CII- 22nd NATIONAL AWARD
EXCELLENCE IN ENERGY MANAGEMENT 2021

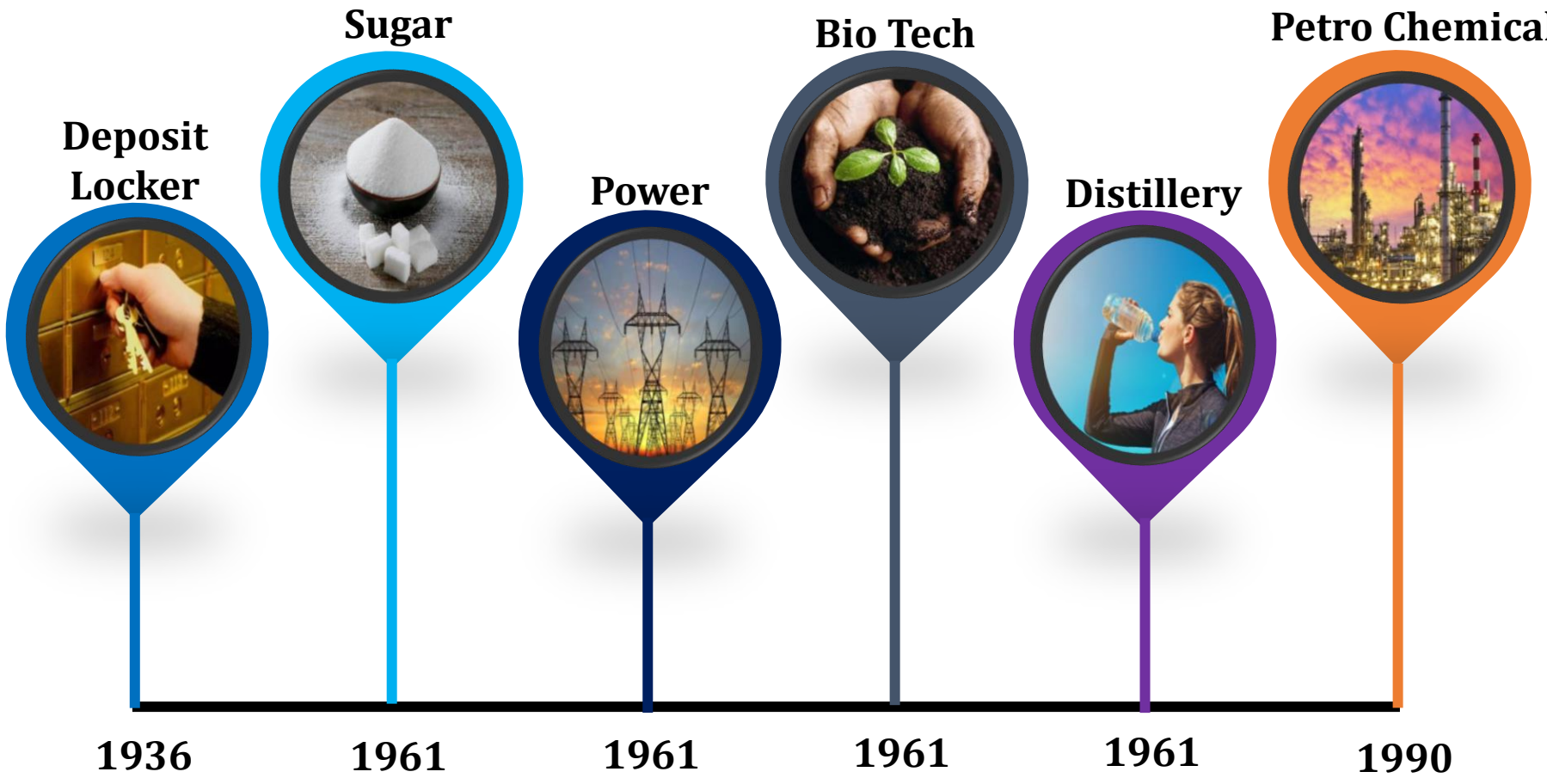
KOTHARI PETROCHEMICALS LTD

MANALI- CHENNAI

TEAM MEMBERS:

Mr. Anand B R – Sr. Manager- TLS
Mr. Saravanan J- Energy manager
Mr. Karunamoorthy R- Asst. Manager- TLS

1. KPL Business overview

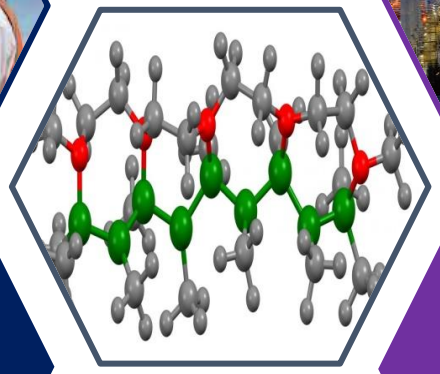


KPL is a part of the renowned "**HC Kothari Group"**, we are the largest producer of premium quality Polybutene in India. Since our founding in 1990

KPL OUTLINE

Plant Commissioned March 1990

Technology of the Process COSDEN



Earlier Plant Design Capacity 5000 MTA

In the Year Of 2002 Capacity Increased to 8400 MTA

In the Year Of 2007 PIB Train-2 was commissioned

Capacity Enhanced to 24KTA Year of 2007 - 2008

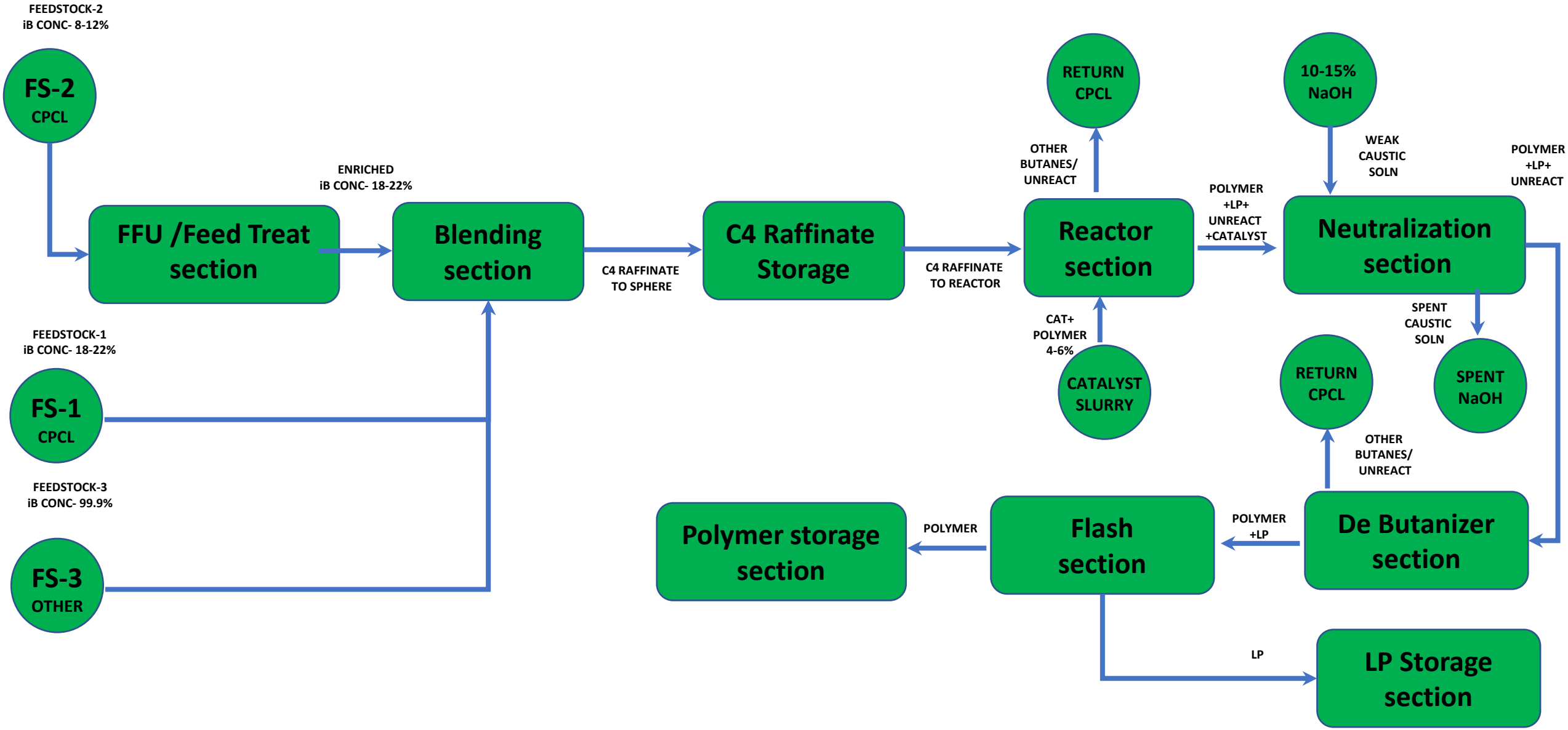
State of Art 2MW CPP Plant Commissioned Year of 2018

Safety & Engineering Park Created Year of 2020

Capacity Enhanced to 36KTA Year of 2020 - 2021

Highest Production of 25KTA was achieved in the year of FY20-21

2. Manufacturing Process Flow



*iB- isobutylene; LP-Light Polymer; CPCL-Chennai petroleum corporation limited

3. Impact of COVID-19

❖This pandemic has really tipped the balance of Global economy.

❖COVID 19 really taught us more. During the pandemic, we were at the stage we have to run the plant at lower capacity. In this situation we are very keen on energy consumption.

❖We have a restricted our manpower as per government guidelines.

❖ Our team gave a greater support to run the plant at very efficiently and very productively.

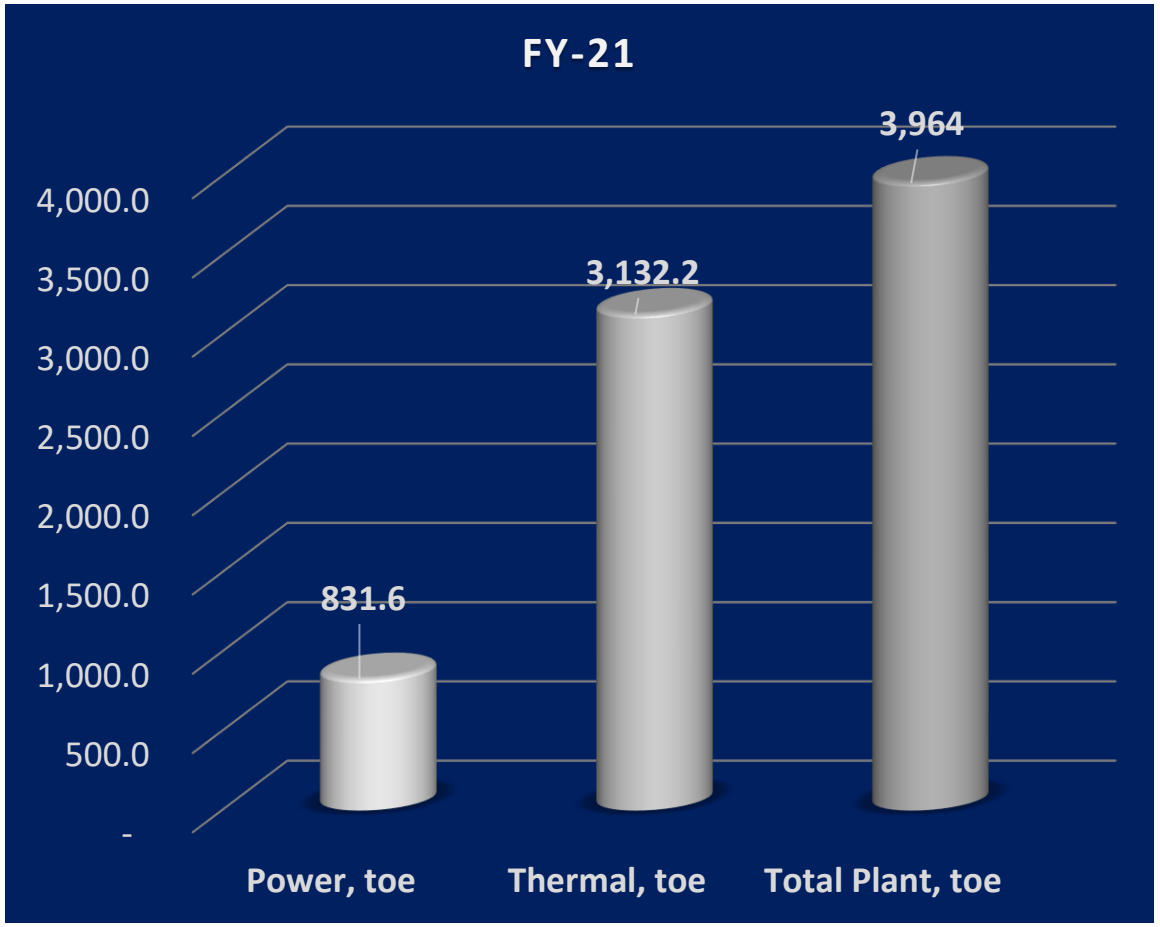
❖We have **Increased our productivity by 5%**

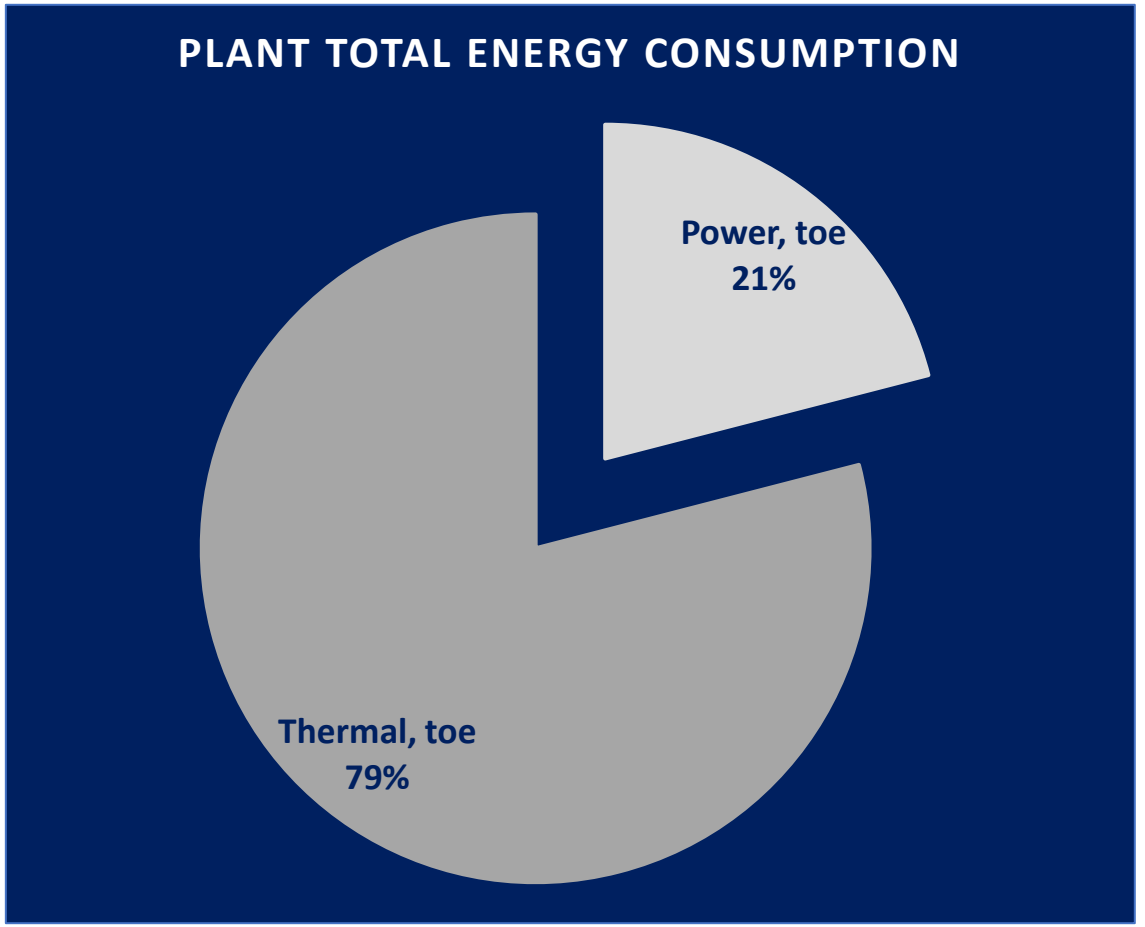
❖We have Reduced our energy consumption by 5%.

❖We were at the stage, we have to export more than domestic demand. Which has a greater impact in freight and transportation.

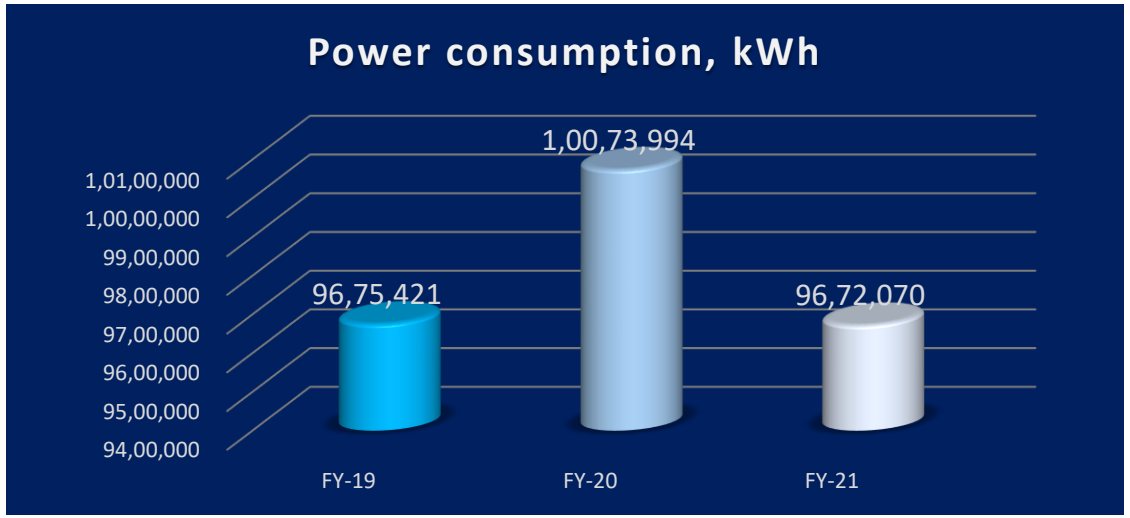
4. Energy Consumption Overview

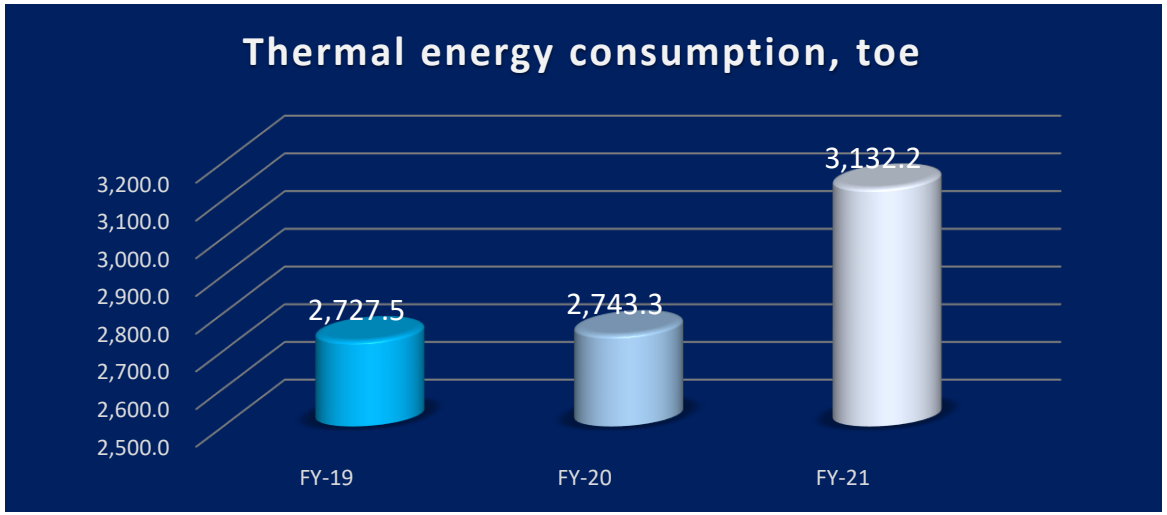
Plant absolute energy consumption FY-2020-2021

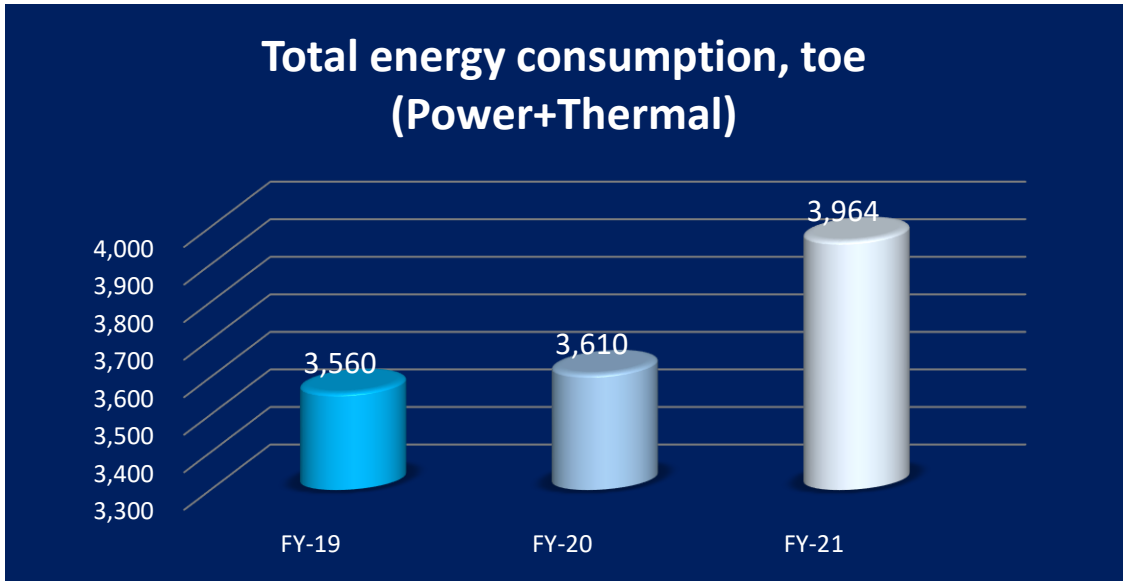




4. Energy Consumption Overview (Last three years)







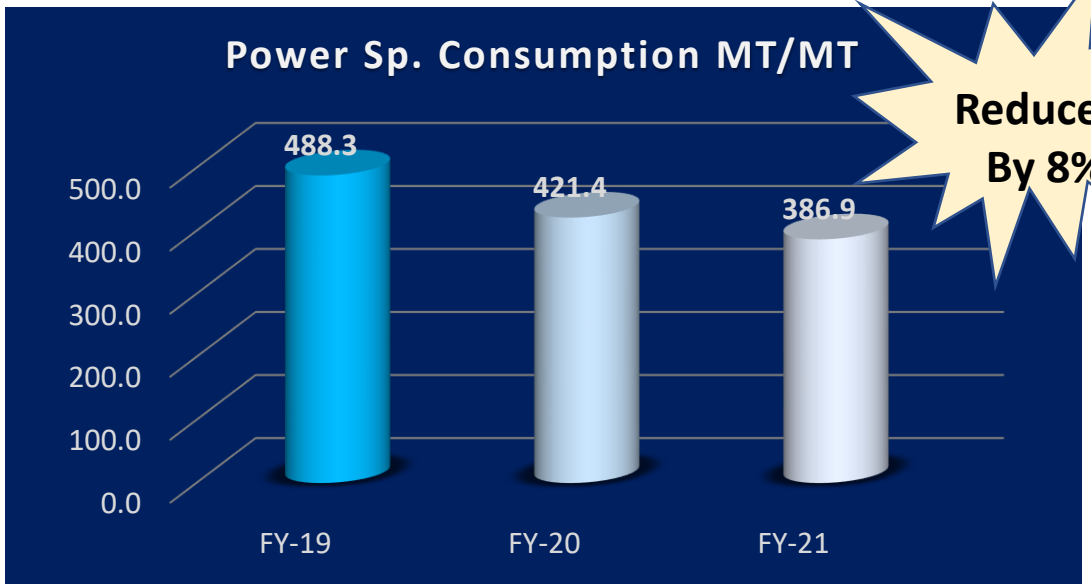
❖Total power consumption dropped by 4%

❖ Total Thermal energy consumption increased by 13%

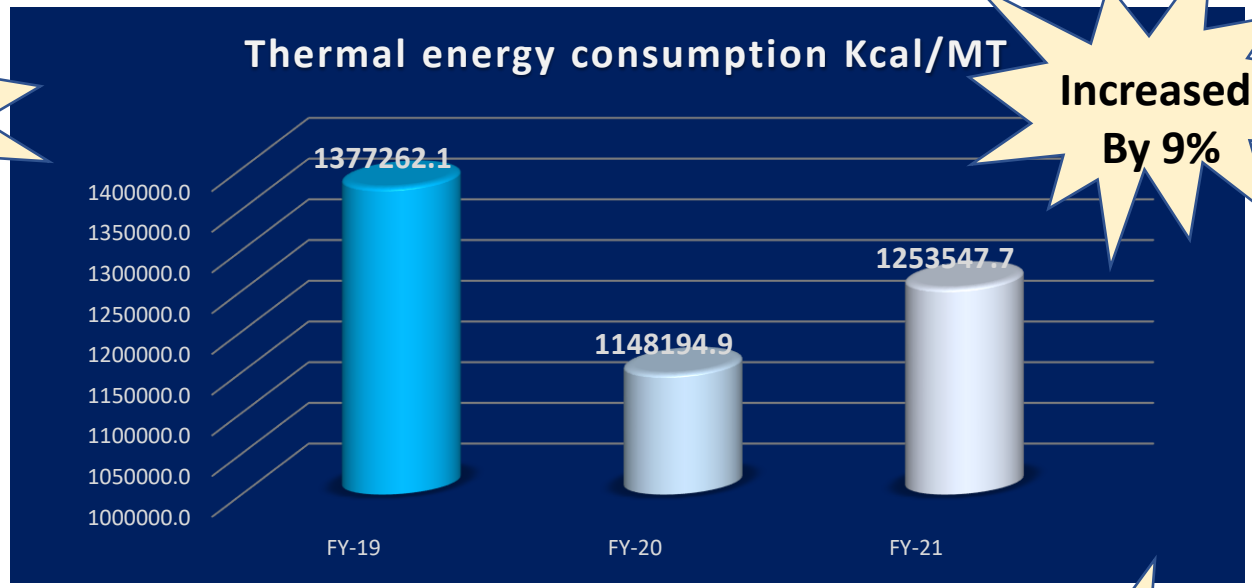
❖ Energy consumption increase 9%

❖ Productivity increase 5%

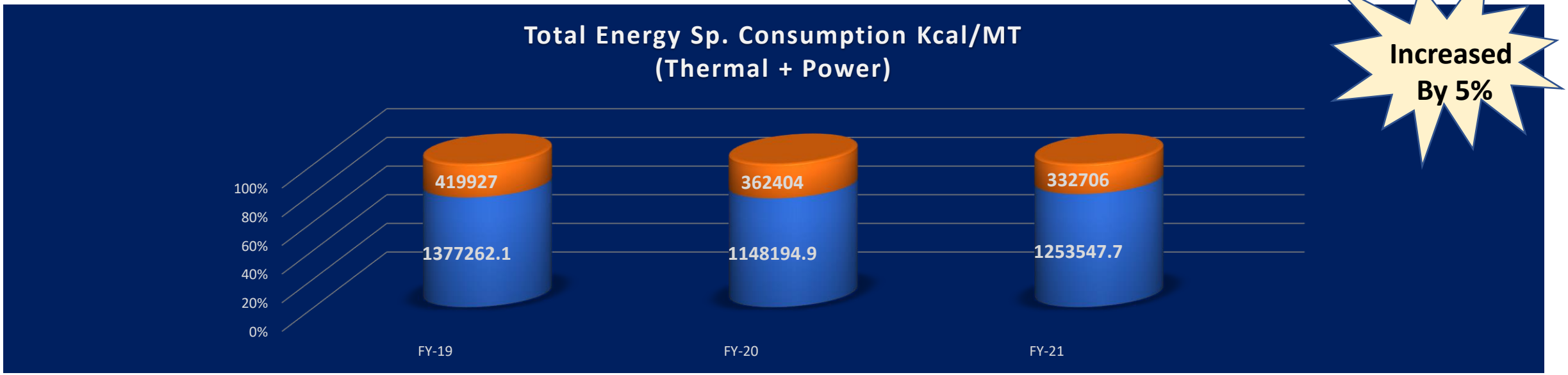
5. Specific Energy Consumption (Last three years)



Reduced By 8%

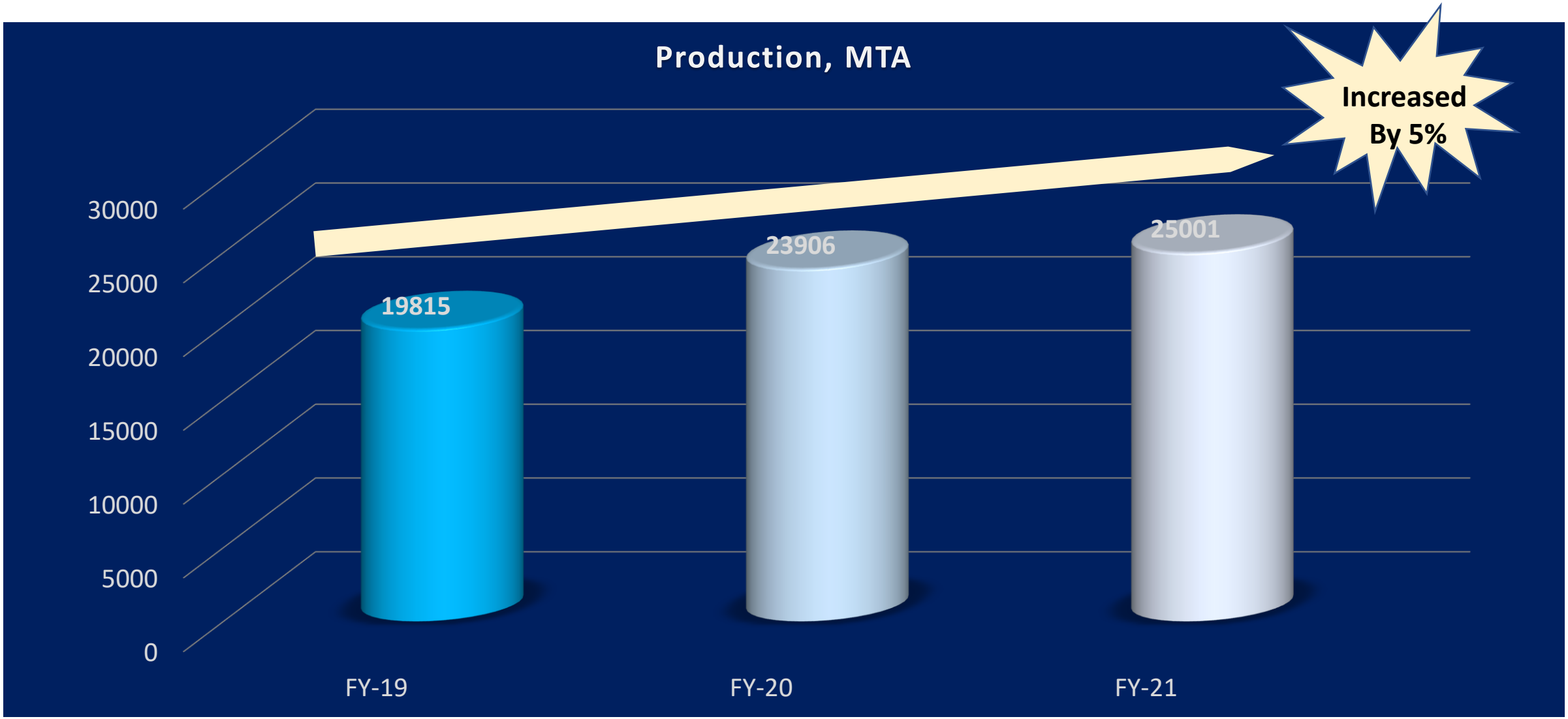


Increased By 9%

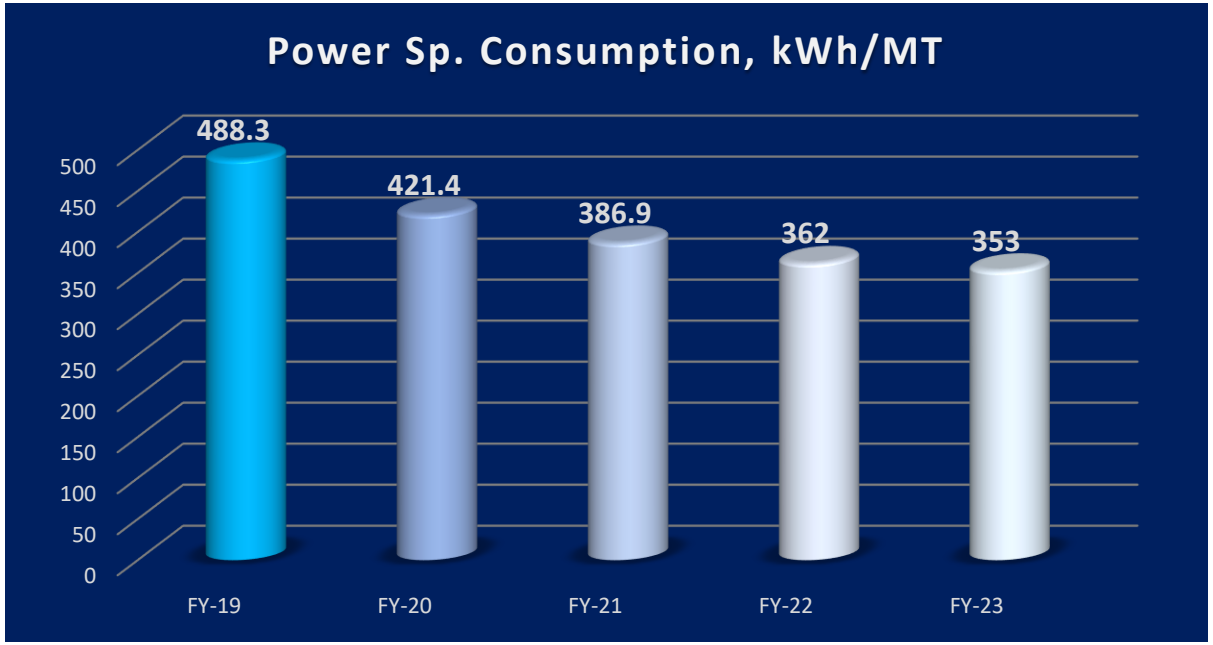


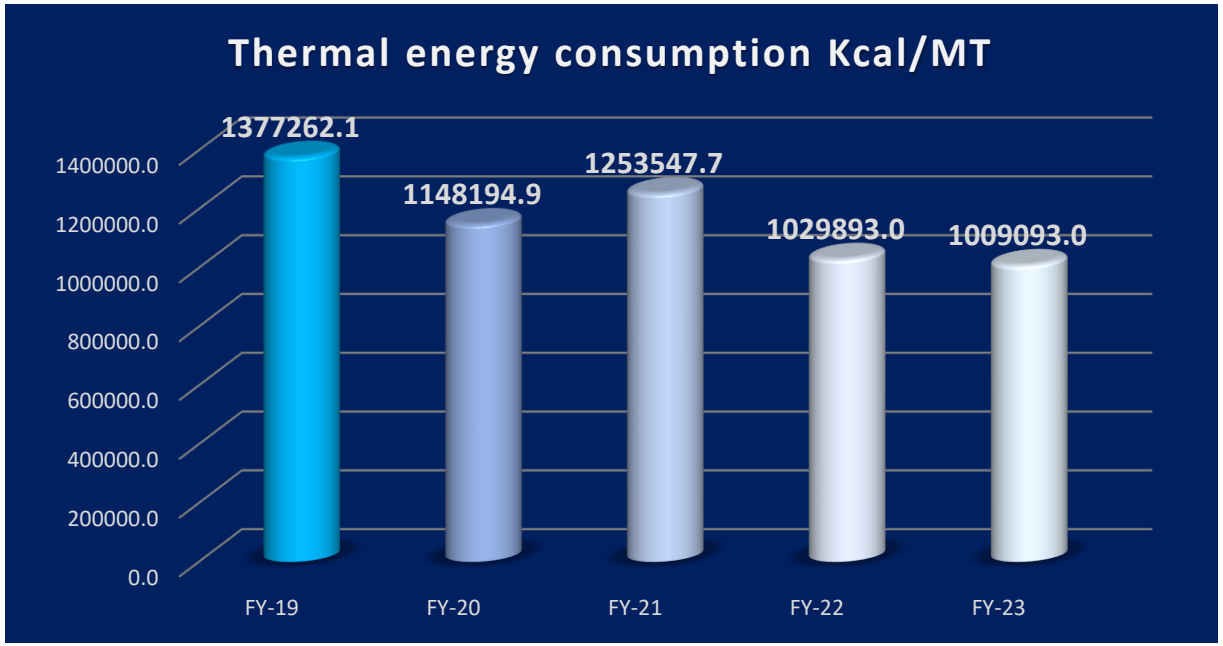
Increased By 5%

5. Production Details (Last three years)



5. Energy Consumption Plan- FY22&23



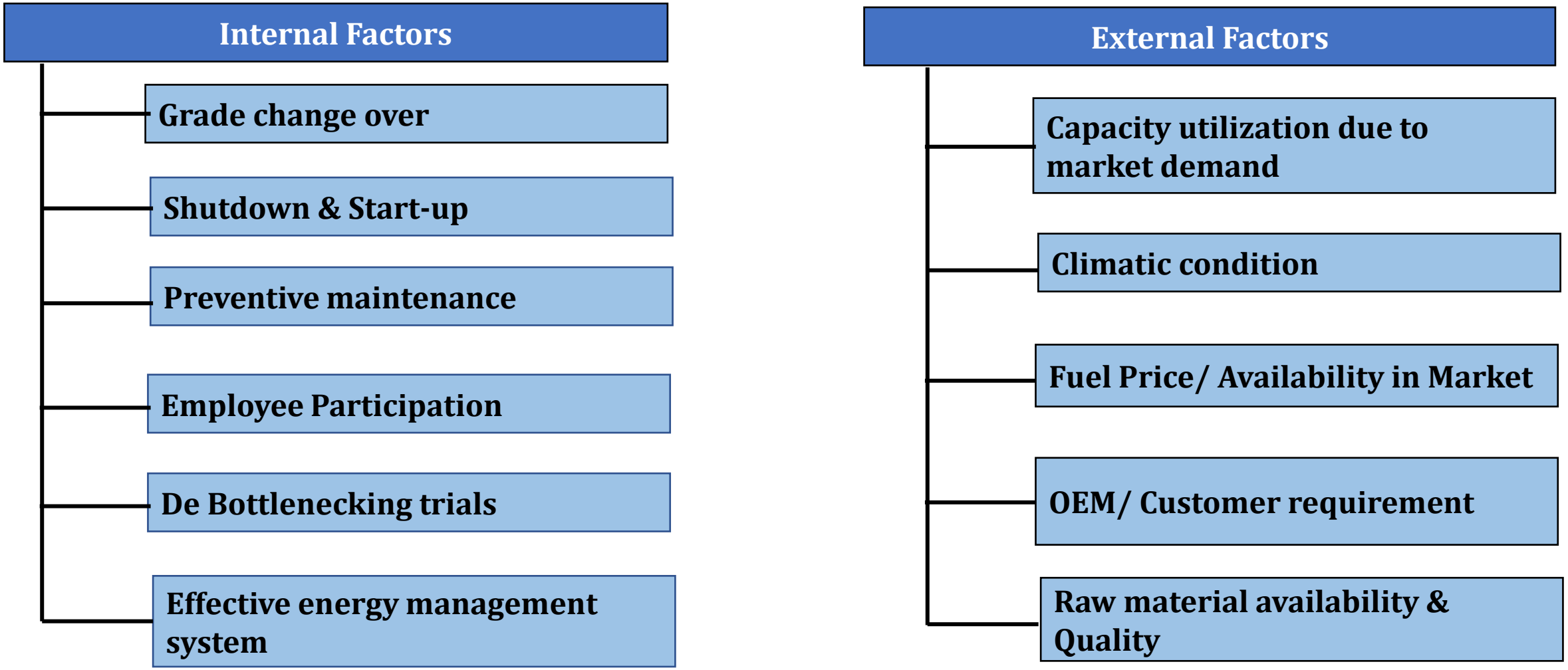


Plan to Reduce Energy Consumption:

- ❖ Increasing Feed throughput & concentration to reactor, increase in productivity with in house trials
- ❖ Identifying Bottlenecks and implementing process change.
- ❖ Utilization of plant at maximum capacity, Running the plant without interruption.
- ❖VFD Provision for Butane compressor to optimize the load and energy consumption.
- ❖ Implementing waste heat recovery system- Pinch Analysis
- ❖ Best Engineering practices of- Thermal survey across the plant; Ultrasound leak detection program.

5. Specific Energy Consumption

Factors Influencing SEC variation.



6. Energy Project Implemented (Last three year's)

	DESCRIPTION	ZERO INVESTMENT	WITH INVESTMENT	TOTAL
2018-2019	Project in No's	1	6	7
	Total Investment in Million	1.946		
	Total savings in Million	7.71		
	Total Energy saving- Thermal MKcal/Year	4132.2		
	Total Energy saving- Power MkWh/Year	0.15		
	Total Water saving- KL/Year	28800		
	Pay Back in Months	3		

	DESCRIPTION	ZERO INVESTMENT	WITH INVESTMENT	TOTAL
2019-2020	Project in No's	5	5	10
	Total Investment in Million	0.33		
	Total savings in Million	21.1		
	Total Energy saving- Thermal MKcal/Year	9711.3		
	Total Energy saving- Power MkWh/Year	1.34		
	Total Water saving- KL/Year	6840		
	Pay Back in Day's	0.2		

	DESCRIPTION	ZERO INVESTMENT	WITH INVESTMENT	TOTAL
2020-2021	Project in No's	7	9	16
	Total Investment in Million	6.22		
	Total savings in Million	7.53		
	Total Energy saving- Thermal MKcal/Year	1301		
	Total Energy saving- Power MkWh/Year	0.66		
	Total Water saving- KL/Year	25430		
	Pay Back in Month's	9.9		

6. Energy Project Implemented (2020-2021)

Project Implemented : Waste heat recovery from LP condensate drum vent using PHE
Description: ❖ LP steam is used in Feed fractionation unit, condensate from FFU is being stored in separate collection drum and send back to boiler. ❖ Flash steam from the drum kept in local. ❖ New PHE provided to recover the heat from flash steam vent.
Investment made : 0.8 Lakhs
Benefit achieved : ❖ Total clean condensate collection- 600KL/Annum ❖Total thermal energy saving – 441MKcal/ Annum ❖ Total cost savings – 5.7 Lakhs/Annum
Pay Back Period: 1.7 Month

6. Energy Project Implemented (2020-2021)

Project Implemented : Waste Heat recovery from HP condensate drum vent using PHE
Description: ❖ HP Condensate drum vent is been connected with condenser lined-up with CT water. ❖ New PHE provided and connected with Boiler feed water to pre heat and send to Boiler. ❖ The heat load is been going to cooling tower is been diverted to Boiler feed water.
Investment made : 5.34 Lakhs
Benefit achieved : ❖ Total clean condensate collection- 1348KL/Annum ❖Total thermal energy saving – 718MKcal/ Annum ❖ Total cost savings – 9.08 Lakhs/Annum
Pay Back Period: 27 Days

6. Energy Project Implemented (2020-2021)

Project Implemented : Capacitor provision for MCC-2
Description: ❖ During continues monitoring of MCC panel, PF found to be low in MCC-2, ❖ Which has been identified and capacitor was provided to balance the load. Now it is running normal; Before PF-0.77; After PF-0.95
Investment made : 1.59 Lakhs
Benefit achieved : ❖ Total thermal energy saving – 0.1MkWh/ Annum ❖ Total cost savings – 5.01 Lakhs/Annum
Pay Back Period: 3.8 Months

6. Energy Project Implemented (2020-2021)

Project Implemented : Condensate collection from FG Storage area
Description: ❖ FG Tank heating condensate drain into gutter, the clean condensate can be re use to boiler feed tank.
Investment made : 16.57 Lakhs
Benefit achieved : ❖ Total water saving – 7200KL/Annum ❖Total cost savings – 9.36 Lakhs/Annum
Pay Back Period: 21 Months

6.Energy Project Implemented (2020-2021)

Project Implemented : Pump swaping in Process (High capacity pump to low capacity pump)
Description: ❖ Process water injection pump have a high head and high capacity ❖ Since we required low capacity (50% of the pump capacity is been utilized). ❖ Pump is been replaced with adequate pump (redundant pump).
Investment made : Zero Investment
Benefit achieved : ❖ Total Power saving – 6048/Annum ❖Total cost savings – 0.35 Lakhs/Annum
Pay Back Period: -

6. Energy Project Implemented (2020-2021)

Project Implemented : UP-9000 Leak detector usage.

Description:

- Since we are handling LPG as a raw material we are unable to detect the untraceable (Lower than detection level) quantity of LPG leak.
- Now we have procured ultra sound leak detector to identify the Fugitive emission from process.

Investment made : 5.0 Lakh

Benefit achieved :

- Total cost savings – 1.16 Lakhs/Annum

Pay Back Period: 4 Months

7. Innovative Project Implemented

Project Implemented : RO Reject water using for cooling tower

Description:

- ❖ RO Reject water is been used for cooling tower makeup.
- ❖ Earlier we use metro water to produce DM water.
- ❖ Since the conductivity of metro water is high it is necessary to treat RO reject water in our Effluent treatment plant.
- ❖ Now we signed MOU with CMWB to use TTRO water from their STP unit.
- ❖ This water quality is better than metro water, conductivity and other parameters are match the CT makeup water.

Investment made : 29.8 Lakhs

Benefit achieved :

- ❖ Total water saving – 7279KL/Annum
- ❖ Total thermal energy saving – 0.21MkWh/ Annum
- ❖ Total cost savings – 17.98 Lakhs/Annum

Pay Back Period: 20 Months

7. Innovative Project Implemented

Project Implemented : Hot condensate using for wash vessel makeup instead of cooled condensate

Description:

- Earlier cold condensate from Ejector is being used for wash vessel.
- Hot condensate from common condensate collection drum is being cooled and used for column injection.
- Injecting the cool condensate to wash vessel incur heat loss and also lead to washing inefficiency, hot condensate from common condensate collection drum can be directly use into wash vessel, at the same cool condensate from ejector directly use for column injection without additional cooling.
- By doing this heat load to cooling tower is reduced, the equivalent amount of heat load is being used for washing section pre heater has been reduced, and also cooled condensate injection pump to column has be isolated.

Investment made : Zero Investment

Benefit achieved :

- Annual water saving – 242 KL
- Annual thermal energy savings – 142.3 Mkcal
- Total cost savings – 2.02 Lakh

Pay back Period: -

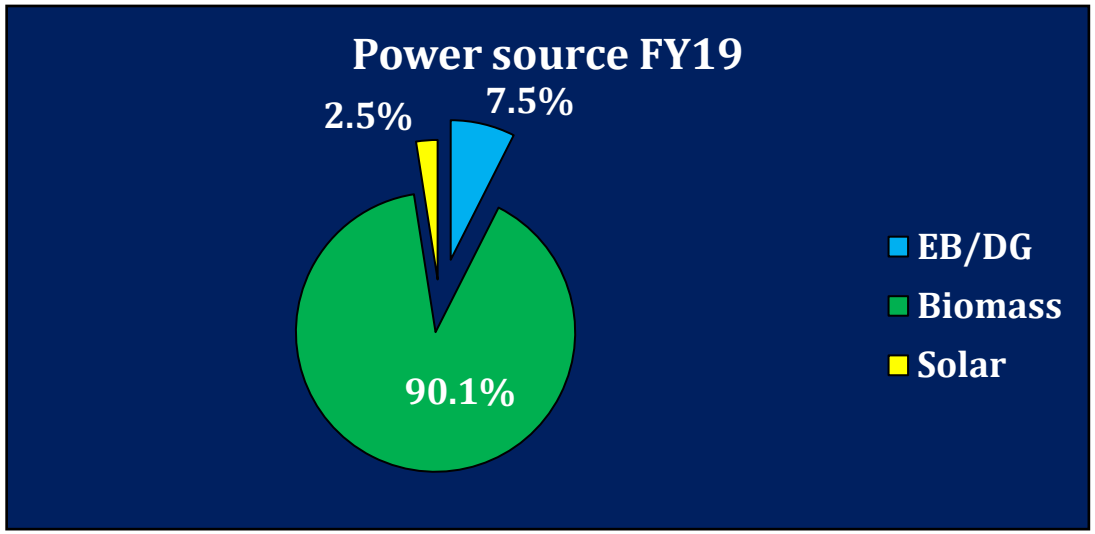
8. Utilization of renewable energy source

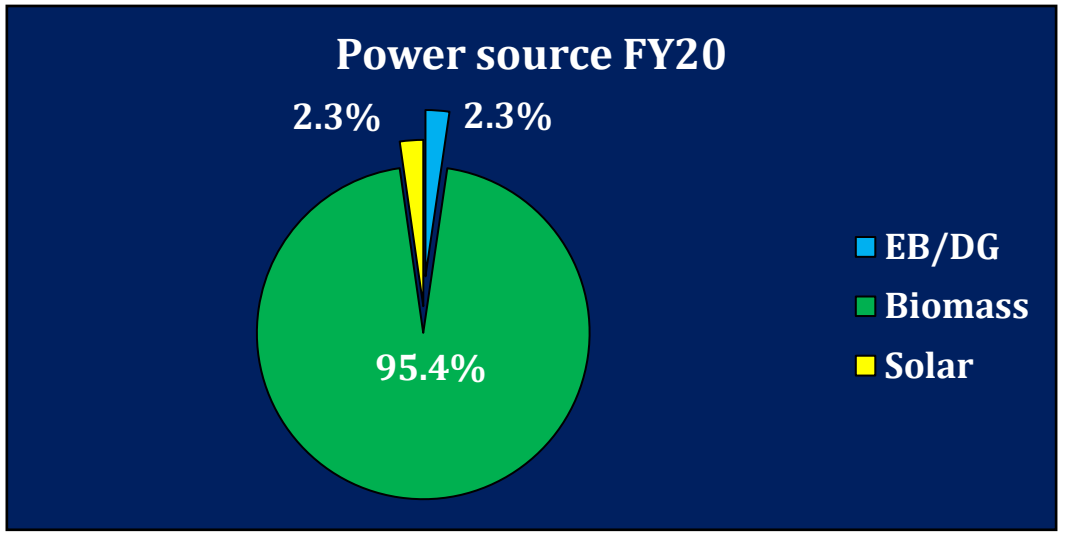
Onsite
Solar Farm- 1
156kWh

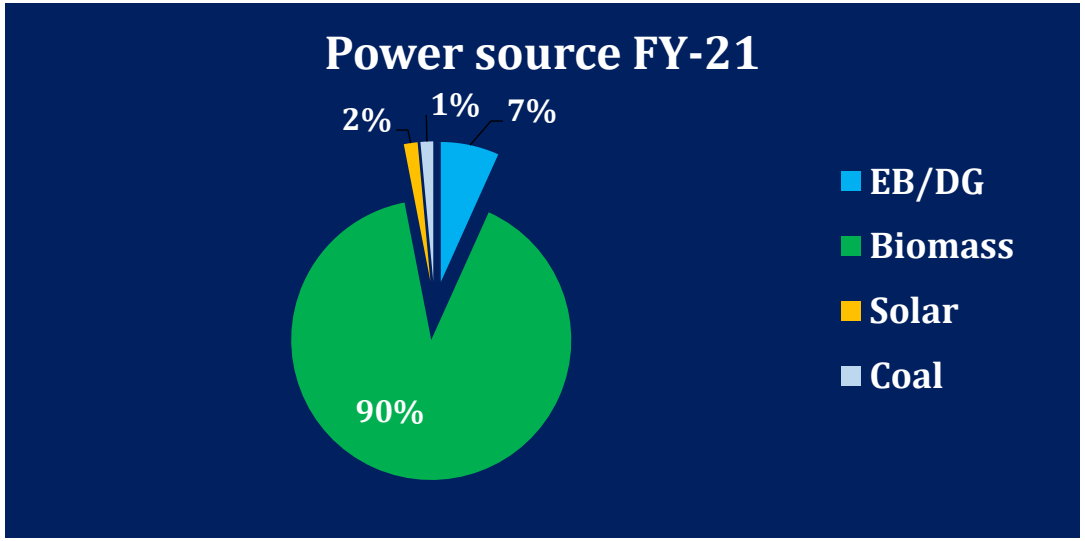
Onsite
Solar farm-2
93.6kWh

We have Bio- Mass Operated Captive Power Plant
2MW
Installed in
KPL Site

8. Utilization of renewable energy source (Last three years)

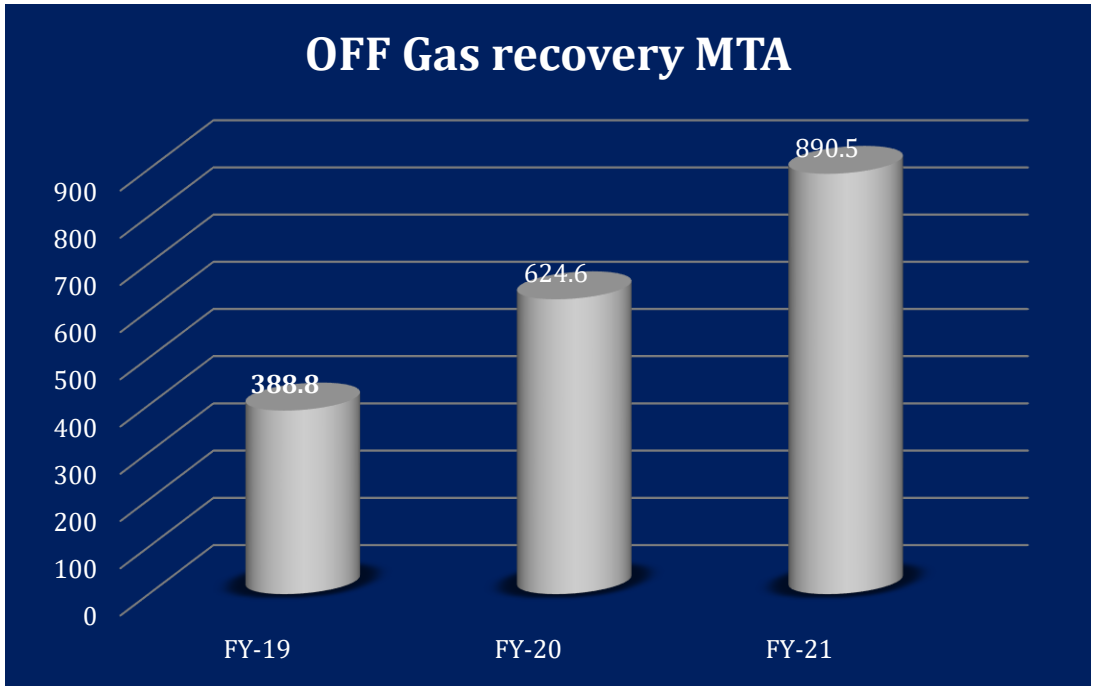


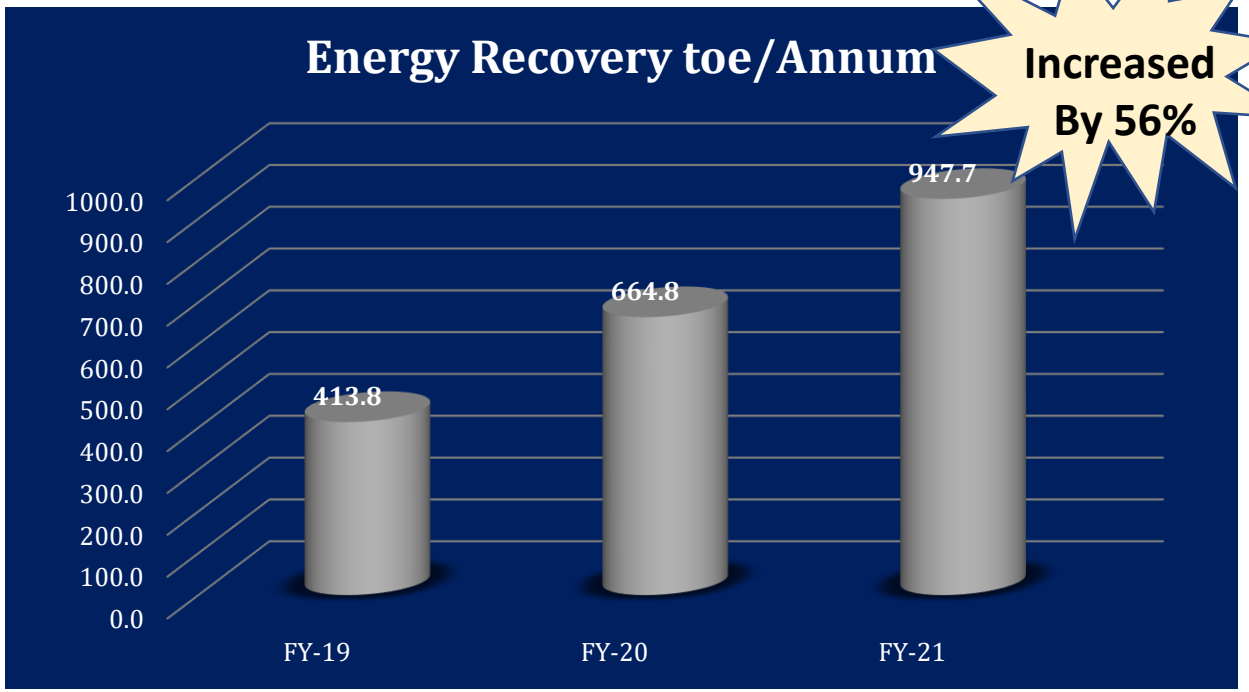




❖We produce and consume around **92%** of our own power requirement through renewable energy resource **(Solar + Bio mass)**

9. Utilization of waste material as fuel





Waste Utilization:

- ❖ OFF Gas recovery system was implemented, recovered and reused for TFH System.
- ❖ Earlier TFH system was run by FO.
- ❖ OFF Gas recovery and utilization was gradually increased in 56%

Plan FY22:

- ❖ Implementation of complete OFF gas recovery system inclusive of pump drain, coalescer drain..etc.

Green Go Project

Project Implemented : HPIB Purchase

Description:

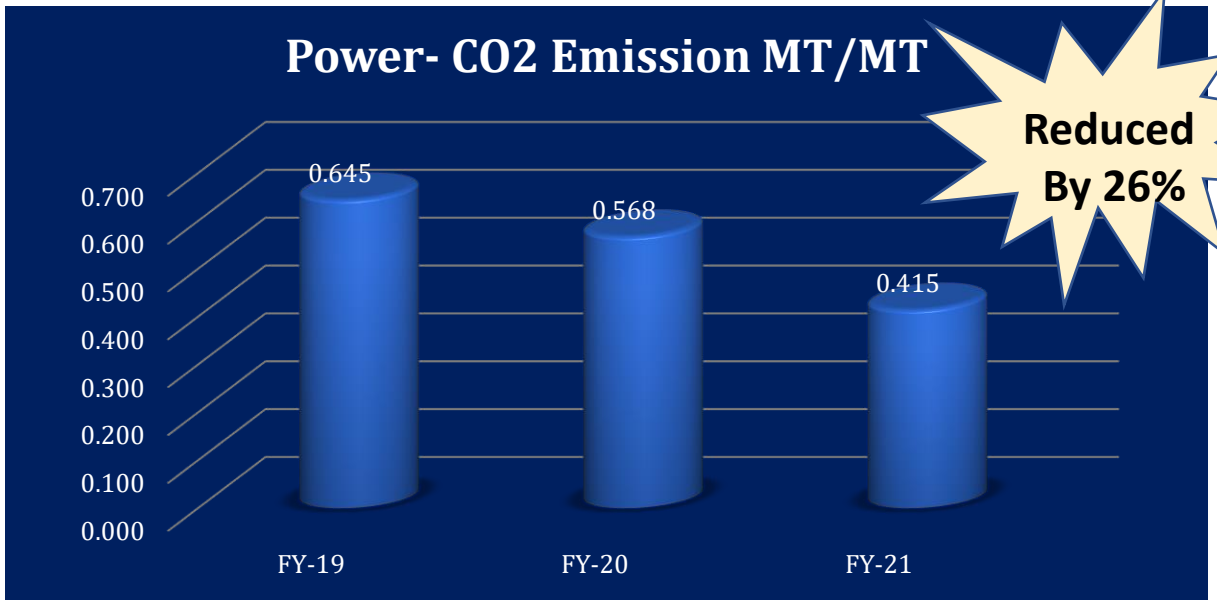
- Earlier procurement concentration of C4 raffinate is 33%
- Now the procurement concentration of C4 raffinate is 99%
- Number of round trip got reduced- 1700 No's

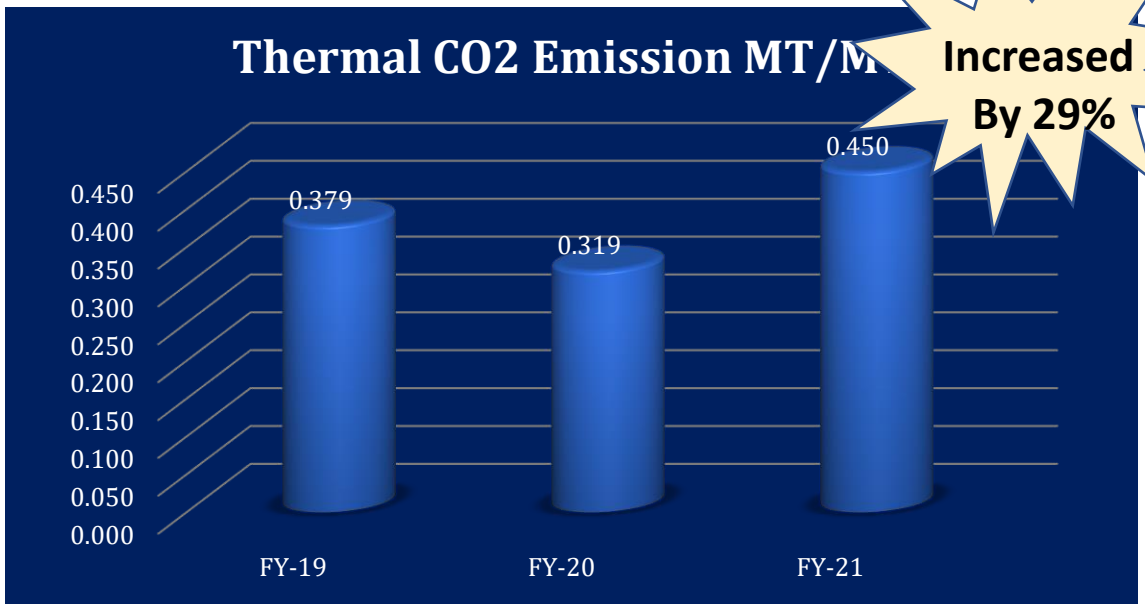
Investment made : Zero Investment

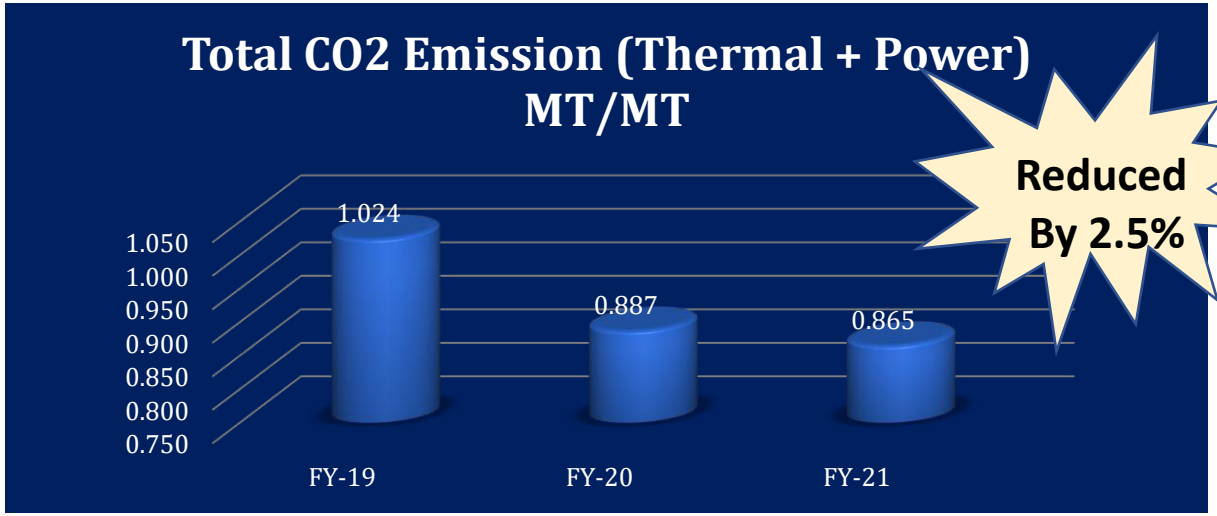
Benefit achieved :

- CO2 emission reduction- 6551.5 MT/Year

10. GHG Emission Intensity and Verification (Last Three Years)



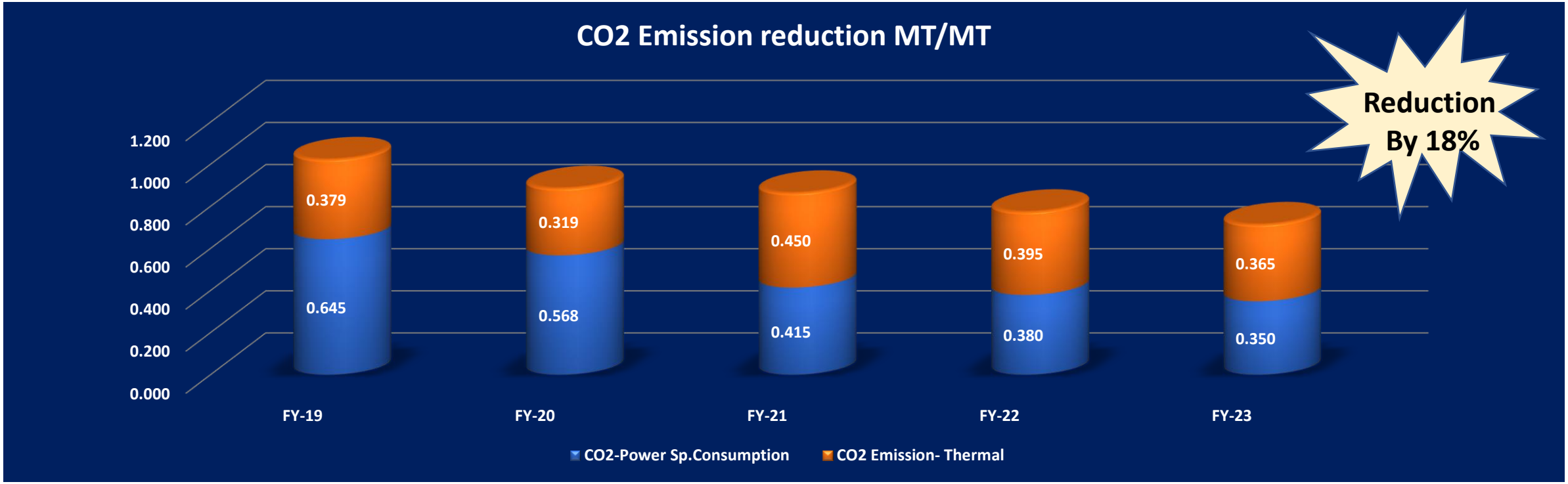




❖ Total GHG intensity reduction is **2.5%**

10. GHG Emission Intensity Reduction Plan

CO2 Emission Reduction MT/MT



Short term goals:

- ❖ Implementing complete OFF Gas recovery system
- ❖ Conducting Insulation efficiency survey
- ❖ Increasing the Productivity with in House trials.
- ❖ Increasing waste heat recovery across the plant.

Long term goals:

- ❖ Converting Fuel Bio Mass to Clean Fuel (LNG)
- ❖Conducting comprehensive energy audit (3rd Party)
- ❖ Increasing the productivity with the help of De Bottleneck.

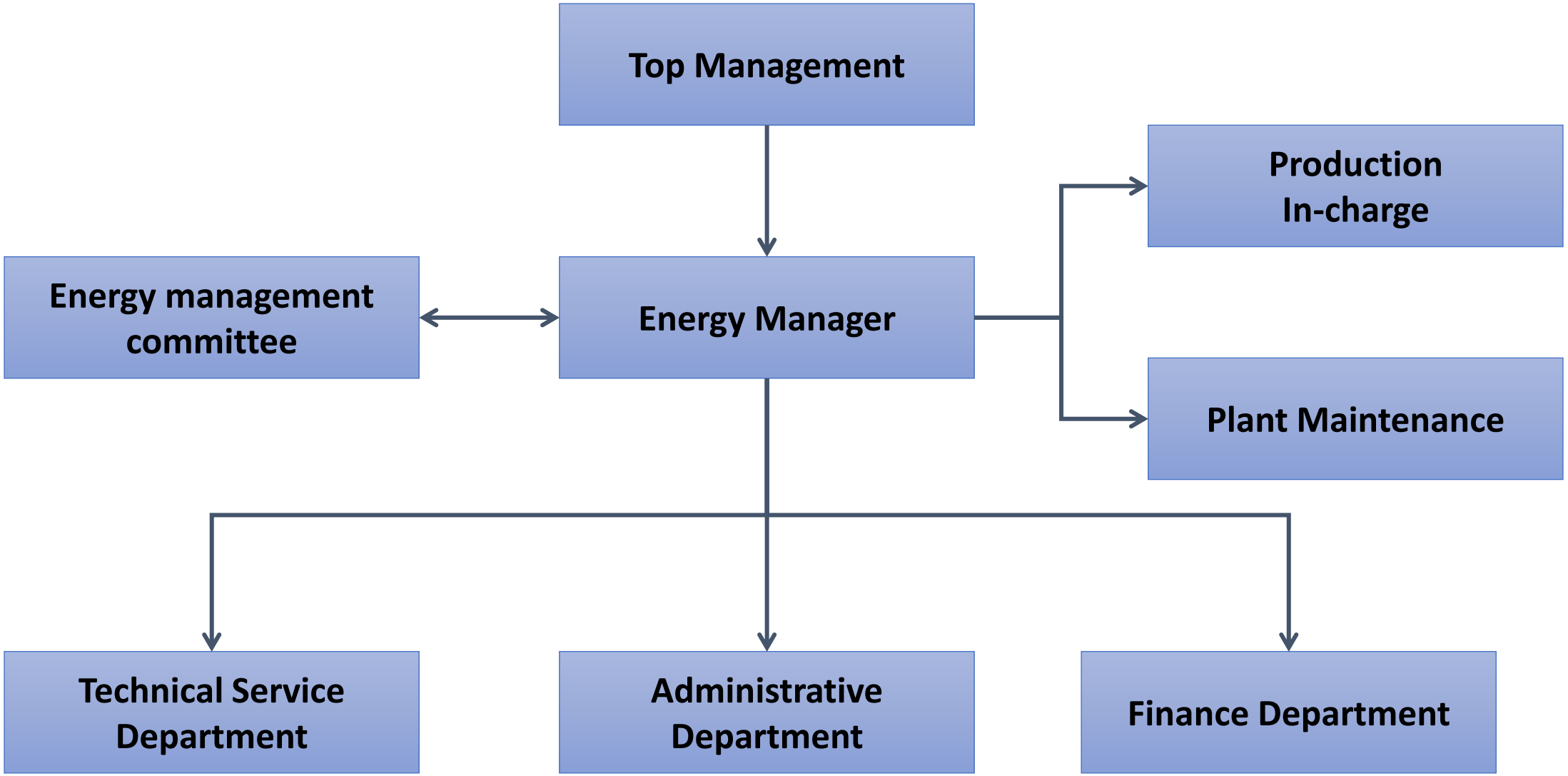
10. Fly Ash Utilisation

- Bio Mass Operated boiler Fly Ash Disposed to Fly ash Brick Manufacturers

Disposal : 100% Daily generation of Fly ash disposed to Fly ash Manufacturer.

- **Mode of Disposal:** Closed Container.
- **Environmental Benefit:** 100% recycle to eco friendly Brick making

12. KPL Energy Cell



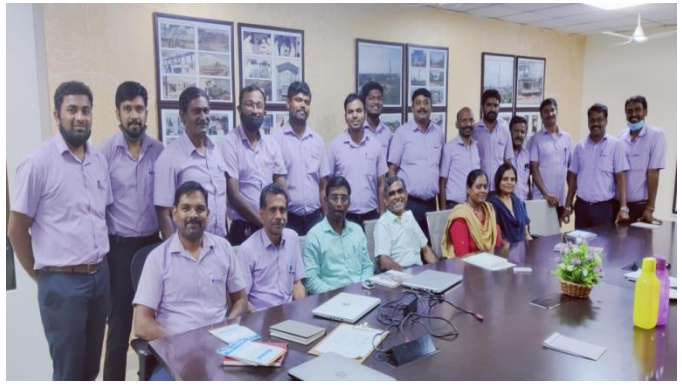
12. Energy Team Work- National Energy Conservation Day Celebration

ENERGY BEST SUGGESTION: Mr. PANDIYAN
COALESCER INSULATION PROVISION TO AVOID HEAT RADIATION

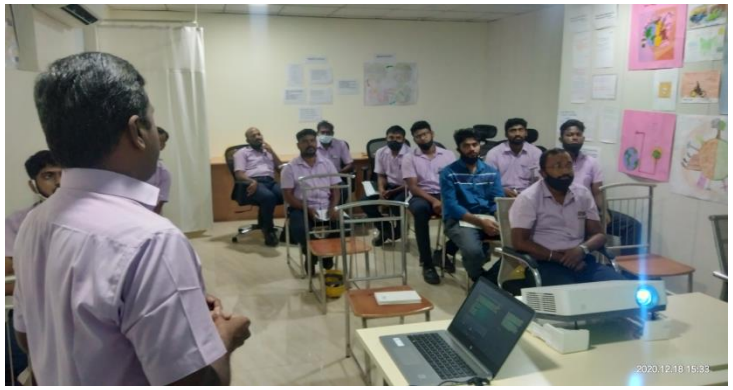
ENERGY BEST SUGGESTION: Mr. ARUL MURUGAN
PUSH TYPE TAP FOR DRINKING WATER TO AVOID WATER LOSS

12. Energy Team Work

Energy Training and Development



"7QC Tools"3 Day's External workshop conducted



Cost Impact of Leak

Best Engineering Practices- "Using Ultra Sound"

Energy Training- Importance of energy conservation in industries

Energy Cell Activity

Description	Value
Total Number of training provided- In House Training	05
Total Number of training provided- By External Training	02
Total number of training participants	52
Total number of man hour training completed	98

Leak Identification program

Description	Value
Total steam leak identified across ISBL	17
Total steam leak arrested - Completed	16
Number of steam leak required Shutdown	01
Cost saving in Steam leak arresting (Rs/Day)	3314

12. Energy Team Work- “GREEN GO” Cycling event Organized

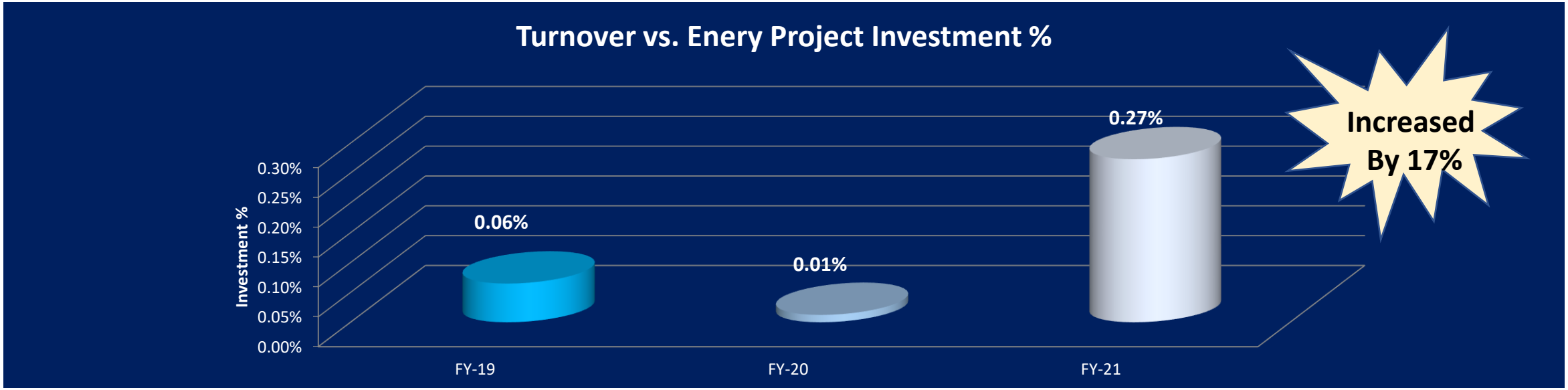
13. Implementation of ISO 50001

INTEGRATED MANAGEMENT SYSTEM

ISO 9001 : 2015 ISO 14001 : 2015 ISO 45001 : 2018

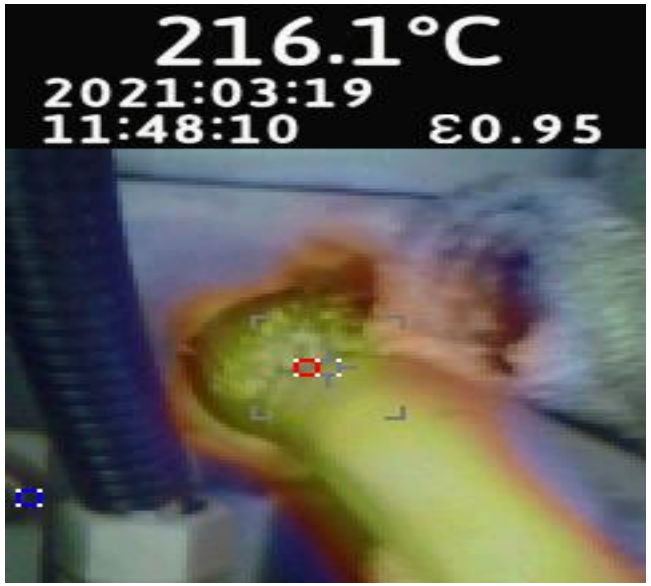
❖KPL Have Combination of ISO 9001, 14001, 45001 as IMS in Place.

❖We are way forward to implement ISO 50001: 2018 By End of FY-23; Measures are in place to convince management.



13. Learning From CII Energy Award 2020

❖ Through CII- Energy award-2020 we have learned some of best engineering practices, are implemented in our site and got positive result of energy saving; Some of



Ultrasound leak detection survey :

❖ Instrument air leak reduction

❖Nitrogen leak reduction.

❖Fugitive emission reduction (Hydrocarbon leak from process)

❖Steam trap testing.

Thermal and Insulation survey :

❖ Thermal and Insulation survey instrument procured and schedule has been followed.

Thank you

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Q&A