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BEYOND INFINITY

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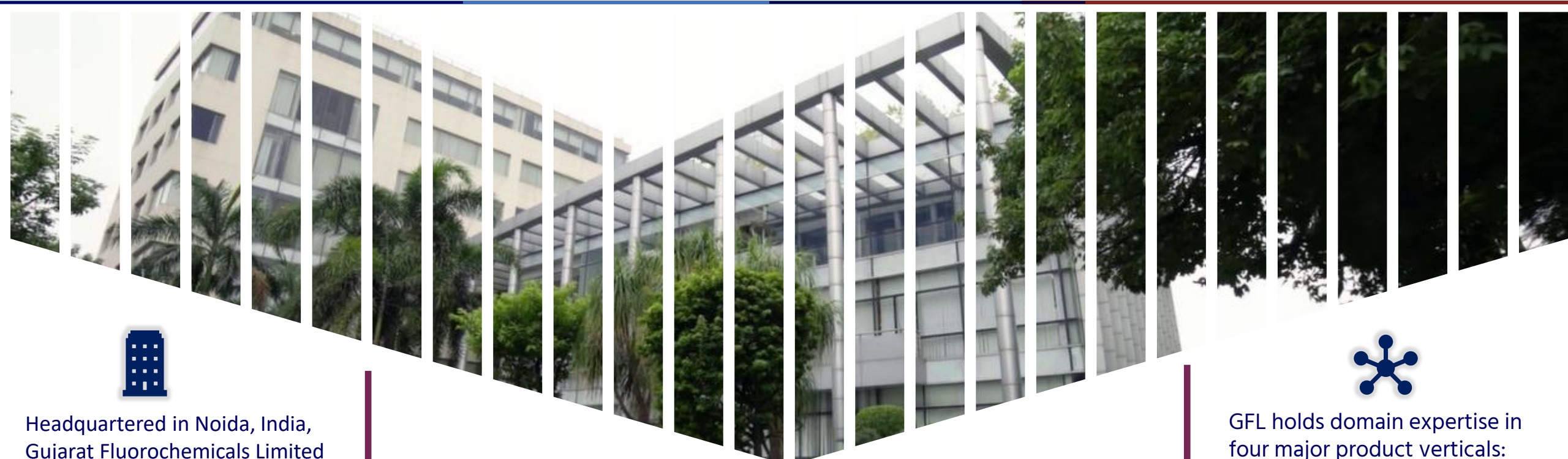
INOFLON[®]
PTFE | FEP | PFA

INOLUB[™]
FLUOROPOLYMER ADDITIVES

**DAHEJ-A
GUJARAT
INDIA**



1. *Mr. Nitin Chaudhary : GM (TS)*
2. *Mr. Hardik Barot : Sr. Manager (Power Plant)*
3. *Mr. Samir Parikh : Sr. Manager (HSEF)*



Headquartered in Noida, India, Gujarat Fluorochemicals Limited (GFL), is a part of the INOXGFL Group.

GFL is an Indian Chemicals Company with over 30 years of expertise in Fluorine Chemistry. GFL holds domain expertise in Fluoropolymers, Fluorospecialities, Refrigerants and Chemicals, catering to the material requirements of modern world



GFL's global footprints are represented by three manufacturing sites in **India**, a captive Fluorspar mine in **Morocco** and wholly-owned subsidiaries in **Europe** and **USA**.

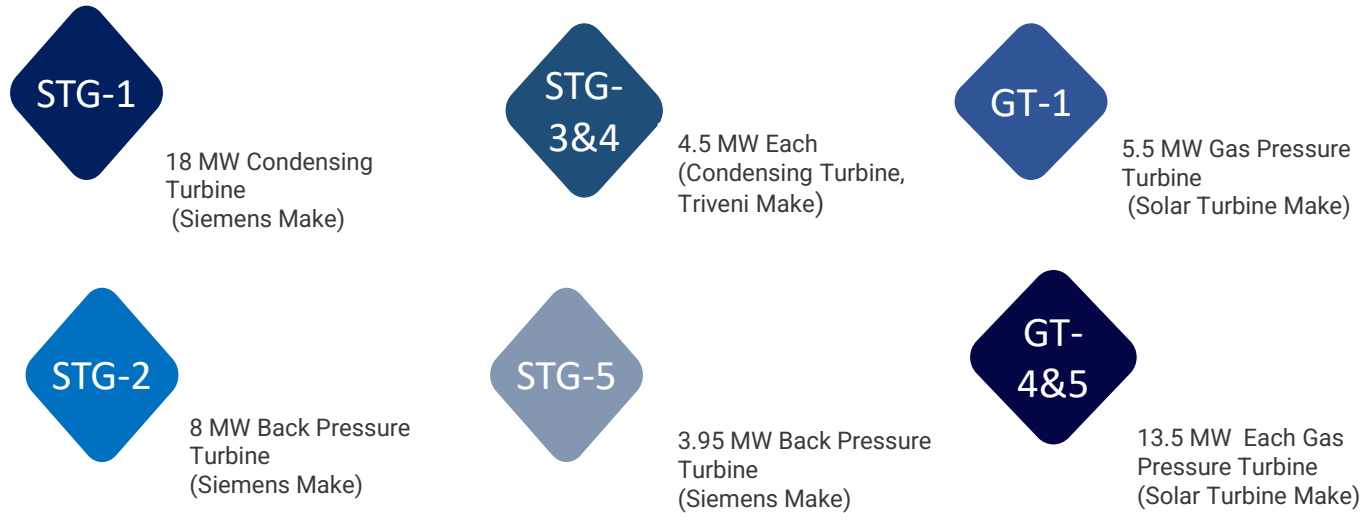


ISO: 9K, 14K, 26K, 27K, 45K, 204, 35K, Certificate .
SA: 8000,

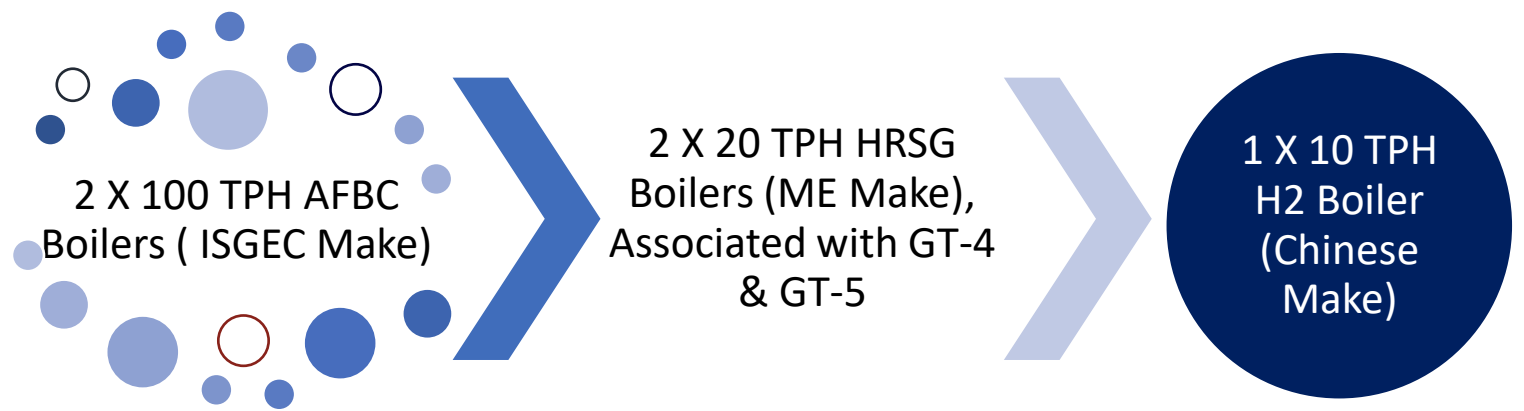
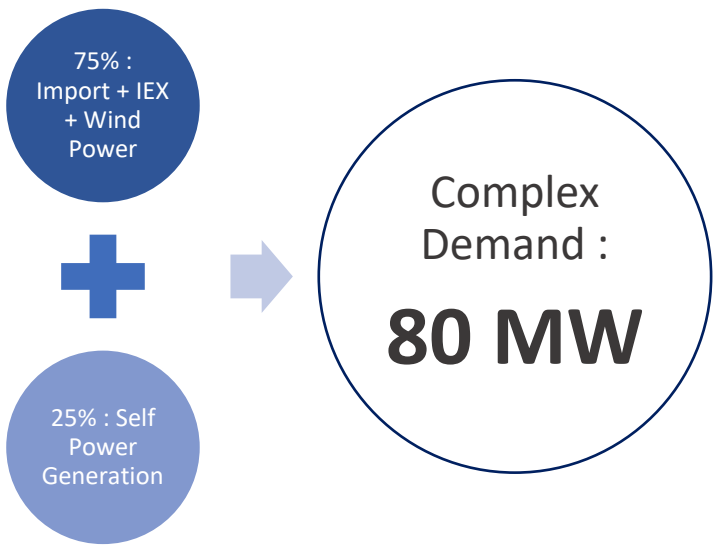
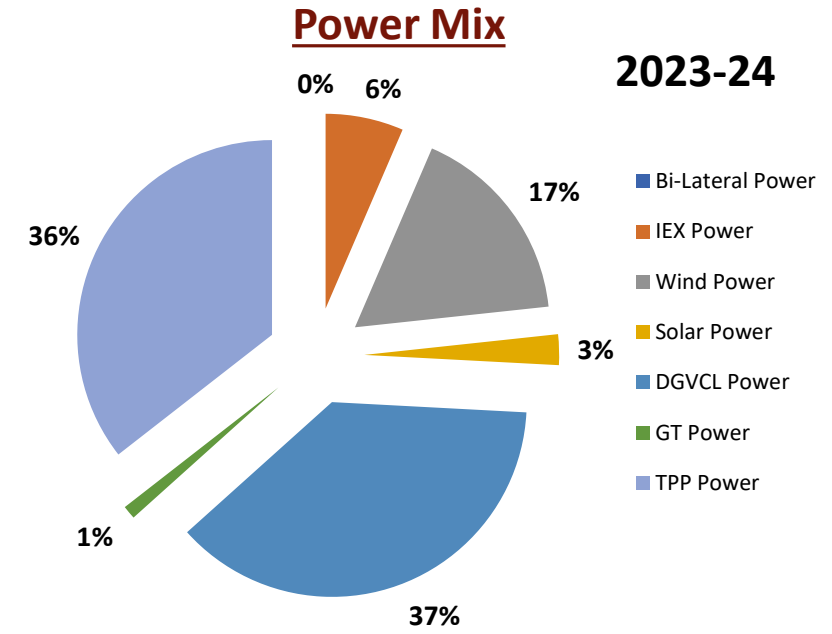


GFL holds domain expertise in four major product verticals: **Fluoropolymers, Fluorospecialities, Refrigerants and Chemicals**. Our steadfast focus and attained expertise in Fluorine Chemistry enable us to develop, manufacture and commercialise Fluorine based products in record time complying to most regulatory requirements

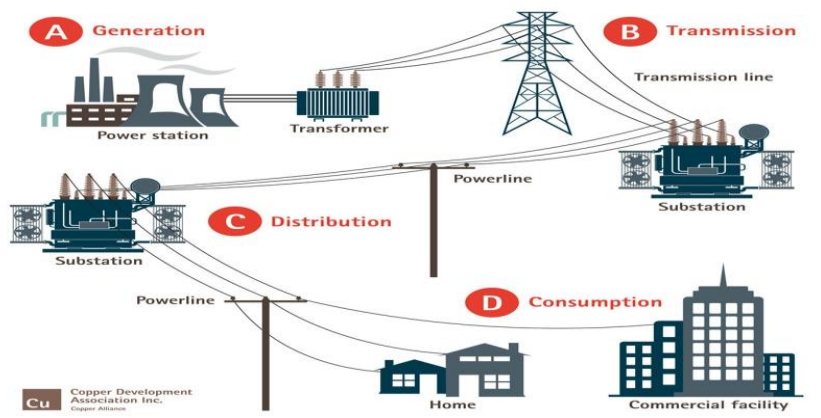
Power / Steam Generating Installations with capacity



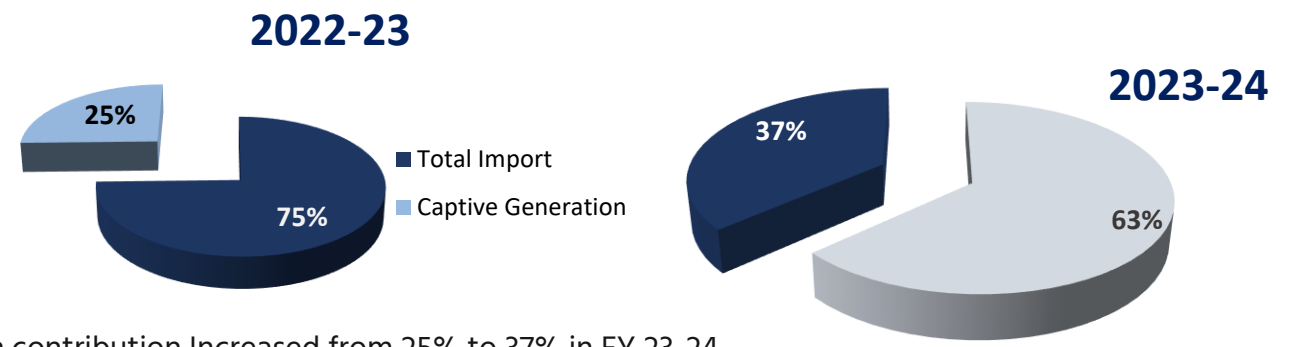
71.45 MW



Energy Contribution

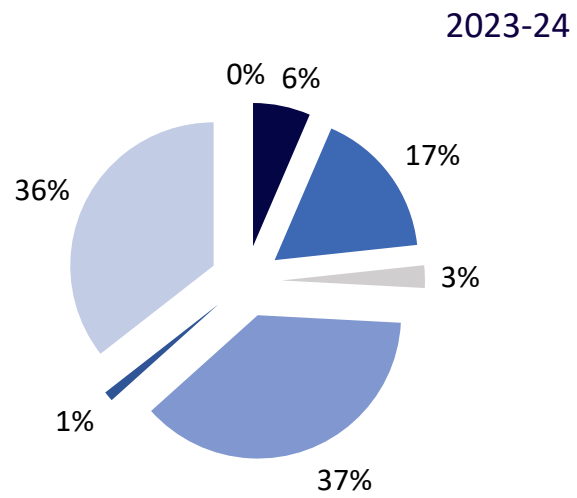
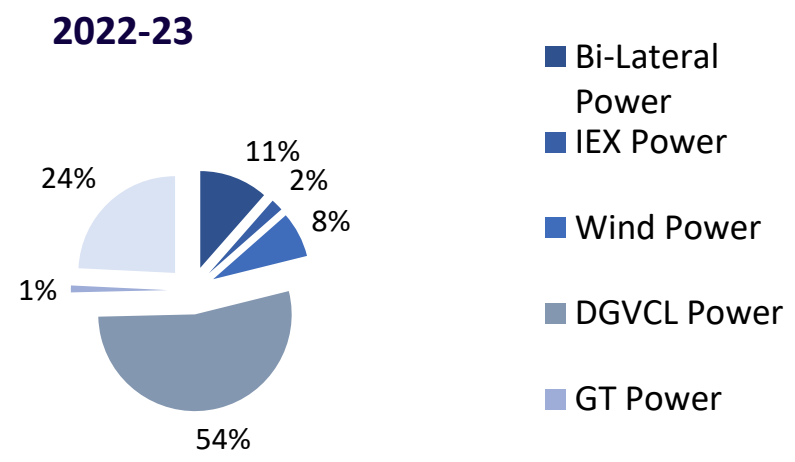


Captive Generation Mix in Total Power Demand



❖ Captive Generation contribution Increased from 25% to 37% in FY 23-24.

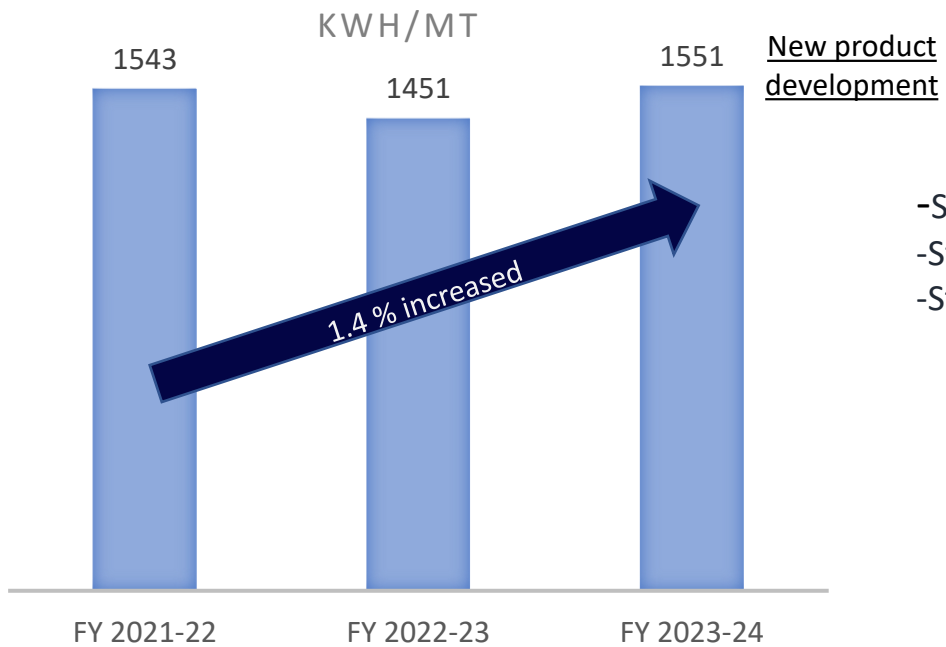
Power Mix at Dahej Site :



- ❖ Total Power consumption has been decreased by 4.8% (From 79.72 MW in FY 23 to 75.87 MW in FY 24)
- ❖ Total import power has been decreased by 19.2% (From 59.49 MW in FY 23 to 48.06 MW in FY 24)

Electrical Energy

Items	FY 2021-22	FY 2022-23	FY 2023-24
Overall Energy Cons (Kwh)	664181317	698405079	664632580
Total Prod (Mt)	430490	481276	428393
Kwh /Mt	1543	1451	1551

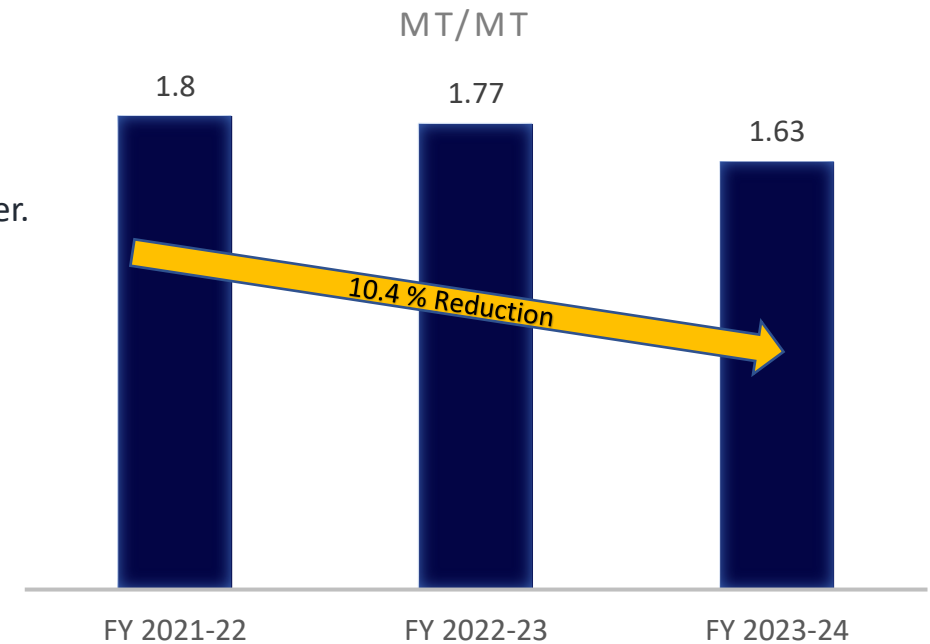


- Steam Based VAM converted in chiller.
- Steam loss survey
- Steam trap audit



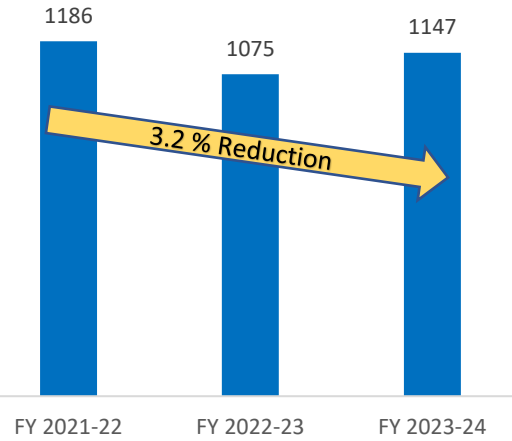
Thermal Energy

Items	FY 2021-22	FY 2022-23	FY 2023-24
Overall Energy Cons (Mt)	775006	853427	696517
Total Prod (Mt)	430490	481276	428393
Mt/Mt	1.8	1.77	1.63

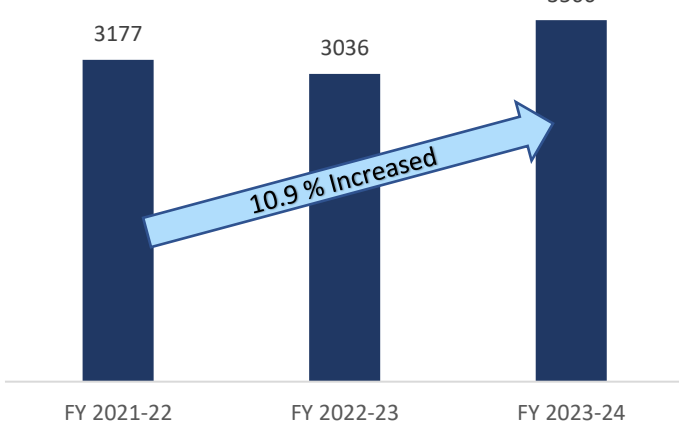


Specific Electrical & Thermal Energy Consumption -Product Specific

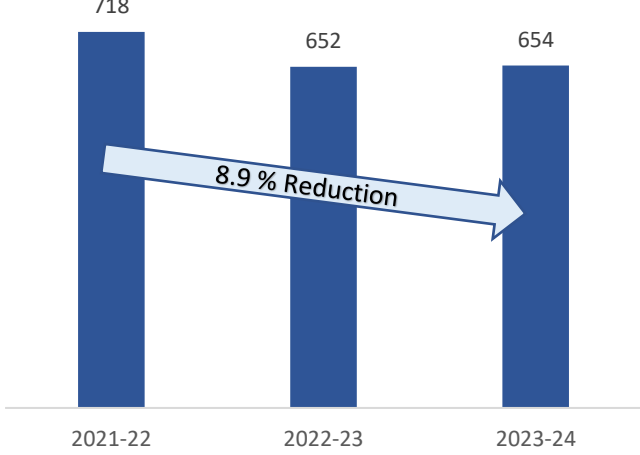
Chemical KWH/MT



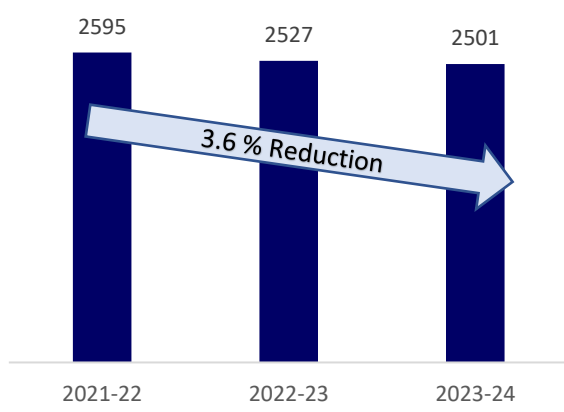
Polymer Kwh/Mt



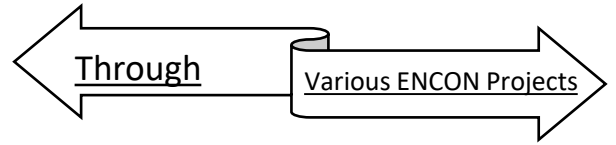
AHF Kwh/Mt



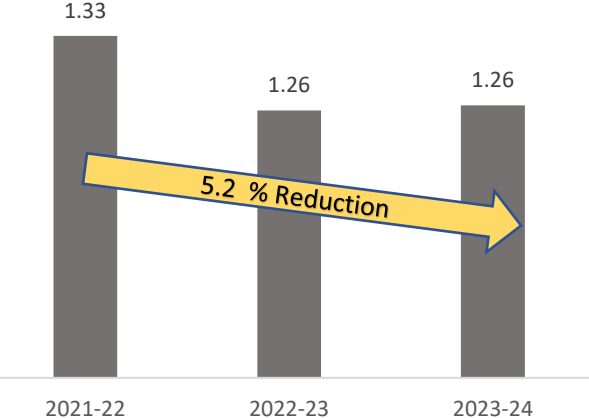
CA KWh/MT



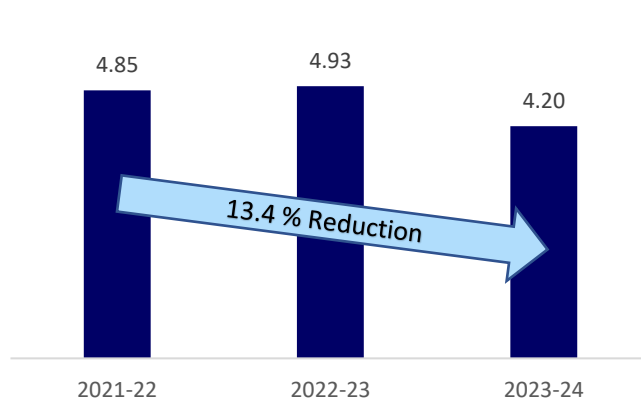
- Refrigeration system optimization
- Chiller load reduced by optimization and distribute in process
- DPTFE flash steam use in TFE process for preheat
- Heat recovery in Distillation section
- Improved Assets Utilization



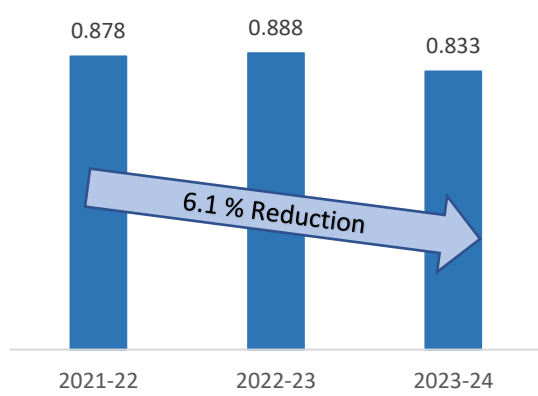
Chemical steam Mt/Mt



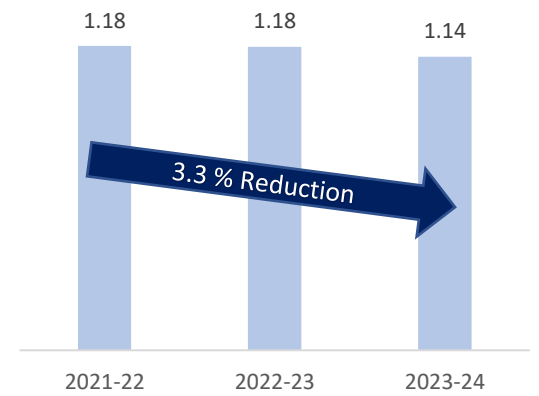
Polymer steam Mt/Mt

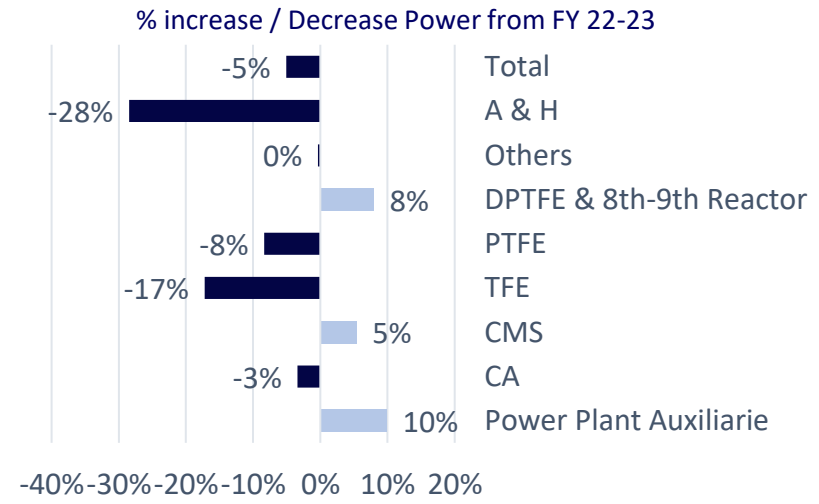
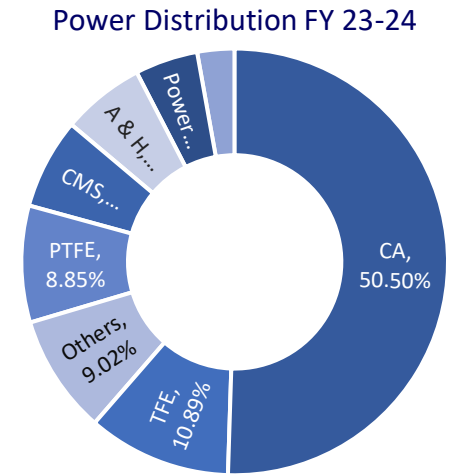
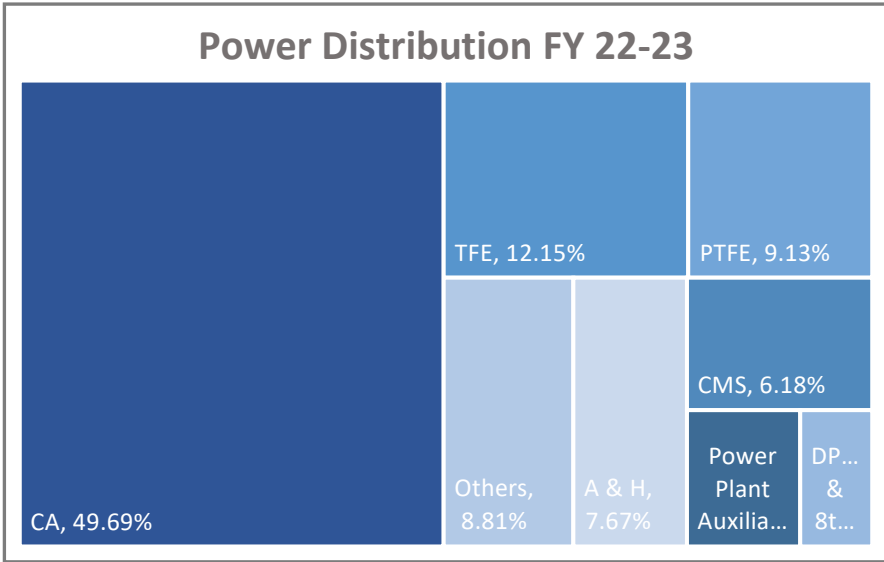


AHF Steam Mt/Mt

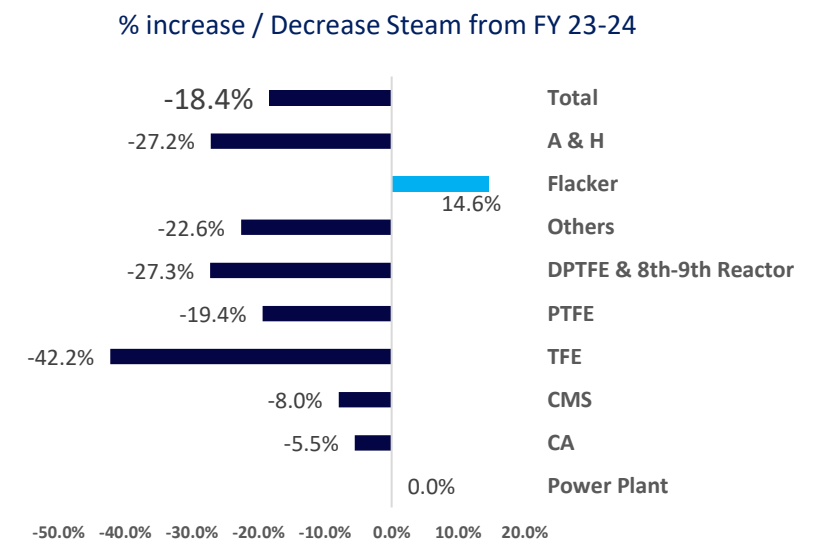
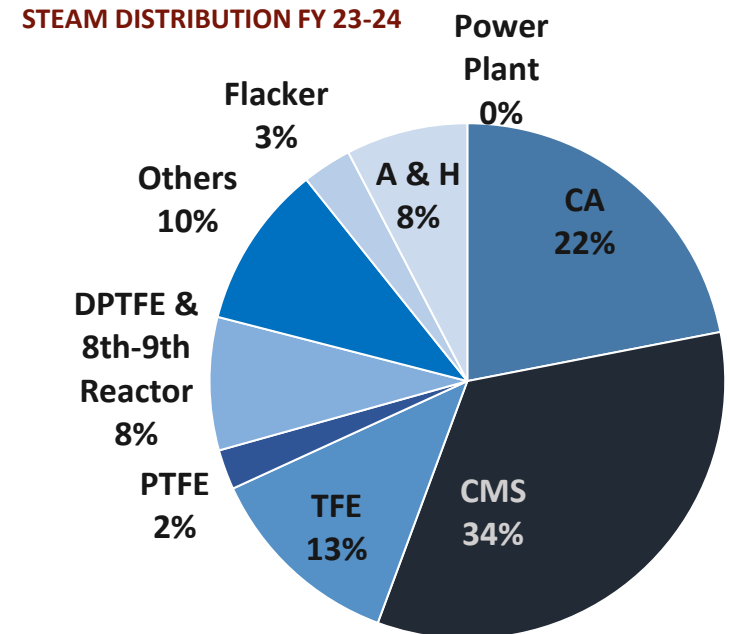
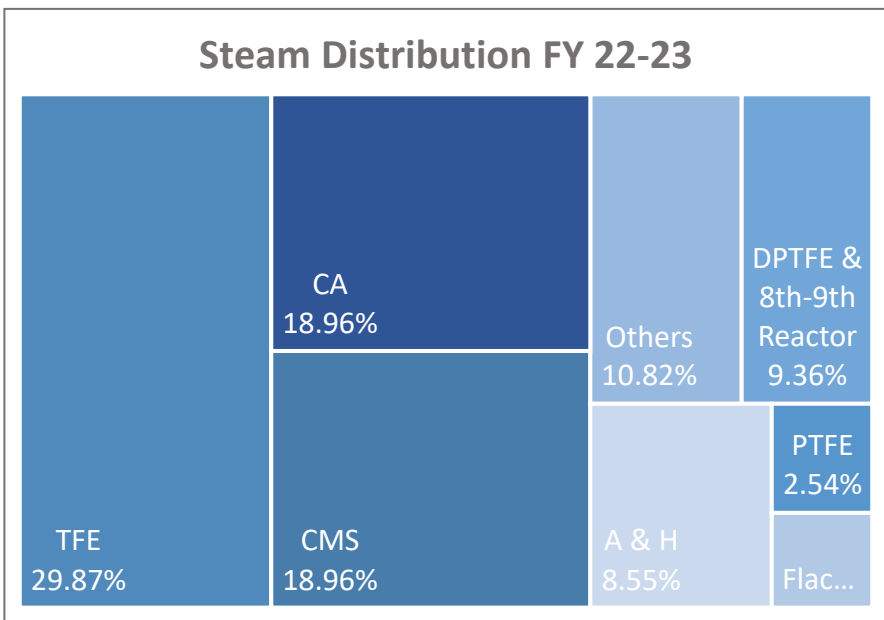


CA steam Mt/Mt

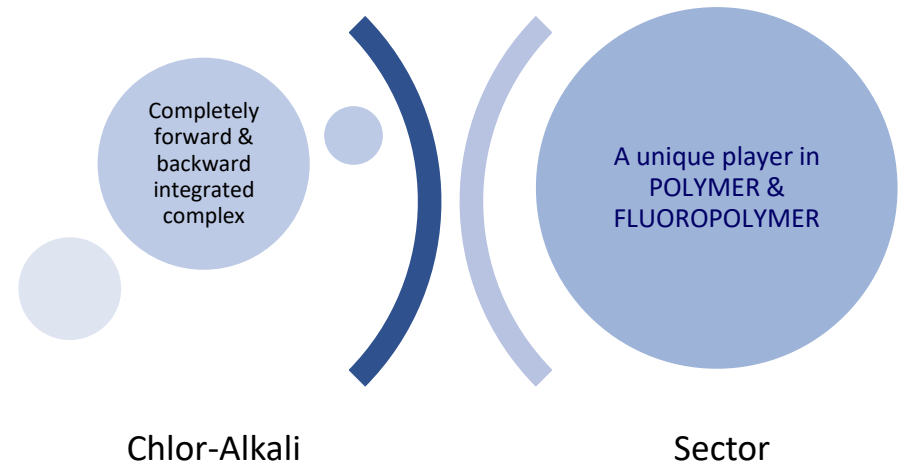
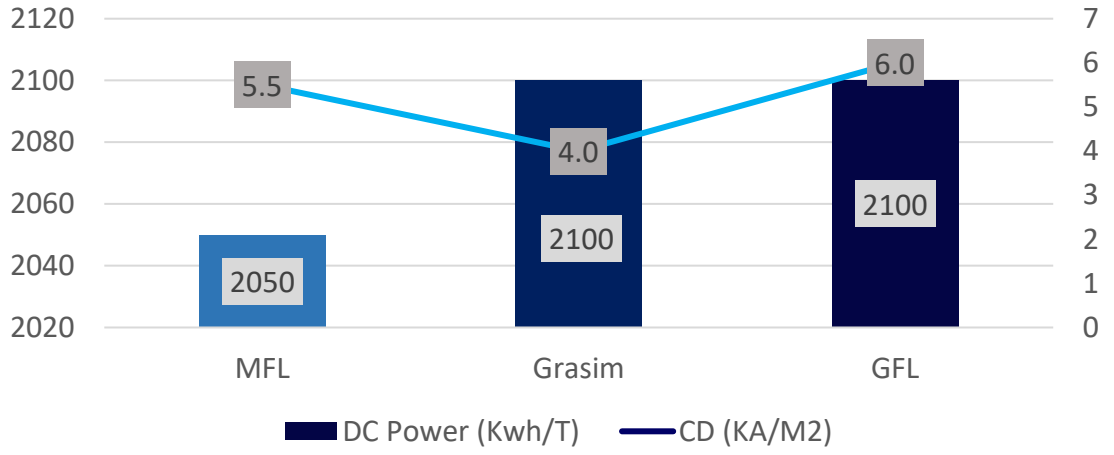




- Total Power consumption has been decreased by 4.8% (From 79.72 MW in FY 23 to 75.87 MW in FY 24).
- Back Pressure Turbine Power Generation has been decreased from 8.26 MW to 7.35 MW in FY 23-24.

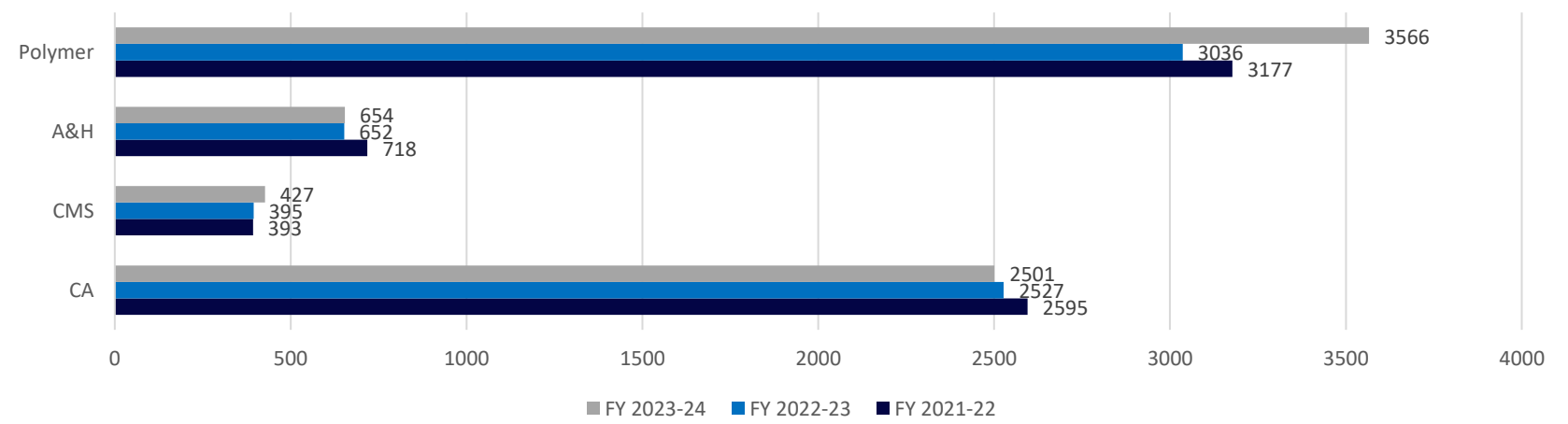


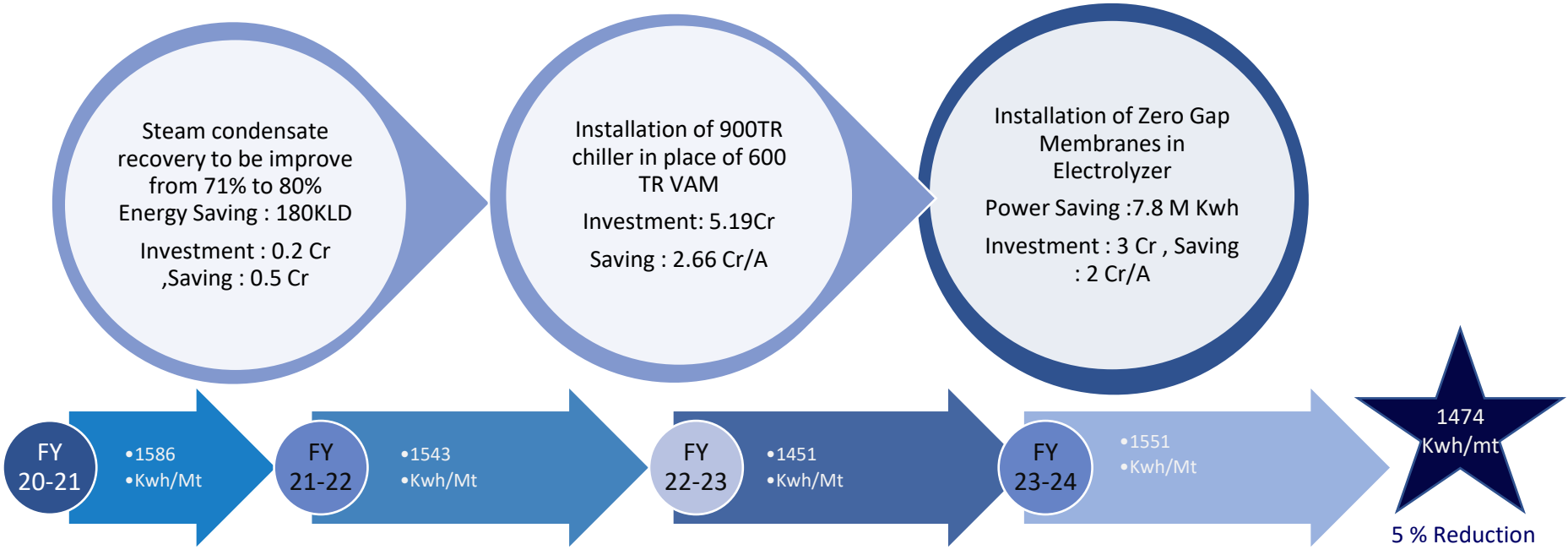
Benchmarking : Chlor-Alkali Complex



Internal Benchmarking

INTERNAL BENCHMARKING





De-staging of Boilers Feed Pumps : Investment : 0.13 Cr, Expected Saving : 0.25 Cr

Installation 20 MVAR HT capacitor bank to improve overall Power Factor from 0.91 to 0.98 on 66kV grid. Investment : 8 Cr , Saving : 3.2 Cr

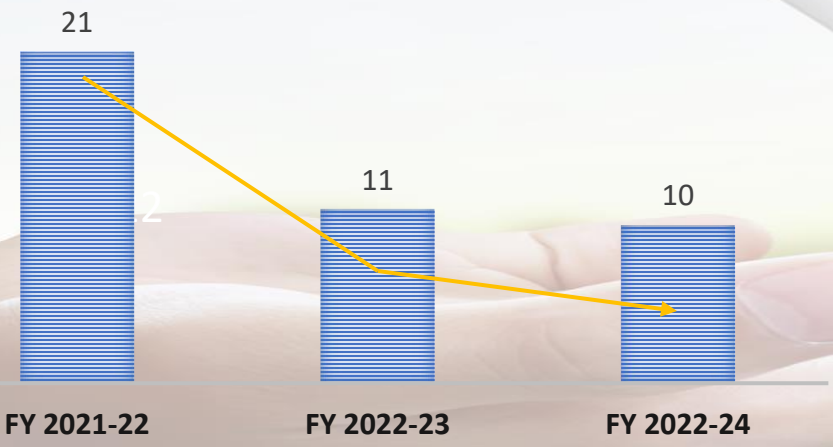
Ref System Losses Optimization, Power Saving : 6.5 M Kwh, Investment : 0.6 Cr, Saving : 0.5 Cr

STG-2 Turbine Steam Path clearances optimization through Overhauling. Expected Saving - 2 Cr

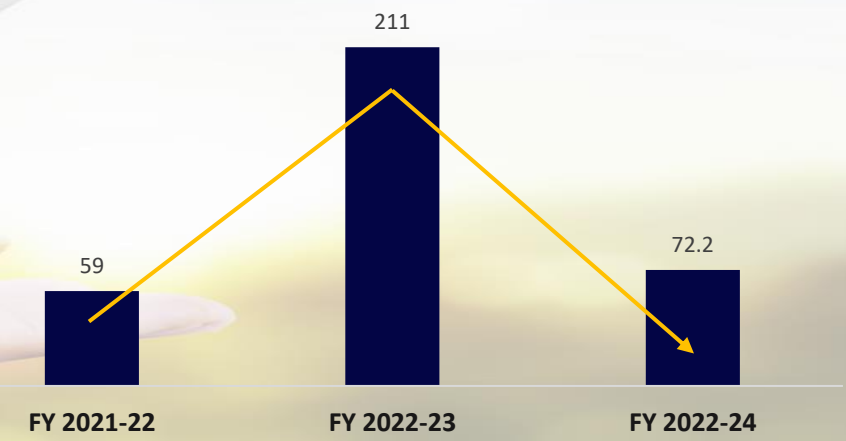
Energy Saving Projects Implemented in Last 3 Years

Year	No of Energy Saving Projects	Investment (INR-Million)	Electrical Saving (Million KWH)	Thermal Saving (Million Kcal/MTOE)	Savings (INR-Million)	Impact on SEC (Thermal, Electrical)
FY 2021-22	21	40	7.4	-	59	0.2%, 2%
FY 2022-23	11	127	10.4	7767	211	5.5%, 1.7%
FY 2023-24	11	168	9.3	11638	133	3.5%, 1.5%

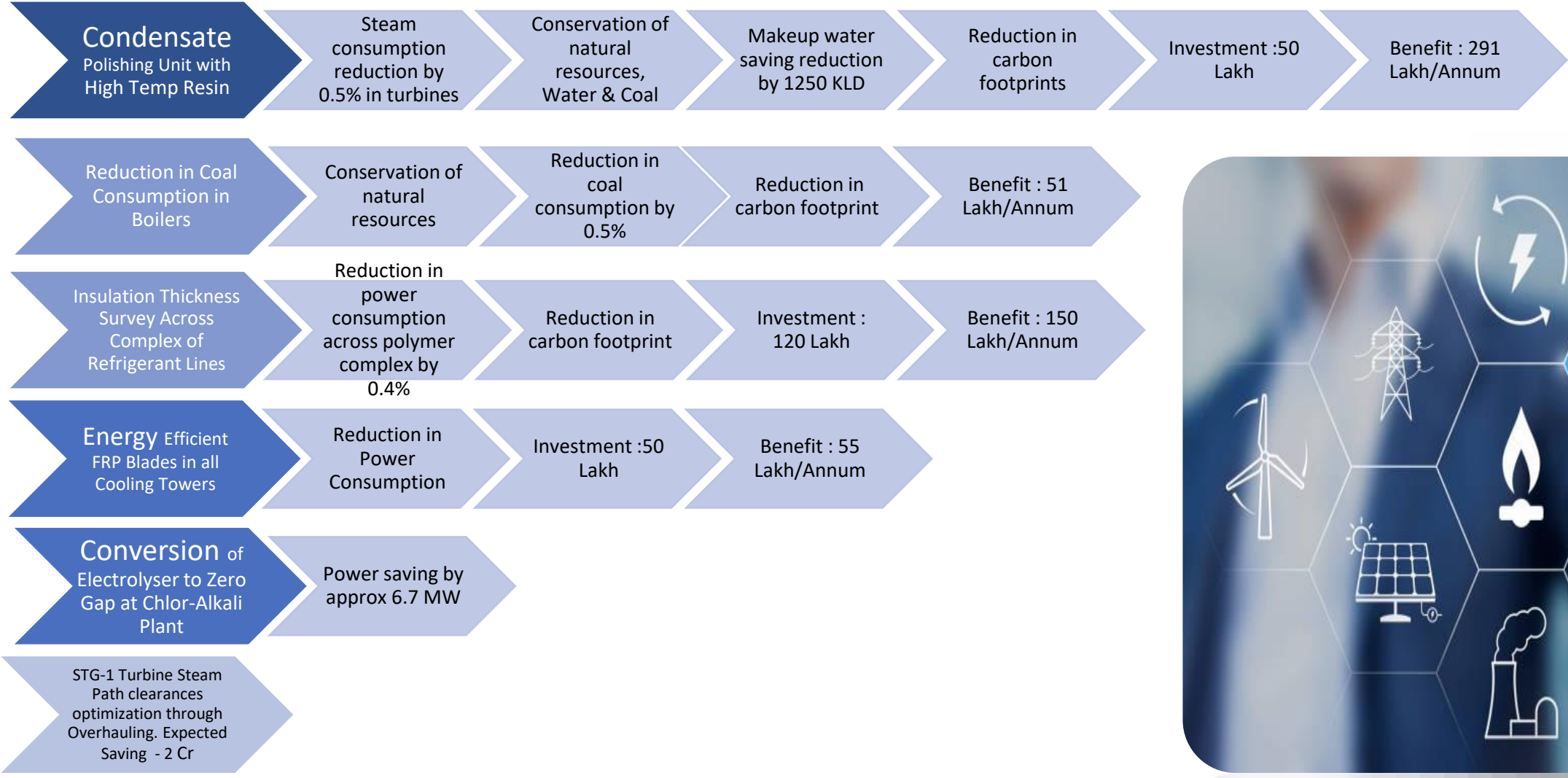
ELECTRICAL SAVING (MILLION KWH)



Electrical saving in Million INR



Initiatives Taken For Energy Conservation



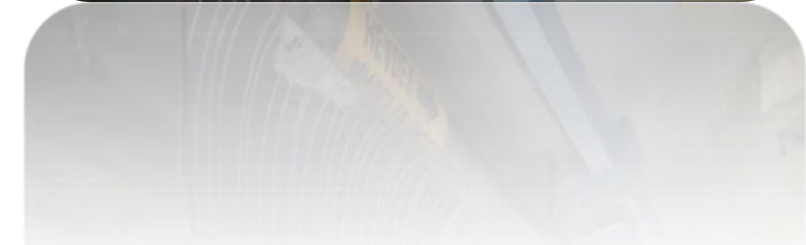
There are many other energy conservation recommendations , identified during audit, are under regular review for timely implementation.

Energy Saving Projects implemented in last 3 years

Sr.no	Year	Project	Investment (Million INR)	Electrical Saving (million KWH)	Thermal Saving (Million Kcal)	Total Saving (Million INR)	Payback (In Months)
1	2023-24	New open type highly efficient brine chiller (-5) DegC with HT motor installed / commissioned & 2 nos. package chillers & 1 no. obsolete vertical compressor with LT motors stopped	11.745	0.00016	0	10.91	13
2	2023-24	Munter's make high efficiency EC (electronically commutated) fan installation in FKM Plant AHU-1.	1.064	0.00002	0	1.05	12
3	2023-24	Revamping of S&A cooling tower (CT) to improve overall effectiveness & reduce its power consumption	2.18	0.00001	0	0.47	56
4	2023-24	Integration of PTFE and S&A CT to save power when plant load minimum.	0.0	0.00003	0	0.59	0
5	2023-24	Interconnection of 6th and 7th DPTFE reactor cooling tower.	0.4	0.00004	0	2.80	2
6	2023-24	TFE-1 Augmentation cooling tower (1200M3PH) load to be diverted on R-125 new C.T (825 M#PH) during winter season for energy saving purpose.	3.3	0.00003	0	0.52	77
7	2023-24	2 Nos. old VAM machines and S&A old chiller were running to cater the chilled water load for S&A/FKM/PTFE/PT-PTFE plants	8.3	0.00060287	11637.5	36.659	2.7
8	2023-24	De-staging of Boiler feed water pump under ENCON project (BFP-1)	0.4	0.42	–	3.6	3.0
9	2023-24	De-staging of Boiler feed water pump under ENCON project (BFP-3)	0.4	0.42	–	3.6	3.0
10	2023-24	Installation of micro turbine	20	1.36	–	12	18.0

Energy Saving Projects implemented in last 3 years

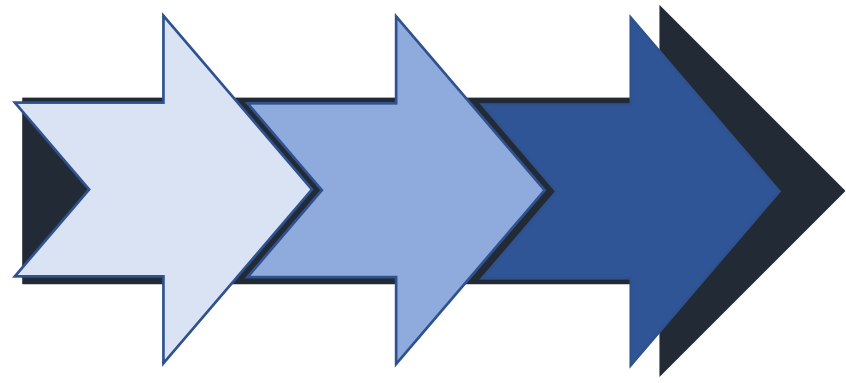
#	Year	Project	Investment (Million INR)	Electrical Saving (million KWH)	Thermal Saving (Million Kcal)	Total Saving (Million INR)	Payback (In Months)
01	2022-23	Re-membraning and replacement of anode & cathode mesh towards zero gap technology	127	7.3	0	62	25
02	2022-23	Boiler feed pump ARC (Automatic Recirculating Valve) overhauling / repairing work was carried out resulted saving in terms power as daily power consumption	5	0.3	0	2	25
03	2022-23	VFD enabled New Air compressor installation	7	0.2	0	1	63
04	2022-23	Usage of Chillers instead of VAM during CPP annual shutdown	0	0	3192	8	0
05	2022-23	Blowdown Tank Flash Steam recovery system has been taken in line through Deaerator-1	0	0	1890	5	0
06	2022-23	Distillation column operation optimization through Aspen simulation	1	1.2	0	11	1
07	2022-23	Utilization of reactor heat recovery and optimization of distillation operation.	0.2	0	5531	13	0
08	2022-23	TFE#1 Utility Section (-)35'C Evaporator tube cleaning work taken in SD_Sept22	6	0.8	0	7	11
09	2022-23	TFE#1 Utility Section (-)15'C Evaporator tube cleaning work taken in SD_Sept22	1.6	0.20	0	2	11
10	2022-23	Usage of Chillers instead of VAM during CPP annual shutdown	0	0	3192	8	0



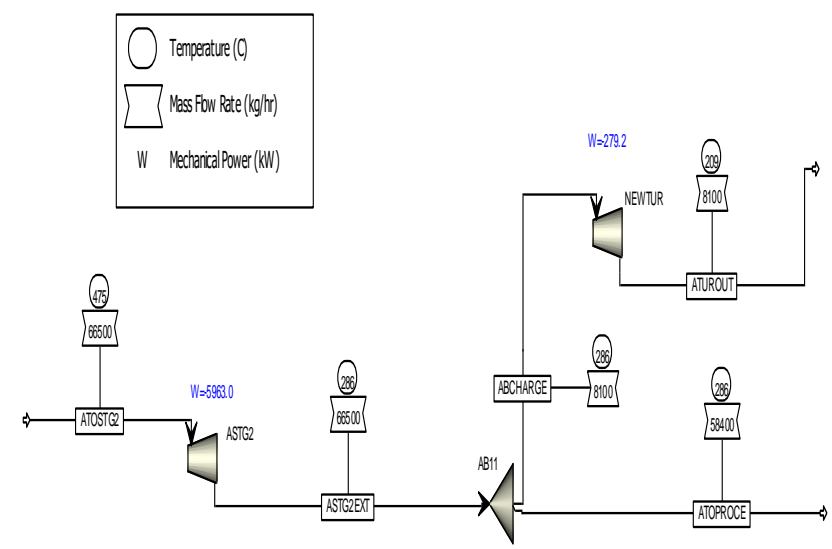
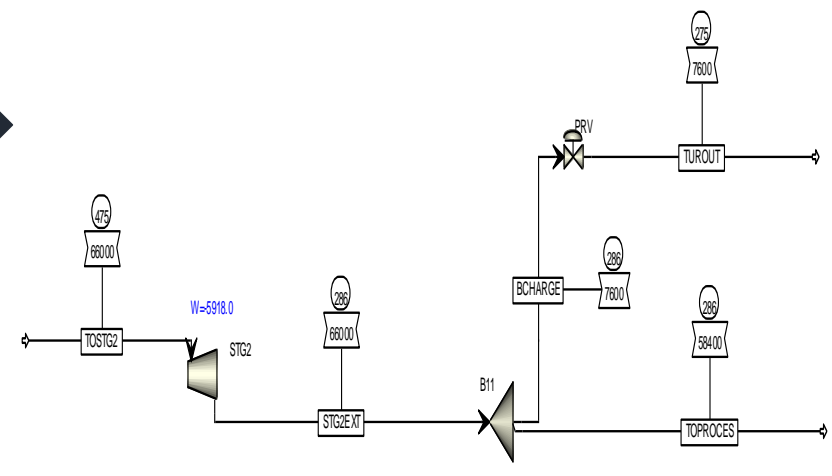
Energy Saving Projects implemented in last 3 years

Sr. No.	Year	Project	Investment (Million INR)	Electrical Saving (million KWH)	Thermal Saving (Million Kcal)	Total Saving (Million INR)	Payback (In Months)
01	2021-22	Electrolyser E-Zero gap	55	2.85	0	24	27
02	2021-22	Utilities – TFE2: Installation & commissioning of efficient standby pump (-15) Deg C . BEFORE: with P804A: Amp was = 160 amp. AFTER: with P804C: Amp = 140 amp. Savings = 20 amp.	1	0.10	0	1	14
03	2021-22	VDF & TFE2 Utilities: Refrigeration systems & associated pipelines cold insulation losses reduction of VDF and TFE2 plant & Utilities.	3	1.12	0	10	4
04	2021-22	TFE2 Utilities: Refrigeration systems COP – Coefficient Of Performance improvement through execution of various identified jobs apart from CT: Cooling Tower's refurbishment / design changeover from cross to counter / 1 cell addition to improve CT efficiency to max possible extent as executed at TFE1 Utilities during last FY.	7	1.32	0	11	8
05	2021-22	At TFE-1 Utilities: Stoppage of 1 No. (-5) DegC refrigeration compressor (Old : 3# was in ops, Now: 2# are in ops) through integration of (-15) compressor suction header with (-5) compressor suction header by laying down additional 4" R22 refrigerant pipeline.	4	0.99	0	8	6

Expected Theoretical Performance

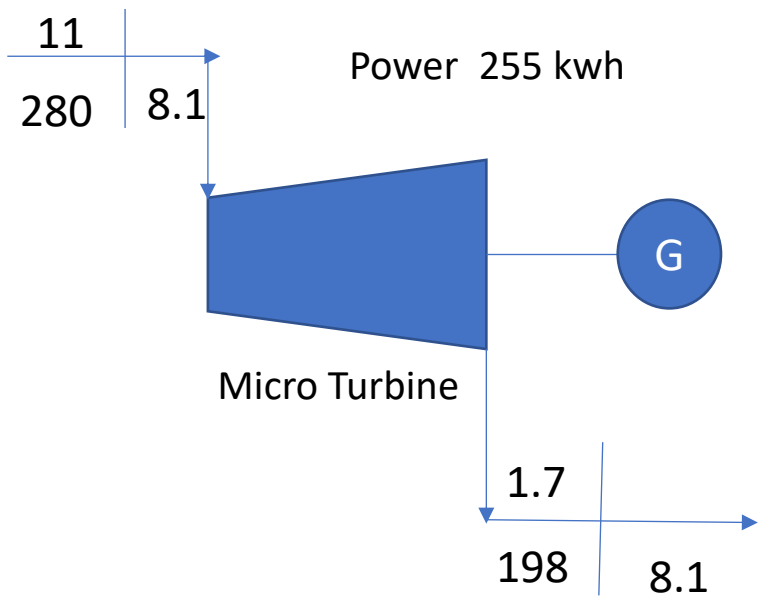


- Presently Deaerator steam (1.7 kg/cm², 7.6 TPH) requirement is fulfilled by the MP steam (12 Kg/cm²) with two sets of PRV in line. It was proposed to installed micro turbine to conserve energy as per the CII recommendation. Detailed Simulation study of Power and Steam network done to evaluate the benefit of the scheme by Central Technical Services.



○ Temperature (C)
 ▭ Mass Flow Rate (kg/hr)
 W Mechanical Power (kW)

Actual Performance



Investment: Total Project Cost 200 Lacs

Installed capacity: 350 KW@ 10 TPH

Operation condition: 255 kw@ 8.1 TPH

Expected power in a year: 1744000

Power Cost: 8.5 Rs/Kwh

Operating hrs.: 8000



Project Frame:	Before	After
Steam to dearetor, kg/hr	7600	8100
Power recovery	0	255
Auxiliary consumption, power kw		5
STG2 steam, kg/hr	66000	66500
STG2 Power	5918	5963
STG2 power increase, Kwh		45
Auxiliary Power consumption, kwh		5
Net Power Increase		295
Net steam increase at Boiler, kg/hr.		500
Power cost, Rs/kwh		8.5
Steam cost, Rs/kg (Rs 2100 per ton)		2.1
Power saving Rs. Lacs		200.6
Steam generation cost		84
Net Saving Rs. Lacs		116.6

- ❖ Auxiliary power consumption (AOP, cooling water, lighting ,UPS): 40000 kw/year
- ❖ Additional steam consumption 500 kg/hr. at deaerator.
- ❖ **PAYBACK = 18 Months**

It is an ENCON project suggested by CII. In CPP, we have two Boilers. For the purpose of feed water supply , 3 BFPs are installed (One Stand-by & Two running) . As per internal discussion after receipt of VFD proposal, it was decided to explore de staging For this is cost effective solution. Accordingly offer was invited from OEM M/S KSB for de staging of BFPs.

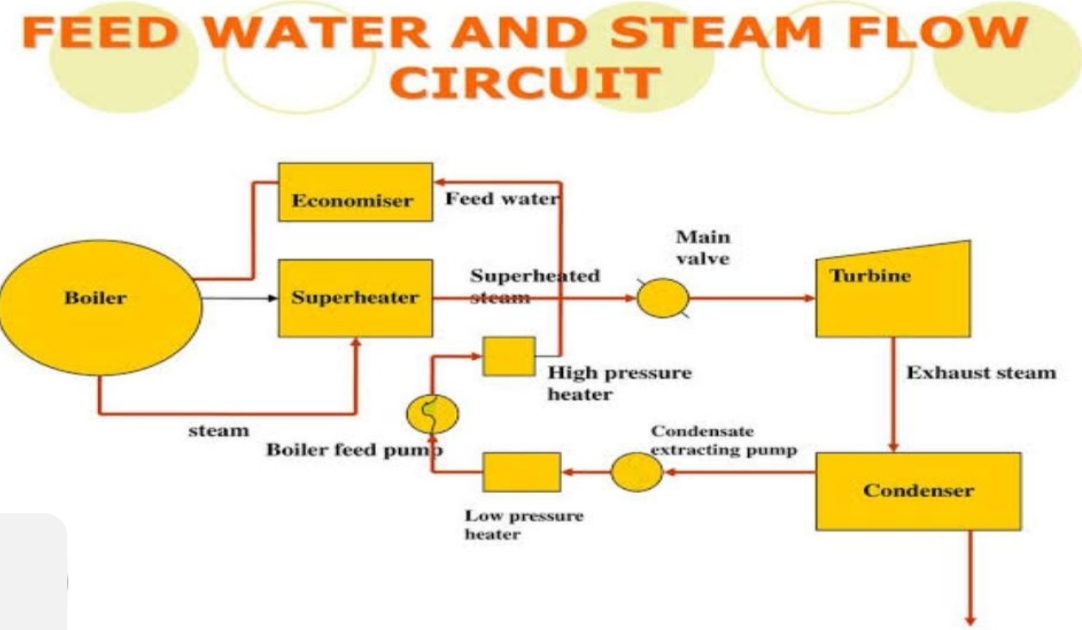
pump is operating with low (80 to 100 m3/hr.) flow than design (136 m3/hr), there is re-circulation occurred in pump stage casing impact on stage wear rings resulting in increased clearances of wear rings.

If Boiler Steam demand is high say 120TPH, pump can deliver the same with 920m head against rated Drum Pressure 75Kg/cm2. per recent performance, Boiler Feed pump(s) is/are not delivering desired reliability due to frequent high vibrations.

One of the actionable which is contributing high vibration is higher capacity of Boiler feed pump which can be optimized by stage reduction in the pump.



Payback = $(21.7 \times 2 / 40.32 \times 2) \times 12$ i.e.6 Months.

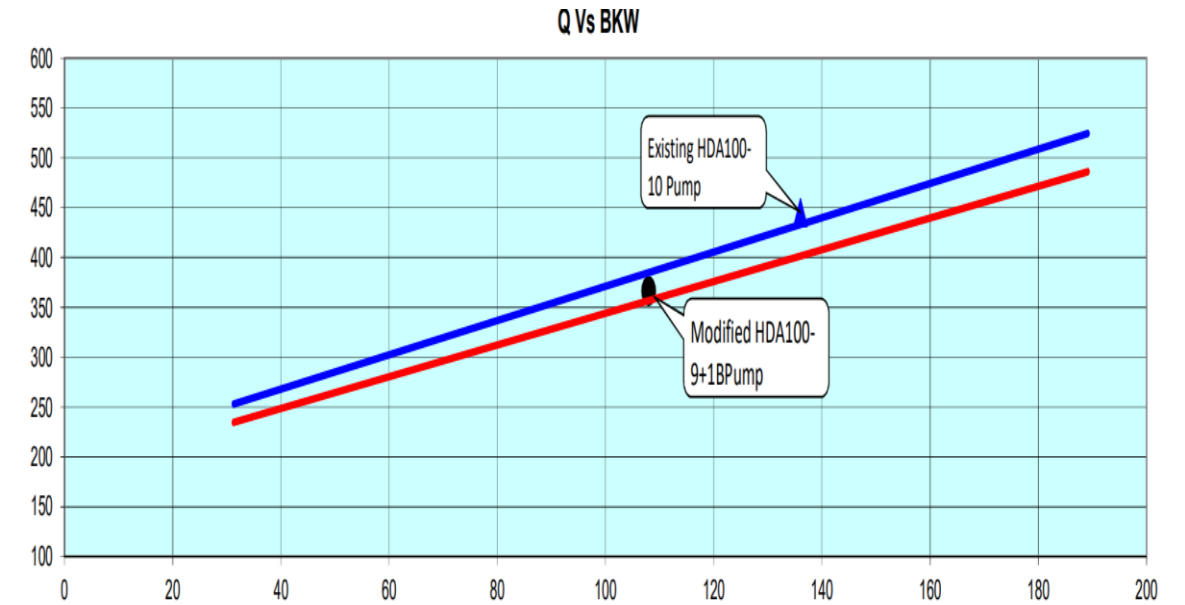
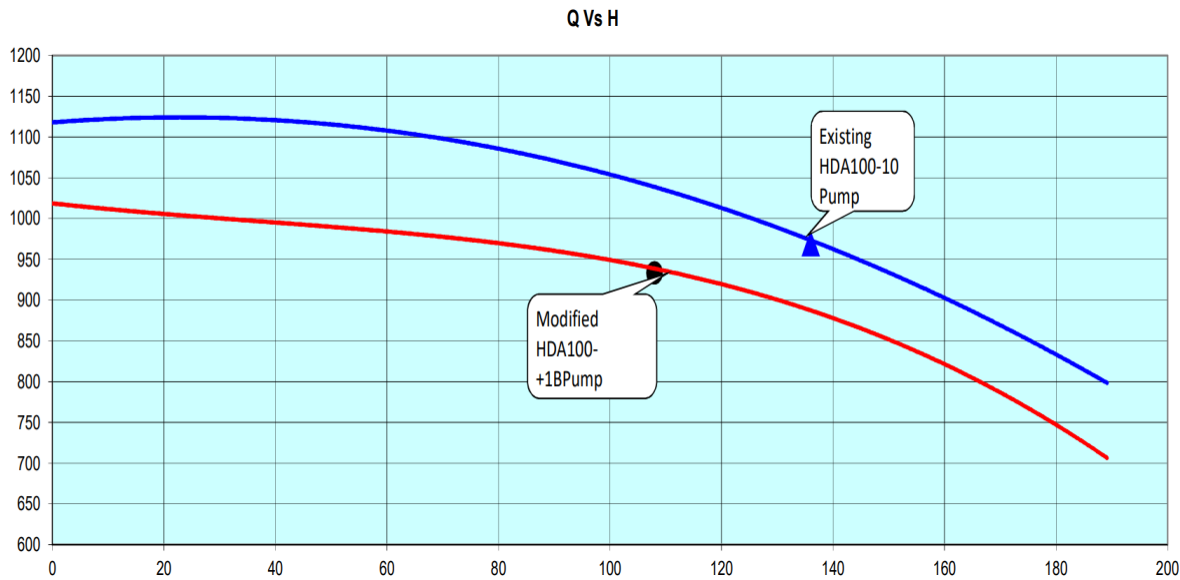
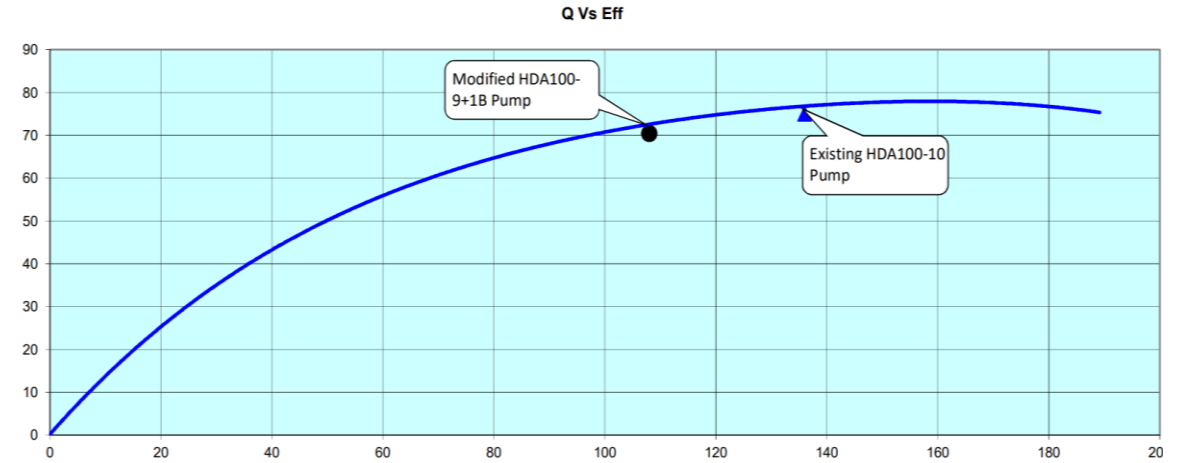
S. No.	Description	Unit	
1	Installed Capacity of BFP	KW	500
2	Present Operating Power (Pump)	KW	445
3	Operating Power (Pump)- After De staging	KW	382
4	Net Saving	KW	63
5	Considering Hours in a Year	Hrs	8000
6	Considering Power Cost	INR / KWH	8.0
7	Net Saving per annum @ one Boiler Feed Pump	INR	<u>40,32,000</u>



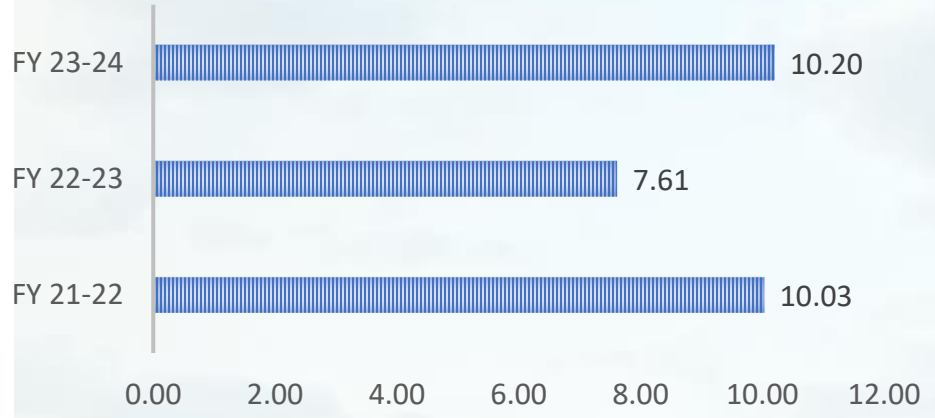
PERFORMANCE CURVE

Customer/Project	Gujarat Fluorochemicals Limited
Pump type	HDA100-10
Pump S.O No	5111014106
SQ No.	SQ:20217842

Parameters	Capacity (Q) m3/hr	Head (m)	BKW KW	Efficiency %	Speed RPM	Conditions
As Per Datasheet	136.00	970.0	445.0	75.0	2980	Existing Pump - HDA100-10 
Modified Pump	108.00	933.0	366	70	2980	Modified Pump - HDA100-09+1B 

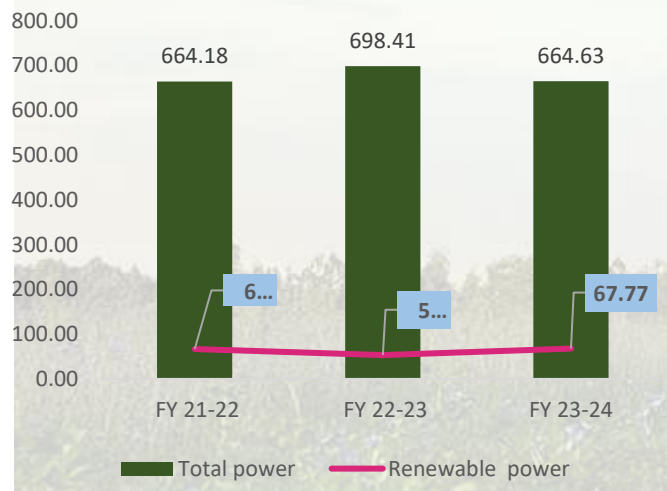


% WIND POWER VS TOTAL POWER



To increase % of RENEWABLE POWER--8 MW + 12 MW : 20 MW : Solar-Wind Hybrid Tied Up Done (50% PLF considered)

Renewable power Vs Total power

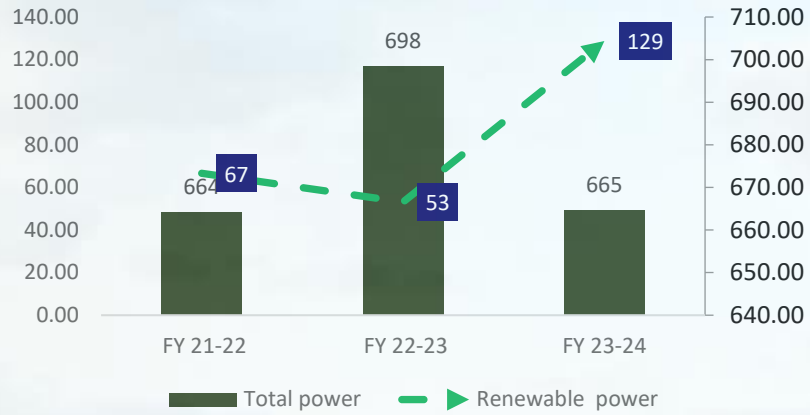


Year	Technology (Electrical)	Type of Energy	Onsite/Offsite	Installed Capacity (MW)	Generation (Million KWH)	% Overall Energy
2021-22	ELECTRICAL	WIND POWER	OFFSITE	50 MW	66.60	10.03
2022-22	ELECTRICAL	WIND POWER	OFFSITE	50 MW	53.16	7.61
2023-24	ELECTRICAL	WIND POWER	OFFSITE	50 MW	67.77	10.20

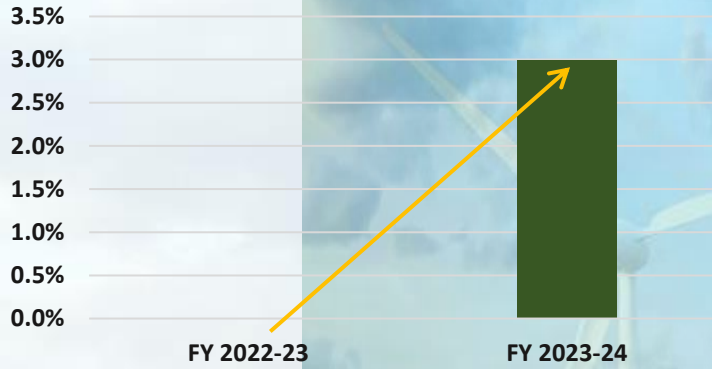


Utilization of Total Renewable Energy Sources (Wind, Hybrid Solar and Wind) -offside

Renewable power Vs Total power



Solar Energy Consumption



To increase % of RENEWABLE POWER--8 MW + 12 MW : 20 MW : Solar-Wind Hybrid Tied Up Done (50% PLF considered)

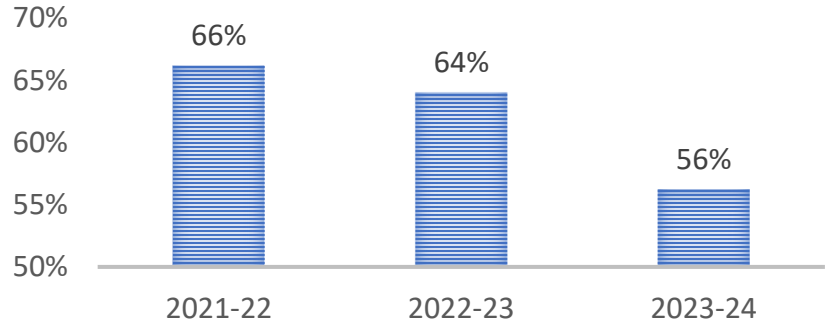
% TOTAL POWER VS. RENEWABLE POWER



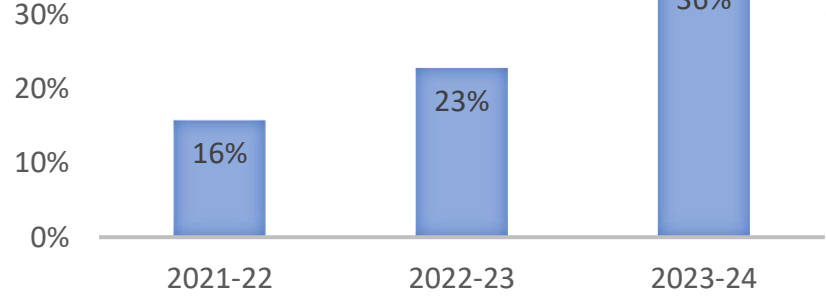
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2021-22	ELECTRICAL	WIND POWER	OFFSITE	50 MW	66.60	10.03
2022-22	ELECTRICAL	WIND POWER	OFFSITE	50 MW	53.16	7.61
2023-24	ELECTRICAL	WIND POWER	OFFSITE	50 MW	128.73	19.37



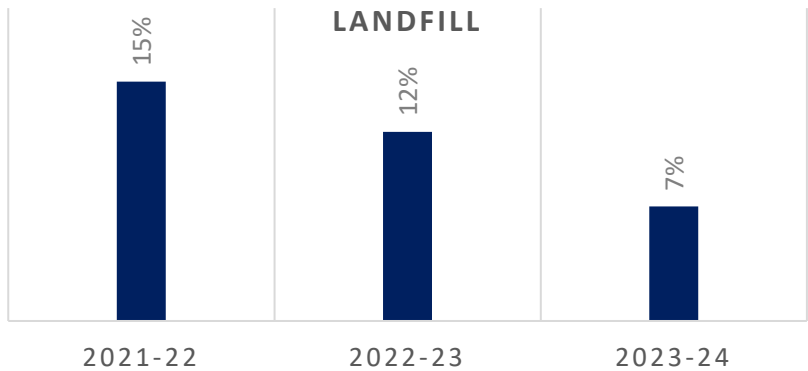
COPROCESSING



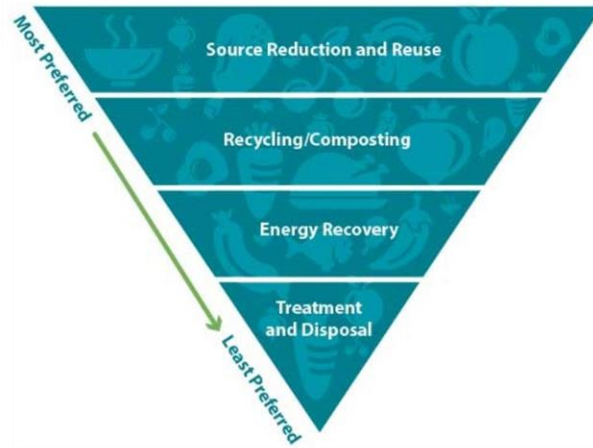
RECYCLERS



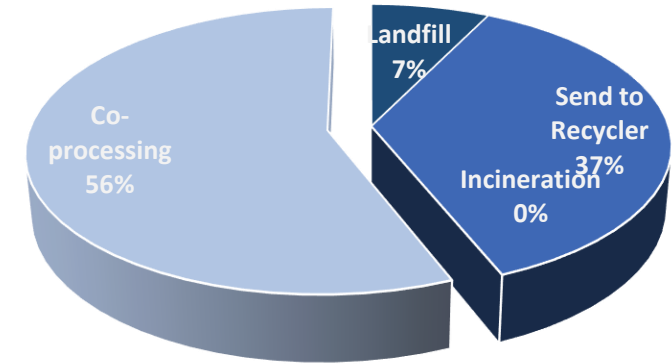
LANDFILL



Waste Management Hierarchy

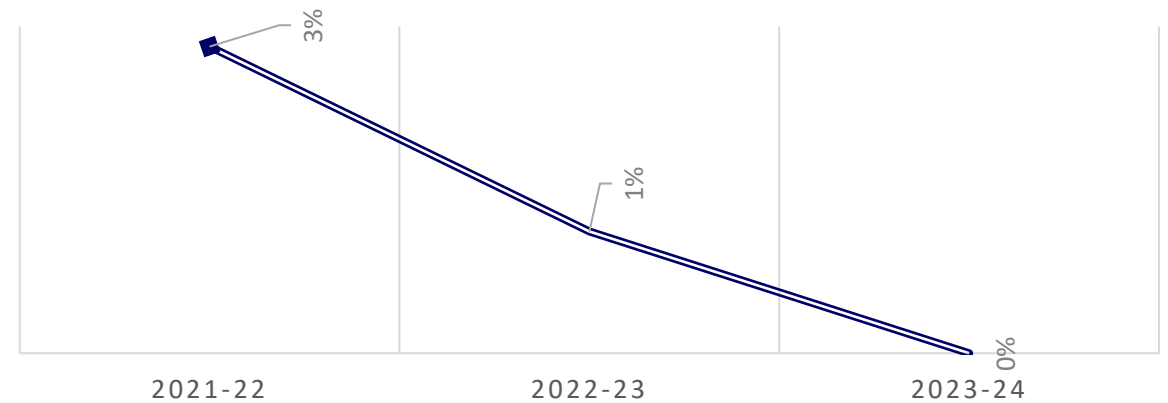


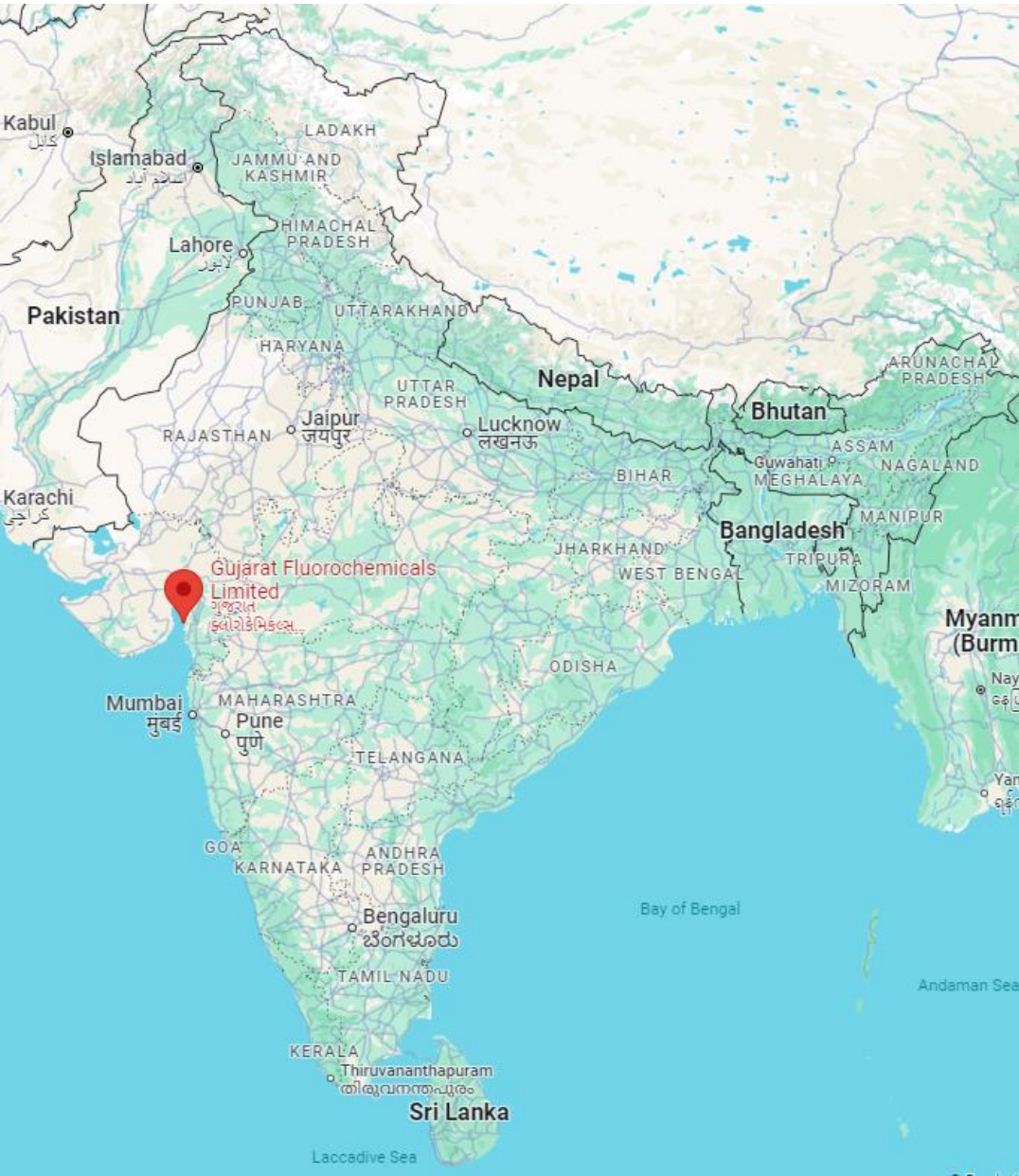
Waste Disposal Mechanism



- Landfill
- Send to Recycler
- Incineration
- Co-processing

INCINERATION





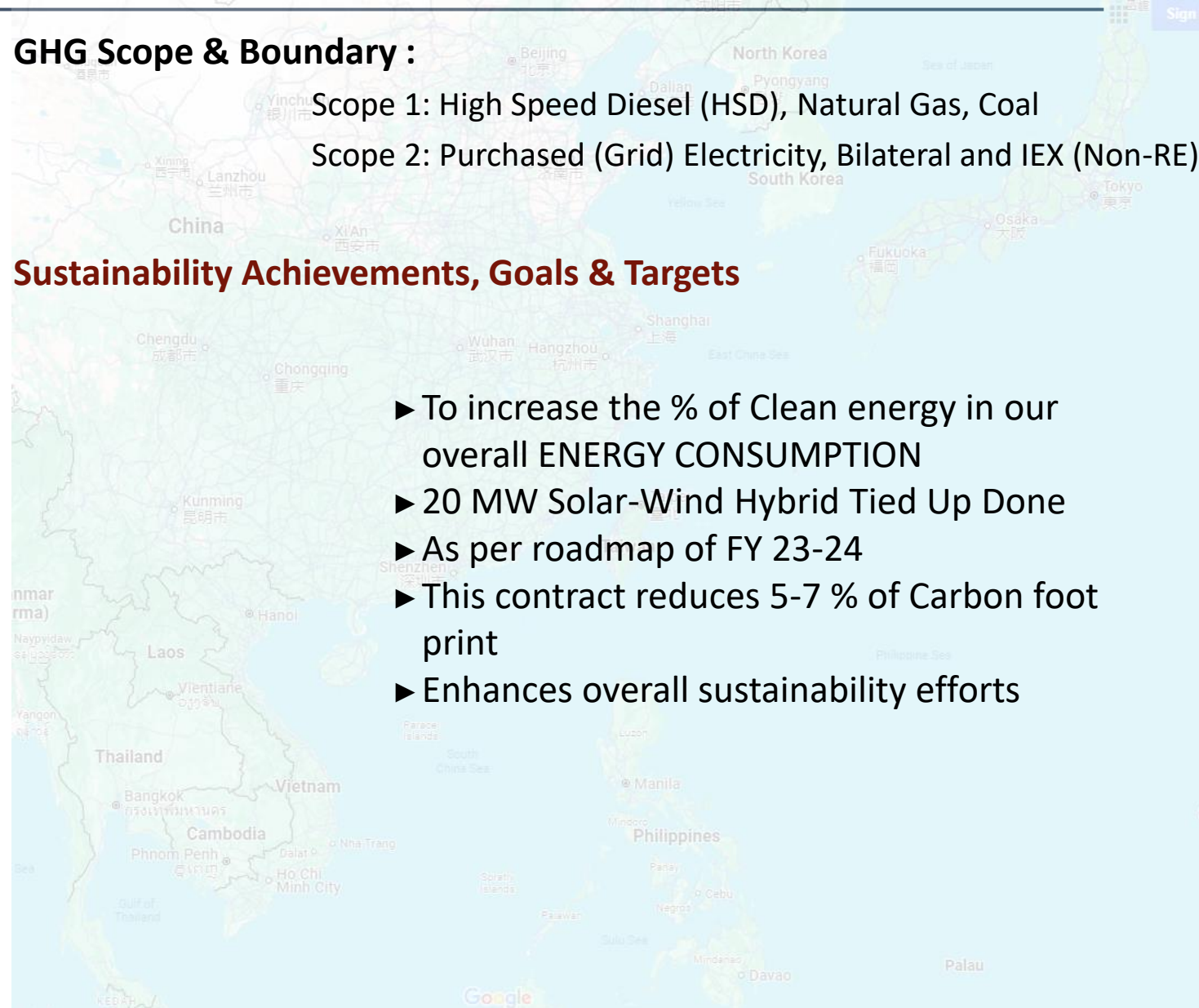
GHG Scope & Boundary :

Scope 1: High Speed Diesel (HSD), Natural Gas, Coal

Scope 2: Purchased (Grid) Electricity, Bilateral and IEX (Non-RE)

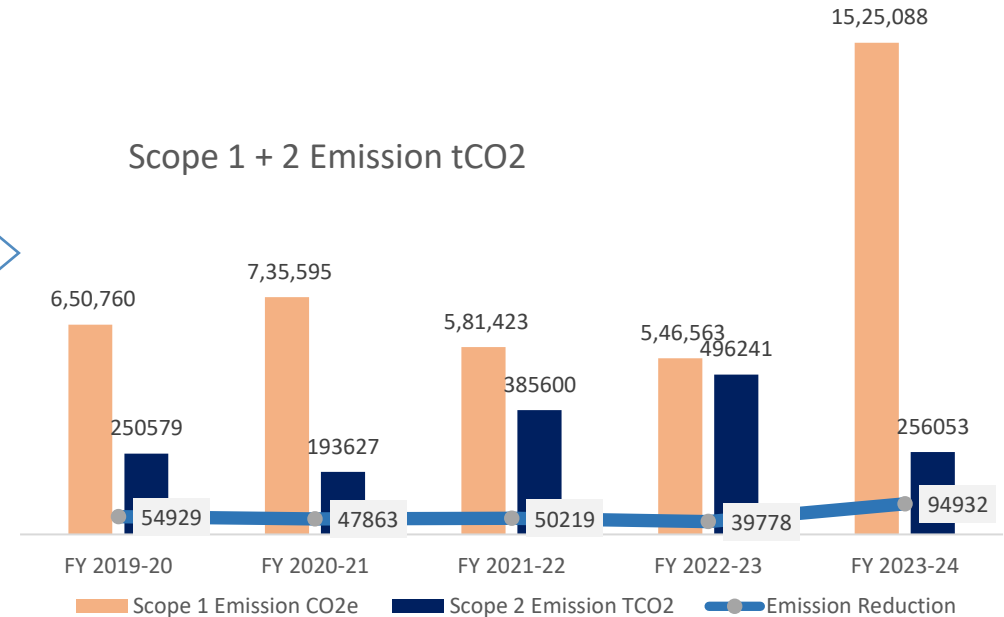
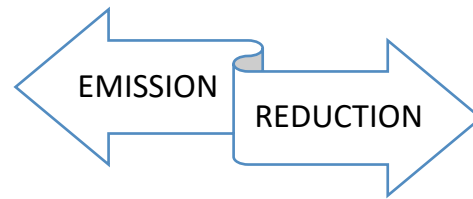
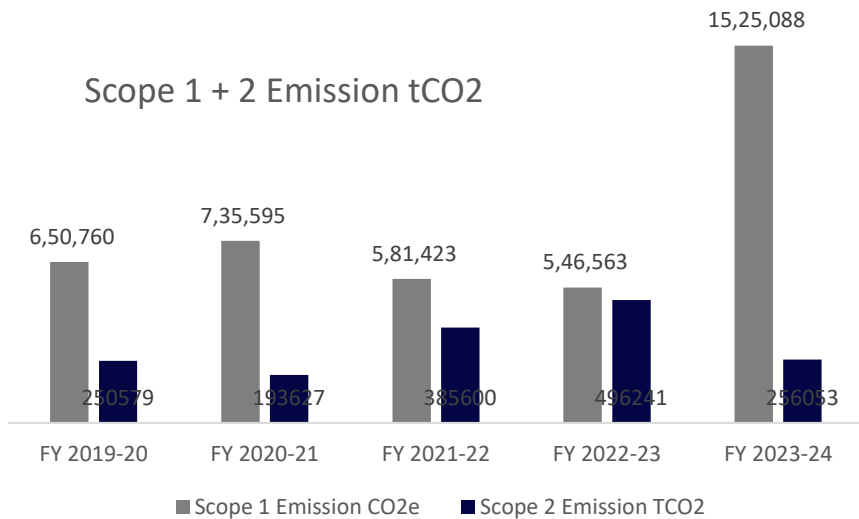
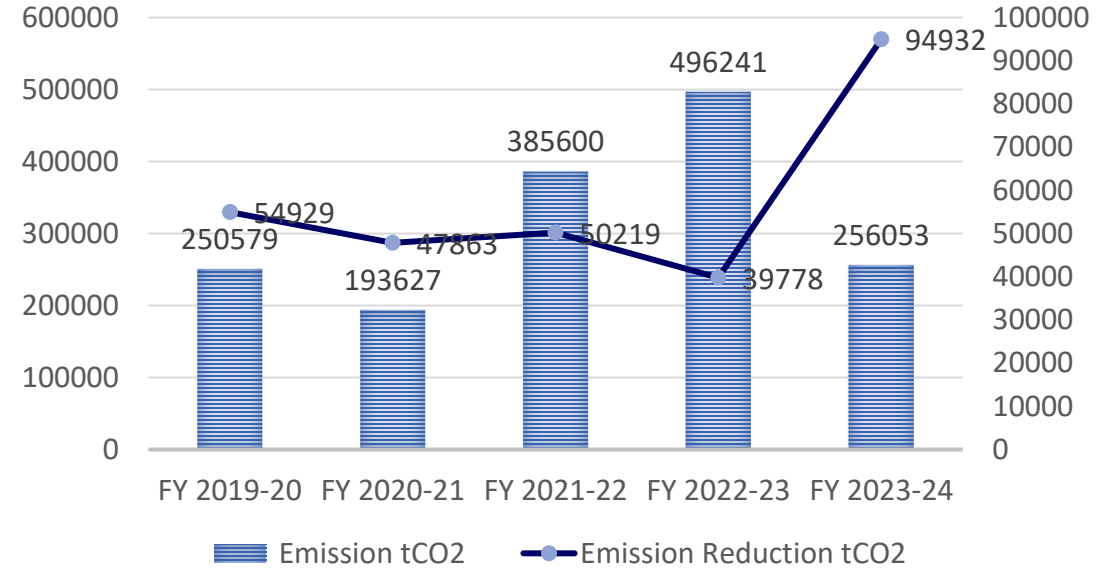
Sustainability Achievements, Goals & Targets

- ▶ To increase the % of Clean energy in our overall ENERGY CONSUMPTION
- ▶ 20 MW Solar-Wind Hybrid Tied Up Done
- ▶ As per roadmap of FY 23-24
- ▶ This contract reduces 5-7 % of Carbon foot print
- ▶ Enhances overall sustainability efforts



GREENHOUSE GAS INVENTORIZATION AND CHANGES IN LAST 3 YEARS

S. No.	Source of Direct energy consumed by the reporting organisation	Units (Kg/Liters /SCM)	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24
1	Diesel for DG sets	tCO2 eq.	144.19	310.57	138.03	142.15	197
3	Natural Gas	tCO2 eq.	92,367.54	122,537.23	97,974.62	46,945.33	53707
4	Coal	tCO2 eq.	558,248.48	612,747.05	483,310.44	499,475.12	1471185
5	Total	tCO2 eq.	650,760.22	735,594.86	581,423.09	546,562.60	1525088





Buying major Raw Material like Sulphuric Acid & Salt from nearby location Dahej and thereby have been saving on diesel cost used in transportation



Similarly we have been buying coal from Adani which is getting landed in nearby Dahej port thereby have been saving on diesel cost used in transportation



We have stopped using Asbestos Cement Sheet, all our new projects are done with metal sheets



For bulky packaging material like HM HDPE Drums we have developed nearby Dahej based sources and hence started saving on diesel cost used in transportation



Forward Path : To monitor CO2 emission of RMs suppliers & Transporters -Giving the priority , those having lowest norms



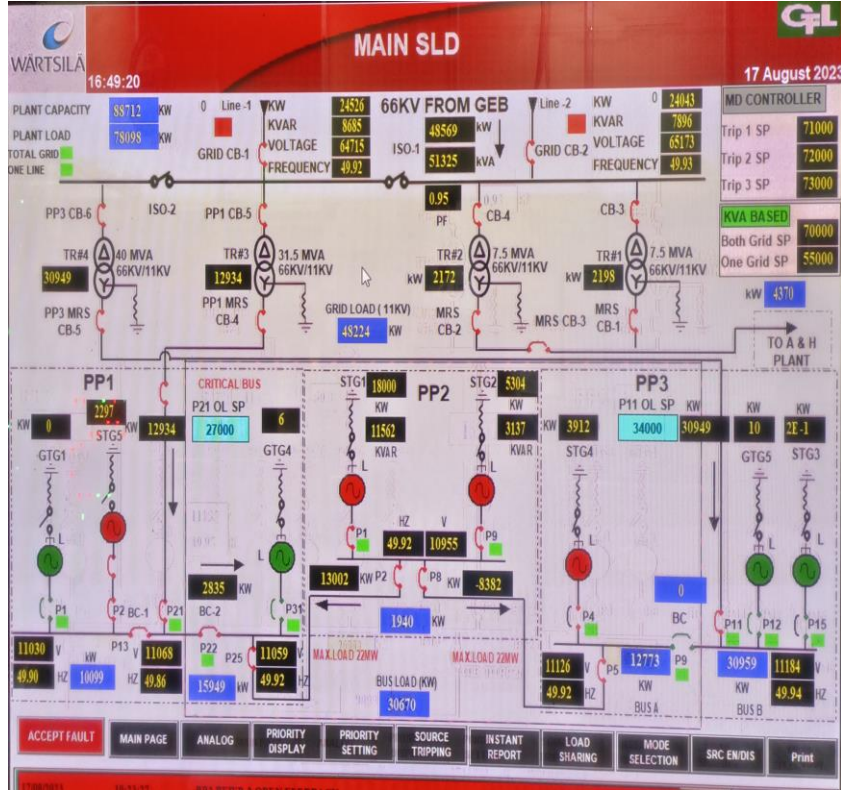
Flash steam recovery, use for process 3.5 T/hr.



Reduction in usage of hazardous RMs in Polymer

SLD for PMS

✓ ISO-50001 Energy management system certification under progress



Software & Database : GaBi Ver 10.6	Time Coverage: 2023 – 24	Geographical Coverage: Raw Materials acquisition and inbound transportation
LCA Boundary: Cradle to Gate; ISO 14040:2006; ISO 14044:2006		

Impact Category	PCF Value
GWP 100 Years [kg CO2 eq./kg of PTFE]	20.05
Scope 1 (Direct Emission)	13.99
Scope 2 (Indirect Emission)	5.36
Scope 3 (Upstream)	0.70

¥

ENCON Review Meeting

¥

Thorough utility loss survey

¥


Daily variance report

All plants are covered to view live consumption, Electrical parameters & history trends

Gujarat Fluorochemicals Limited (GFL)

Plants

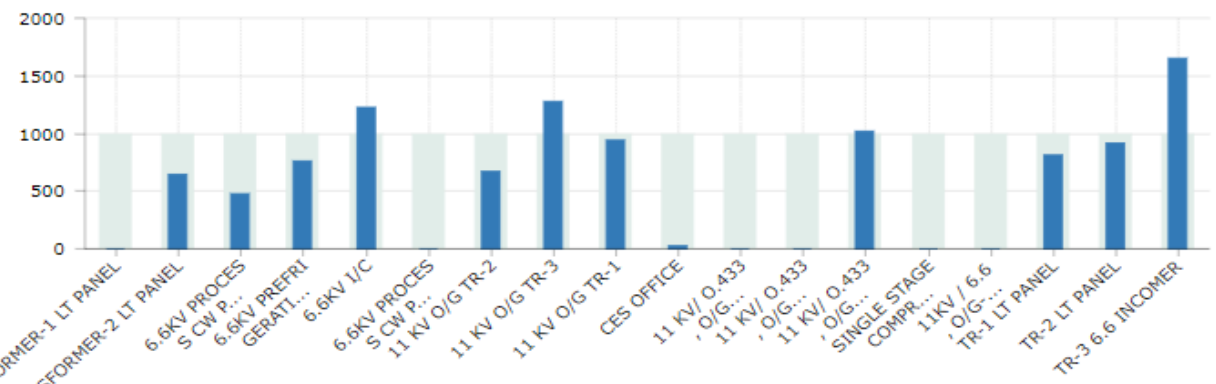
- CMS S/S
- CA S/S
- VDF UTILITY S/S
- CPP S/S
- DPTFE S/S
- UTILITY S/S
- FI CaCl2 S/S
- TFE-1 S/S
- PTPTFE S/S
- TFE-3 S/S
- A & H S/S
- TFE-2 S/S

Off 

11 KV O/G TR-3			11 KV O/G TR-1			CES OFFICE			11 KV/ 0.433 , O/G- TR-1		
1086.80	1281.30	0.848	753.10	940.20	0.800	-21.90	22.10	-0.988	0.33	0.40	0.832
KW	KVA	PF	KW	KVA	PF	KW	KVA	PF	KW	KVA	PF
	Unit(KWH)	Rs.		Unit(KWH)	Rs.		Unit(KWH)	Rs.		Unit(KWH)	Rs.
Today	8k	80k	Today	5k	55k	Today	0.00	0.00	Today	2.20	22.00
Yesterday	26k	264k	Yesterday	18k	183k	Yesterday	0.00	0.00	Yesterday	6.50	65.00

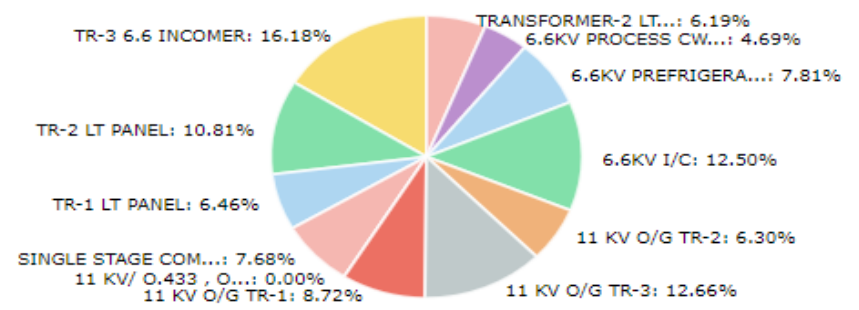
Analyze >  Summary

Max vs Actual Demand



Max Demand KVA  Live Demand(KVA) 

Consumption Overview



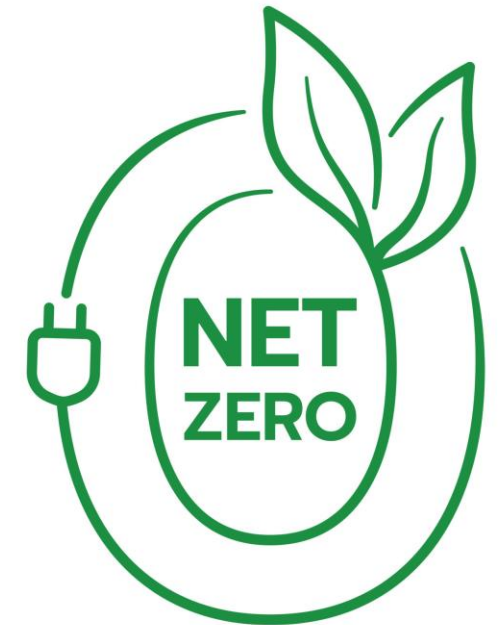
Yesterday **This Week** Last Week This Month Last Month Holiday

Yesterday **This Week** Last Week This Month Last Month Holiday

GFL Group have plan for GHG emission reduction which will be implemented in short, medium & long term.

Invested in 64 MW of wind turbine installation & Hybrid (solar + Wind) power as renewable energy set-off resulting in to 73.7 MW of renewable energy power (258863 GJ) resulting in 51485 tCO₂ emission reduction.

Plan to improve Renewable energy use up to 70% by 2030 a Step toward become a NET ZERO company in future.





Energy Saving Certificates :
 FY 2018-19 : PAT Cycle 2 : 336 ECerts
 FY 2014-15 : PAT Cycle 1 : 437 ECerts

Year 2018-19
 IMC RBNQA
 MQH Best Practice Award for **TFE Vent Gas**

Year 2019-20
 IMC RBNQA
 MQH Best Practice Award for **Effluent Recovery System**

Year 2020-21
 IMC RBNQA
 MQH Best Practice Award for **Condensate Polishing Unit**

Nov 2021
 Par Excellence Award in the International Convention on Quality Control Circle 2021

Dec 2021
 CII-15th National Water Excellence Award 2021

Aug 2022
 CII-22nd National Energy Efficient Award 2022

Sep 2023
 CII-24th National Energy Efficient Award 2023





CPP Team won "PLATINUM" award at National level in QC competition at Dhaka, Bangladesh FY 2020




CPP Team won "Excellent" award at National level in QC competition at Aurangabad FY 2021


National award "GFL as Energy Efficient Unit" from CII -FY 2022

Head Office

Gujarat Fluorochemicals Limited

 INOX Towers, Plot No.17, Sector 16A, Noida-201301,
U.P., INDIA


 +91-120-6149600

 contact@gfl.co.in


 www.gfl.co.in

Manufacturing

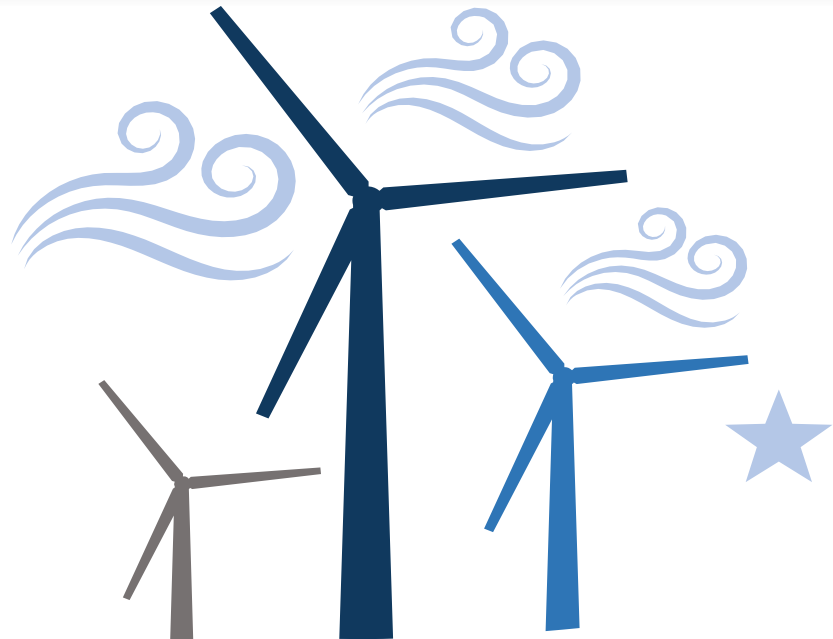
Gujarat Fluorochemicals Limited

 12/A, GIDC Dahej Industrial Estate, Tehsil Vagra, Distt. Bharuch-392230, Gujarat,
INDIA

 +91-2641-618031

 contact@gfl.co.in

 www.gfl.co.in



Thank you

