SECTORAL WORKSHOP ON

BEST PRACTICES IN ENERGY EFFICIENCY IN CEMENT SECTOR – A PATH FOR DECARBONISATION 14th march 2023

JK LAKSHMI CEMENT LTD.- SIROHI, RAJASTHAN

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Dy. Mgr. - Env

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Dy. Mgr. - Electrical

BRIEF INTRODUCTION OF JKLC, SIROHI

OPC 43

OPC 53

PPC

"PRO+" PPC

JK LAKSHMI Power Mix READY MIX CONCRETE

JK SMARTBLOX Autoclaved Aerated Concrete

JK LAKSHMIPLAST PLASTER OF PARIS

ISO 9001

ISO 14001

ISO 50001

Iso 45001: 2018

JOURNEY TOWARDS UPGRADATION.....

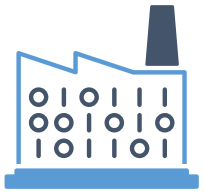
Established in Aug1982 with 0.5 MTPA capacity.

Unit – II Commissioned in 1995 with 0.9 MTPA capacity.

Unit – III Commissioned in 1996 with 0.9 MTPA capacity.

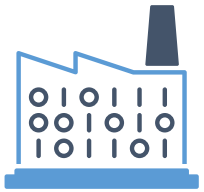
Present Cement Production Capacity 4.64 MTPA.

PLANT	YEAR OF COMMISSIONING	INSTALLED CAPACITY (TPD)	PRESENT STATUS (TPD)
KILN-1	1982	1500	4750
KILN-2	1995	2500	5125
KILN-3	1996	2500	5125



Efforts towards Decarbonization

1. Continuous Reduction in GHG Emission
2. Usage of Fly Ash Chemical Gypsum and Jarosite to Improve Clinker Factor
3. Usage of various AFR (Liquid , Hazardous and Non-Hazardous waste as fuel
4. Continuous increase in Usage of Renewable Energy (WHR & Solar)
5. Usage of TPP Fly Ash as fuel
6. Water Positivity/Rainwater Harvesting system



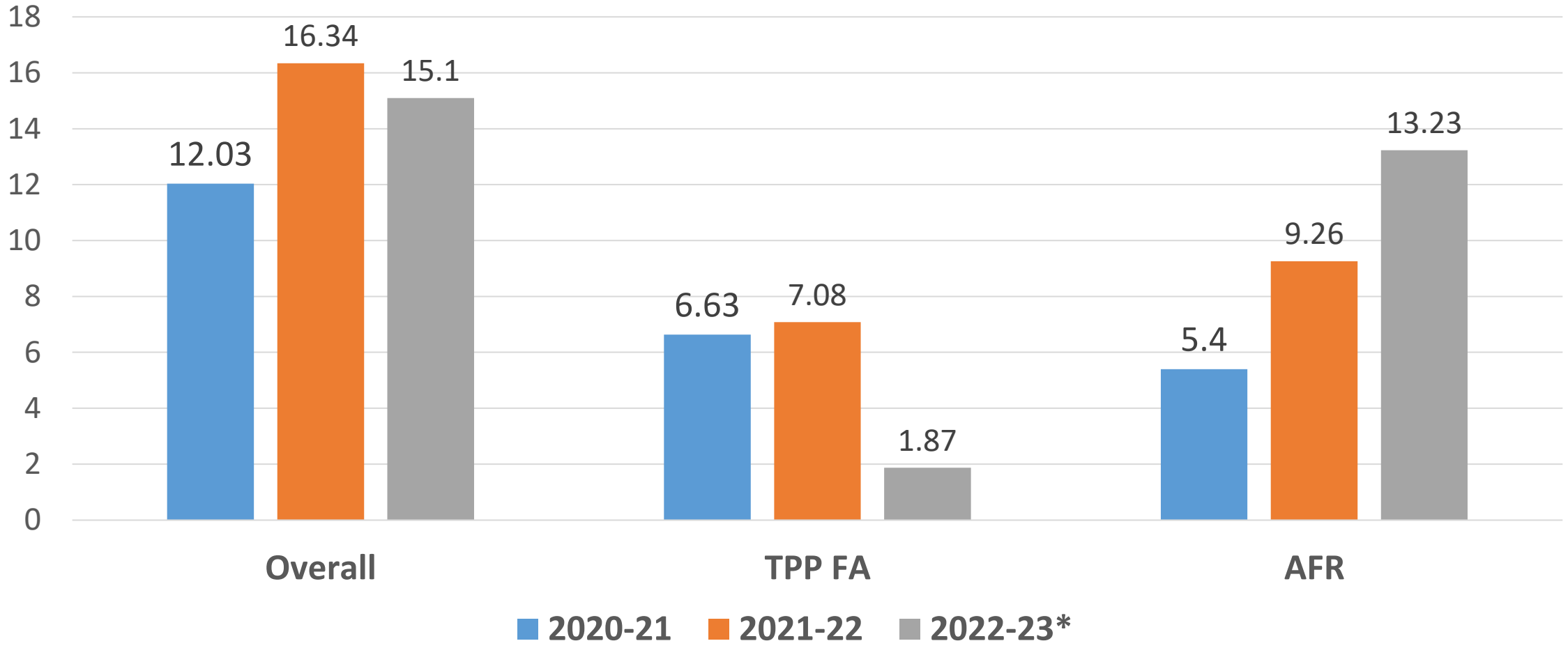
Efforts towards Decarbonization

7. Online ambient air quality monitoring system

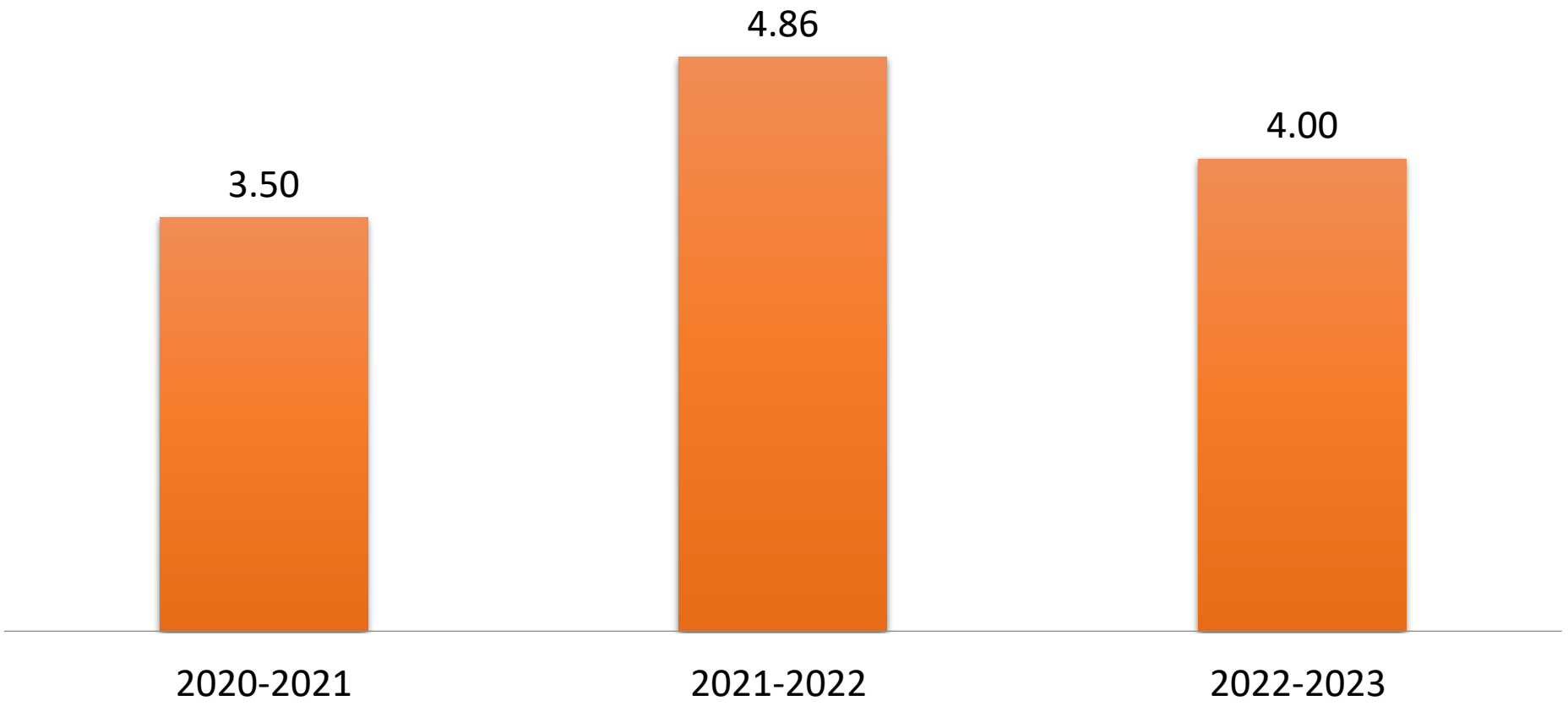
8. Innovative rainwater recharge solution

9. Plantation in Mines, Plant and nearby area

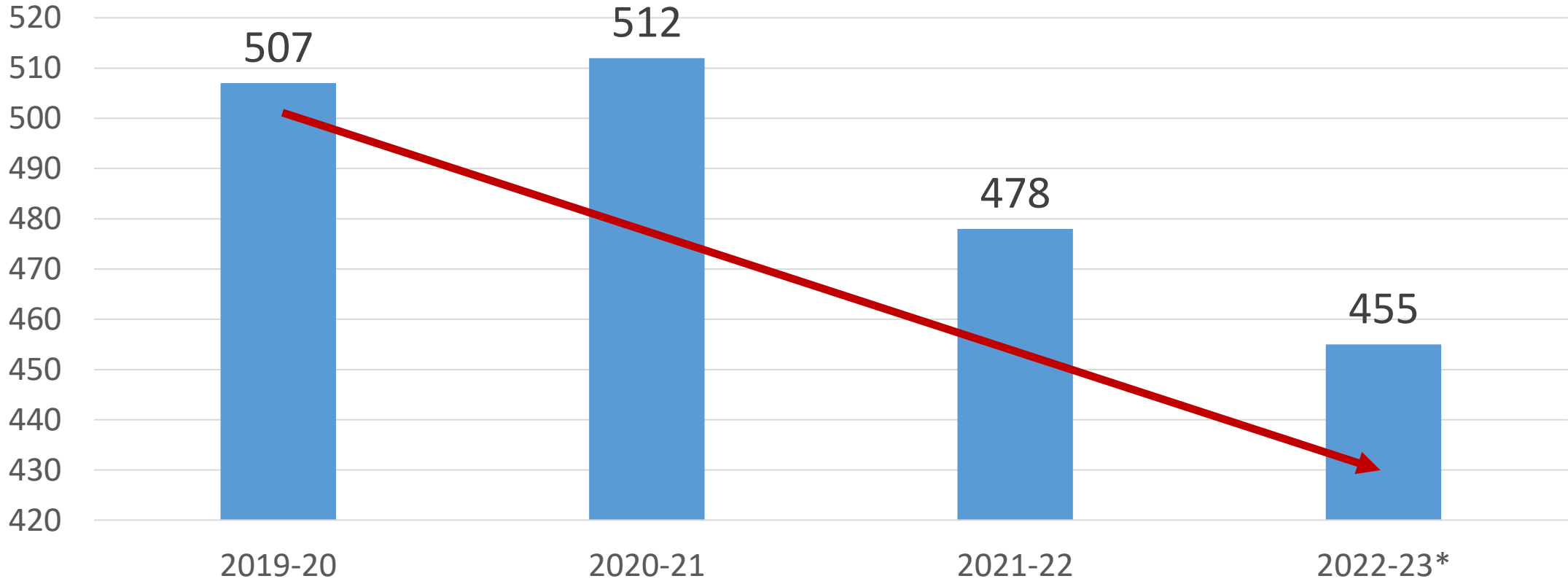
% AFR Consumption



% TSR



ACHIEVEMENT IN GHG INVENTORISATION (Kg CO2/T PPC Cement)



GREEN MANUFACTURING: CII GREEN PRO CERTIFICATION

Confederation of Indian Industry

CII-Green Products and Services Council

hereby certifies that

Sixer (Portland Pozolana Cement)

(GPJK03004)

Manufactured by JK Lakshmi Cement Limited at their integrated plants in Sirohi - Rajasthan, Durg - Chattisgarh and grinding units in Jhajjar - Haryana, Kalol & Surat - Gujarat meets the requirements of GreenPro Ecolabelling and qualifies as Green Product.

This certification is valid till ***December 2023***

Jamshyd N Godrej
Chairman, CII-Godrej GBC

ParasuRaman R
Chairman, CII-Green Products & Services Council

K S Venkatagiri
Executive Director, CII-Godrej GBC

Supporting Council and programmes

Confederation of Indian Industry

CII-Green Products and Services Council

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PRO + (Portland Pozzolana Cement)

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Supporting Council and programmes

Confederation of Indian Industry

CII-Green Products and Services Council

hereby certifies that

HDP (Portland Pozzolana Cement)

(GPJK03005)

Manufactured by JK Lakshmi Cement Limited at their integrated plants in Sirohi - Rajasthan, Durg - Chattisgarh and grinding units in Jhajjar - Haryana, Kalol & Surat - Gujarat meets the requirements of GreenPro Ecolabelling and qualifies as Green Product.

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hereby certifies that

Portland Slag Cement (PSC)

(GPJK03008)

Manufactured by JK Lakshmi Cement Limited at their integrated plants in Sirohi - Rajasthan, Durg - Chattisgarh and grinding units in Jhajjar - Haryana, Kalol & Surat - Gujarat meets the requirements of GreenPro Ecolabelling and qualifies as Green Product.

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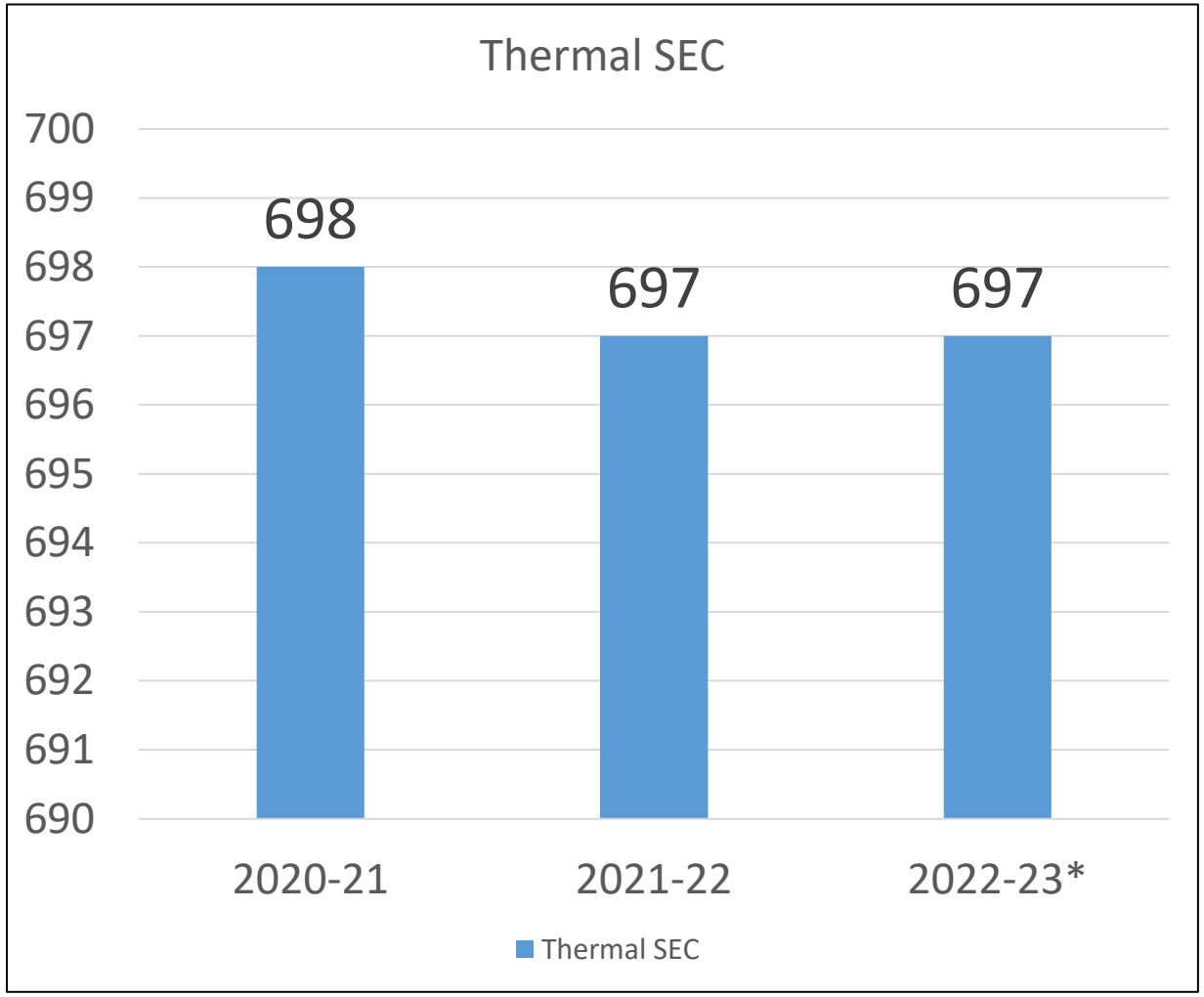
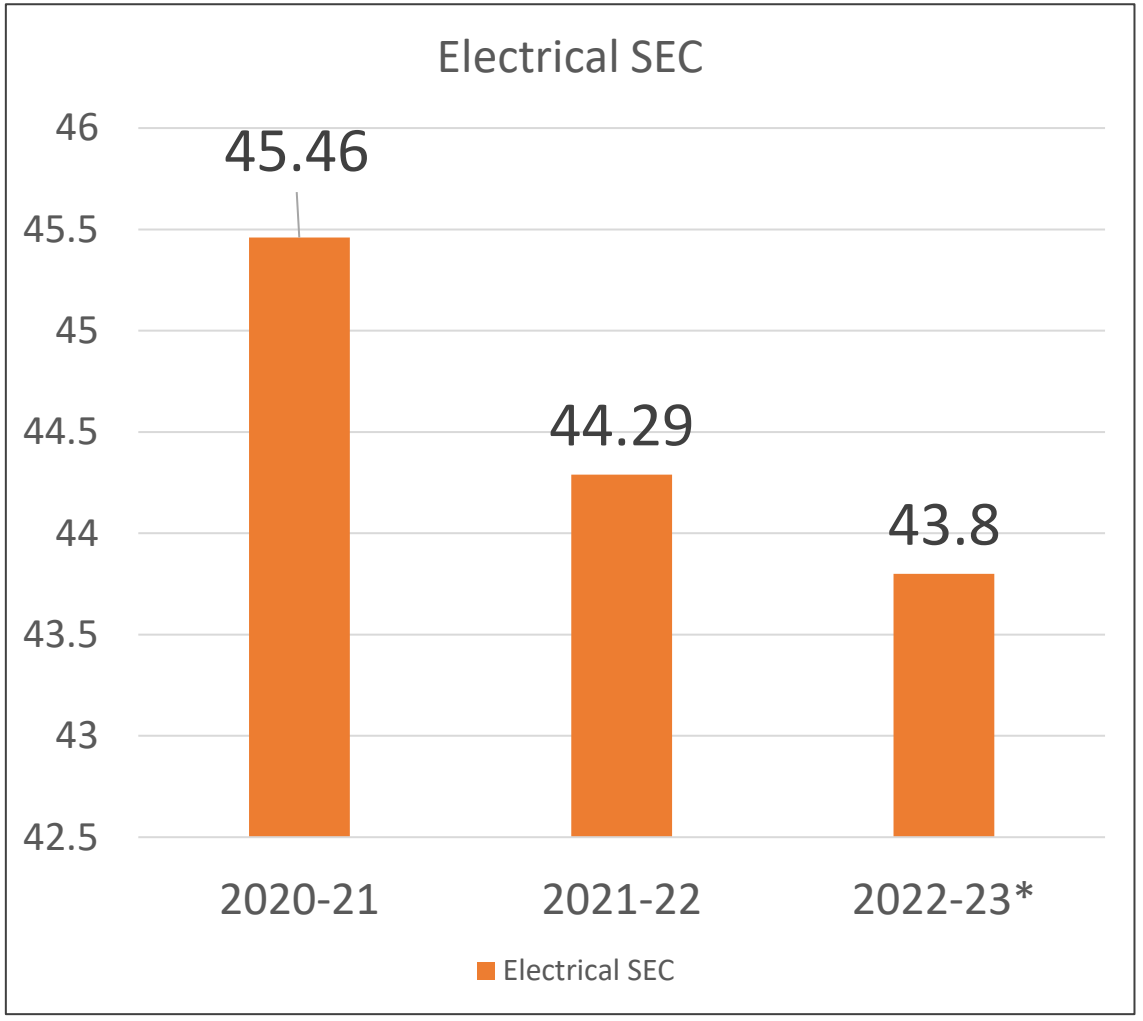
SPECIFIC THERMAL ENERGY CONSUMPTION

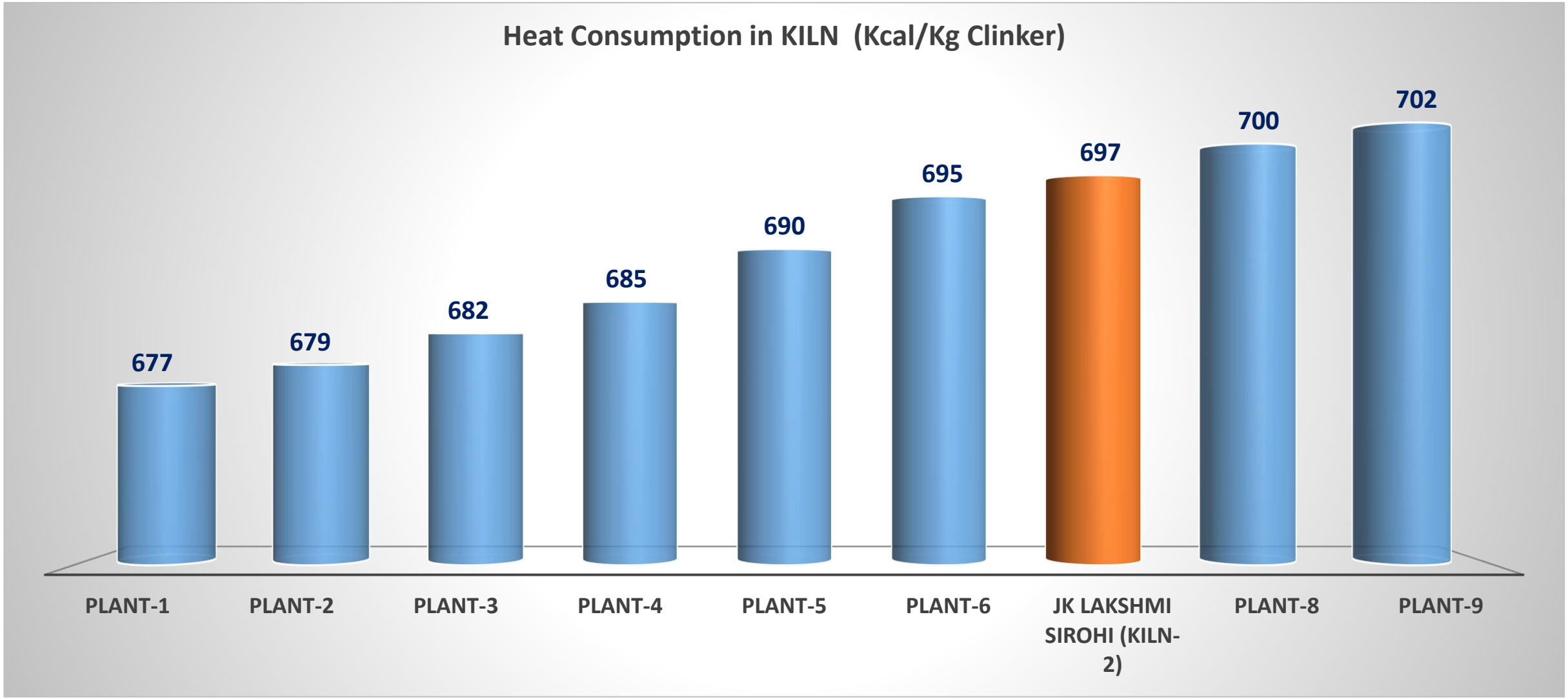


SPECIFIC ELECTRICAL ENERGY CONSUMPTION UPTO CLIKERISATION



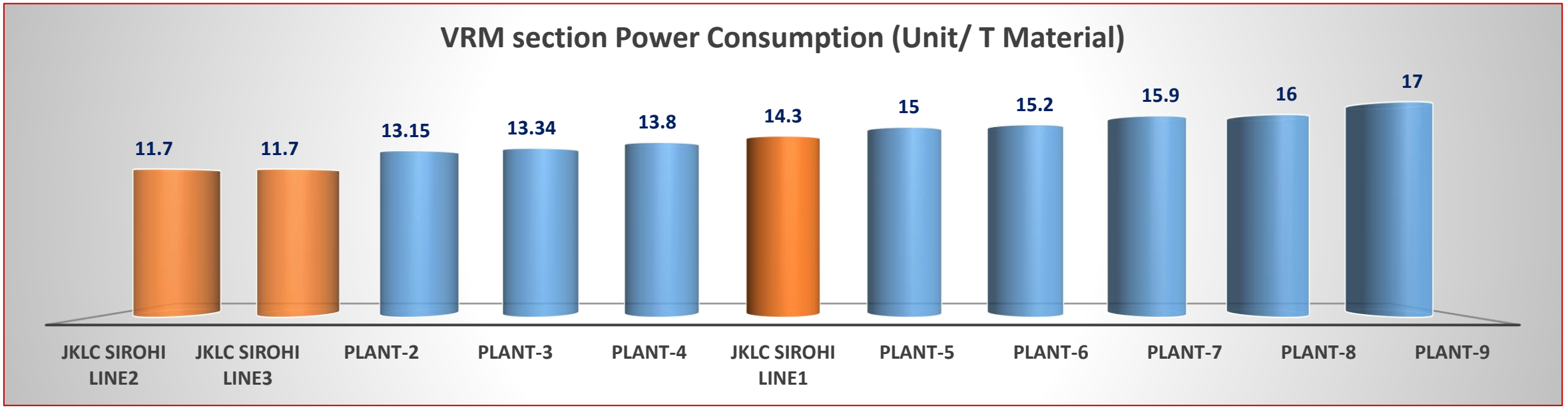
THERMAL SEC IN SAME CLUSTER

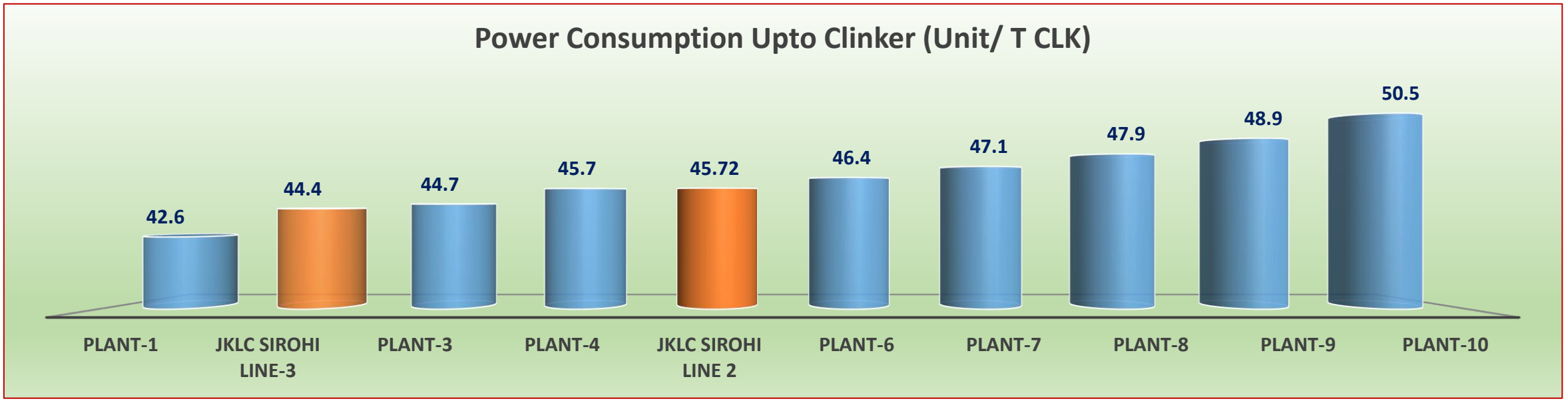
Energy Benchmarking By CII 2021-22



ELECTRICAL SEC ON CLINKER IN SAME CLUSTER

Energy Benchmarking By CII 2021-22





UTILIZATION OF RENEWABLE ENERGY

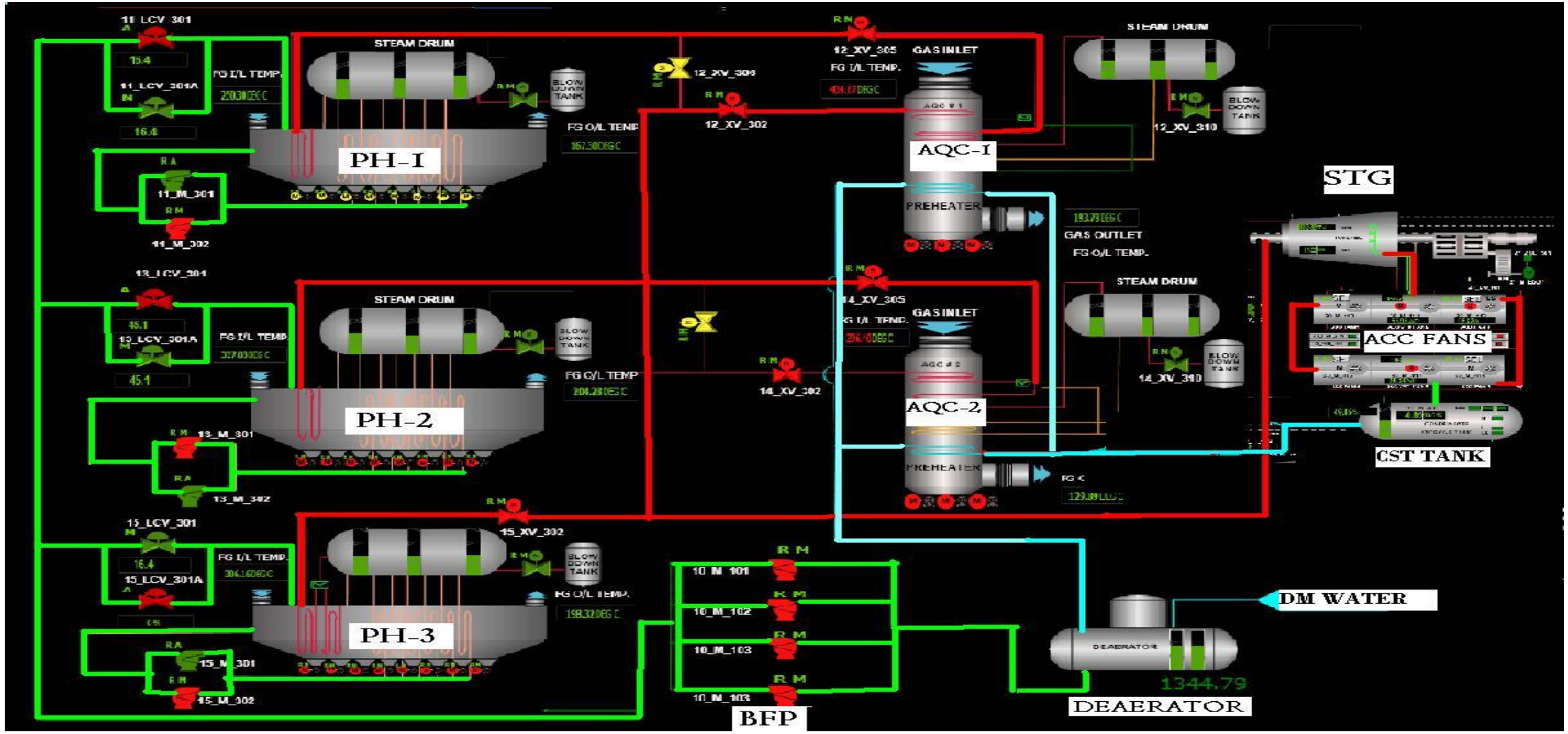
Year	Technology (Electrical)	Type of Energy	Installed Capacity (MW)	Net Generation (million kWh)	% of overall electrical energy
2022-23* (Upto Feb)	WHRS	Green Power	25.4	121.62	33.29
2021-22	WHRS	Green Power	15	106.16	27.25
2020-21	WHRS	Green Power	15	82.29	22.44

Year	Technology (Electrical)	Type of Energy	Installed Capacity (MW)	Net Generation (million kWh)	% of overall electrical energy
2022-23* (Up to Feb)	SOLAR	Green Power	17.56	17.16	4.70
2021-22	SOLAR	Green Power	4.16	8.42	2.16
2020-21	SOLAR	Green Power	4.16	5.41	1.47

- Journey of Waste Heat Recovery System at JKPURAM

15 MW WHR Installed in December 2010

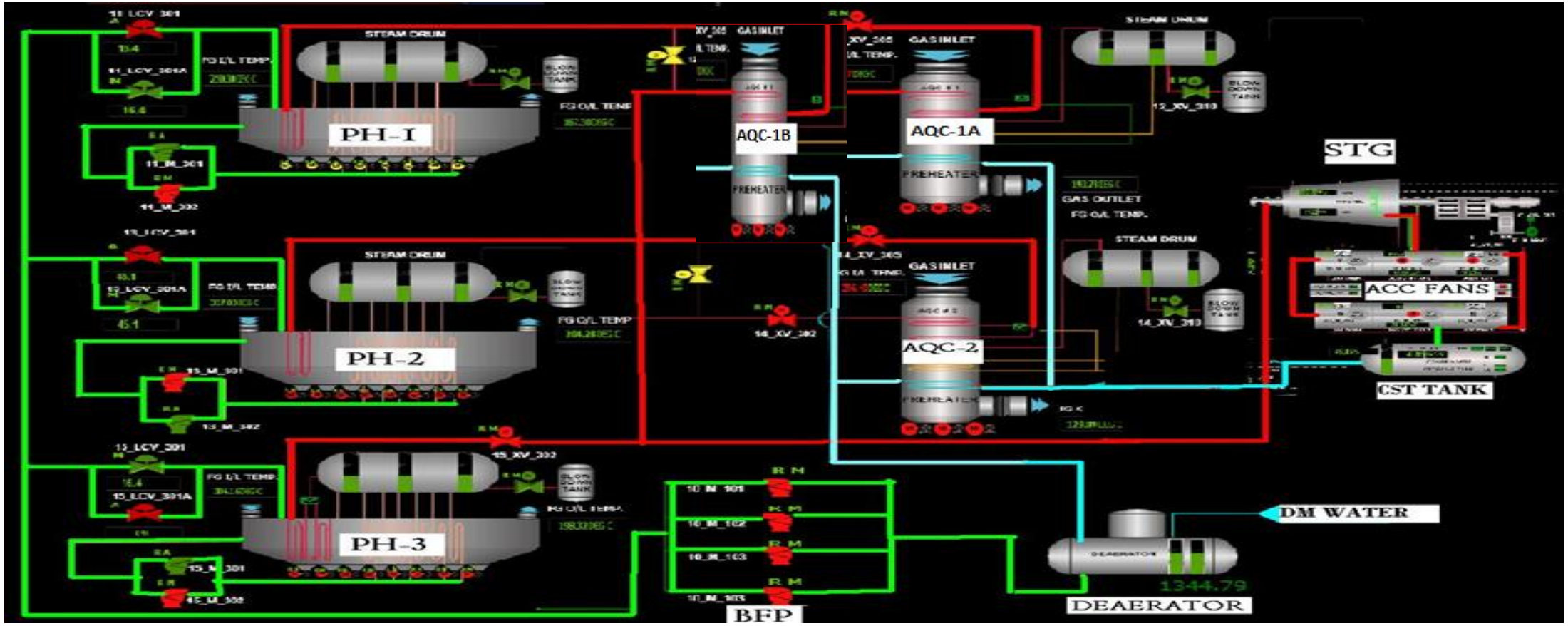
- Three Numbers PH Boilers Heated By Exit Flue Gases From The Preheater Of Kiln 1,2 & 3
  - Two Nos AQC Boilers Heated By Exit Gases From Cooler Kiln 1 & 2



Schematic Flow Diagram of WHR

Additional Boiler installation at Kiln-1 in year 2014

- **Boiler Capacity 6.22 TPH**
- **Increased power Generation- 39193 KWH per Day**



Schematic Single Line Diagram

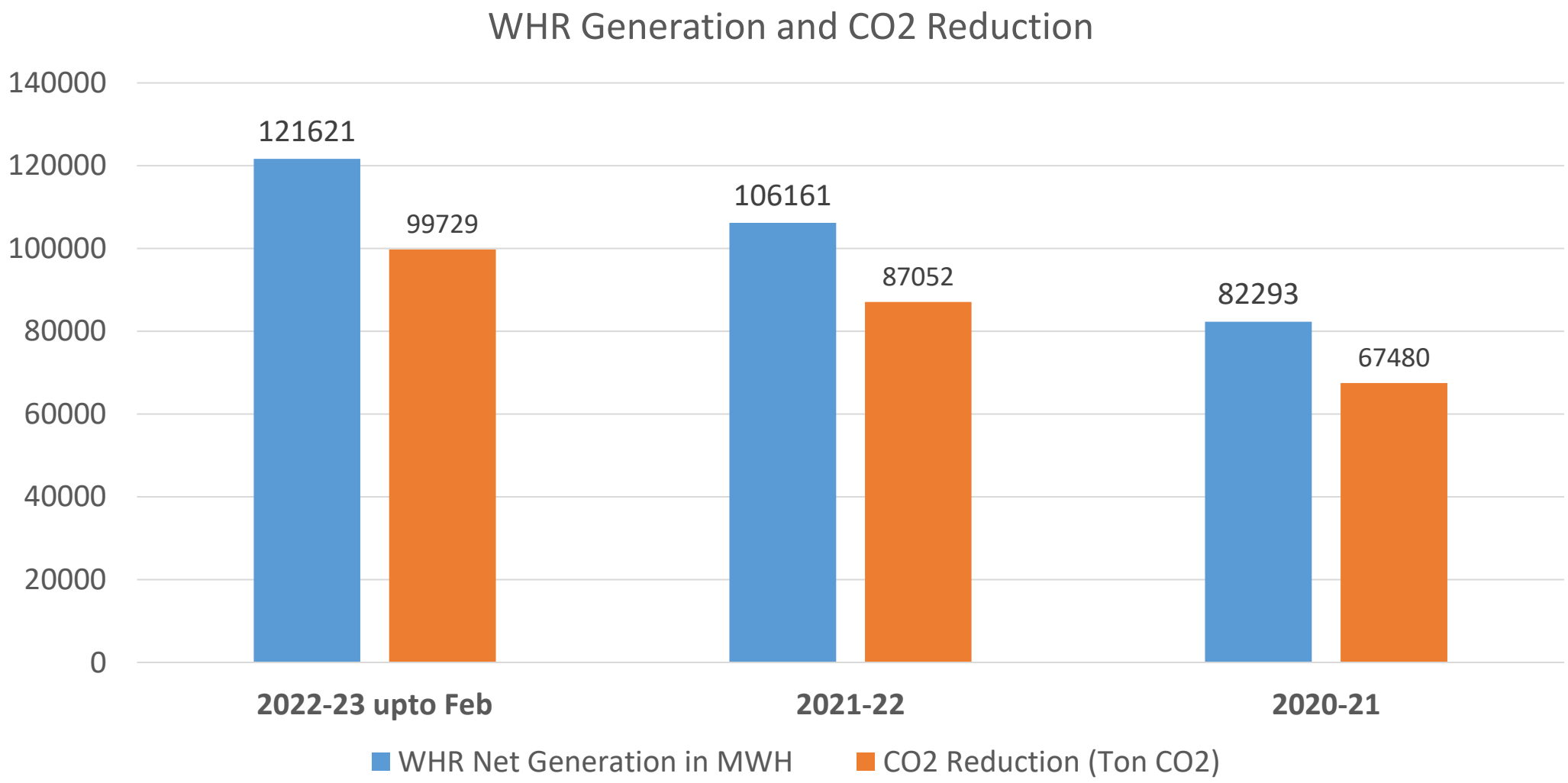
Major Improvement Jobs

S. No.	Opportunity Identified	Action Planned	Benefit Achieved
1	**TG Low Back Pressure Issue due to chocking of Condenser Coil**	Energy Efficient Blades Installed in ACC	1. TG Back Pressure Increased 2. Auxiliary Saving- **600 KWH/Day** 3. Overall ACC Efficiency increased
2	**TG Inlet Steam Temperature High**	Revised TG Inlet Temp. a) 324°C Auxiliary b) 356° to 400°C	1. Turbine Tripping due to High Temp Reduced 2. Reliability Factor Increased 3. Reduced De-superheating of steam
3	**a) Auxiliary power Consumption increased In ID Fan** **b) Erosion in ID Fan impeller by fine clinker particles**	Installed Energy Efficient Fan in AQC-1A & 1B Boilers	1. **2220 KWH/Day** Auxiliary Saved 2. Fan Low RPM design, erosion in fan impeller Reduced
4	**PH Boiler Eco drain Header Water Leakage**	Eco Drain header extended to installed outside Boiler	1. Water leakage due to thermal expansion in drain header not carried out. 2. Ease of maintenance in case of leakage

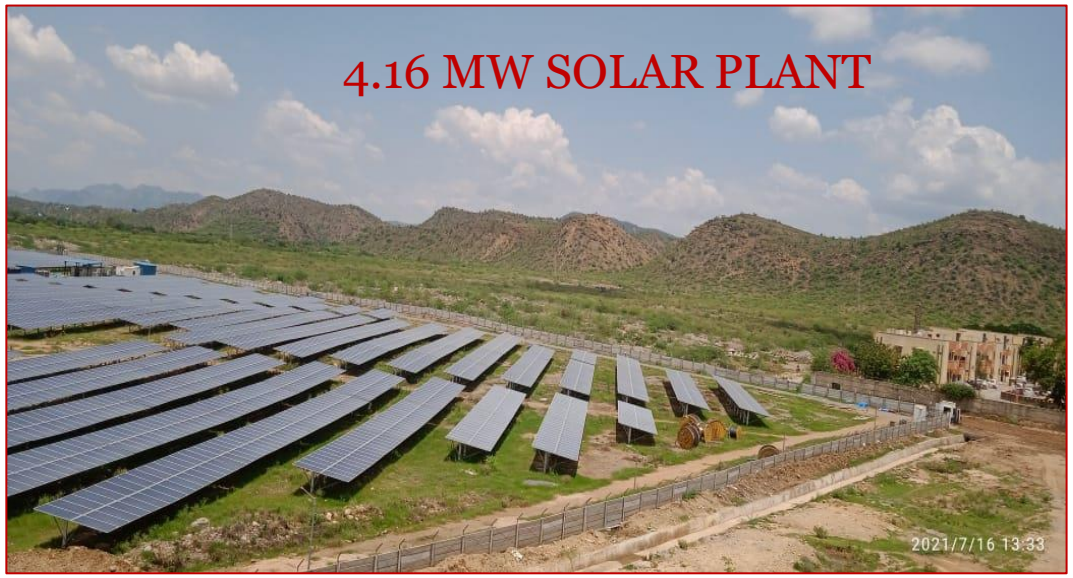
Major Improvement Jobs

S. No.	Opportunity Identified	Action Planned	Benefit Achieved
5	**Final Superheater Coils Leakage by fine clinker particles**	Baffles are incorporated to reduce velocity of fine clinker	1. reduced tube leakages due to high temperature fine clinker particles. 2. Increased Super heater tube life
6	**ACC Fans Auxiliary power consumption increased**	VFD's Installation in ACC fans	1. ACC Fans RPM varies according to TG back Pressure. Auto logic removes human error. 2. Reduced auxiliary power consumption
7	**BFP and CEP Auxiliary power consumption Increased**	VFD's Installation in BFP and CEP	1. Reduced Auxiliary power consumption in BFP- **336.72 KWH/Day** 2. Reduced Auxiliary power consumption in CEP- **307.2 KWH/Day**
8	**TG Area Exhaust Fans Power**	Installed Tubo vent Fan	Reduced Auxiliary power consumption- **73 KWH/Day**

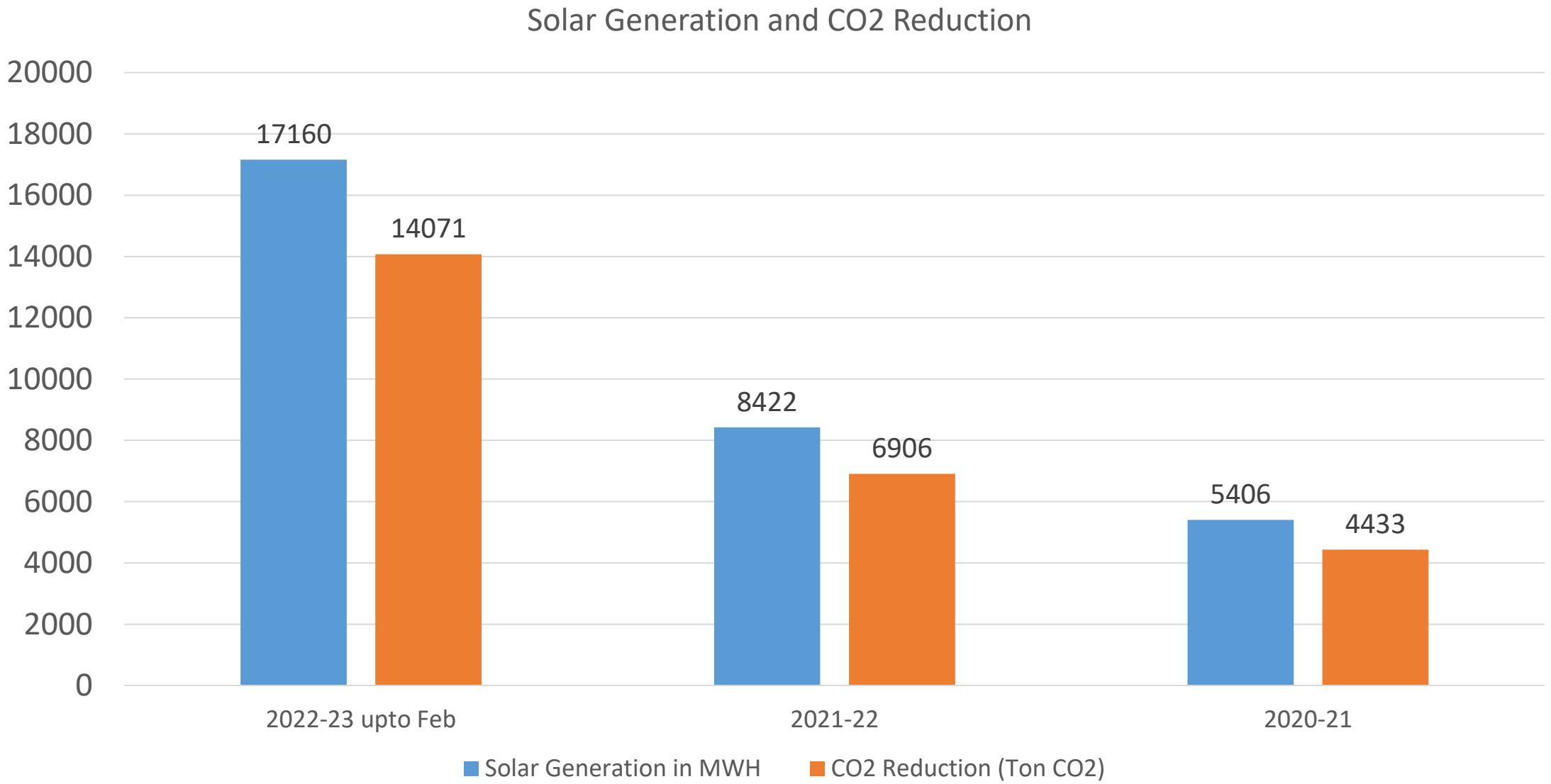
WHR GENERATION



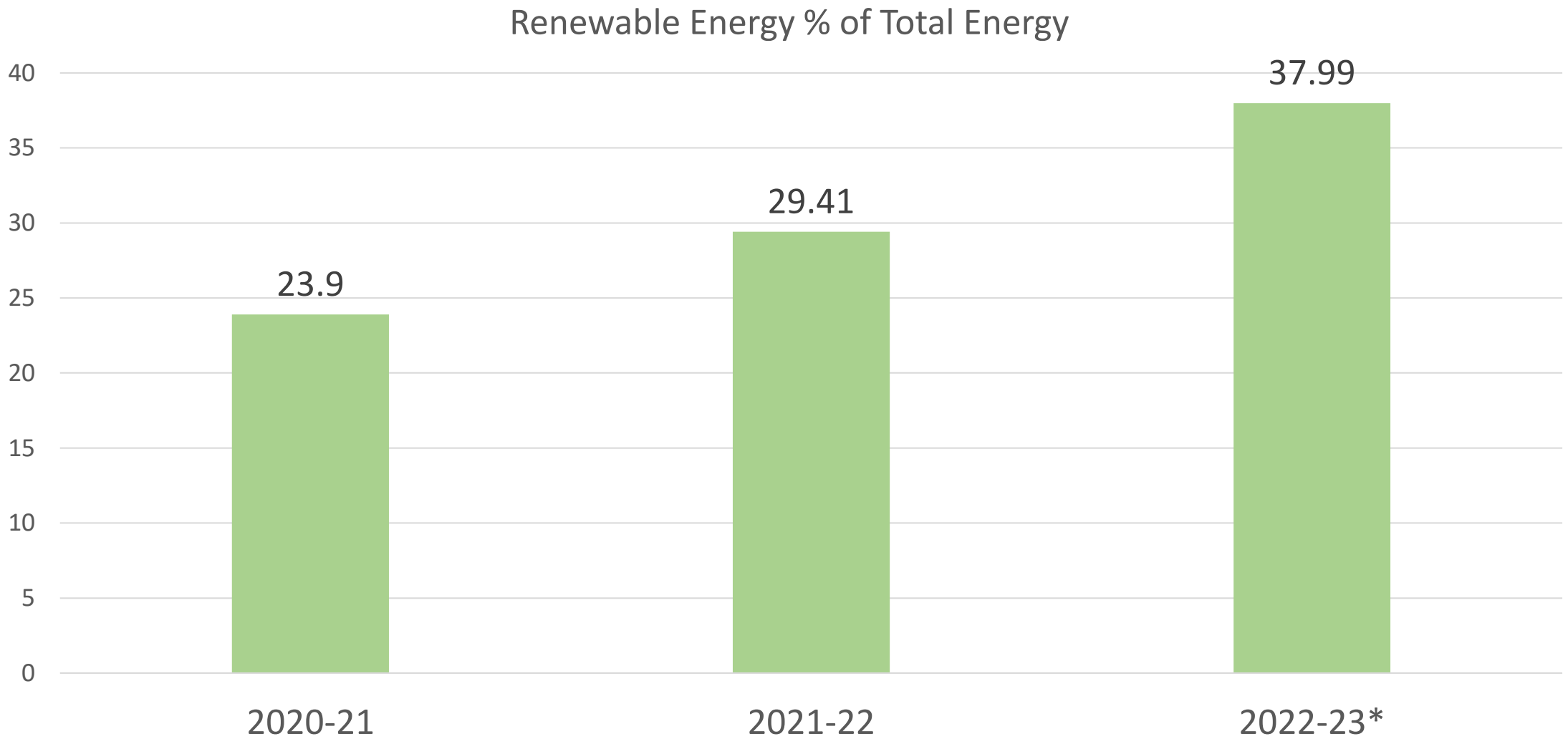
RENEWABLE ENERGY AT JKLC



RENEWABLE ENERGY AT JKLC



Usages of Renewable Energy



Best Practices At JKLC Sirohi

MAJOR ENERGY SAVING PROJECTS

S. No	Energy Saving Projects Description	Annual Saving Description
	Optimization of VRM by modification of Nozzle ring and optimization of mill bed height.	**(133 kW)**
	Optimization of Coal Mill by grinding media and modification of intermediate diaphragm.	**(61 kW)**
	Optimization of Kiln-3 Compressors Operation by reducing the operating pressure of Compressor.	**(15 kW)**
	Optimization of kiln operation.	**(16630 MT Coal Saving /Annum)**

MAJOR ENERGY SAVING PROJECTS

S. No	Energy Saving Projects Description	Annual Saving Description
03	Modification in 465 KW Kiln-2 CV Fan SPRS system.	**42 kW**
08	**Optimization of Dam Ring Height in China VRM (70 mm to 56 mm)**	**110 kW**
09	Arresting of false air in pre-collector and replacement of expansion joint in china VRM	**22 kW**
10	Reduction in PH fan power consumption in Kiln-3 by arresting false air ingress	**30 kW**
11	Remove 35 BE1 Bucket elevator in precrusher (Feeding belt discharge in vibrating screen instead of bucket elevator)	**15 kW**

MAJOR ENERGY SAVING PROJECTS

S. No	Energy Saving Projects Description	Annual Saving Description
12	Installation of high efficient fan with VFD in cement mill-1	**60 kW**
13	Re-Routing of dry fly ash transportation line.	**59 kW**
14	**Kiln inlet riser duct modification in kiln-1**	**65 kW**
15	**Modification of Raw Mill -2 by CFD of Cyclones and duct**	**60 kW**

MAJOR ENERGY SAVING PROJECTS

S. No	Energy Saving Projects Description	Annual Saving Description
15	**Modification of Raw Mill -3 by CFD of Cyclones and duct.**	**60 kW**
16	**Installation of IGBT based digital SPRS in place of thyristor based analogue SPRS in raw mill-3**	**50 kW**
17	Reduced power consumption in 10FN-1 Dust collector Fan	**18 KW**
18	Reduce power consumption in Kiln-1 cooler fans through optimization	**15 KW**
19	Optimization of cooling air in kiln-1 by cleaning of grate plates	**46 KW**

MAJOR ENERGY SAVING PROJECTS

S. No	Energy Saving Projects Description	Annual Saving Description
20	Optimization of separator BH DP in CM-1, CM-3,CM-5,CM-6	**16 KW**
21	Sphere slot of outlet diaphragm has been blocked in cement mill-1	**25 KW**
22	Reduction in Electrical & Heat Consumption by Optimizing the Coal Conveying Volume in Kiln-1	**18 KW & 1 Kcal/Kg Clk**
23	Interconnection of RM-1 Compressor 36CP-3 with Raw Mill-4 Bag House Compressor 361CP-1	**29 KW**
24	**Modification Of Cheek Plate in CM-2 HRC**	**170 KW**

MAJOR ENERGY SAVING PROJECTS

S. No	Energy Saving Projects Description	Annual Saving Description
25	Reduce power consumption of Kiln-2 andKiln-3 Blaster compressor by optimization of Blaster Operating freq. & compressor loading-unloading pressure	**55 KW**
26	Interconnection of Kiln-2 PH blaster compr with Kiln-2 inlet seal compressors	**22 KW**
27	Interconnection of Kiln-1 PH Blaster compr with 3 nos. of other compr (KGG; Cooler Blaster & Chemical Lab)	**25 KW**
28	Optimization of CM-1,CM-3,CM-5,CM-6 Bag house system	**34 KW**
29	CM-1 CA Fan I/L Damper Removal	**22 KW**

MAJOR ENERGY SAVING PROJECTS

S. No	Energy Saving Projects Description	Annual Saving Description
30	417 Nos. Conventional HPSV Lights replaced with Energy Efficient LED lights	**33 KW**
31	**Installation of HOT Air Recirculation in Kiln-2 to increase the Green Power Generation (Through WHRS)**	**9500 kWh/Day**
32	**Installation of New Louver Ring in RM-3**	**150 KW**

MAJOR ENERGY SAVING PROJECTS

S. No.	Energy Saving Projects Description	Annual Saving Description
33	Optimization of grinding media in CM-1 as per Pro+ grade	**80 kW**
34	Arresting False air ingress across pre-collector and mill outlet (RM-4)	**40 kW**
35	Optimization of Cooling Air in Kiln-1	**80 kW**
36	**Installation of Aerofoil design louver ring and armour ring in VRM-2**	**100 kW**
37	Installation of Online Particle size Distribution Analyzer (PSD) in CM-2	**185 kW**

MAJOR ENERGY SAVING PROJECTS

S. No.	Energy Saving Projects Description	Annual Saving Description
38	Reduction in Energy Consumption of CCR centralized Air conditioner by installing motorized dampers and VFD	**15 kW**
39	**Optimization of Cement Mill-2 by modification of Mill vent Bag House circuit**	**88 kW**
40	optimization of Raw Mill-4 Circuit by reducing false air ingress	**16 kW**
41	**Optimization of Grinding Media Pattern in Both the Camber to improve productivity**	**90 kW**
42	Optimization of Armour ring angle & Installation of Support Ring at Damring in Phase-2 VRM	**64 kW**
43	**Phase-1 VRM BH Fan power reduction by false air leakage arresting and SPRS new panel installation.**	**80 kW**

MAJOR ENERGY SAVING PROJECTS

S. No.	Energy Saving Projects Description	Annual Saving Description
44	Logic modification in fly ash dryer D-pump	25 kW
45	To make filling arrangement for cement silo no.-6 by cement mill no-2:	40 kW
46	Arresting of false air ingress across RM-4 circuit	30 kW
47	RM-1 Separator Efficiency Improved By False Air Arresting at Sep. Grid Cone Body & Sep. Feeding Bucket Elevator Discharge Flaps Repairing Work.	36 kW
48	optimization of separator efficiency inCM-1	20 kW
49	To improve ventilation across mill, Modification in opening area of mill intermediate diaphragm	36 kW

MAJOR ENERGY SAVING PROJECTS

S. No.	Energy Saving Projects Description	Annual Saving Description
50	Installation of Iteca Seal in Kiln-3 to reduce false air ingress through kiln Inlet seal	**40 kW**
51	Applied Insulating Paint on PH and TAD area of kiln-3	**0.75 kCal/kg of clinker**
52	**Optimization of Grinding Media Pattern in RM-1 Ball mill in both the Camber of mill to improve productivity**	**90 kW**
53	RM-3 Armour ring angle has been optimized that resulted into improvement in internal recirculation in the mill	**64 kW**
54	Arresting the false air ingress across the Preheater in Kiln-2	**50 kW**
55	Optimization of Kiln-2 Cooler	**50 kW**

MAJOR ENERGY SAVING PROJECTS

S. No.	Energy Saving Projects Description	Annual Savings in kW
56	Modification of boiler outlet duct to preheater fan inlet duct in Kiln-3 to reduce pressure drop	70kW
57	Increase in Fly Ash and Gypsum consumption in PPC & "Pro +" Cement Production. Power Reduced in PPC 1.51 U/T and 0.47 U/T in Pro+. We have also saved 37287 MT Clinker	300kW
58	Uses of 39 types of AFR including TPP Fly ash . We have started some type of new AFR like spent alumina, Corex fine,spent caron etc.	% AFR Consumption 16.4%

Best Practices At JKLC Sirohi

1. Reduction in Raw mill fan power consumption by installation of aerofoil design louver ring in VRM-III

❑**Background:** Pressure drop across Mill (892 mmwg)

❑**Probable reason :** Non uniform distribution of air across louver ring

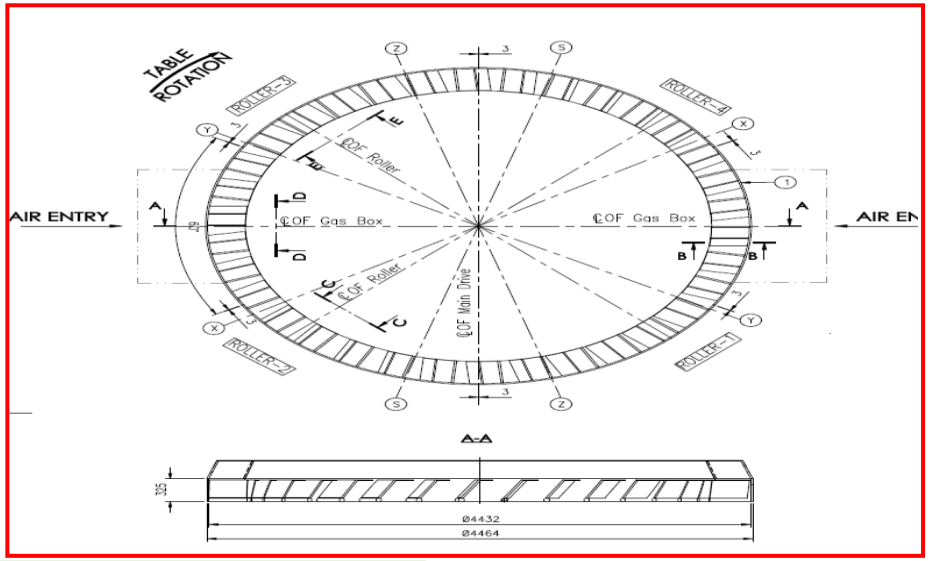
❑**Action taken :** Thorough study and replacement of louver ring with aero foil design louvers

Best Practices At JKLC Sirohi

1. Reduction in Raw mill fan power consumption by installation of aerofoil design louver ring in VRM-III

- This modification helped us to reduce pressure drop by 62 mmwg.

- **There is saving of 159 units/hour in Raw mill fan Power**



Savings in terms Power Consumption

- **Total units saved : 1259280 KWH/Year**
- **Total Savings : 6.92 Million/Annum (@5.5 Rs/Unit)**
- **Total Investment : 0.35 Million**
- **Payback Period : 1 Month**

Best Practices At JKLC Sirohi

2. OPTIMISATION OF PHASE 01 VRM

❑Background:

1. Pressure drop across Mill Was High
2. Mill reject was also high
3. Mill vibration was on higher side

❑Action taken :

1. Armour Ring angle has been changed from 15 degree to 10 Degree.

2. Support Ring at dam ring has been installed to retain more feed on Table

Best Practices At JKLC Sirohi

2. OPTIMISATION OF PHASE 01 VRM

❑Benefits:

1. Productivity improved by 10 TPH
2. Specific Power Consumption has been reduced by 0.5 unit/t
3. Mill vibration reduced from 12 mm/s to 9 mm/sec

Before

AFTER

Best Practices At JKLC Sirohi

3. Modification of Raw Mill -3 by CFD of Cyclones and duct.

❑Background:

1. Pressure drop across Cyclone Was High due to uneven flow distribution.

❑Action taken :

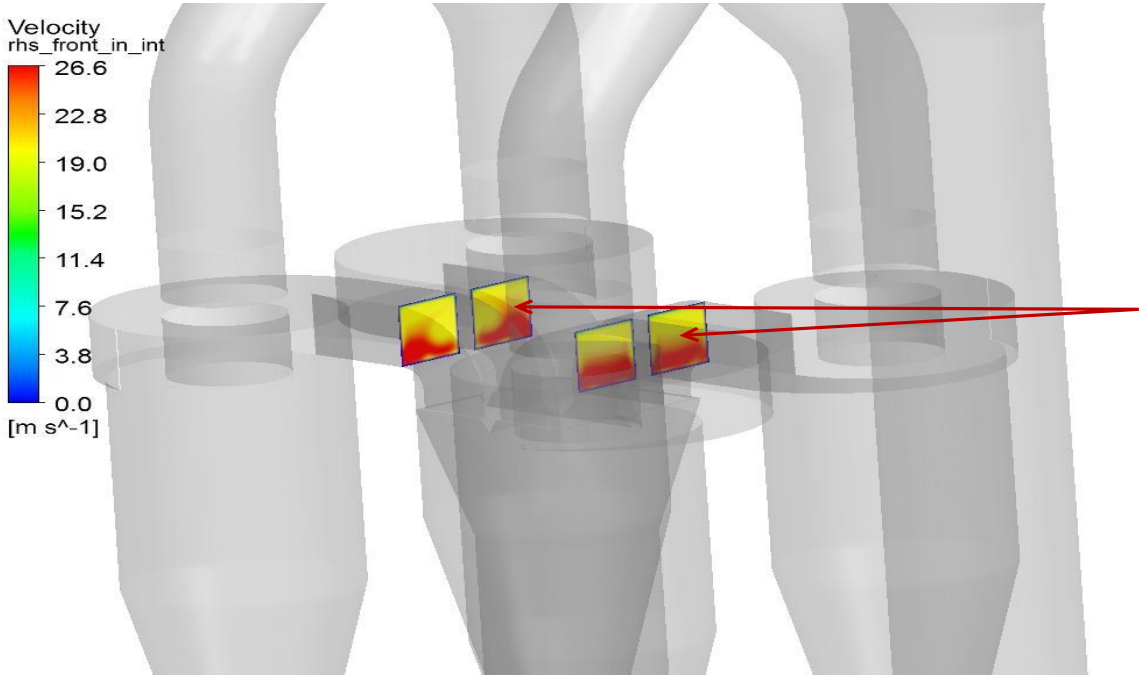
1. CFD of cyclone has been carried out

2. In crease Cyclone Inlet height By 300 mm

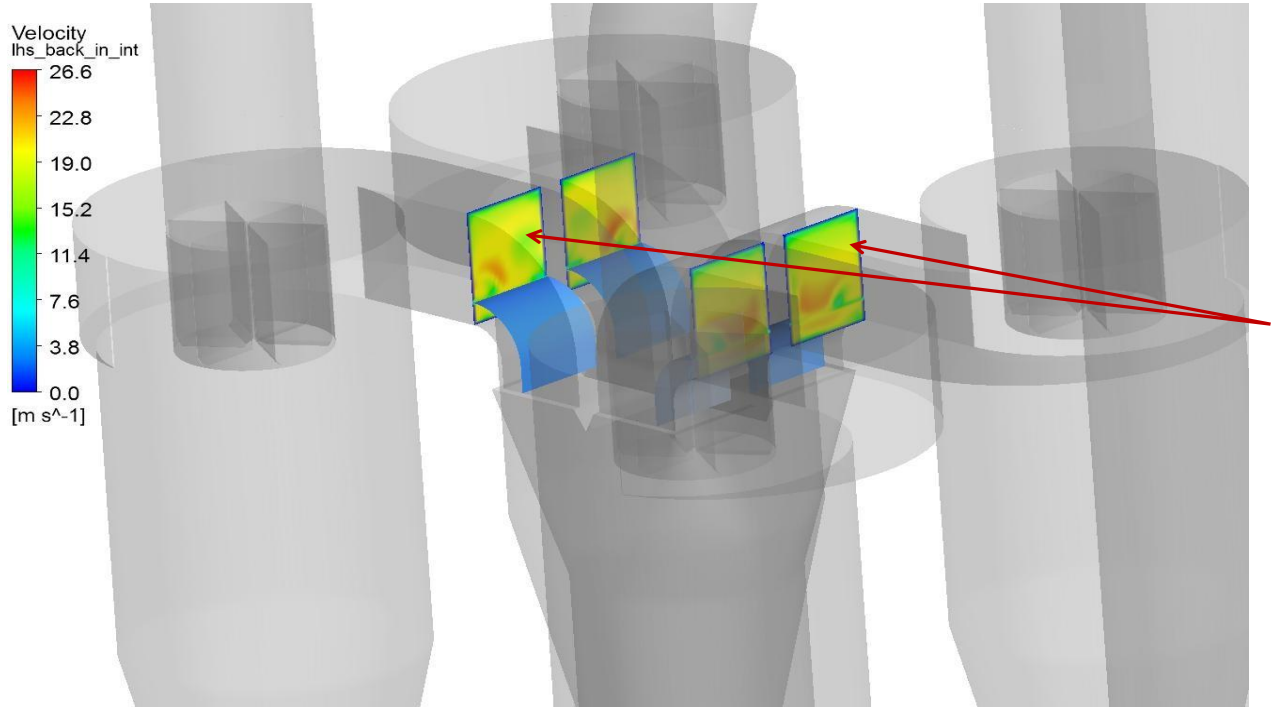
Best Practices At JKLC Sirohi

3. Modification of Raw Mill -3 by CFD of Cyclones and duct.

Flow distribution in Existing Case-:



Flow distribution in Modified Case-:

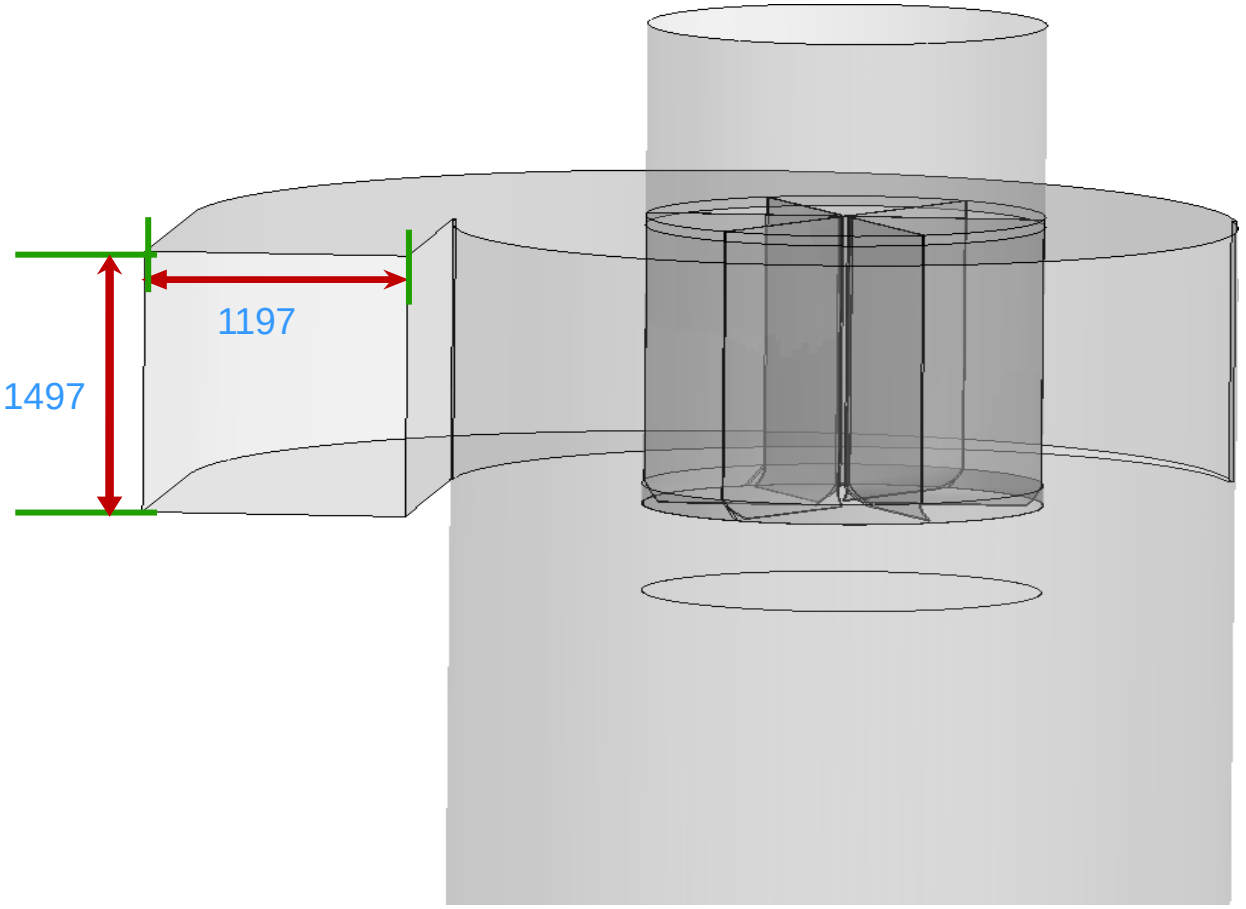


Best Practices At JKLC Sirohi

3. Modification of Raw Mill -3 by CFD of Cyclones and duct.

❑Benefits:

1. Productivity improved by 10 TPH
2. Power Consumption has been reduced by 60 kWh.



Cyclone Inlet Height Increased from 1197 mm to 1497 MM

Best Practices At JKLC Sirohi

4. INSTALLATION OF ONLINE PARTICLE SIZE DISTRIBUTION ANALYZER (PSD) IN CM-2

NEED

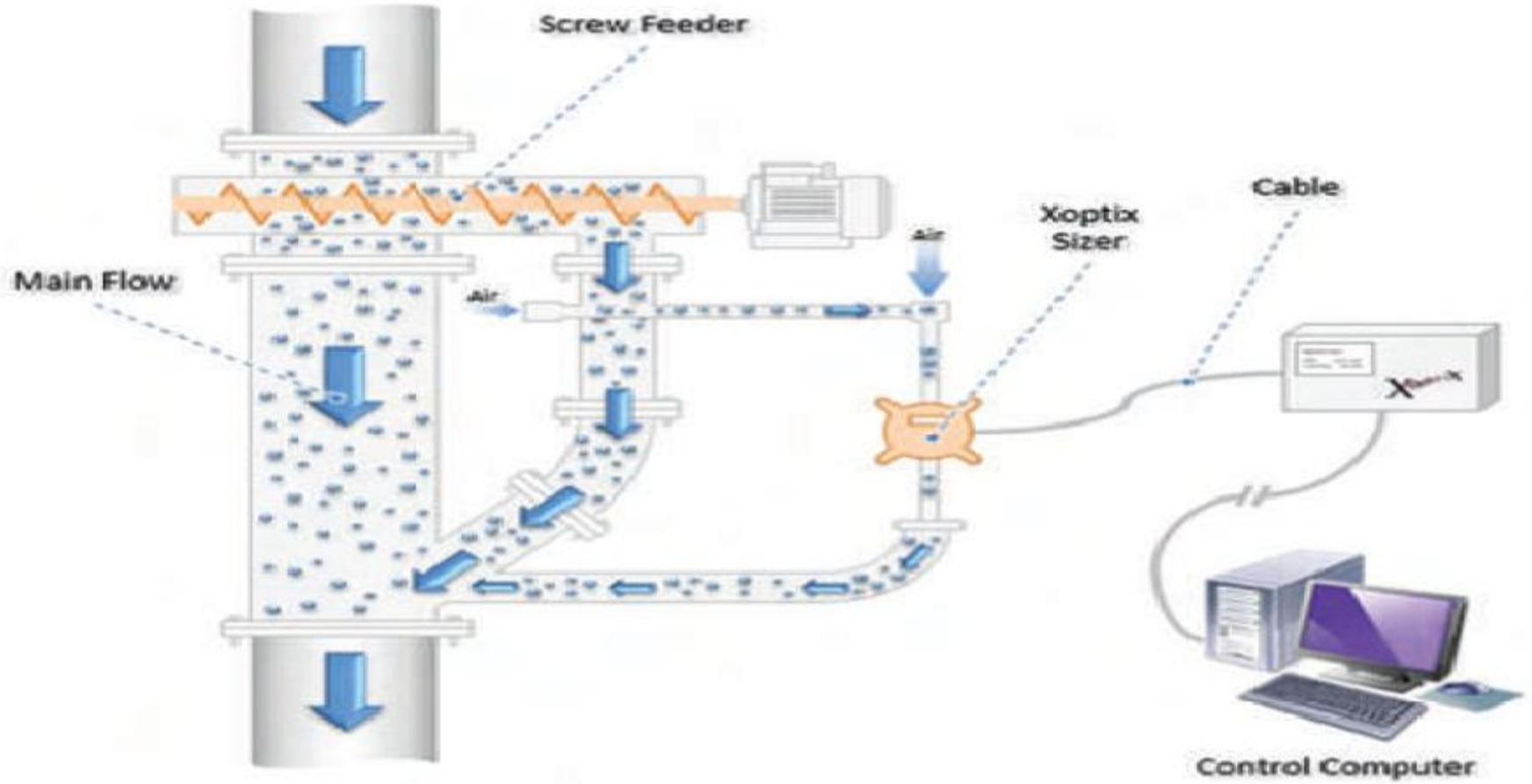
- The limitation of the manual sieving technique, are that it is slow manual procedure and there are chances of error.
- There were significant variation in the product residue and blaine, despite of no changes being observed in the process.
- These variation forced CCR operator to adjust the separator RPM and wait for an hour or two to see the impact.

SOLUTION

- We optimized Cement Mill-2 with the help of getting online data of Particle size distribution, as it helps in tuning the mill parameters which further helped us in increasing the mill throughput.

Best Practices At JKLC Sirohi

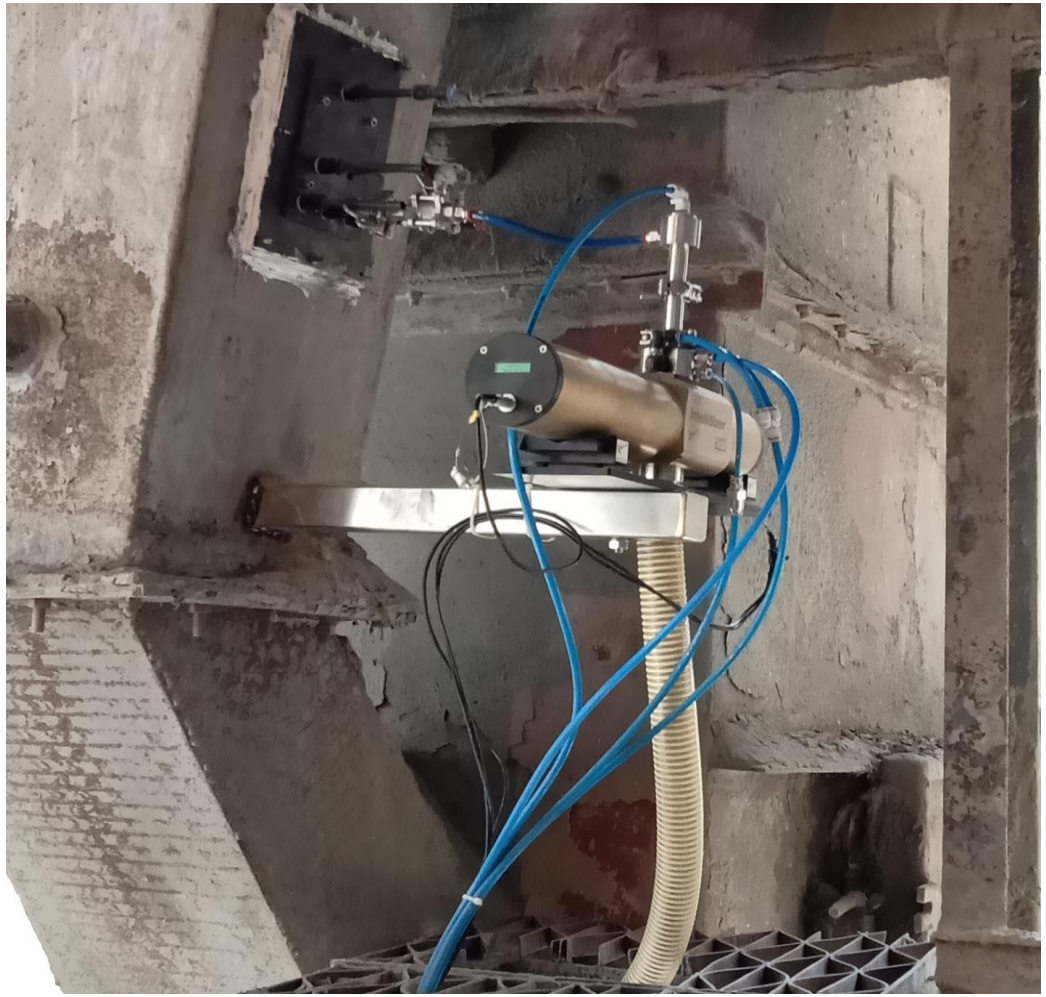
4. INSTALLATION OF ONLINE PARTICLE SIZE DISTRIBUTION ANALYZER (PSD) IN CM-2



Process Flow Diagram for Online PSD Analyzer

Best Practices At JKLC Sirohi

4. INSTALLATION OF ONLINE PARTICLE SIZE DISTRIBUTION ANALYZER (PSD) IN CM-2

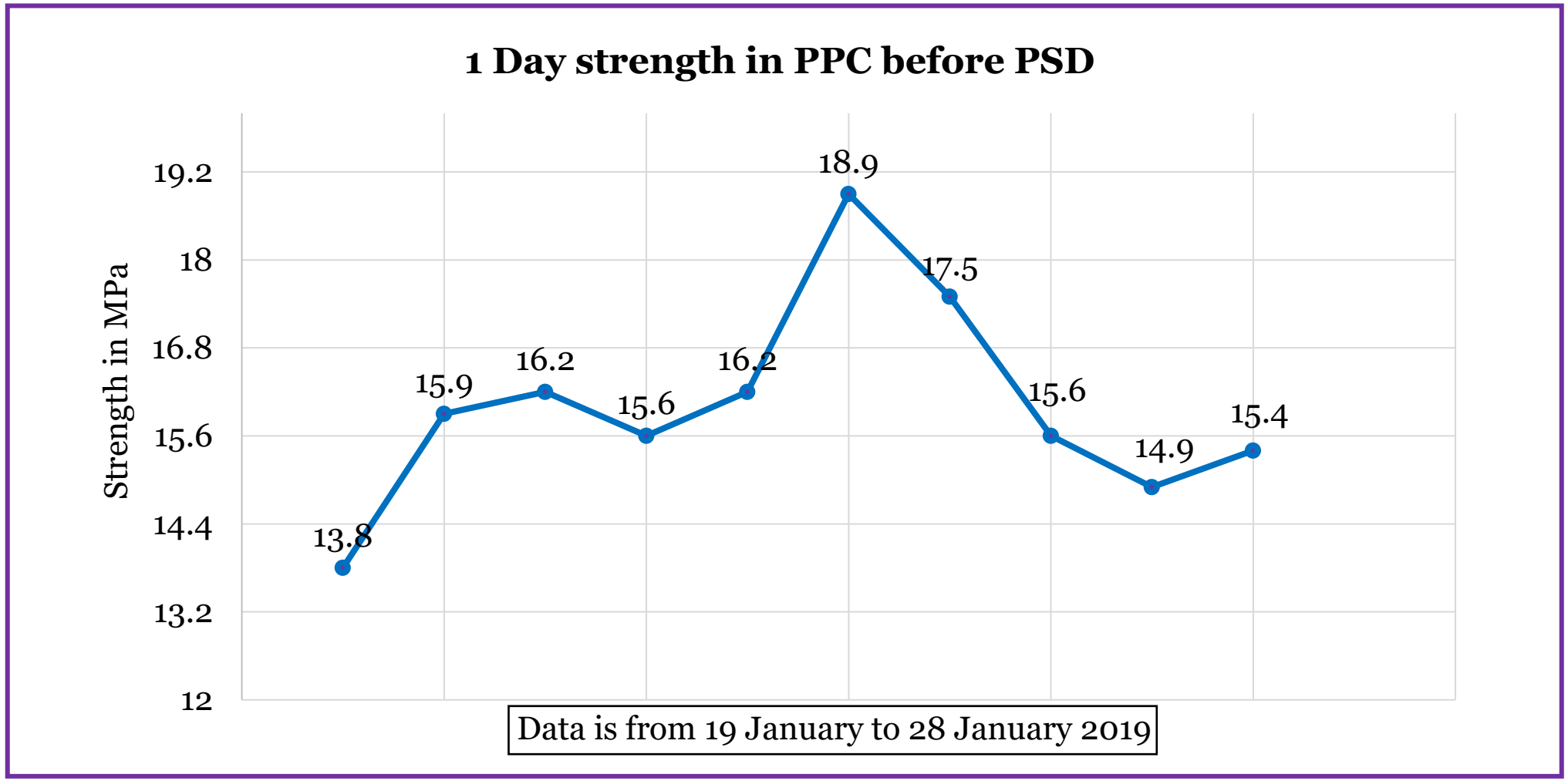


On-Site Picture for PSD Sampler

Control Box

Best Practices At JKLC Sirohi

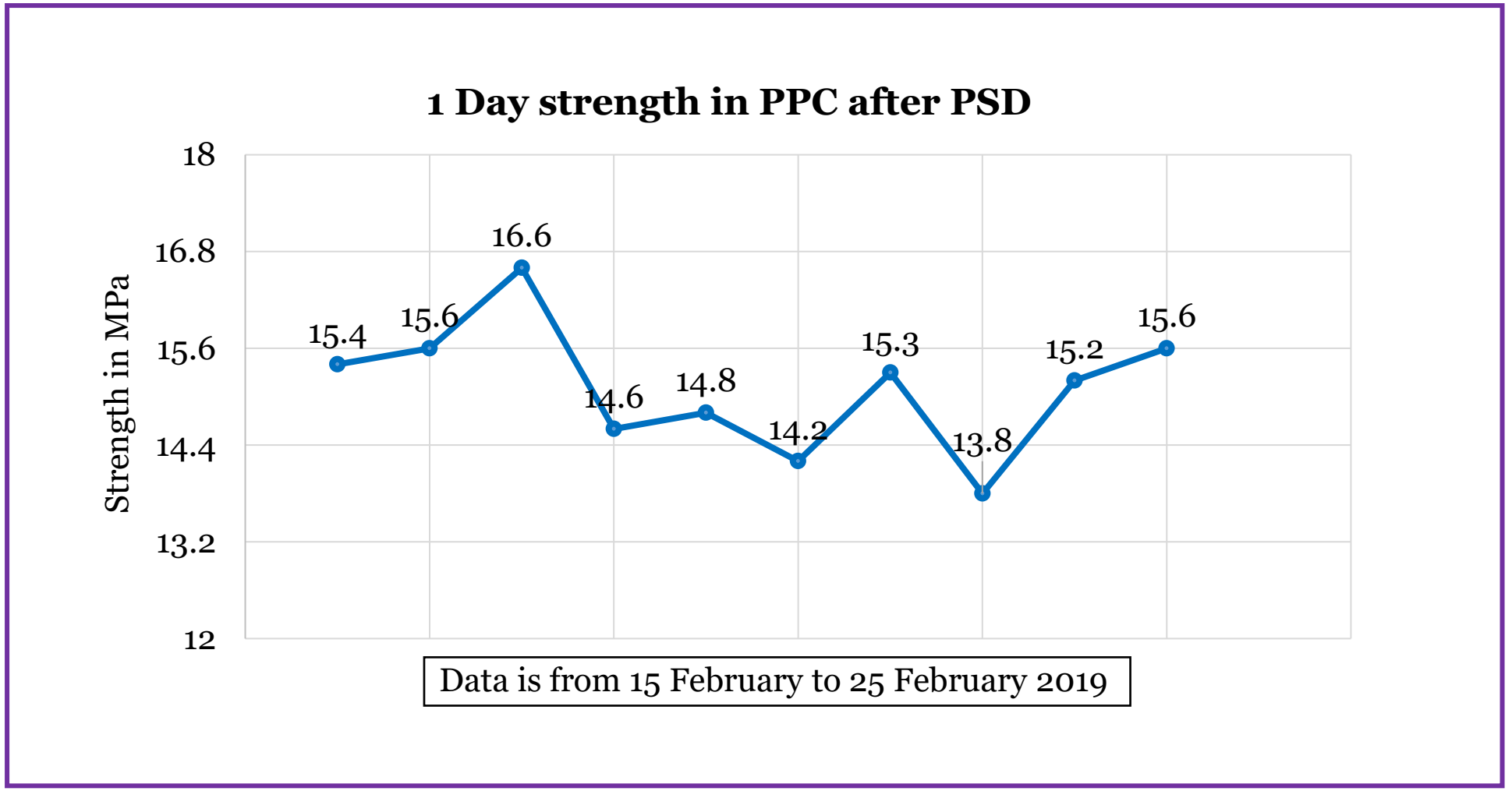
4. INSTALLATION OF ONLINE PARTICLE SIZE DISTRIBUTION ANALYZER (PSD) IN CM-2



Standard Deviation= 1.39 MPa

Best Practices At JKLC Sirohi

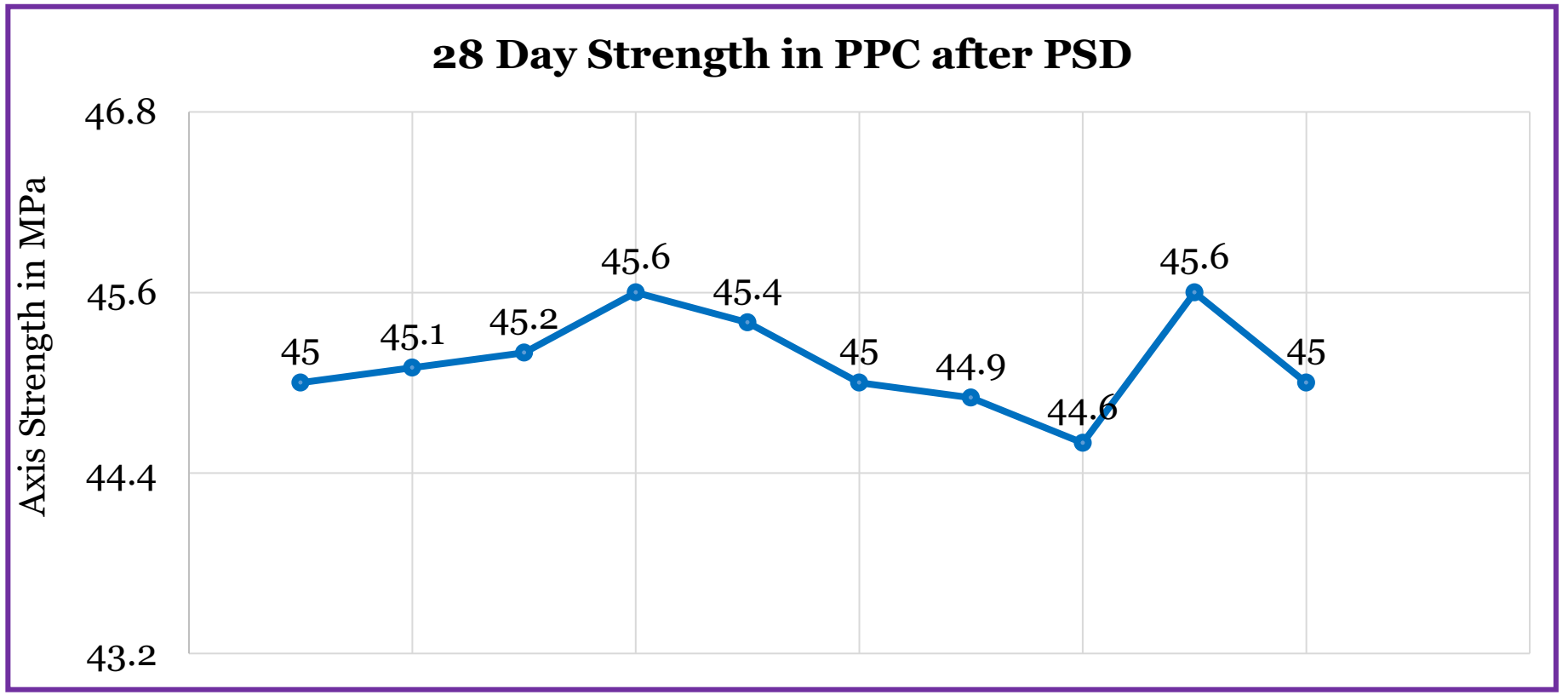
4. INSTALLATION OF ONLINE PARTICLE SIZE DISTRIBUTION ANALYZER (PSD) IN CM-2



Standard Deviation= 0.80 MPa

Best Practices At JKLC Sirohi

4. INSTALLATION OF ONLINE PARTICLE SIZE DISTRIBUTION ANALYZER (PSD) IN CM-2



Standard Deviation Before = 1.59 MPa
Standard Deviation After = 0.32 MPa

Total Electrical Saving = 185 kW

Annual Electrical Savings= 1350500 Units

Monetary Benefits= Rs 4.6 Millions

Best Practices At JKLC Sirohi

4. INSTALLATION OF ONLINE PARTICLE SIZE DISTRIBUTION ANALYZER (PSD) IN CM-2

Parameter	Unit	Before PSD	After PSD
Mill Rate in 43 Grade	TPH	200	206
Mill Rate in PPC Grade	TPH	212	218
1 Day strength in 43 Grade	MPa	26	25.77
1 Day Strength in PPC Grade	MPa	16.41	15.87
28 Day strength in 43 Grade	MPa	52.45	52.25
28 Day strength in PPC Grade	MPa	49.18	48.27

Best Practices At JKLC Sirohi

5. Modification of cheek plate in HRC of cement mill-2

Problem

a) There were two number of cheek plates to guide the clinker to HRC.

b) The cheek plate was only on two side and other two side was open, in open side free fall height of clinker was 297 mm, which was resulting in splash of clinker outside the crushing zone.

c)This was resulting in passage of about 20% uncrushed clinker leading to higher cement grinding power consumption

Initiative

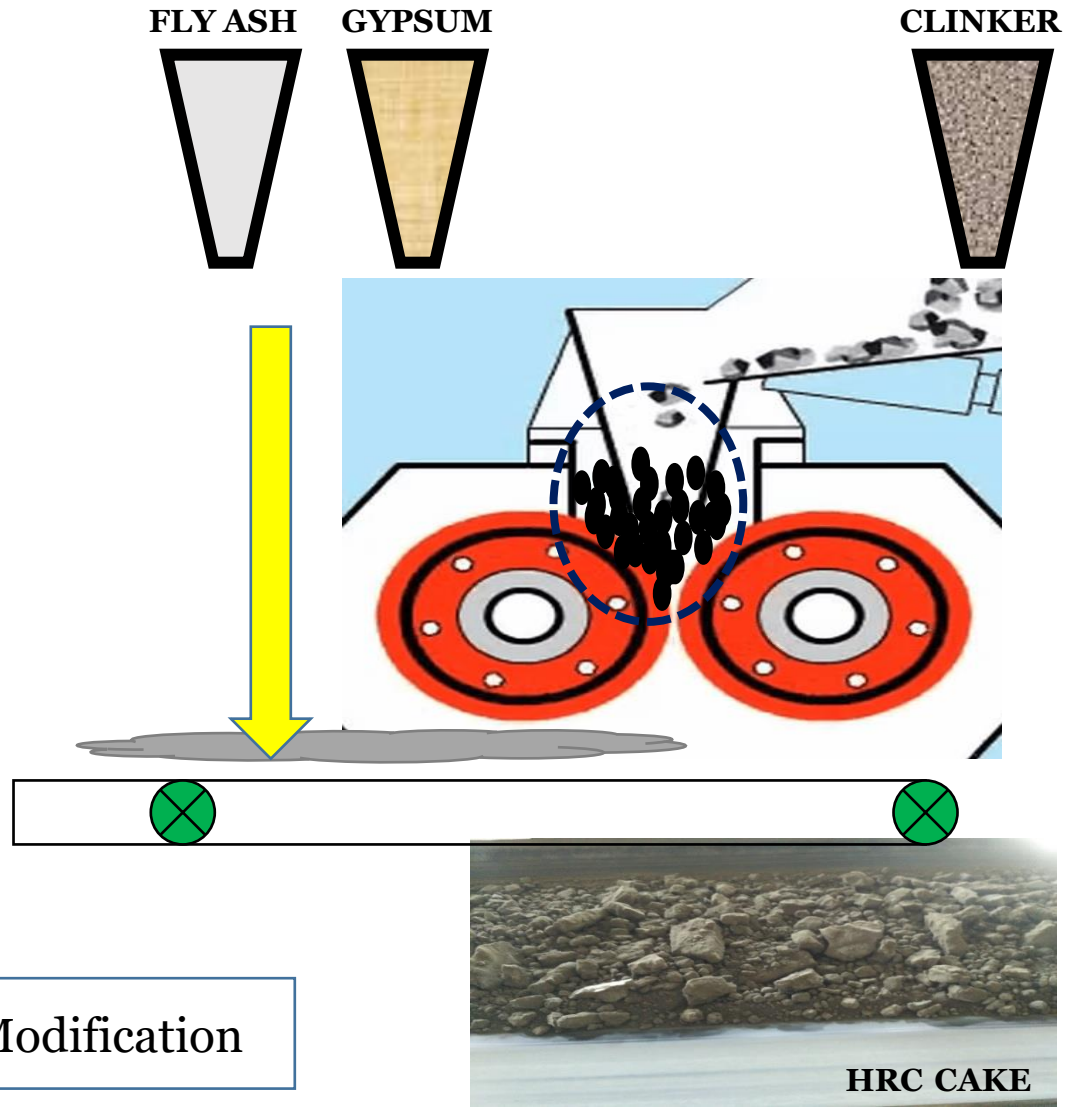
After a lot of brainstorming on the problem, our team came up with a solution of blocking gap between rollers and casing. Our goal was to increase HRC CAKE % and rate of production by around 4 TPH in cement mill no.2.

Results

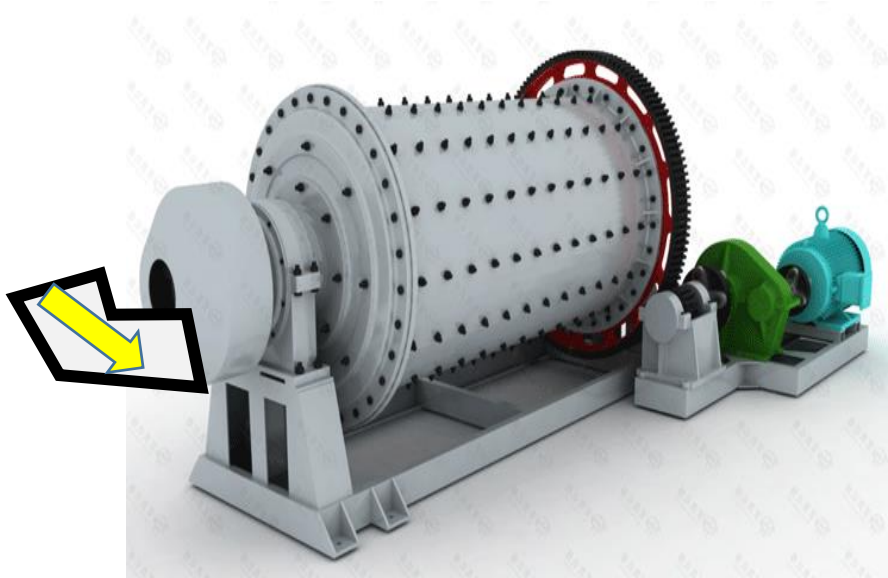
Cheek plate was installed in the gap between rollers. This modification resulted in increased cake formation and mill productivity. It simultaneously decreased the specific power consumption of mill.

Best Practices At JKLC Sirohi

5. Modification of cheek plate in HRC of cement mill-2



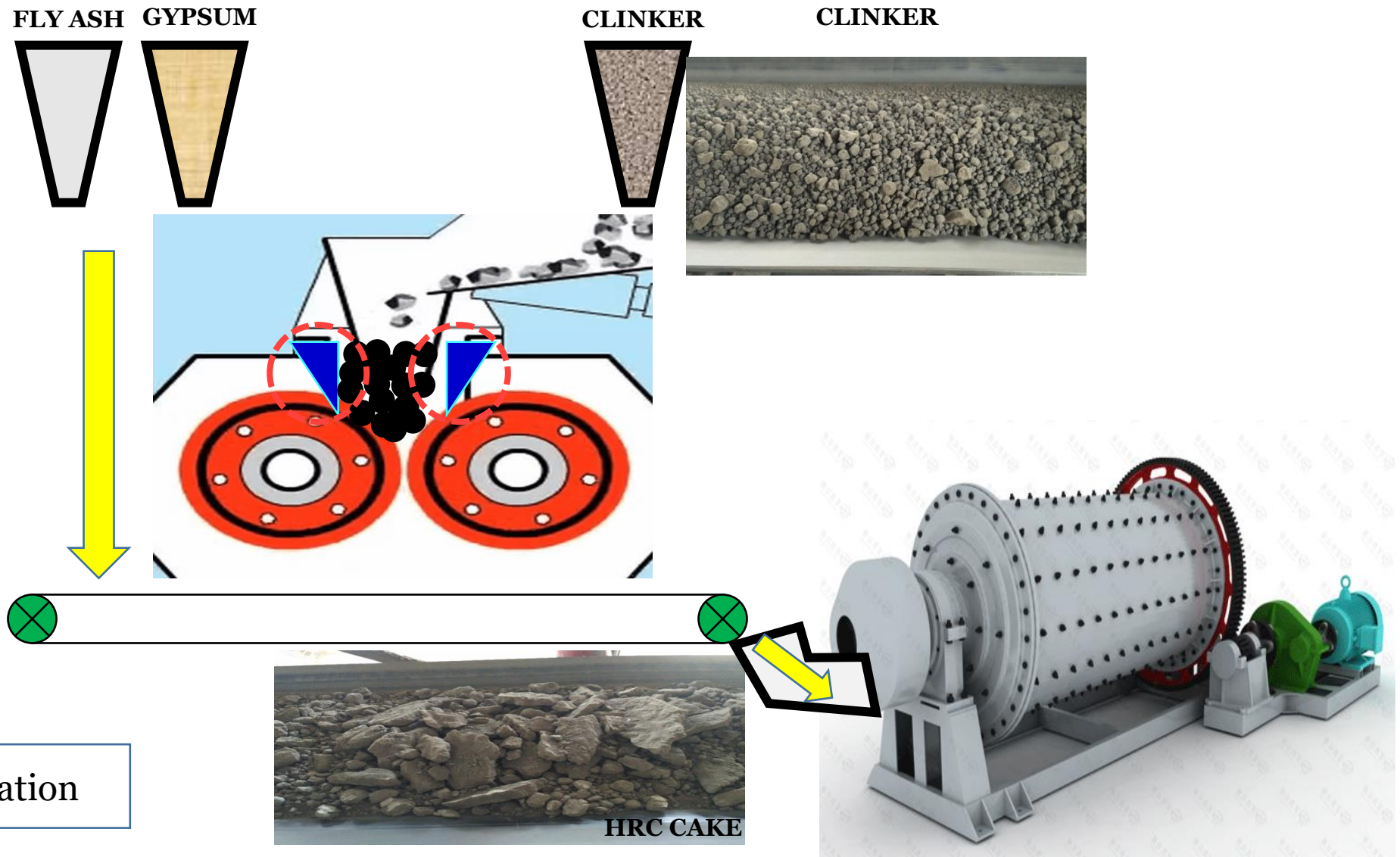
CLINKER



Before Modification

Best Practices At JKLC Sirohi

5. Modification of cheek plate in HRC of cement mill-2



After Modification

Best Practices At JKLC Sirohi

5. Modification of cheek plate in HRC of cement mill-2

Feed Rate (TPH)		HRC Cake (%)	
Before (Jul. 2017 to Sep. 2017)	After (Oct. 2017 to Dec. 2017)	Before (Jul. 2017 to Sep. 2017)	After (Oct. 2017 to Dec. 2017)
193	197	54.2	68.1
195	200	55.4	70.3
194	202	54.2	73.5

Total Units Saved in a Year= 1376214

Specific Power Saved= 0.92 Units/MT

Monetary Savings= Rs 5.7 Lakhs

Best Practices At JKLC Sirohi

6. OPTIMIZATION OF CEMENT MILL 02 BY MOIDFICATION OF MILL VENT CIRCUIT

CHALLENGES

- High velocity being maintained across mill-vent duct carrying courser particles to mill-vent bag-house
- Unnecessary recirculation of fines from Mill-vent material again into circuit.
- Finding out and process bottlenecks and layout constraints.

Best Practices At JKLC Sirohi

6. OPTIMIZATION OF CEMENT MILL 02 BY MOIDFICATION OF MILL VENT CIRCUIT

ACTIVITIES

After a lot of brainstorming and process studies, our team came up with a solution to increase the area of mill outlet duct reducing the velocity of coarser particles so only fines could reach the mill-vent bag house. These fines were is commensurable as final product.

Best Practices At JKLC Sirohi

6. OPTIMIZATION OF CEMENT MILL 02 BY MOIDFICATION OF MILL VENT CIRCUIT

ACTIVITIES

For making this happen our team conducted site study and in-house created the arrangement of reverse screw conveyor and bucket elevator for transfer of material from mill vent bag house to final product.

Best Practices At JKLC Sirohi

6. OPTIMIZATION OF CEMENT MILL 02 BY MOIDFICATION OF MILL VENT CIRCUIT

CONCLUSION

OBSERVATIONS

Due to velocity drop across mill outlet duct and diverting mill vent bag-house product to final air-slide ,“our fresh feed demand increased”.

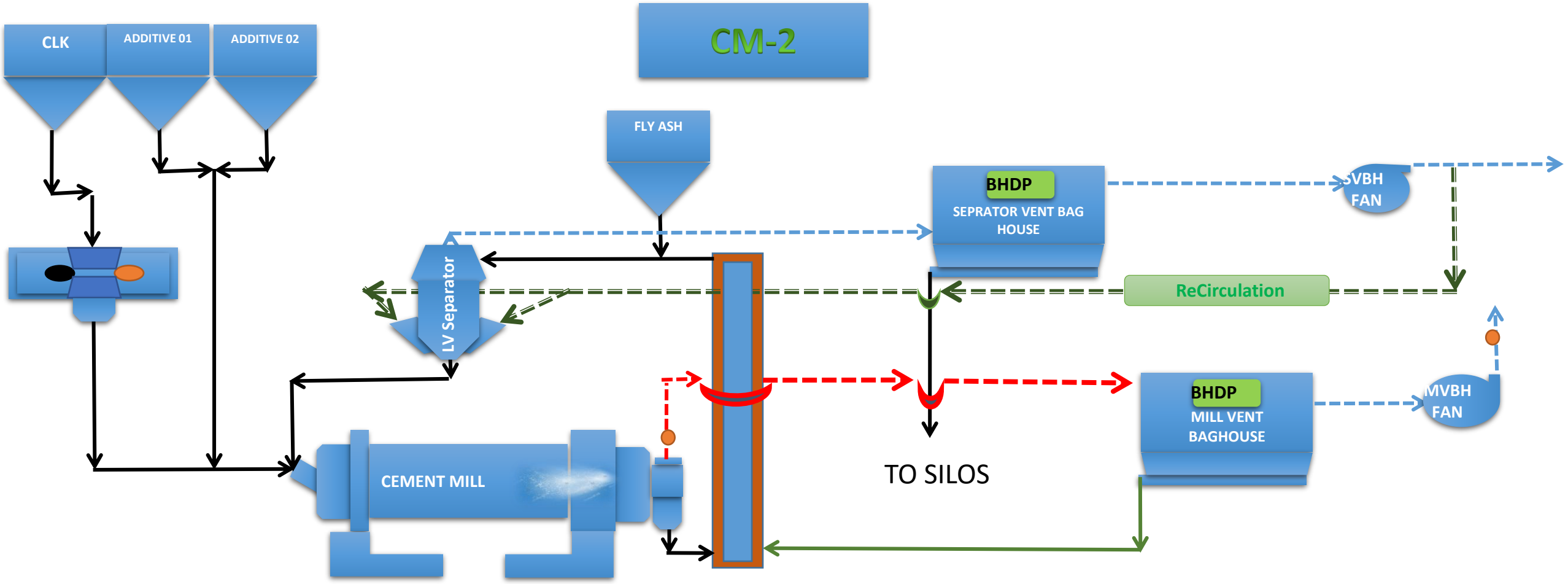
RESULTS

As a result we were able to admit 3 MT/Hr of fresh feed or saved 0.42 U/MT giving us annual electrical cost saving of 5.043 Rs million.

Best Practices At JKLC Sirohi

6. OPTIMIZATION OF CEMENT MILL 02 BY MOIDFICATION OF MILL VENT CIRCUIT

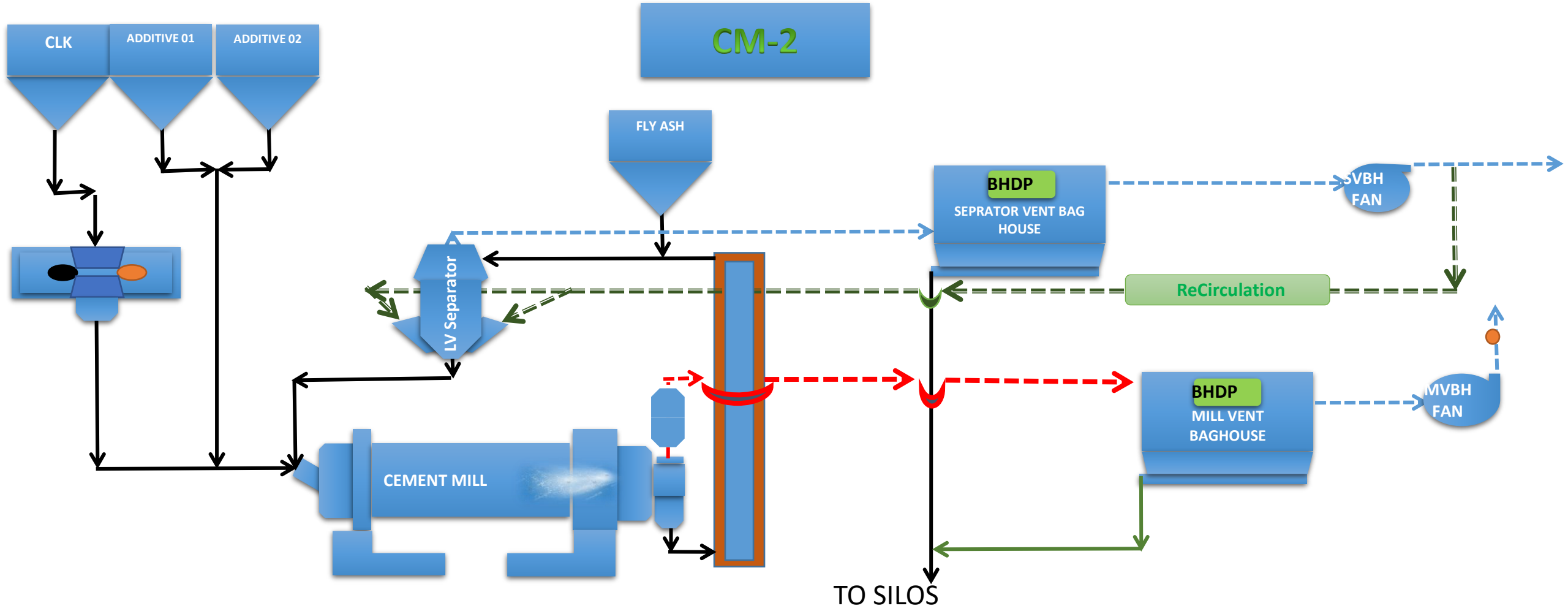
Before Modification



Best Practices At JKLC Sirohi

6. OPTIMIZATION OF CEMENT MILL 02 BY MOIDFICATION OF MILL VENT CIRCUIT

After Modification



Best Practices At JKLC Sirohi

7. Installation Of Hot Air Recirculation Kiln-1 and Kiln -2

- **Challenges-:**
- High Clinker Temperature.
- How many cooler fans should be connected to hot air recirculation?
- Selection of fan motors to handle both cold and hot air
- Selection of fans to handle high dust concentration.
- How to Take care of Sensitive parts Under Grate.
- **Mitigation Of Challenges-**
- To connect Hot Air duct to cooler fans 6,7 &8 only.
- To go with fans for high dust concentration and operating temperature 140 deg C
- Motor rating as per maximum power demand in cold air condition.
- Availability of Only two movable parts in IKN cooler reduced the chances of damage of sensitive parts.
- **Results-:10040 units/day more green power generation from each Kiln.**

Pay back- 11.5 months

Best Practices At JKLC Sirohi

7. Reduction in Energy Consumption of CCR centralized Air conditioner by installing motorized dampers and VFD

NEED

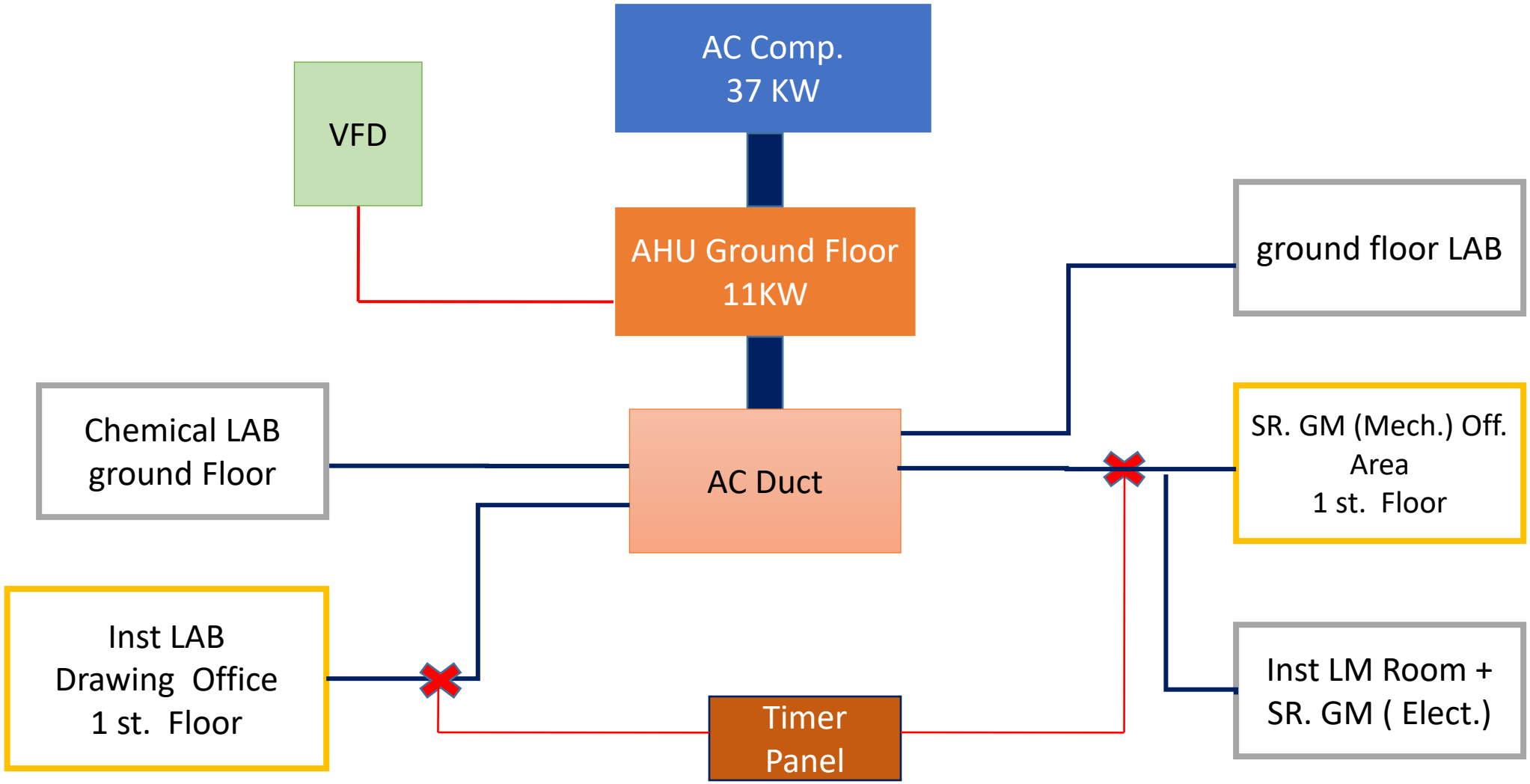
- We have Centralize Air Conditioner in CCR Building
- CCR Centralize AC was supply Air to the panel room as well as office areas also through out the day.
- There are two AHU (Air Handling Unit) for CCR. One for CCR Ist floor and another for CCR IInd floor
- No body remains in the Office area during the Night hours, but air supply remains continue.
- There was no provision for block the Air supply
- There was Energy saving potential.

SOLUTION

- To restricted the air supply in office areas of CCR building during the Night hours we had installed the motorized dampers in office area's duct.
- VFD has installed for optimization of Air flow of AHU.
- Operation of dampers was auto control through Timer panel at predefined time.
- As per need we can bypass the individual damper operation through Timer panel.

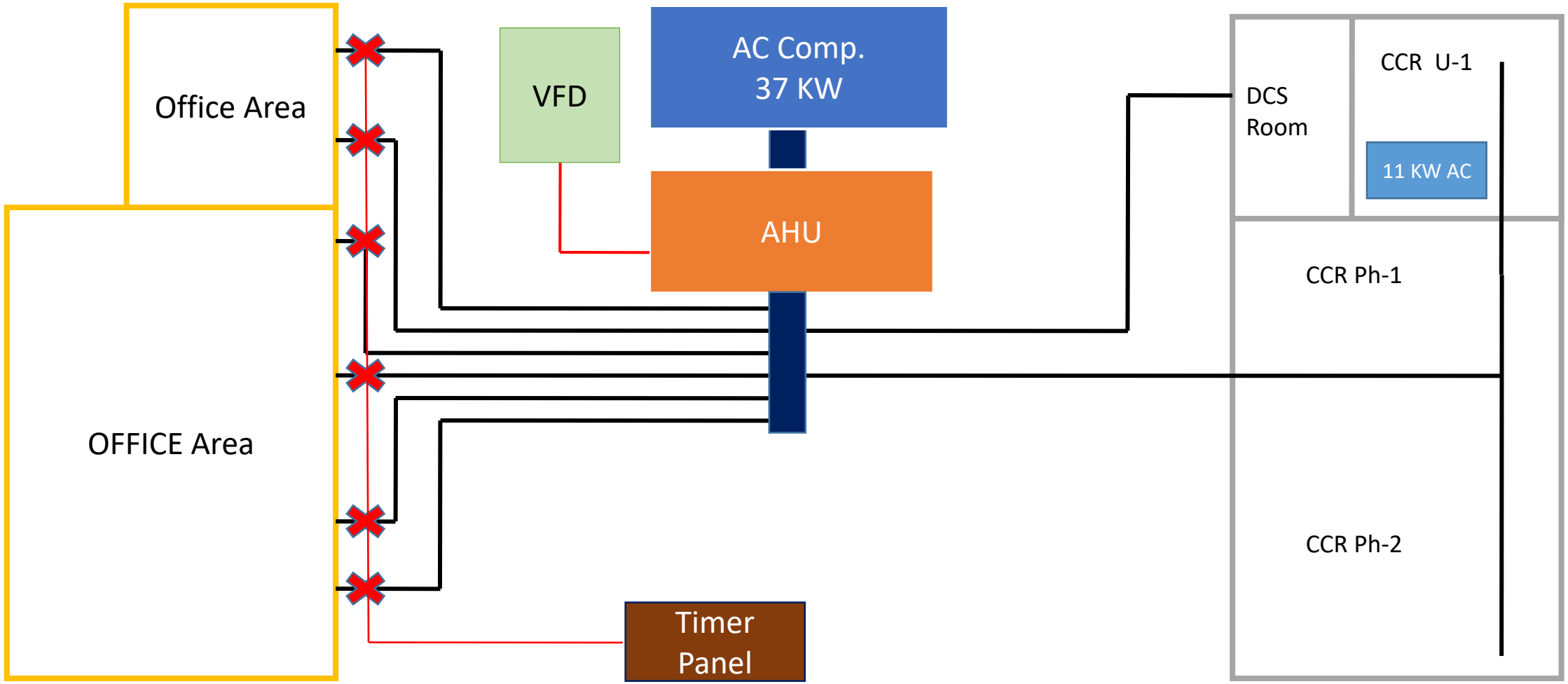
Best Practices At JKLC Sirohi

8. Reduction in Energy Consumption of CCR centralized Air conditioner by installing motorized dampers and VFD



Best Practices At JKLC Sirohi

8. Reduction in Energy Consumption of CCR centralized Air conditioner by installing motorized dampers and VFD



Best Practices At JKLC Sirohi

8. Reduction in Energy Consumption of CCR centralized Air conditioner by installing motorized dampers and VFD

Cost Involved in Project
- Rs.= 9.30 Lacs

Energy Saving
- 350 kWh/Day
- 127750 kWh/Annum

Monitory Savings
- Rs.- 10.03 Lacs/Annum

ROI
- 11 Months only

Other Benefits

- Precious Control of Temperature
- Reduced Maintenance

Best Practices At JKLC Sirohi

9.Reduction in Power Consumption of Line-2 and Line-3 Kiln Blaster Compressor by Optimization of Blaster Operating Frequency and Compressor Loading and Unloading Pressure.

Description	Kiln-2		Kiln-3	
	Before	After	Before	After
No. of Blaster	71	71	84	84
Operating Freq. /Hrs.	782	540	1032	686
Total Air Consumption (in M^3/Hrs)	762	486	929	618
Motor Rated kW	180	180	180	180
Compressor Loading Pressure (kg/cm2)	6	6	6	6
Compressor Unloading Pressure (kg/cm2)	7	6.5	6.9	6.4

Best Practices At JKLC Sirohi

9.Reduction in Power Consumption of Line-2 and Line-3 Kiln Blaster Compressor by Optimization of Blaster Operating Frequency and Compressor Loading and Unloading Pressure.

Kiln System	Power Consumption Before	Power Consumption After	Saving Potential
Line-2	128 kW/hr.	103 kW	25 kW
Line-3	133 kW/hr.	103 kW	30 kW

Total Electrical Saving Potential= 55 kW

Annual Electrical Savings= 435600 Units

Monetary Benefits= Rs 3.38 Millions