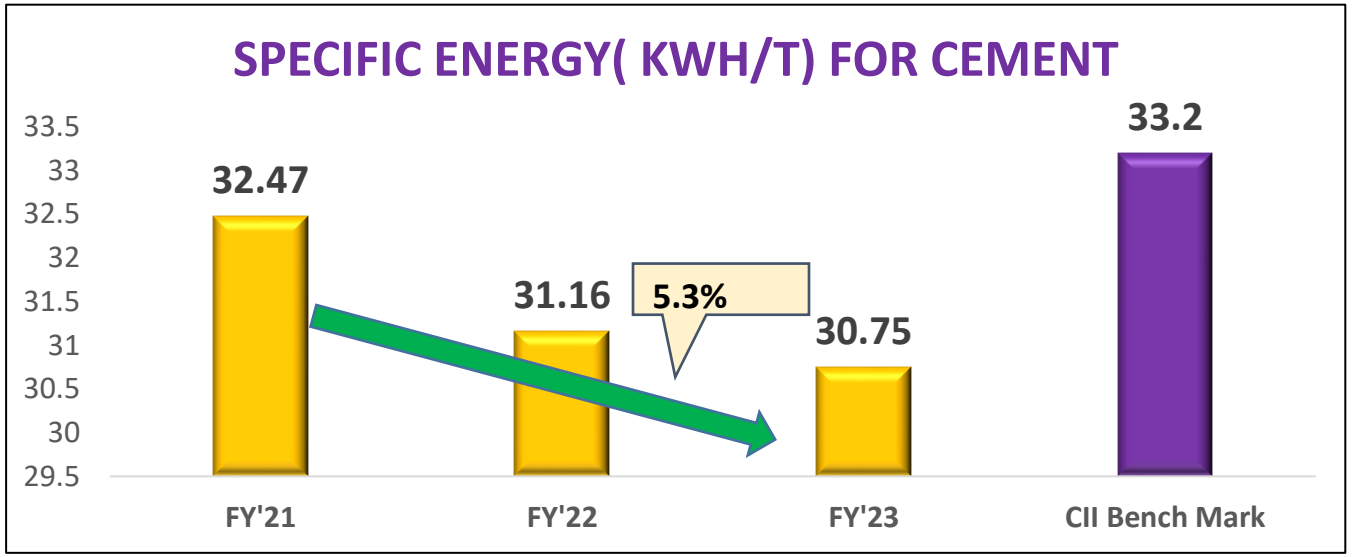
2. Benchmark: SEC Where We Are ..Where To Go...



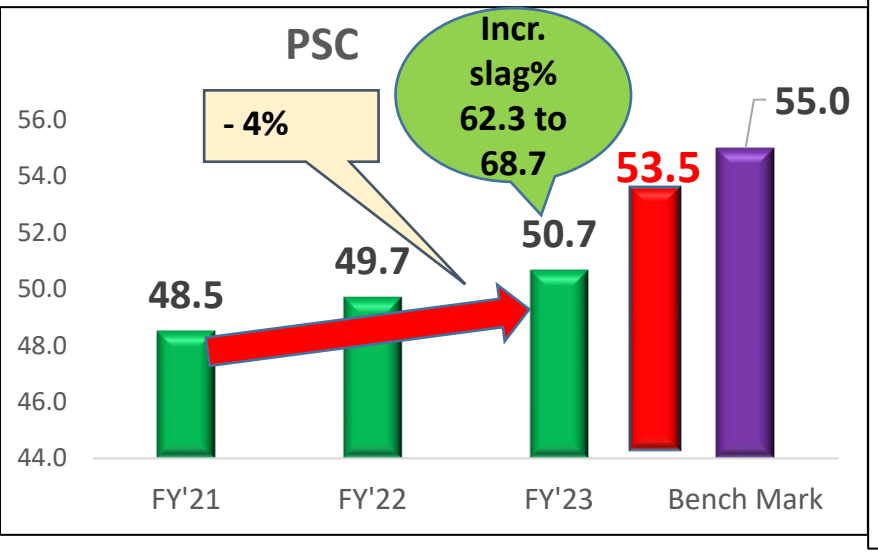


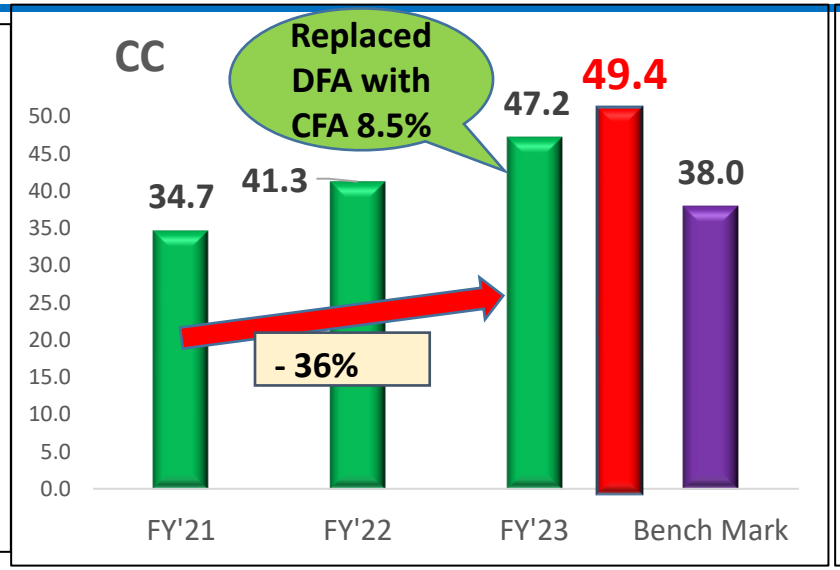


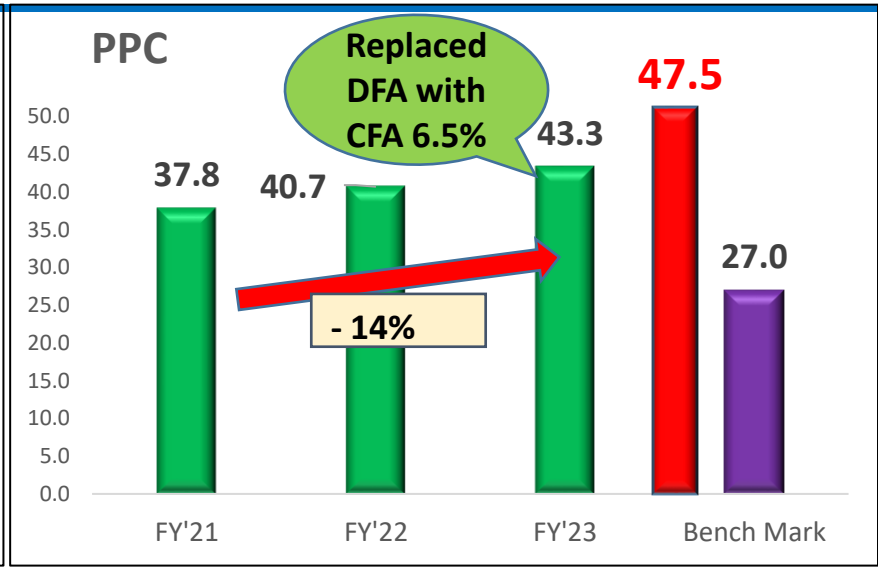


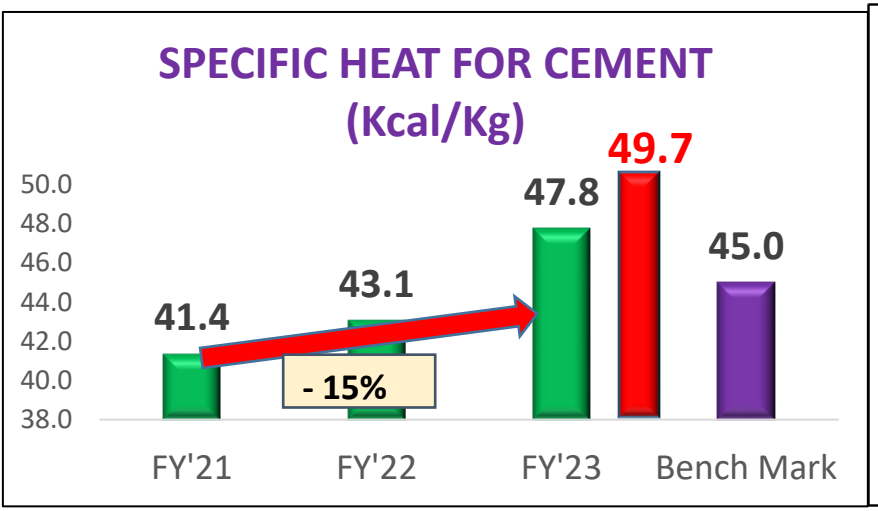


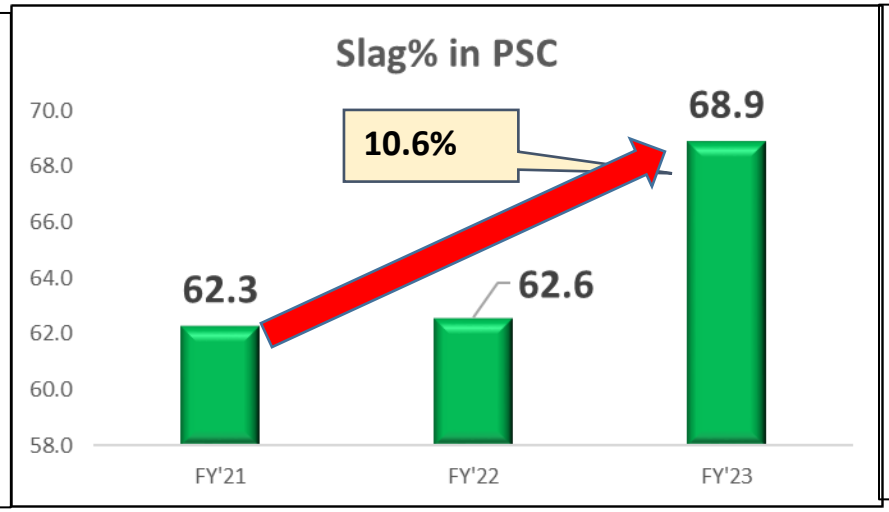
2. Benchmark: SHC Where We Are ..Where To Go...

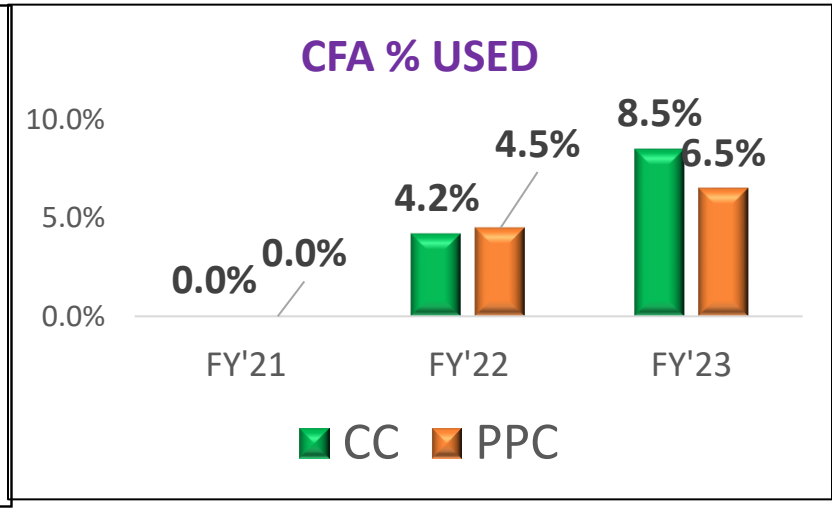






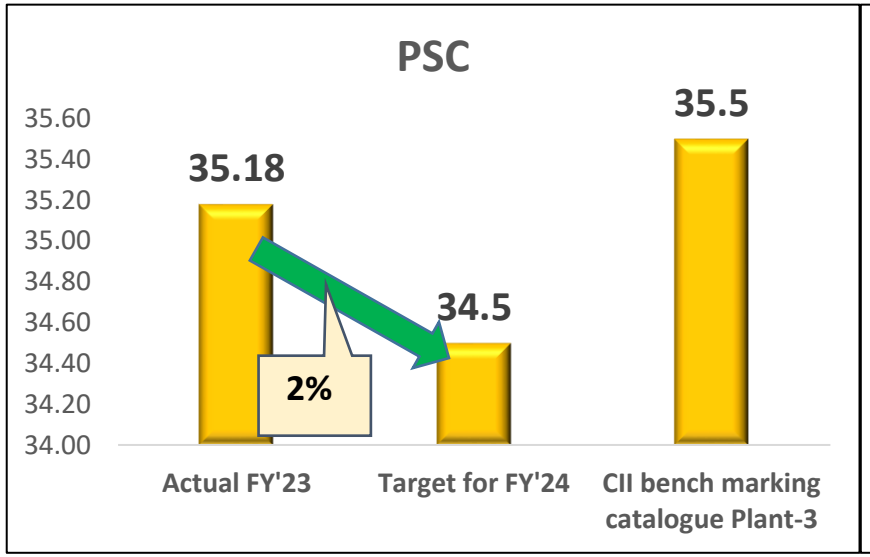


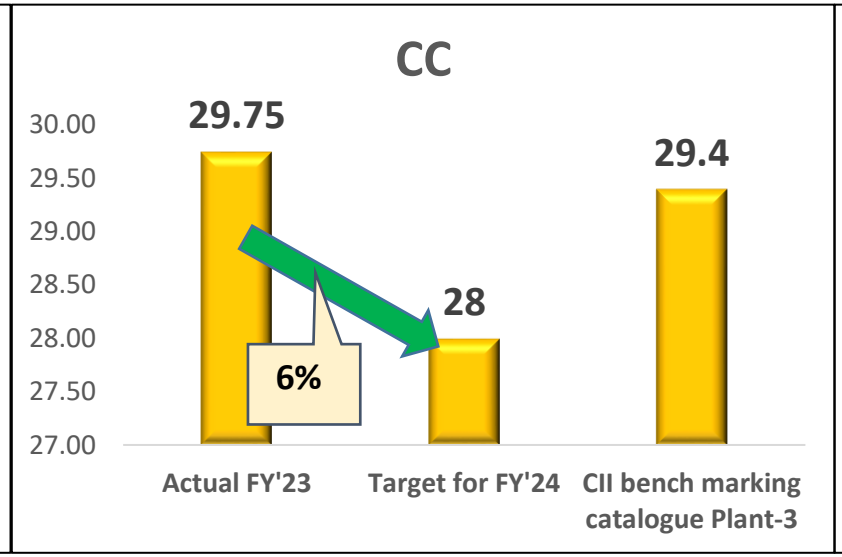


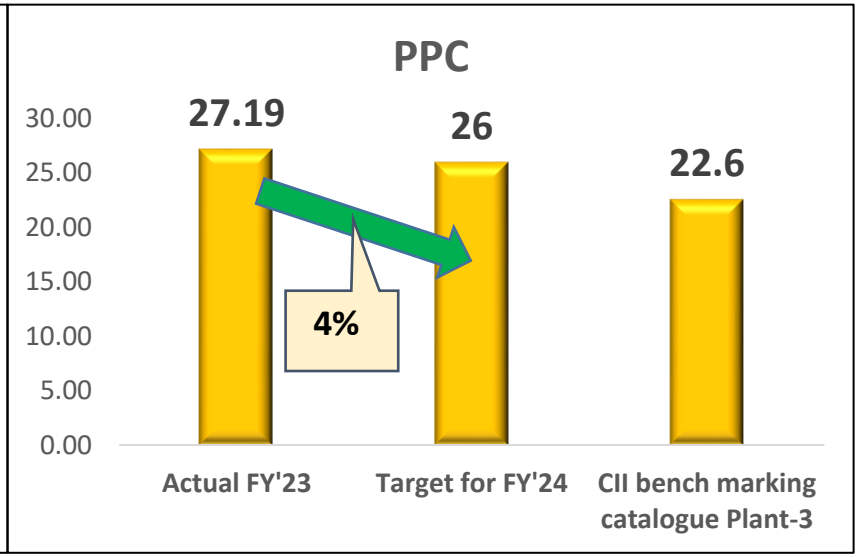


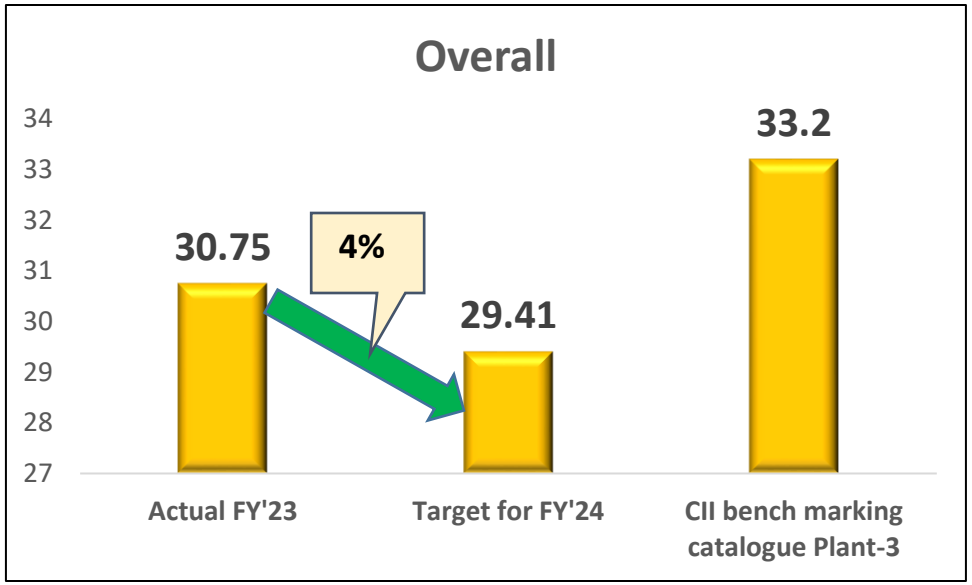
❖ **Moisture content in CFA varies from 18% – 20%. Usages Kcal/kg of 8.5% CFA increases 3% of total feed moisture which increases SHC by 14.7 Kcal/Kg of Cement & 6.5% CFA increases 9.7 Kcal/kg of cement**

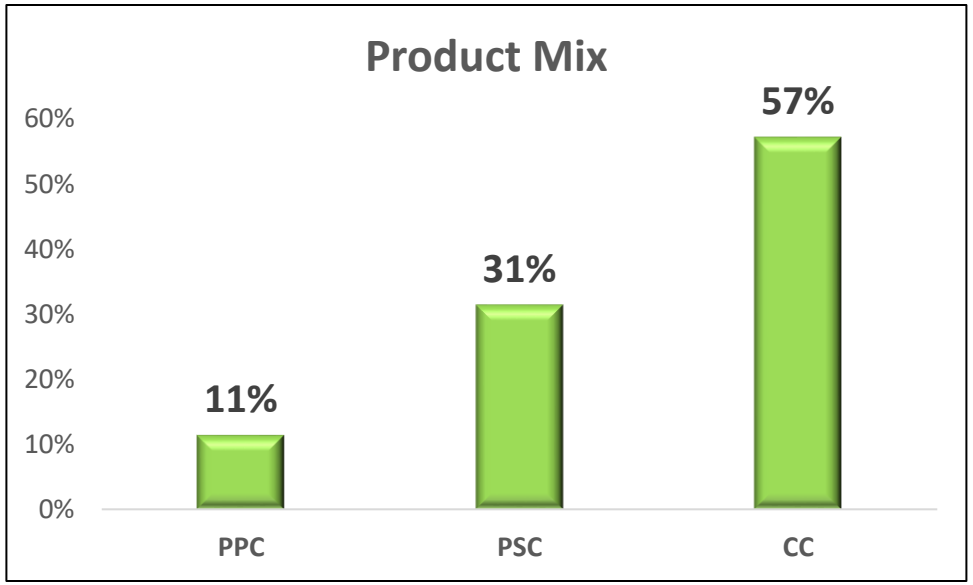
3. Bench marking & Target: SEC (KWH/T)











3. Encon Projects plan in FY'24

S/N	Year	Name of Energy saving projects	Investments (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Impact on SEC/ SHC (kWh /MT cement or Kcal/Kg cement)	Status
1	2023-24	Repalcement of two 593 CFM HP compressor with single reciprocating LP compressor of 1644 CFM	**4**	**0.3**		**2.4**	**0.17**	**WIP**
2	2023-24	Installation of new reclaimer in existing rail track to minimize idle running of feeding circuit	**50**	**0.4**		**2.9**	**0.2**	**WIP**
3	2023-24	Dam ring height optimization from 160 mm to 155 mm	**0**	**2.98**		**2.40**	**1.7**	**Completed**
4	2023-24	Increase grinding pressure from 145 to 150 Bar						
5	2023-24	All aux. bag filter to be run on DP mode and Fan speed reduction						
6	2023-24	Maintaining false air below 12% in Mill circuit by arresting leakages						
7	2023-24	To avoid Idle running of clinker extraction belt, installation of starvation switch						
8	2023-24	111 meter long hot air duct insulation to reduce heat loss	**2.6**		**8838**	**17.7**	**5.1**	**Completed**
Total			**56.60**	**3.64**	**8838.00**	**25.42**	**2.07 Kwh/MT, 5.1 Kcal/Kg**	

4. 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 2020-21	7	2.2	1.92	0	15.39	1.1 Kwh/MT
FY 2021-22	4	0.05	0.15	0	1.22	0.09 Kwh/MT
FY 2022-23	8	6.4	1.79	2850	20.04	0.92 Kwh/MT, 8 Kcal/Kg
FY 2023-24	8	56.6	3.64	8838	25.42	2.07 Kwh/MT, 5.1 Kcal/Kg
Total	27	65.25	7.5	11688	62.07	4.18 Kwh/MT, 13.1 Kcal/Kg

4. Energy Saving projects implemented in FY'23

S/N	Year	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 cement or Kcal/Kg cement)
1	2022-23	Installation of 3.7KW/5 HP Compressor for CVRM roller & table rebuilding	**0.7**	**0.04**		**0.4**	**0.03**
2	2022-23	Replacement of Inefficient Fine Coal Blower 110 kW withTurbo Blower 75 kW	**1.5**	**0.13**		**1.1**	**0.08**
3	2022-23	Nozzle ring area enhancement to reduce ID fan power consumption	**2.6**	**1.00**		**8.0**	**0.57**
4	2022-23	Combined operation of line 1 & line 2 with 160 KW & 90 KW VFD based in series by interconnecting the pipelines.	**0.35**	**0.29**		**2.3**	**0.17**
5	2022-23	Reduction in Packing Power Consumption Run both the silo bin with single root blower 45KW	**0**	**0.33**		**2.6**	**0.19**
6	2022-23	optimization of inefficiency in capacity utilization of FBC (Total capacity is 50 Mkcal and required 25)	**0.5**		**1450**	**2.9**	**4.0**
7	2022-23	Installation and fine tuning of Expert Optimizer Loop to minimize SHC.	**0.75**		**350**	**0.70**	**1.0**
8	2022-23	Green fuel usage upto 5% in HAG.	**0**		**1050**	**2.10**	**3.00**
Total			**6.4**	**1.79**	**2850**	**20.04**	**0.92 Kwh/MT, 8 Kcal/Kg**

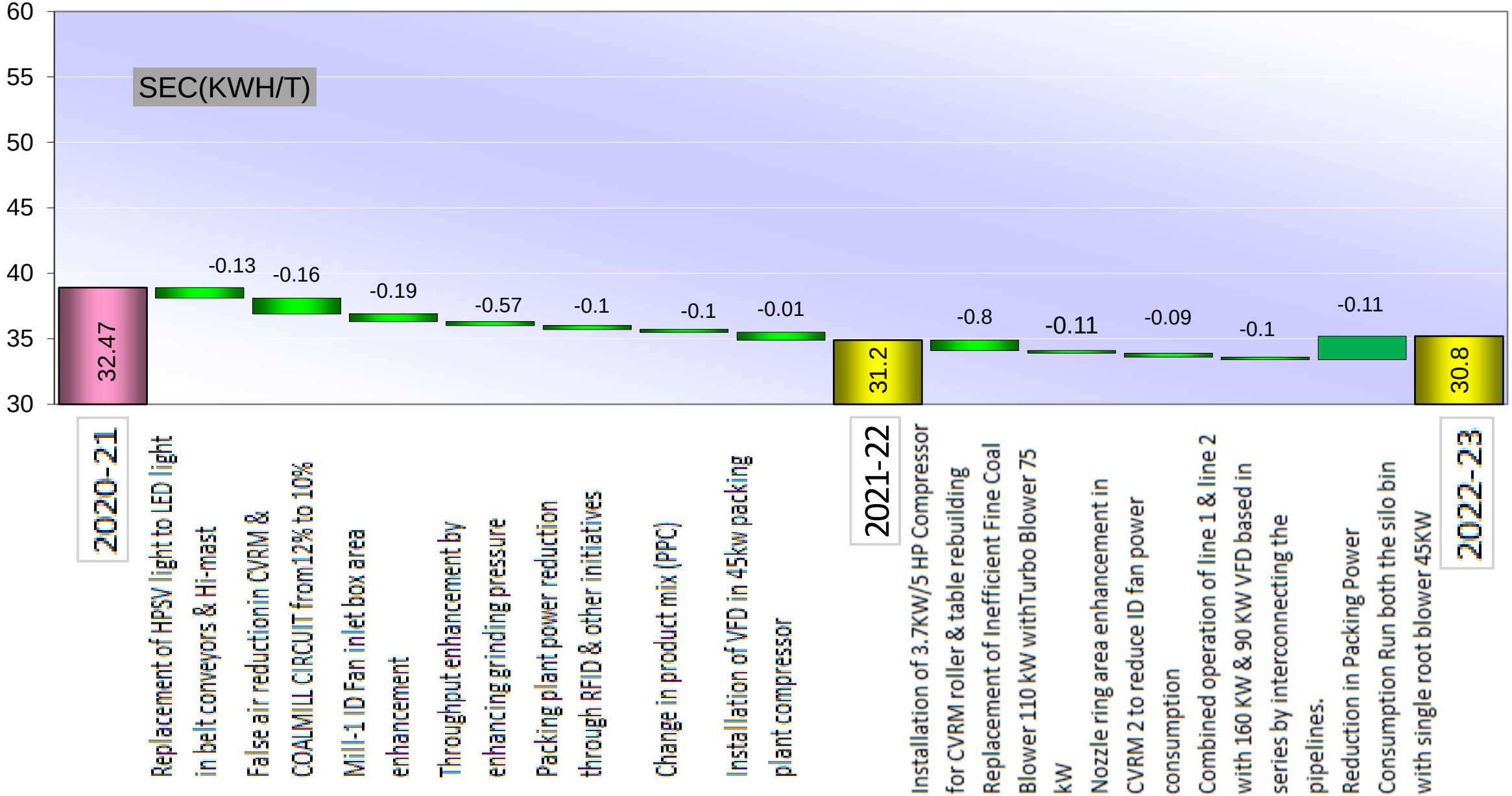
4. Energy Saving projects implemented in FY'22

S/N	Year	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 cement or Kcal/Kg cement)
1	2021-22	All auxillary bag filter purging air pressure to be set from 6kg/cm2 to 4.5 kg/cm2(12Nos)	**0**	**0.04**		**0.3**	**0.02**
2	2021-22	Interlocking of Cement Silo top bag filter fan operating RPM with silo feeding time	**0**	**0.04**		**0.3**	**0.02**
3	2021-22	Interlocking of wagon tippler fan operational speed with apron conveyor load to avoid idle running	**0**	**0.03**		**0.3**	**0.02**
4	2021-22	Installation of starvation switch in belt conveyors to minimize idle running (7 nos)	**0.05**	**0.05**		**0.4**	**0.03**
Total			**0.05**	**0.15**	**0.00**	**1.22**	**0.09**

4. Energy Saving projects implemented in FY'21

S/N	Year	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 cement or Kcal/Kg cement)
1	2020-21	Replacement of HPSV light to LED light in belt conveyors & Hi-mast	**0.50**	**0.20**		**1.60**	**0.11**
2	2021-22	False air reductionin CVRM & COALMILL CIRCUIT from12% to 10%	**0.05**	**0.26**		**2.08**	**0.15**
3	2021-22	Mill-1 ID Fan inlet box area enhancement	**0.25**	**0.29**		**2.34**	**0.17**
4	2021-22	Throughput enhancement by enhancing grinding pressure 140 to 145 bar	**0.00**	**0.90**		**7.20**	**0.51**
5	2021-22	Packing plant power reduction through RFID & other initiatives	**0.50**	**0.17**		**1.32**	**0.09**
6	2021-22	Change in product mix (PPC)	**0.00**	**0.09**		**0.72**	**0.05**
7	2021-22	Installation of VFD in 45kw packing plant compressor	**0.90**	**0.02**		**0.13**	**0.01**
Total			**2.20**	**1.92**	**0.00**	**15.39**	**1.10**

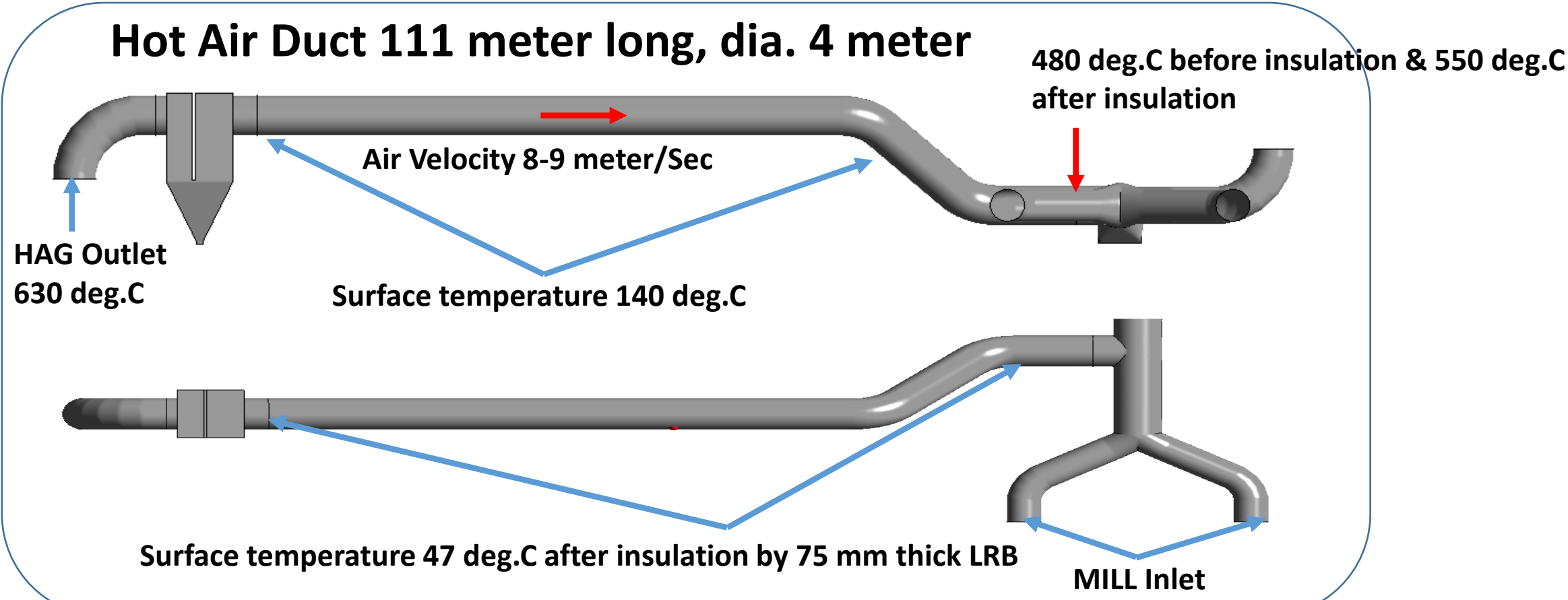
4. Journey : SEC (KWH/T)



5. Innovative project-1: Insulation in HAG hot air duct

❖ **HAG outlet duct LRB based insulation to reduce Sp. Heat consumption**

- MILL required hot air supplied by HAG which in having 111-meter-long outlet duct with 4-meter diameter
- 114 mm thick firebrick was installed inside the entire duct to reduce heat loss
- Even though the surface temperature of the duct & settling chamber area is 140 deg.C



5. Innovative project-1: Insulation in HAG hot air duct

❖ **HAG outlet duct LRB based insulation to reduce Sp. Heat consumption**

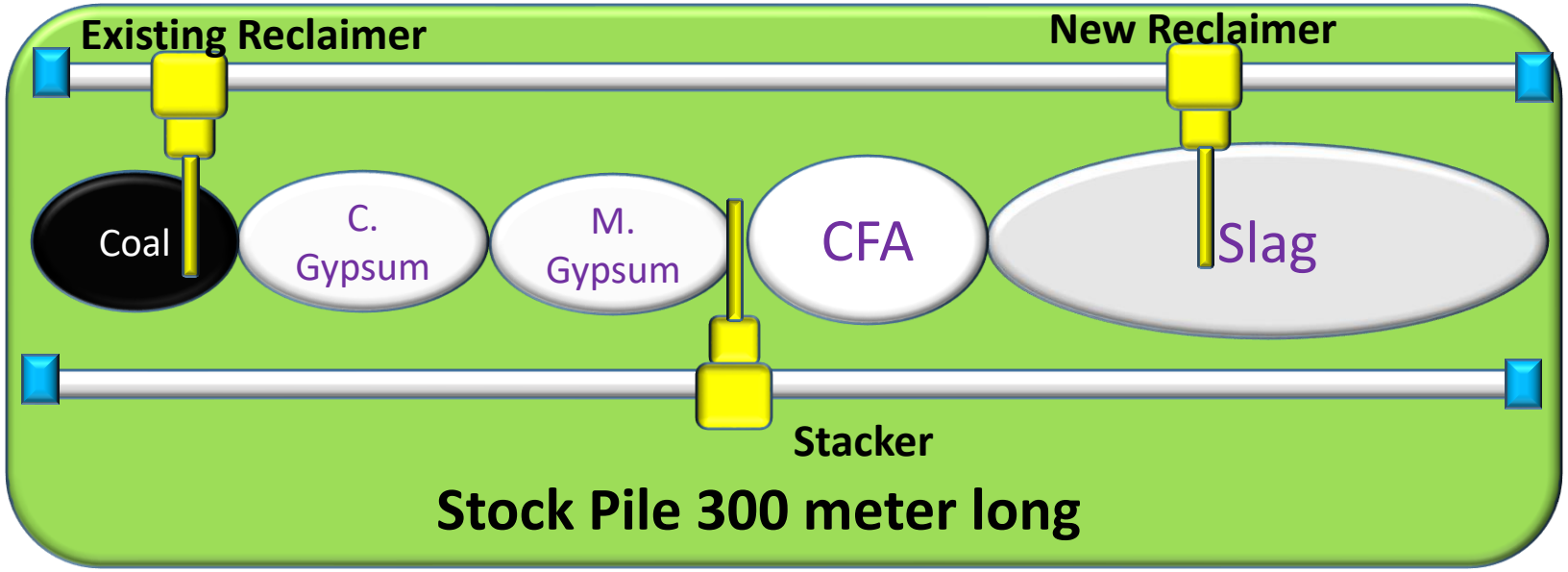
- By reducing surface temperature from 140 deg.C to 47 deg.C. **Estimated saving was 5.1 Kcal/kg of cement but in actual we have saved 10.3 Kcal/Kg of cement**
- **Actual yearly saving Rs. 404 lakhs against estimated 177 lakhs.**

SN	Particulars	UOM	Qty.
1	Length of pipe, L	m	111.2
2	Bare Pipe outer diameter, d1	mm	4000
3	Bare pipe surface area, A	m2	1397
4	Ambient temperature, Ta	°C	30
5	Bare Pipe Wall Temperature, Th	°C	**140**
6	Desired Wall Temperature with insultation, Tc	°C	**47**
7	Total Losses From Bare Surface, Q = hxAx(Th -Ta)	Mkcal/hr	**1.85**
8	Total Loss From Insulated Surface, Q' = h' x A' x (Tc-Ta)	Mkcal/hr	**0.08**
9	Power Saved by Providing Insulation, P= Q-Q'	Mkcal/hr	**1.768**
10	Annual Working Hours, n	hrs	5000
11	Energy Saving After Providing Insulation, E = P x n	Mkcal	**8838**
12	Heat Energy Cost, p	Rs/Mnk Cal	**2000**
13	Annual Monetary Saving, S=E x p	RsLac	177

5. Innovative project-2: Installation of new Reclaimer in existing rail

Dalmia cement FUTURE TODAY

- Installation of one additional side scraper reclaimer in existing rail track to feed 5 different type of raw material to both the mill
  - Reclaimer operation time for feeding the material is 15.5 Hrs./Day & Pile change over time is 8.5 Hrs/Day. **Means effective utilization of existing reclaimer is only 65% & we are loosing 35% time of reclaimer for pile change over.**
  - As per existing reclaimer availability hours (15.5 Hrs, 65%) for operation**, can feed 7000 MT of material & by installing new reclaimer we can feed 8365 MT of raw material.**
  - **Yearly saving Rs. 15 lakhs**

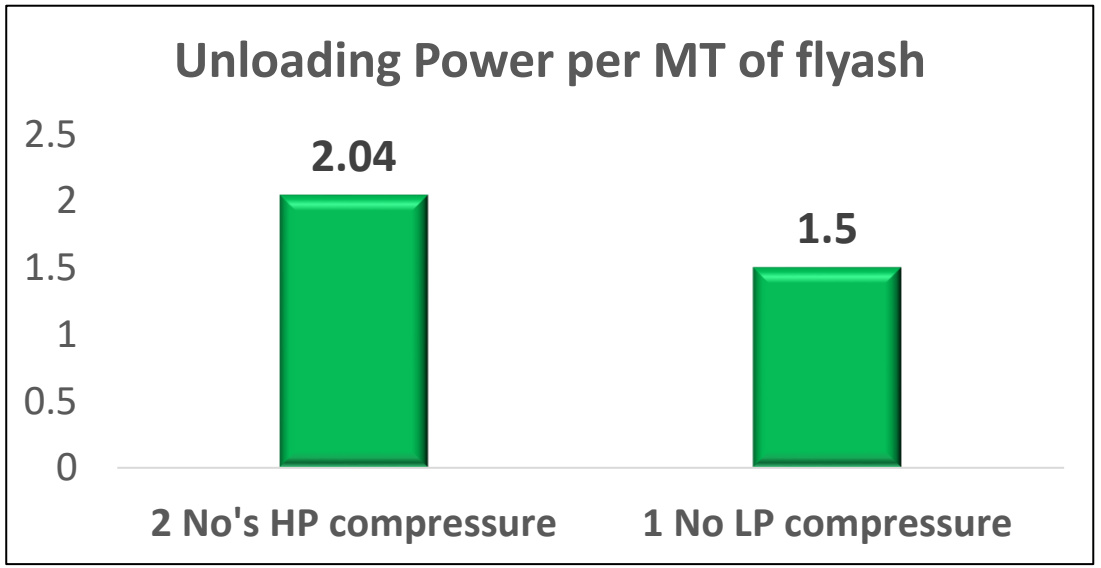


Description	UOM	Value
Reclaimer Circuit No of Drives	NOS	10
Total Drive KW	KW	450
Total Running KW	KW	405
Daily Running hours	HRS	23
Idle running hours	HRS	8
Idle power per day	Kwh	3260
Daily production in both the mill	MT	12500
Losses due to idle running @80%	**Kwh/MT**	**0.2**

5. Innovative project-3: Installation of LP compressor

❖ **Installation of low pressure high volume compressor in place of high pressure low volume compressor for flyash unloading.**

- HP Compressor for flyash unloading was 593 CFA & motor power 90KW. Total 2 no's compressor was there for simultaneous unloading of 2 bulker. Total CFA- 1186 & KW-180.
- In place of 2 HP compressor installed single Low pressure compressor of CFM-1644 & motor power 132 KW.
- Saving of 0.54 Kwh/MT of flyash
- Yearly saving of 13 lakhs



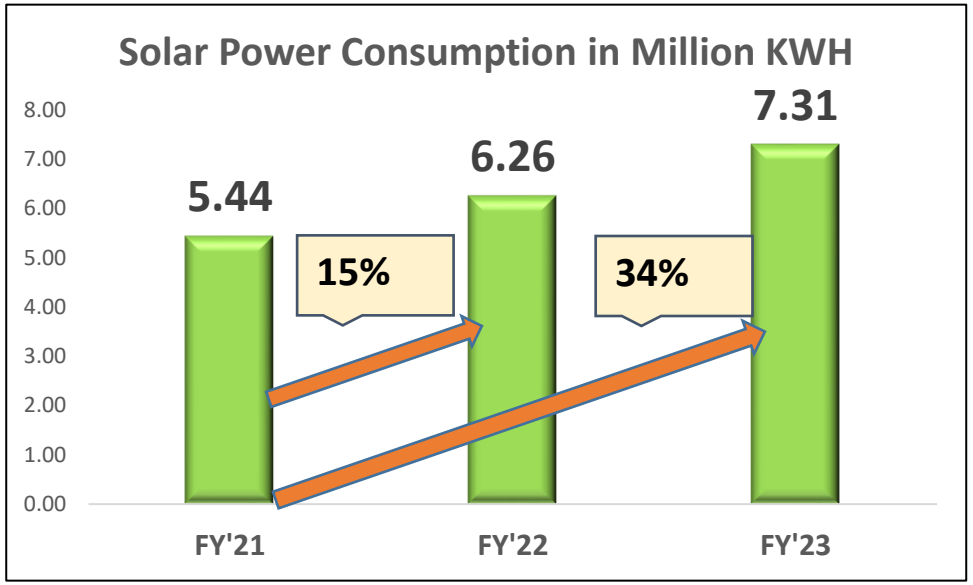
S.No	Description	Units	Values
1	Existing compressor capacity	CFM	593
2	No of compressor	NO	2
3	Motor rating of existing compressor	KW	90
4	Total motor rating for both the compressor (90KW *2)	KW	180
5	Compressor running load @ 85% of Full load	KW	153
6	Flyash unloaded / Hour with two point	TPH	75
7	Unloading power /T flyash with two point	KWH/T	2.04
8	New low pressure compressor capacity	CFM	1644
9	Flyash unloaded / Hour with two point	TPH	75
10	One new low pressure compressor motor rating	KW	132
11	New Compressor running load @ 85% of Full load	KW	112
12	Unloading power /T flyash with two point with new compressor	KWH/T	1.50
13	KW/T difference	KWH/T	0.54
14	**Cost Savings**	**Lakhs**	**13**

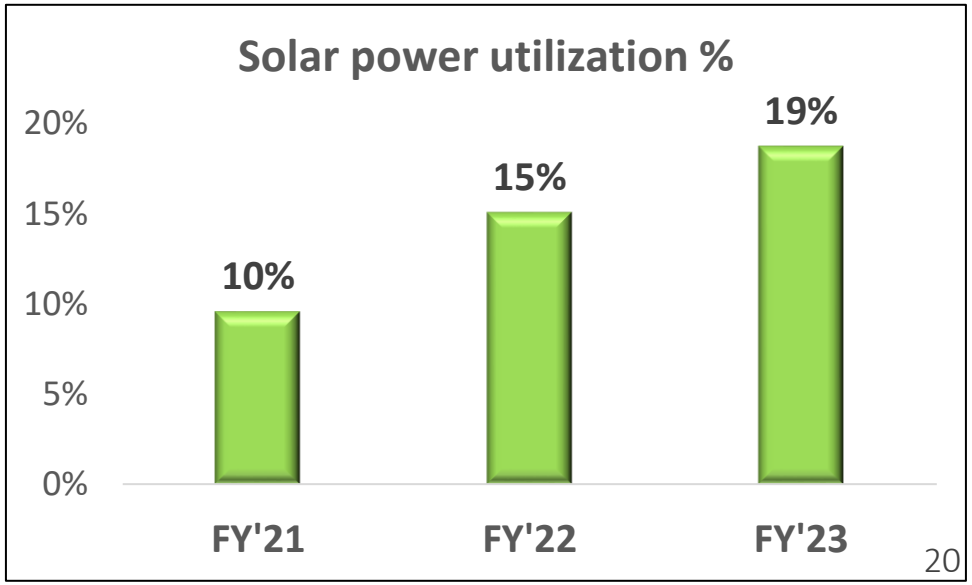
6: Utilization of Renewable Energy sources

5 MW in March'16 & 3.85 MW in Dec'20 ONSITE solar Power Plant was commissioned on to utilize renewable energy & reduction of CO_2 emission.

Initiatives Taken To Increase Generation

- ✓ **Tilting solar module two times in a year with trials at different angle on every season.**
- ✓ ***DCBL In-house developed Robotic cleaning equipment installed for fast and effective cleaning of module***
- ✓ ***Cleaning entire solar modules in 8 cycles in a months for summer and winter season instead of 2 Cycles suggested by OEM.***
- ✓ ***Regularly checking VOC of solar modules on every month*** *and replacing faulty modules.*
- ✓ *Condition monitoring of transformer, HT and LT switch gear and all the repairs or rectification done in the evening hrs. with out effecting plant performance . Thus 100% up-keep achieved in last year.*
- ✓ ***Cleaning and replacing air filters of Inverter as regular interval*** *and also arrangement done for better cooling . Thus increased efficiency of inverters.*





6. Renewable Energy Initiatives :

SN	Initiatives for Renewable Energy FY 23	Investment in MINR	Savings in MINR
1	Installation of Solar street light along Railway track area & solar plant (total 40 nos) – completed	1.5	0.1
2	solar water heater at guest house - Completed	0.5	0.4
3	Additional Ground mounted 4 MW Solar Power Plant installation- Under Approval from SLT	180	50
	Total	**256.8**	**50.5**

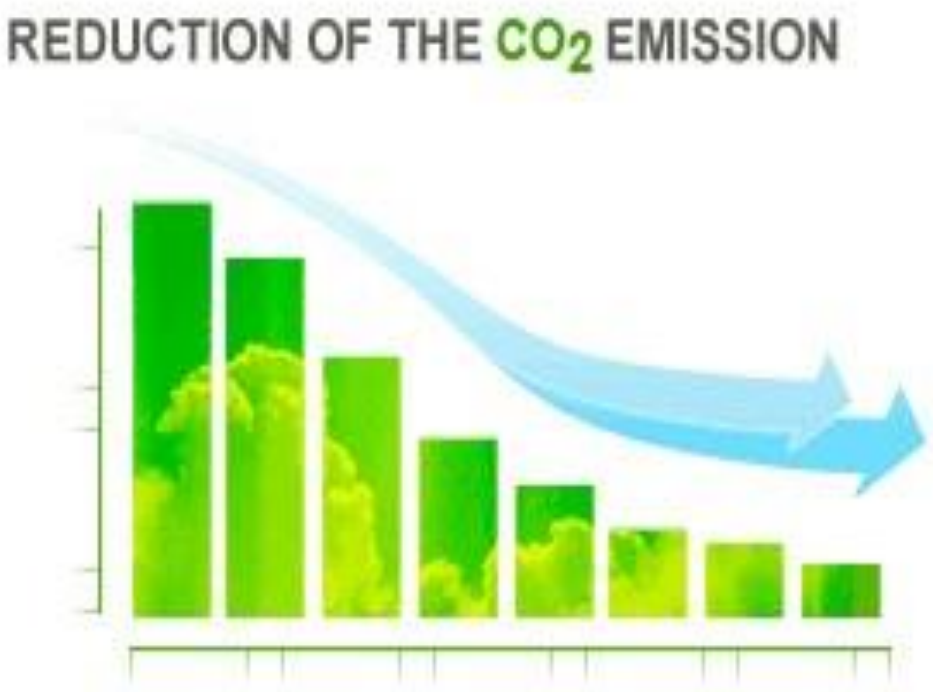
❑ By the end of FY24 our total renewable energy source will be 12.85 MW.

Promotion of solar lamp in community Fy 2021-22: 500 families,

FY 2022-23 for 700 families.

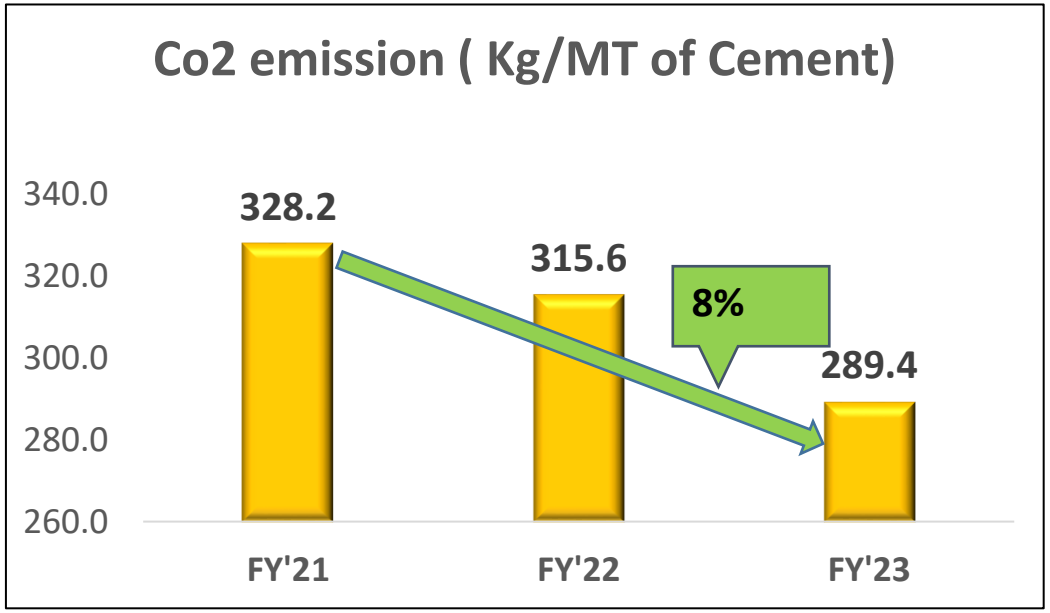
Promotion of solar street light in community Fy 2022-23 : total 40 nos

GHG INVENTORIZATION

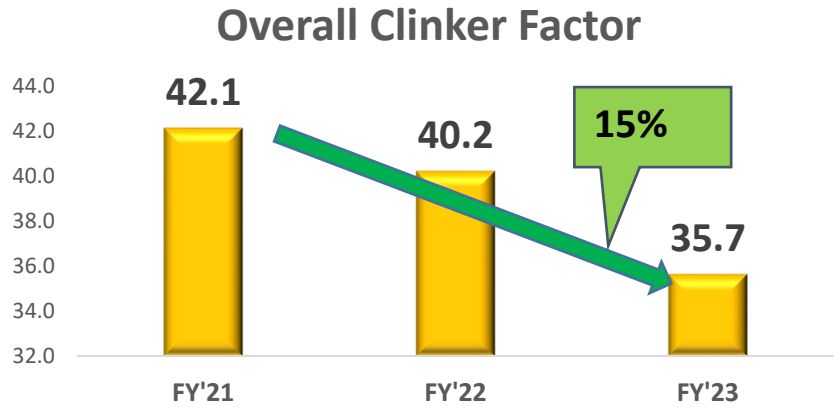


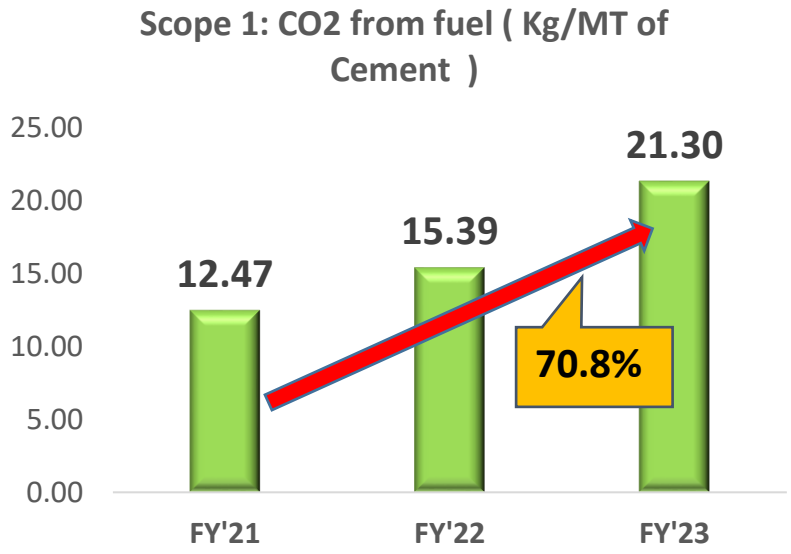
Dalmia Bharat Group Globally
Ranked No 1
by CDP (Carbon Disclosure Project)

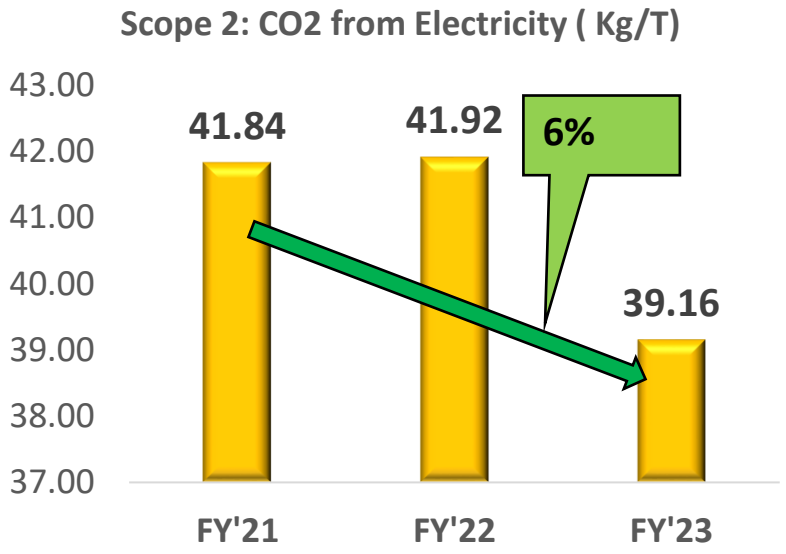
7. GHG INVENTORIZATION : Carbon Emission Reduction

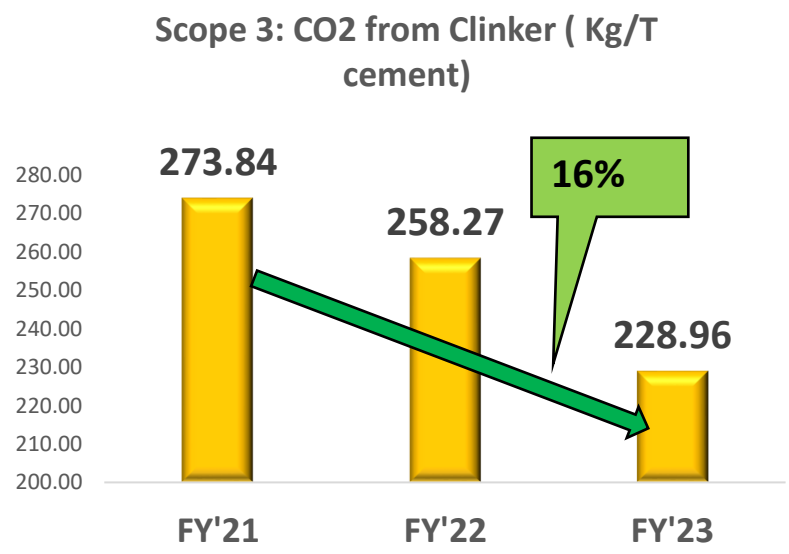


- Enhacement in production of Composit Cement in place of PPC - **an approach towards sustainability with reduced Clinker Factor**







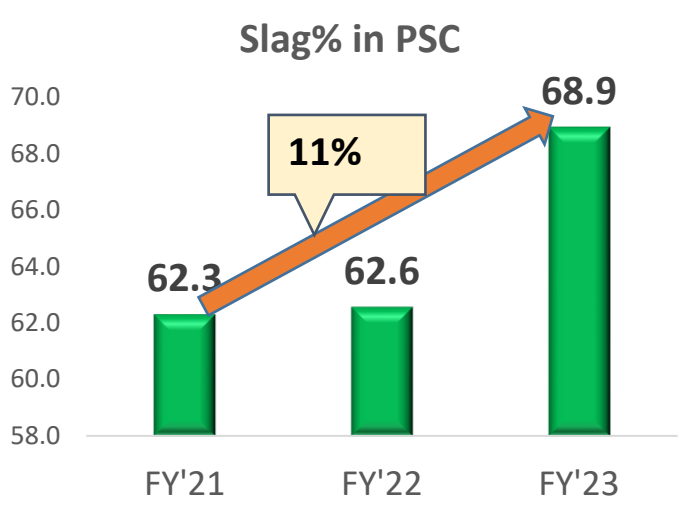


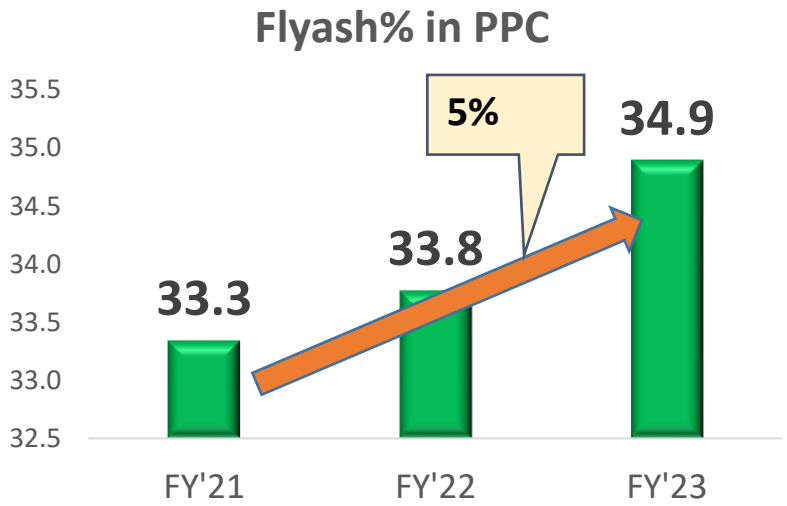
7. GHG INVENTORIZATION : Carbon Emission Reduction

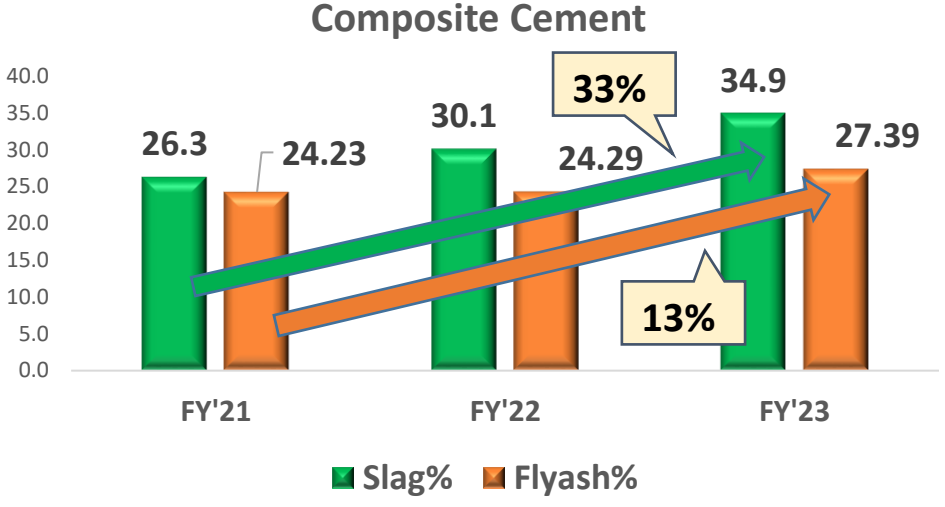
Initiatives to reduce carbon emission :

- Installation of 8.85 MW solar PV power plant
- Reduction of total electrical energy consumption
- Improving clinker factor in cement.
- Reduction of internal vehicle fuel consumption by use of battery driven vehicles.
- Reduction of raw material vehicle fuel consumption by change of mode from road to rail .

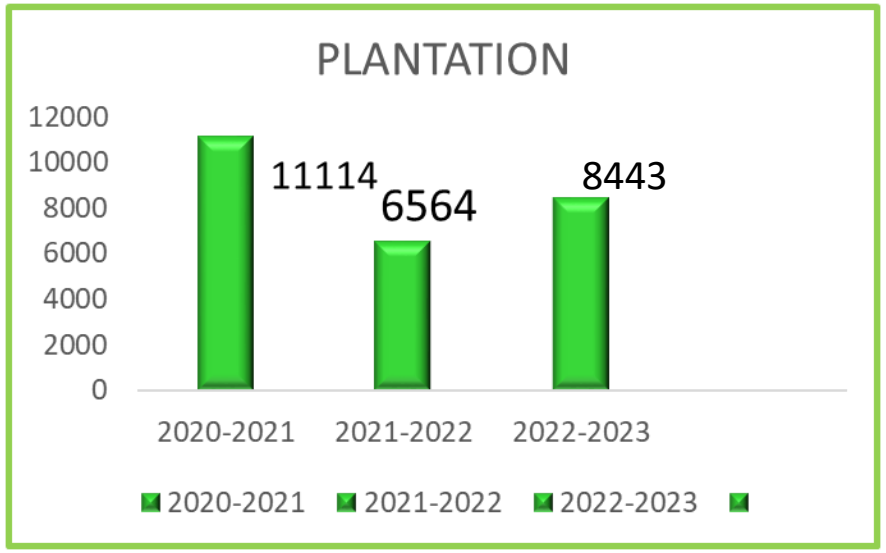
Use of battery operated vehicle for plant internal transport saved 20,000Kg CO2 emission per year



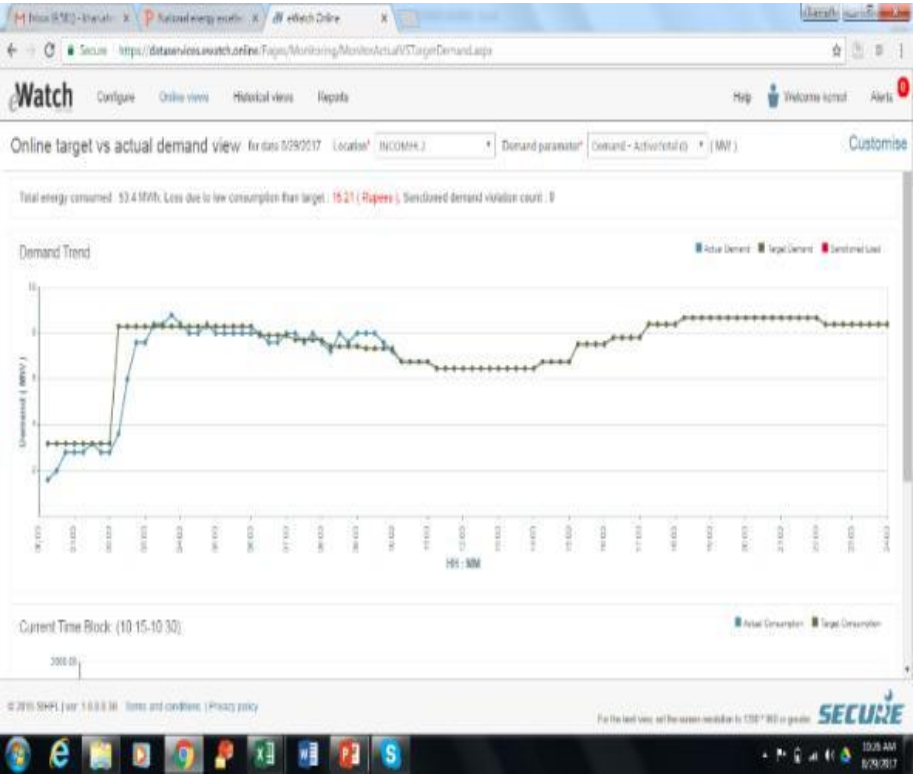


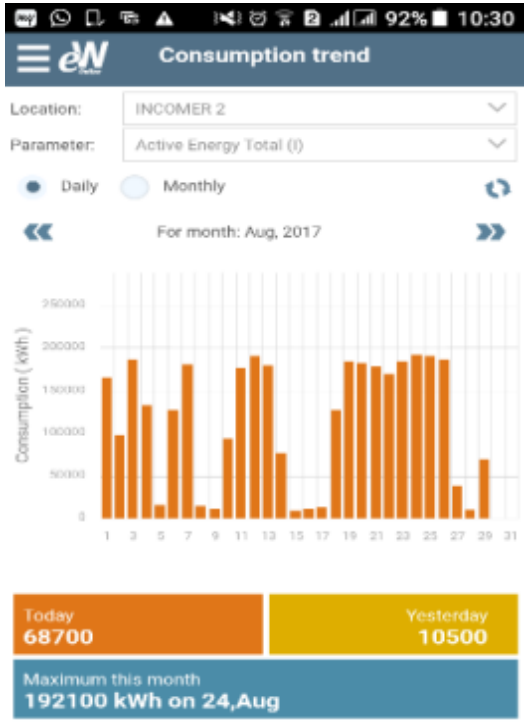


7. Greenbelt Development to reduce GHG

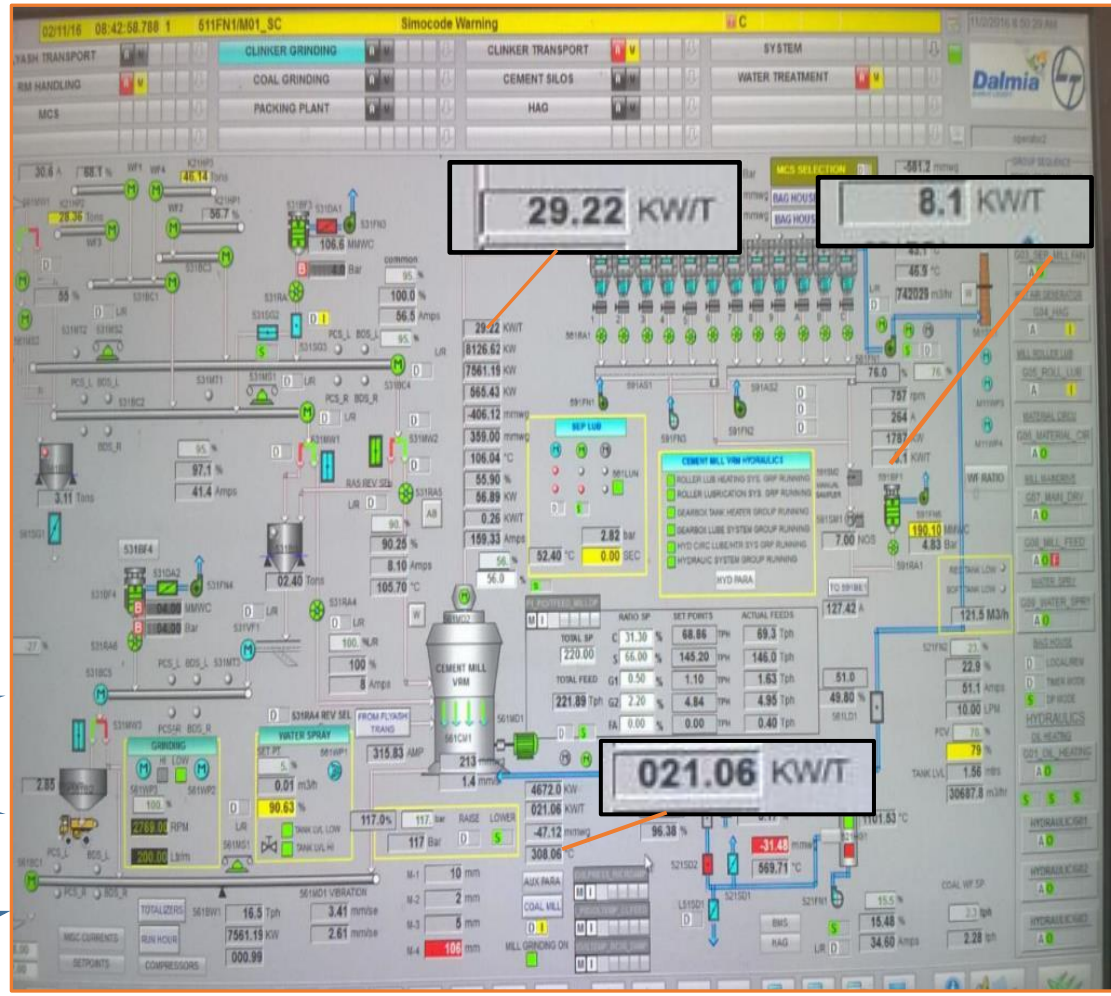


8. EMS System: Online monitoring





CCR operation screen with Total KWH & KWH/T display for main drives.



Ewatch system access from Computer & Mobile

Daily online drive wise energy report with real time data capture

8. Implementation of ISO 50001:2011

ENERGY MANAGEMENT SYSTEM


TÜV NORD

CERTIFICATE

for the Energy Management System as per
DIN EN ISO 50001 : 2011

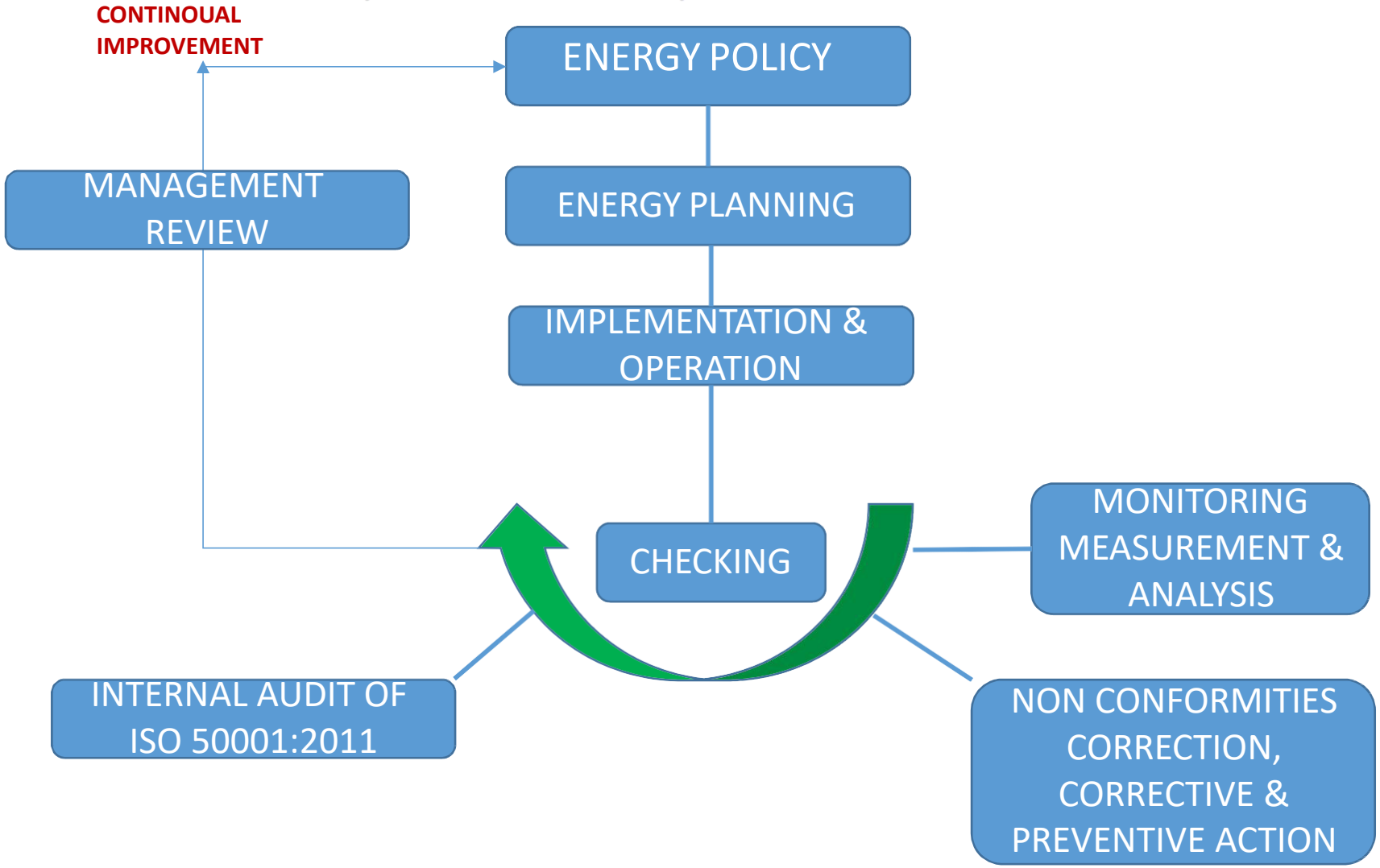
OCL BENGAL CEMENT WORKS
(A UNIT OF OCL INDIA LIMITED)
Vill - Kalapachuria, P.O. Beesha,
Via- Godapiasal, P.S. Balbori,
Dist: Paschim Medinipur, W.B. - 721 129,
India

Manufacture and Supply of Portland Slag Cement & Portland Pozzolana Cement and Composite Cement by Grinding and Solar PV Power Generation for Captive Use

DAkkS

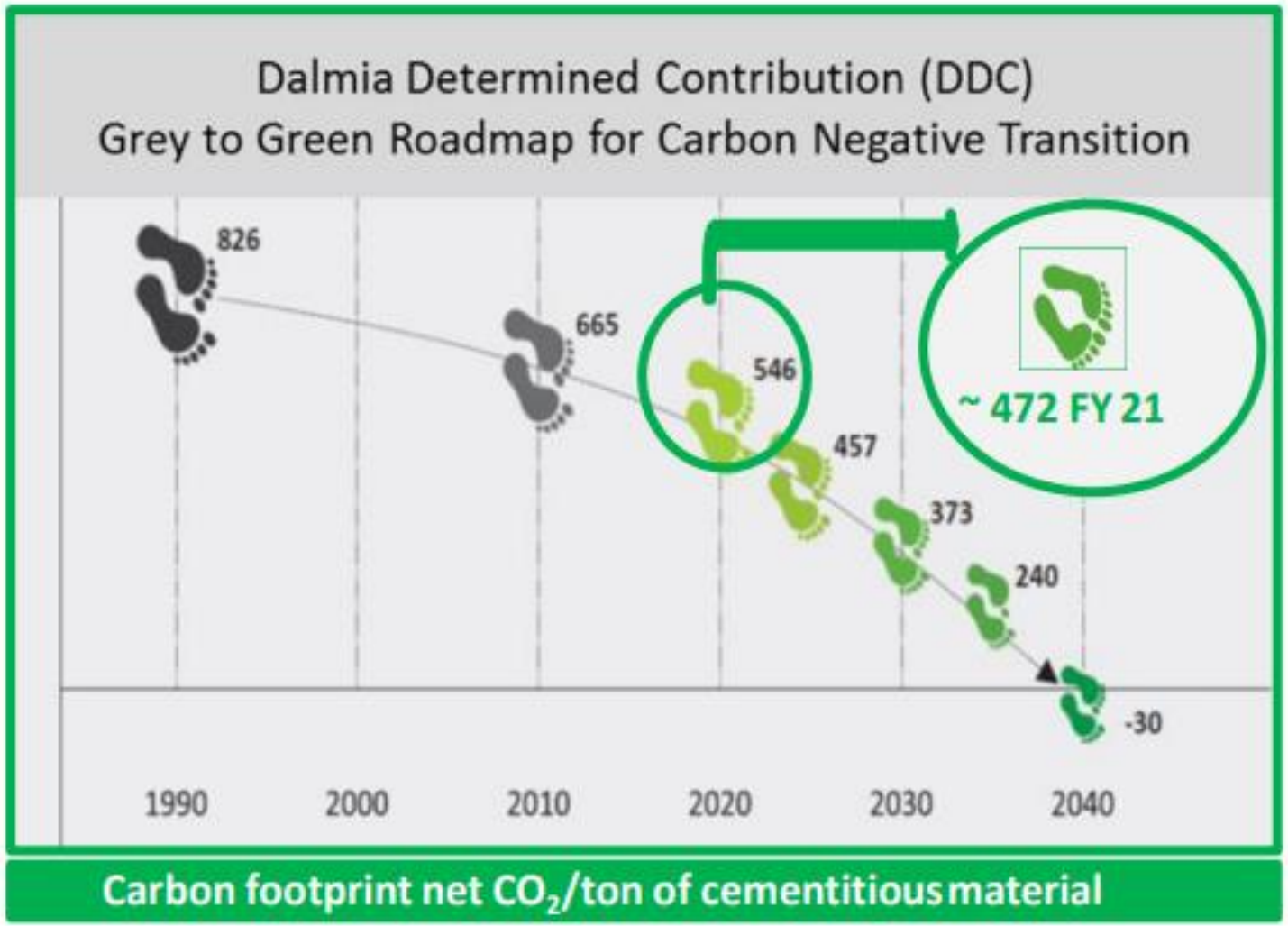
ISO 50001: 2011

Steps followed for Implementation of ISO 50001:2011



Carbon Negative Roadmap to Dalmia Determined Contributions (DDCs)

- Usage of 100% renewable power under fossil free electricity initiative by 2030 (RE 100)
- Double energy productivity by 2030 (EP 100)
- Use of renewable biomass, hazardous waste, hydrogen and Municipal Solid Waste to fully replace fossil fuel by 2035
- Carbon Capture and Utilisation (CCU) to make value added products; Carbon Sequestration and adoption of other advanced green technologies by 2040



Awards & Accolades

- *CII Excellent energy efficient unit award 2016*
- *CII Excellent energy efficient unit award 2017*
- *CII Energy leader award 2018*
- *CII National Energy Leader & Excellent energy efficient unit 2019*
- *CII Excellent energy efficient unit award 2021*


Thank You!


save
energy