JHARKHAND CEMENT WORKS

(A Unit of Dalmia Cement Bharat Limited)

Dalmia Bharat Group

22nd National Award For Excellence in Energy Management 2021

Team Leader:

Priya Ranjan – Unit Head

Presented By:

Ashok Kushwaha – DM (E&I)

Rishi Gavaskar – DM (E&I)

Rajan Singh – DM (Production)

Brief Introduction of Company

Dalmia Bharat Group

Fourth largest cement group in India with
26 Million Tons of installed cement capacity
186 MW of captive power capacity

Cement – 27 MTPA

Sugar – 34,000 TCD

- Founded by Jaidayal Dalmia in 1939
- Presence – 13 Plants in 9 States
- Cement Capacity – 27 MTPA
- Largest Producer of Slag Cement in India
- First Global Cement Company to Join the EP100
- First Cement Company to Join the RE100
- World's Greenest Cement with Lowest Carbon Emission
- Target to become carbon negative till 2040

Solar Power – 60 MW

Wind Power – 16.5 MW

Thermal Power - 72 MW

Bagasse Power - 79 MW

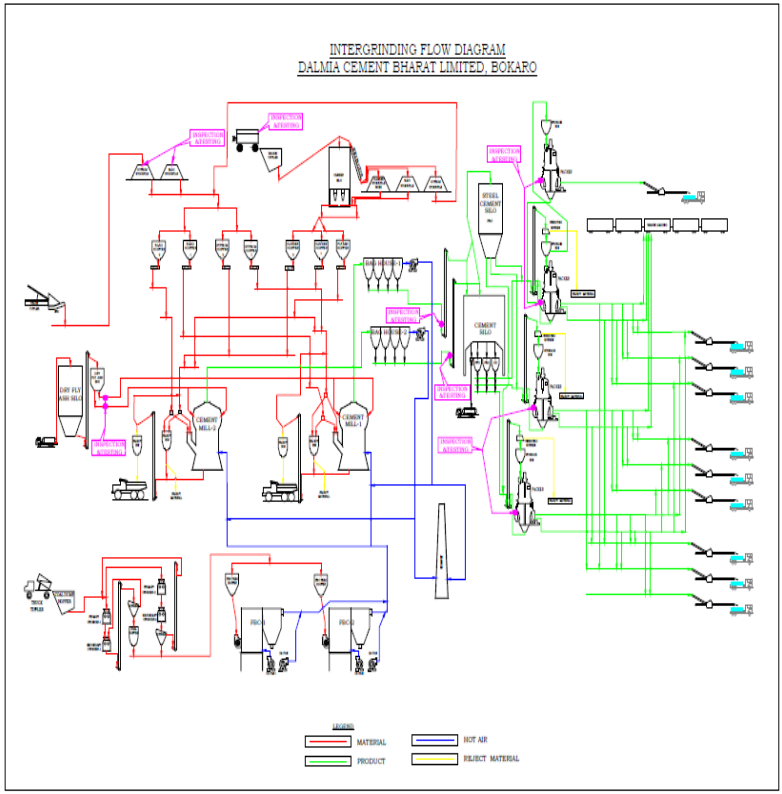
Refractories

Brief Introduction of Unit

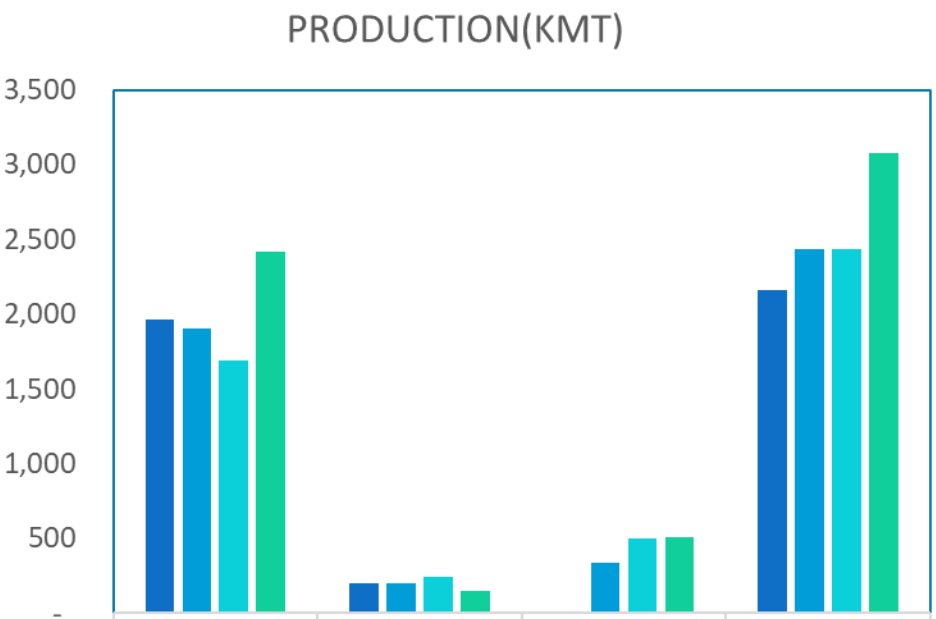
The unit was founded in 2011. Dalmia Bharat Group acquired this unit in November 2014 from Jaypee with installed capacity of 2.1 MTPA.

- Present Capacity – 3.7 MTPA and presently undergoing expansion project for additional 0.8MTPA.
- FLS Cement Vertical Roller Mill OK 42.4 (255 TPH Each) – 2 No.
- FLS Roto-Packer (240 TPH Each) – 4 No
- Truck Loading Machine (120 TPH Each) – 12 No.
- Wagon Loading Machine (120 TPH Each) – 8 No.
- Fluidized Bed Combustor (17.5 Mkcal/Hr Each) – 2 No , additional one no FBC installation is undergoing having capacity of 25 Mkcal/Hr
- TRF Wagon Tippler (800 TPH) – 1 No.
- Slag Route (500 TPH) – 1 No.
- Cement Silo (18,600 MT) – 1 No.
- Clinker Silo (25,000 MT) – 1 No.

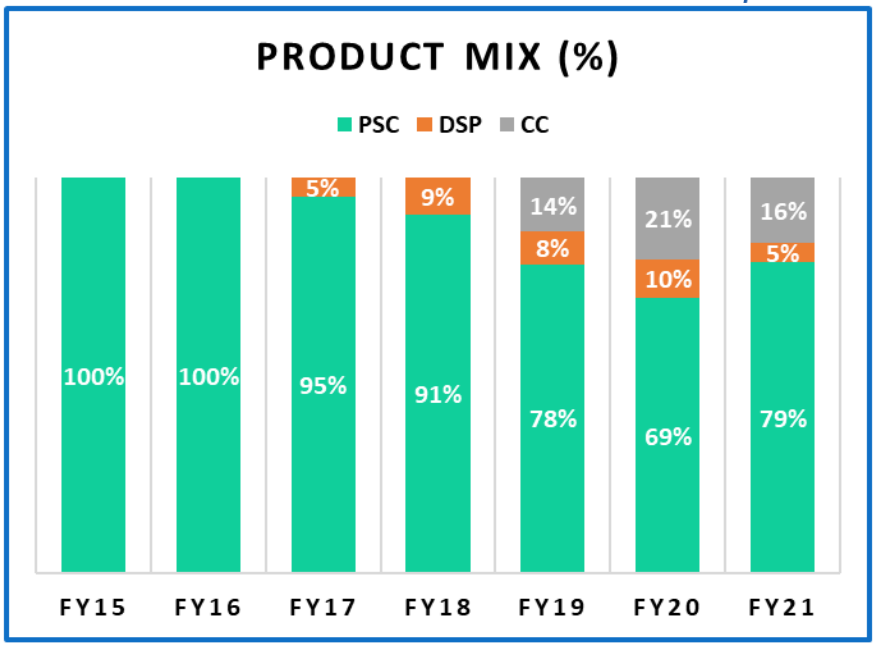
- **Products –**
  - **Portland Slag Cement**
  - **Composite Cement**



Production Journey



	PSC	DSP	CC	Overall
FY18	1,962	202		2,163
FY19	1,906	199	333	2,439
FY20	1,693	243	500	2,437
FY21	2,421	149	504	3,074



CC Production Started from FY19

Benefit –

- Lower Variable Cost than PSC
- Lower Heat Consumption than PSC
- Lower Coal Consumption than PSC

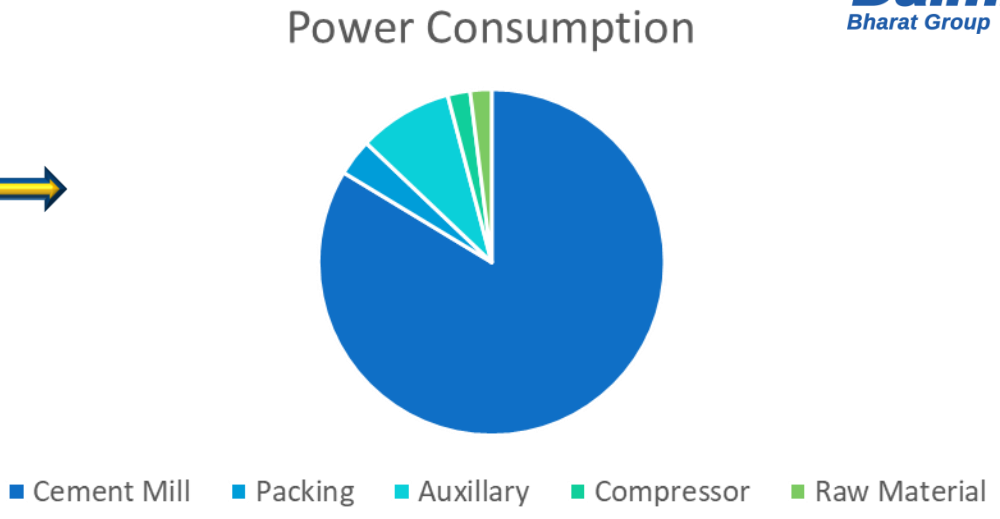
Overall Energy Consumption Overview

Dalmia Bharat Group

Electrical Energy

Grid - 100%

105.86 MnkWh

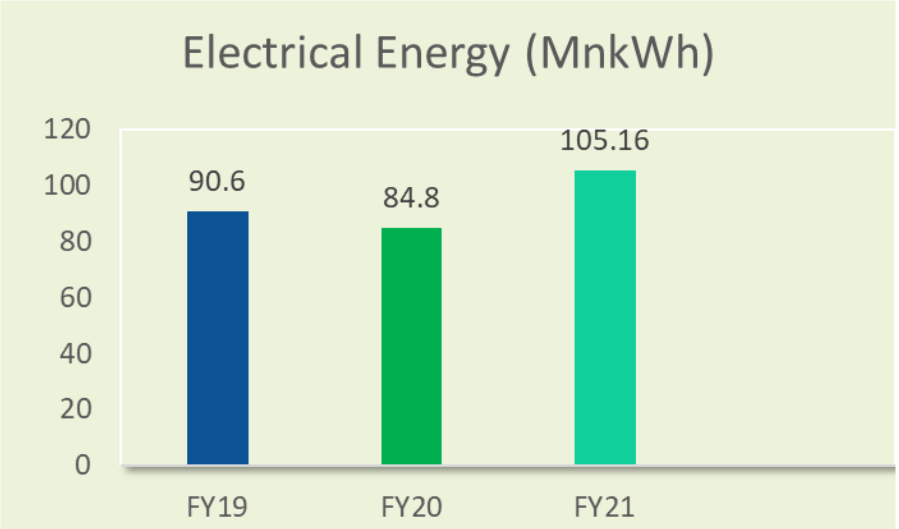


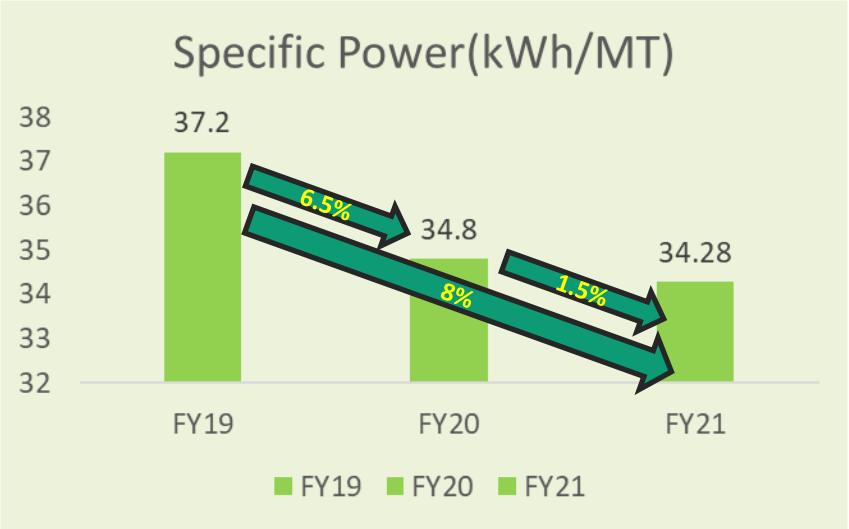
Thermal Energy
(From Coal & Diesel)

Cement Mill - 100%

2,70,450 Mnkcal

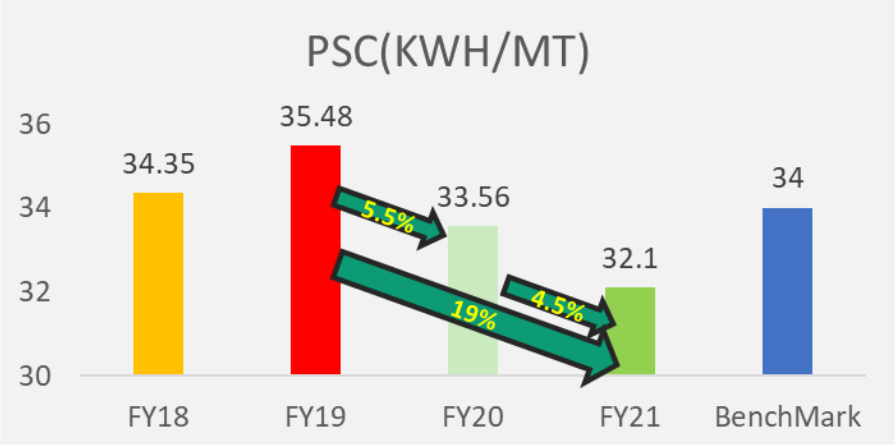
Electrical Energy Consumption Overview

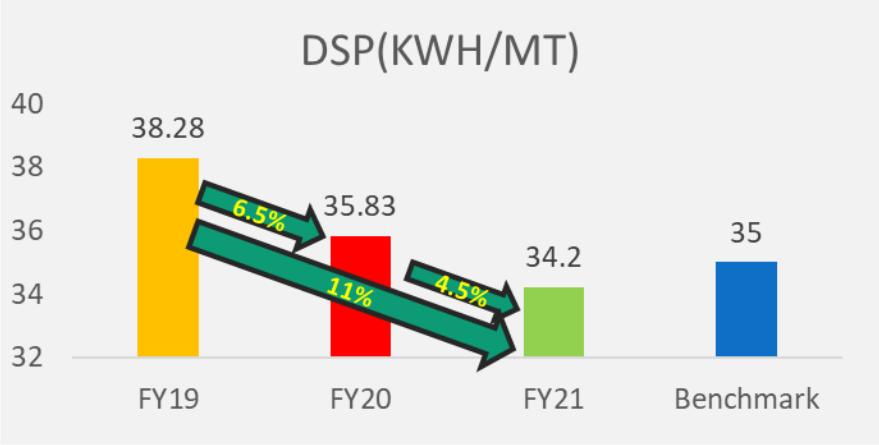


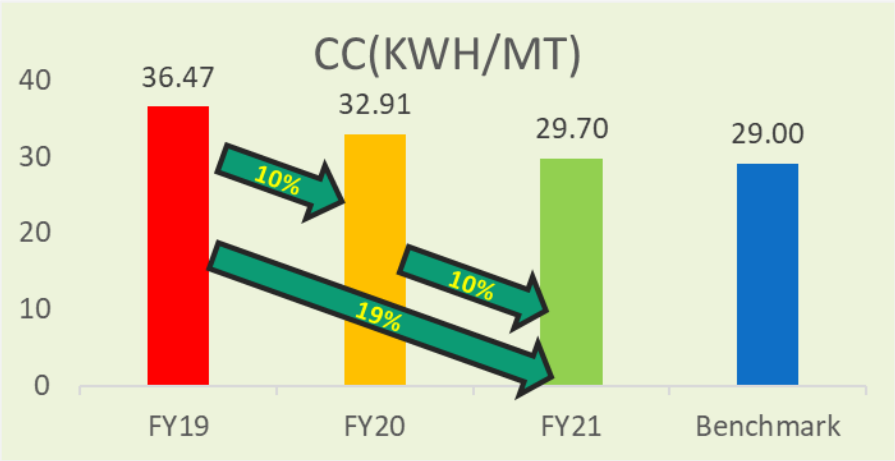


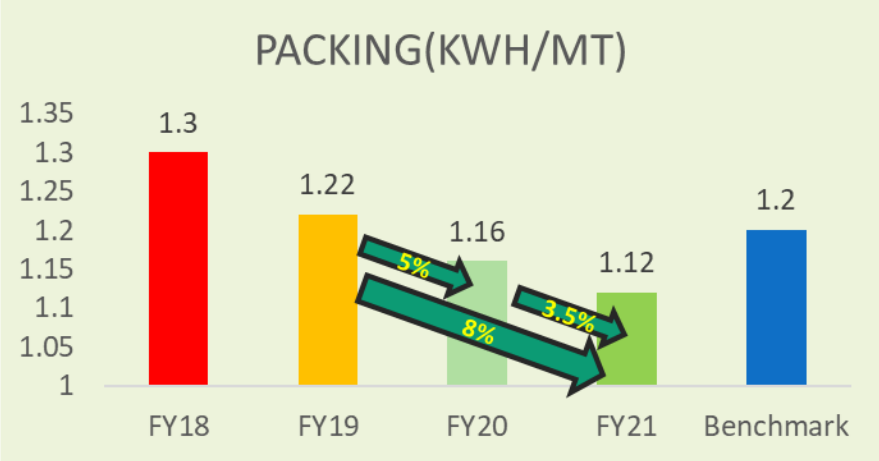
Production	FY19	FY20	FY21
KMT	2,439	2,437	3,074

Specific Energy Consumption





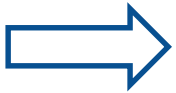




Major Highlights

- Overall specific energy reduced 8.5% in last 3 years.
- Continuous reduction trend of TOE in last 3 years .
- Clinker Factor reduced YOY in PSC Cement from 38% to 36%.
- Maximum uses of Dry fly ash in place of wet Fly ash , it reduces the heat consumption.

2019-20
0.0203 TOE/Tonne of equivalent cement



2020-21
0.0196 TOE/Tonne of equivalent cement

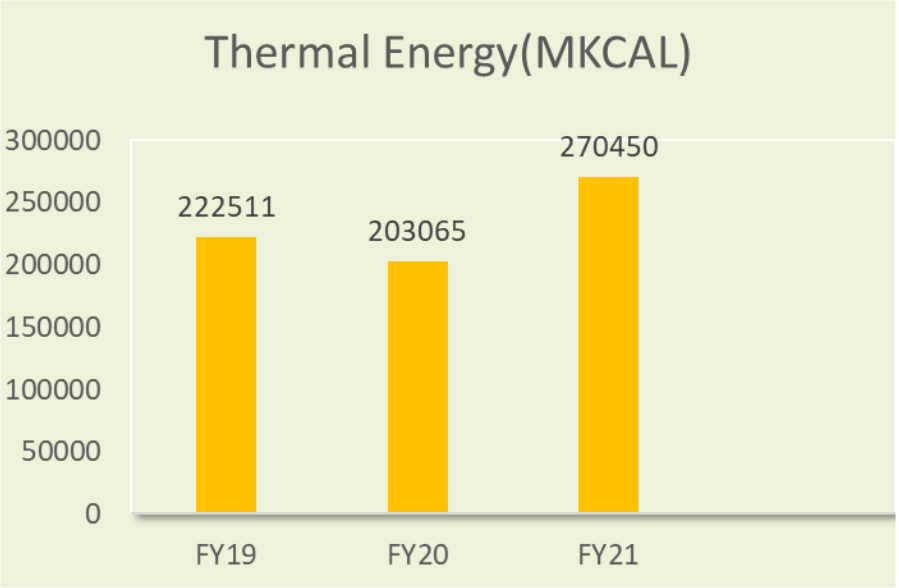
Dalmia Bharat Group

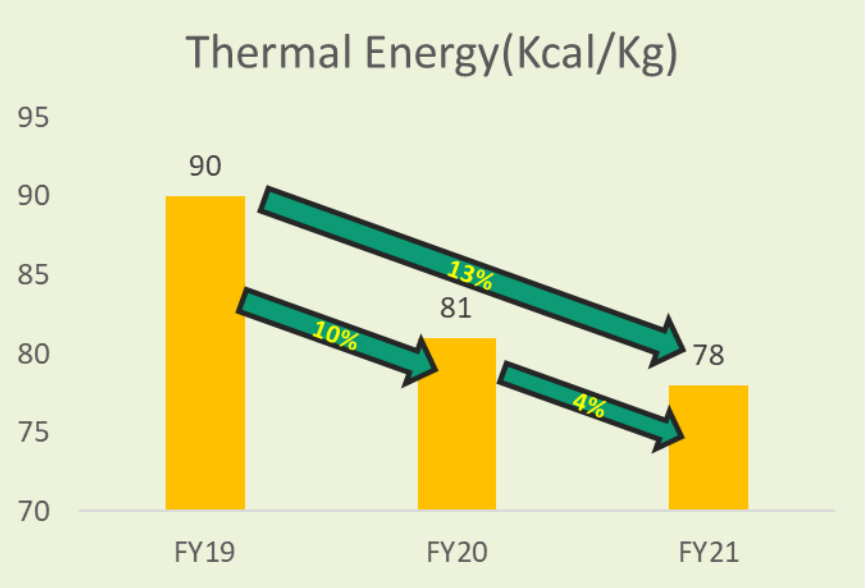
Encon Projects FY22

Sl. No.	Description of Energy Efficiency Improvement Measure	Investment (Rs.Mn)	Savings (Rs.Mn)	Energy Savings (MnkWh)
1	Cement Mill Classifier Upgradation. Saving – 1 kWh/MT (Phase-2 upgradation for capacity enhancement)	338.2	12	3
2	Cement Silo Bucket Elevator upgradation to increase productivity		15.46	3.7
3	Main Bag house bags replacement		9.27	2.22
4	Installation of 25MnKCal/Hr. Fluidized Bed Combustor		6.22	
5	Solar Street light and Solar High mast installation	1.5	0.072	0.018
6	Plant lighting Automation	0.1	0..627	0.15
	Total	**339.8**	**43.018**	**9.088**

Thermal Energy Consumption Overview

Reduction by 9%

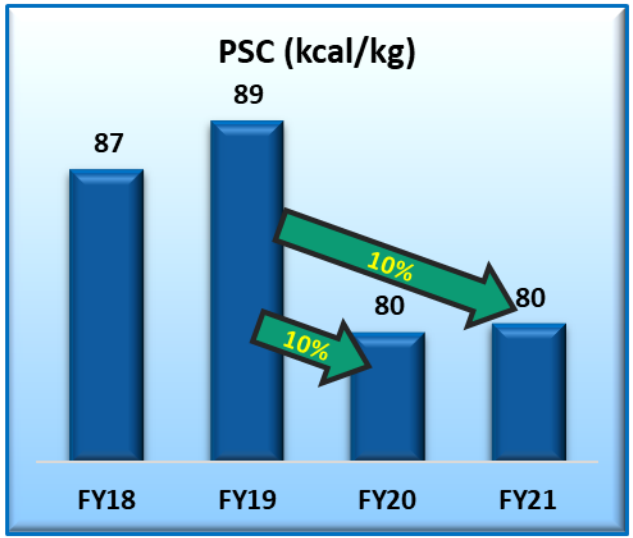


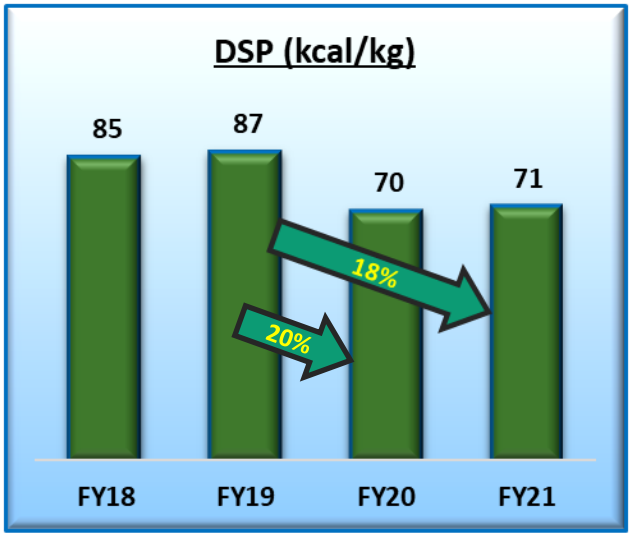


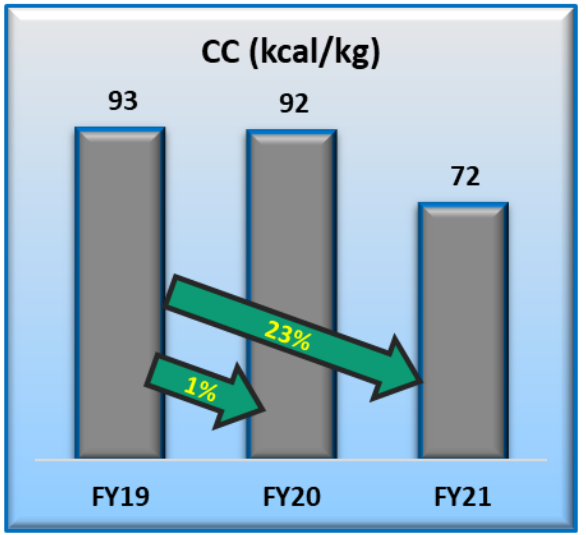
Production	FY19	FY20	FY21
KMT	2,439	2,437	3,074

Note - No CC Production in FY18

Sp. Heat Consumption Product-wise







Note - No CC Production in FY18

Energy Saving Projects Implemented in Last Three Years

Year	No. of Proposals	Energy Savings (MnkWh)	Investment (Rs.Mn)	Savings (Rs.Mn)	Payback Months
FY19	10	1.25	6.39	4.98	9
FY20	6	8.71	195	35	2
FY21	9	2.819	1.267	14.11	9
Total	25	12.779	202.657	54.09	20

1 Crore of Units Saved in Last Three Years

Major Encon Projects

Dalmia Bharat Group

Encon Projects FY19

Sl. No.	Description of Energy Efficiency Improvement Measure	Investment (Rs.Mn)	Savings (Rs.Mn)	Energy Savings (MnkWh)
1	Installation of VFD's in Bag filters Fans in PACKING PLANT (a) 75kw (b) 37kw , VFD qty-2 for Cement Silo top BF Fan 11KW	0.94	0.840	0.210
2	Replace V belt with cogged flat belt in compressor(With change in pulley if required)	0.58	0.060	0.016
3	Optimization of PID loop of Mill 1 &2	0.00	1.600	0.400
4	Replacement of 70 W HPSV well glass lights by 40 W LED Light. (25% of plant light)8X 800 W HPSV Lamp of High Mast (3Nos.) by 8 x 200 W LED.	1.25	0.380	0.096
5	Coal Crusher (25 TPH)& Reversal Belt. Conv.	0.58	1.490	0.373
6	Screw Air Compressor GA90 VSD with filters	1.88	0.300	0.076
	Total	5.23	4.67	1.17

Encon Projects FY20

Sl. No.	Description of Energy Efficiency Improvement Measure	Investment (Rs.Mn)	Savings (Rs.Mn)	Energy Savings (MnkWh)
1	Modification of inlet duct of Mill 1&2 from 1.6 mtr dia. to 3 mtr.dia.Pressure drop across Mill inlet is 145 mm WC which is equivalent to 22% head developed by Fan.	14.00	9.162	2.291
2	Replacement of 70 W HPSV well glass lights by 40 W LED Light. (25% of plant light)	0.80	0.131	0.033
3	Installation of VFD in Main Water Pump (90kW)	0.75	0.470	0.117
4	1st Phase Cement Mill Upgradation	100.00	20.000	5.000
5	Dry Flyash Feeding & Storage System	78.98	5.080	1.270
	Total	194.53	34.84	8.71

Major Encon Projects

Dalmia Bharat Group

Encon Projects FY21

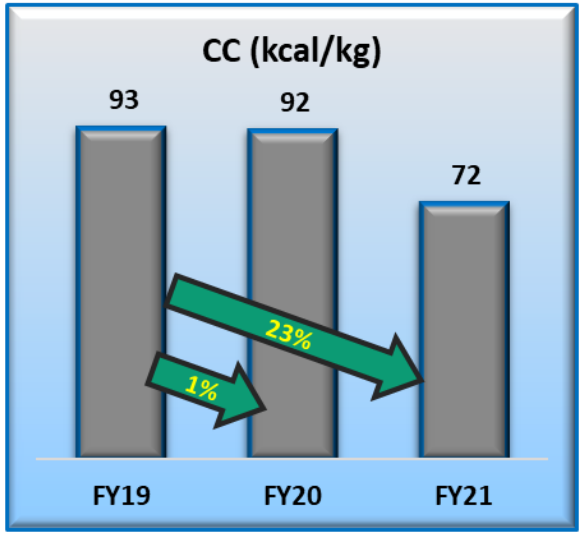
Sl. No.	Description of Energy Efficiency Improvement Measure	Investment (Rs.Mn)	Savings (Rs.Mn)	Energy Savings (MnkWh)
1	Optimization of VFD'S rpm	0	0.812	0.194
2	Replacement of 70/250/800 W HPSV well glass lights by 35/90/240 W LED Light.	0.44	0.191	0.045
3	Idle running minimization by changing logic of Belt conveyors	0	0.812	0.194
4	Idle running of TLM's ,Blower , WLM's etc.	0.097	0.689	0.165
5	Interconnecting of Root Blowers Aeration Lines	0.05	0.803	0.192
6	Cement Silo extraction logic modification	0.0	0.936	0.224
7	Dry Fly ash usage for CC manufacturing	0.00	6.71	1.605
8	Installation of VFD's in Bag filters Fans in Packing Plant (a) 75kw (b) 30kw	0.68	0.71	0.17
9	FBC firing with the help of waste wood in place of HSD	0	2.32	
	Total	1.267	14.11	2.819

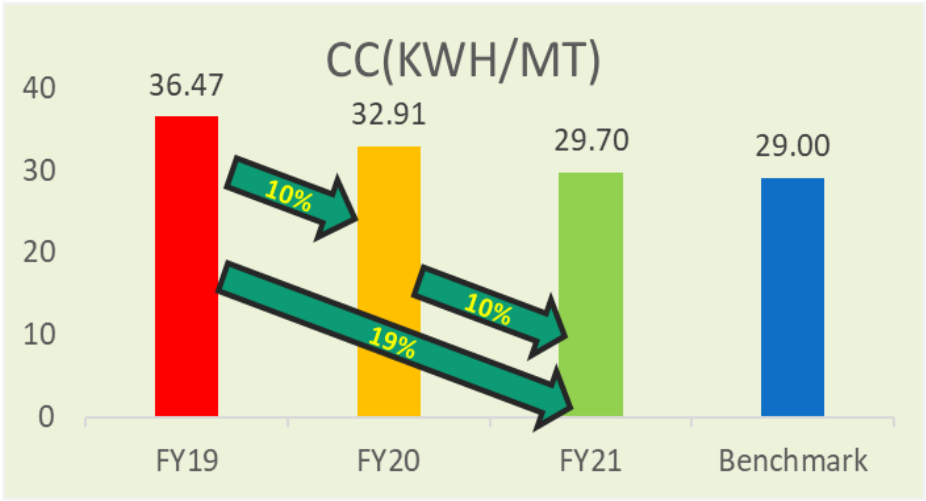
Innovative Projects Implemented

Project 1 – Dry Flyash Usage

CC Grinding started in plant in FY19 and wet fly ash was used for making CC. In August 2020 dry fly ash feeding system was commissioned to make CC cement with dry fly ash .

Benefits: Saving in specific power of CC is 3.21KWH/MT (excluding Packing power) and Specific heat consumption saving in CC is 20KCal/KG





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Project 2 : Slag Lifting cost reduction from source (BSL)

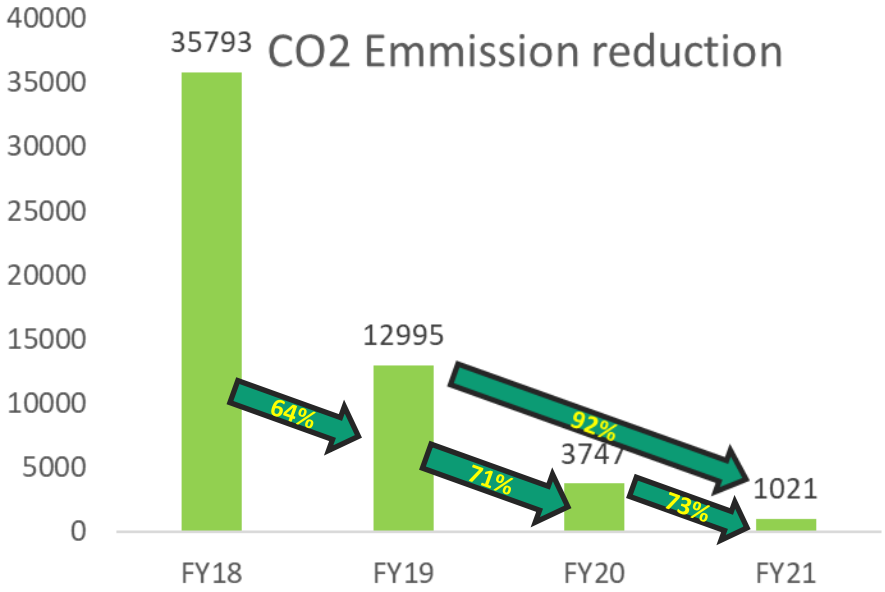
Due to High Moisture of BSL Slag our cost of slag increases and heat loss and low feed of mill was our bottleneck. BSL is generating the slag at 22 % moisture. We have made a cross functional team to reduce the moisture at the source. We have identified the reason slag is with high moisture due to compressor is not working at Sail plant, which can reduce the moisture. We have maintained the compressor at the SAIL plant and corrected the water line and airline and improve the purging system of slag generation. By the result of that moisture was reduced from 22 % to 13 % at the source. Moisture reduce at 0.6 % at plant

Benefit- Saving for 0.6 % moisture reduction- 5 Lakh, Saving due to heat reduction - 18 Lakh, Saving in Power- 6 Lakh
Total Saving- 29 Lakh/Month

Other Initiatives

- Reciprocation compressor power reduction by modification in pulley and belt.
- 75KW Screw compressor installed for Packers to reduce the power consumption of Packing House.
- Packer feed bin’s root blower line interconnecting.
- Mill feeding circuit logic and reject discharge chute modified to run with single raw material feeding belt conveyor.
- Wagon tippler bag house purging converted from timer mode to DP mode.
- Raw material feeding belt conveyors capacity enhanced for hopper filling . It saves power and running hours of belt conveyors.

GHG Inventorisation



- Connecting Road from plant entry to Raw material Yard RCC .
- Truck and Wagon tippler connecting road RCC .
- Vehicles Turn around time reduced .

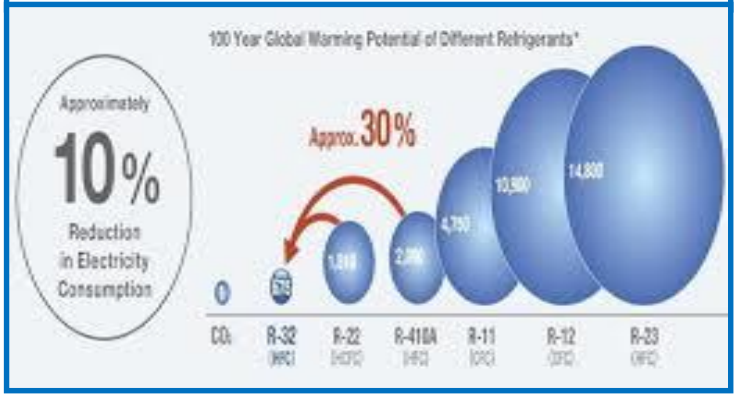
Reduction in CO2 Emission in FBC by Continuous Improvement in Diesel Consumption

GHG Inventorisation

- 33% of the total area of Plant has been developed into Greenbelt up to till date.
- Plant inside road concreating done .
- Use of R32 gas in AC's to reduce the potential of Global warming and saving of Electrical Energy approx. 10%.

	Ozone Depletion Potential	Global Warming Potential
R32	**0**	**675**
R410A	0	2,090
R22	0.05	1,810

R32 has zero Ozone Depletion Potential (OPD), and lower Global Warming Potential (GWP) which contributes to the prevention of global warming.

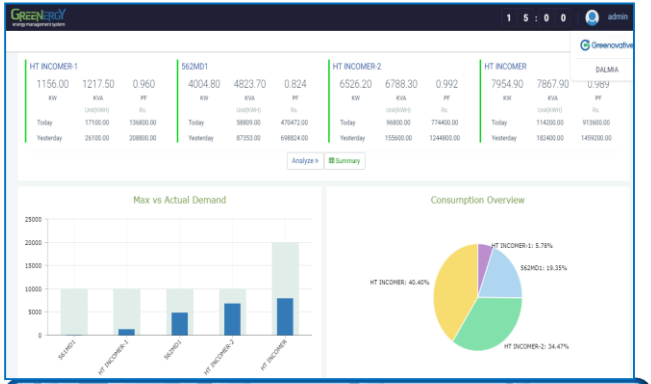


GHG Inventorisation

- 100 KLD STP Constructed for the Treatment of Domestic Waste Water.
- Treated Water is being used in Dust Suppression and Greenbelt Development .
- 6517 trees plantation done at nearby villages and taken care by Dalmia Bharat Foundation .
- Solar street light installation , Fuel efficient chullah and Solar lantern distributed to nearby villagers.
- Pond and well renovated to nearby localities to improve the ground water level and minimization of underground water consumption.

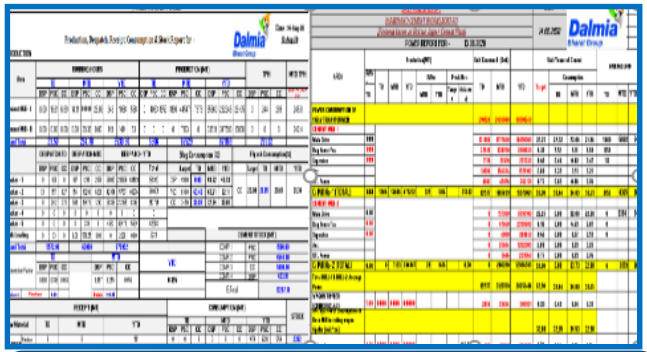
GHG – Green Belt Development

Teamwork, Employee Involvement & Monitoring



Realtime Specific Energy Management System

Online SPC Monitored in CCR



Production & Power Report Circulated on Daily Basis

Award Scheme for Project implementation through KAIZEN

- IOT System is used for daily monitoring the plant data .
- Production meeting held on daily for plant performance and improvement discussion.
- Award scheme for Team and individual .

Best Practices in Green Supply Chain

- Monthly energy meeting is being held all technical persons are member of it. Individual suggestions are invited and being implemented to save energy and increase productivity.
- RCA meeting is held monthly.
- Specific power and Heat consumption target is being fixed for product specific on weekly basis.
- Eyes on wheels- TAT is monitored on daily basis.
- Energy saving awareness training programs are being conducted time to time/ weekly basis for technicians and plant workers also.

- Maximize the Cement bulker loading .

Green Procurement Policy

- Procurement of Energy efficient motors and equipment's with 5 star ratings.
- Purchase of LED lights in future only.
- Adopt energy efficient technology in new projects.

Awards & Recognition

(1) Dalmia, Bokaro has been awarded "Energy Efficient Unit "
- By CII 2020

(2) Dalmia, Bokaro has been awarded 1345 eCert by BEE.
- By BEE 2019-20

(3) Dalmia, Bokaro has been awarded "Environment Excellence Award 2019 in Cement Sector"
- By Apex India Foundation

(4) Dalmia, Bokaro has been awarded "IMEA Silver Certificate of Merit-2017"
- By Frost & Sullivan & FICCI's India Manufacturing Excellence Awards

(5) Dalmia, Bokaro has qualified for "PAT Cycle-III, 2016-17"
- By Bureau of Energy Efficiency

(6) Dalmia, Bokaro has been awarded "National Energy Conservation Award Certificate of Merit-2016" in Cement Sector

Thank You

CONTACT INFORMATION

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