GMR Group

www.**gmrgroup**.in

25th National Award
For
Excellence in Energy Management

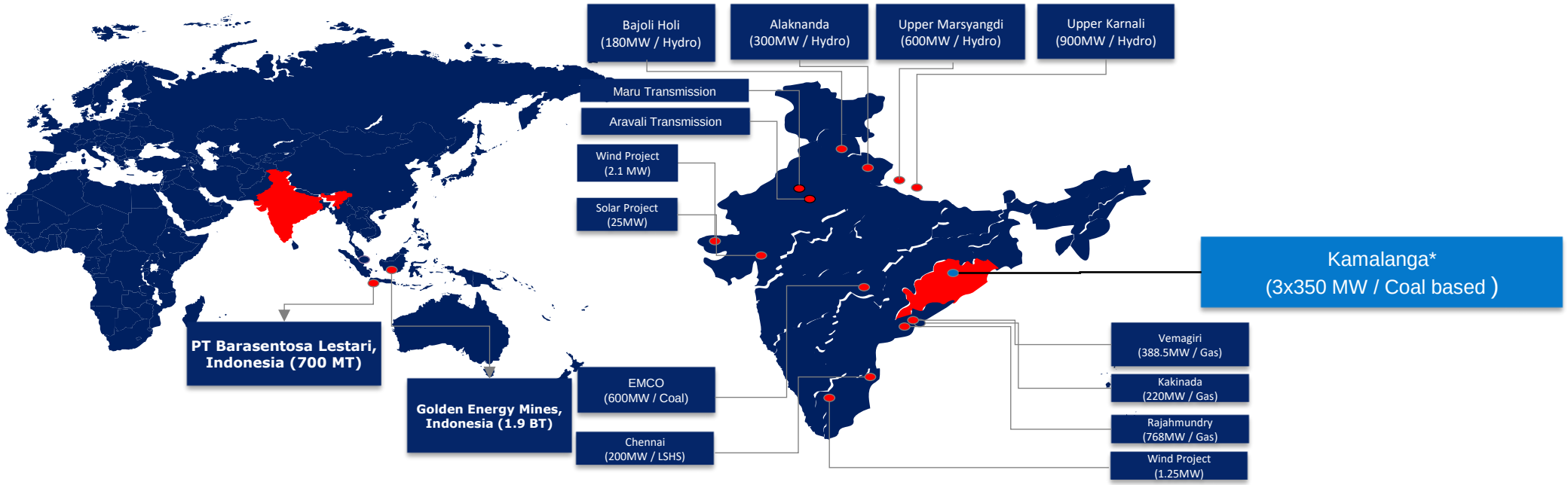
GMR Kamalanga Energy Ltd

CONTENTS

Vision

"GMR Group will be an institution in perpetuity that will build entrepreneurial organizations, making a difference to society through creation of value."

1. GMR AT A GLANCE



About GKEL

- GMR Kamalanga Energy Limited is a wholly owned subsidiary of GMR Energy LTD and is a step down subsidiary of GMR Power & Urban Infra Limited (**GPUIL**).
- **Products/Businesses of organization** : Electricity Generation
- **Capacity :** 1050 MW - (3x350 MW)
- **Operational since:** April 2013

FSA

GKEL is having FSA with MCL

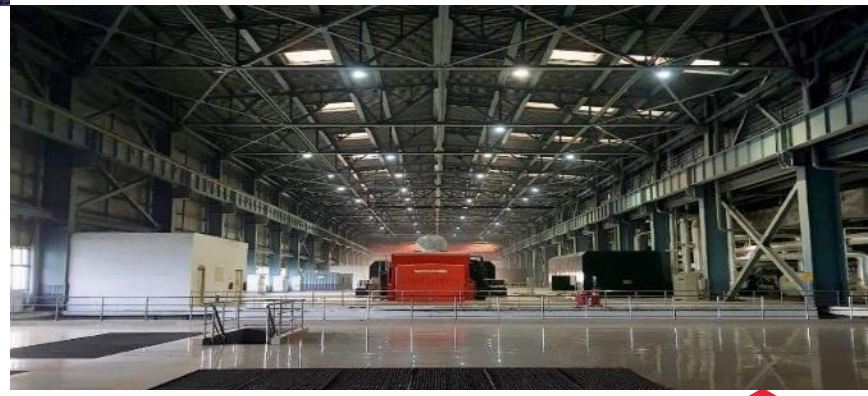
- FSA LINKAGE - 2.14 Million MT
- SAKTI LINKAGE - 1.50 Million MT
- SAKTI LINKAGE (B3)- 0.06 Million MT
- WATER SOURCE – 20 Cusec - BRAMHANI RIVER

PLANT FACILITY

- BOILER – HARBIN
- TURBINE – Donfang Turbine company
- GENERATOR - Donfang Electric company
- BFP - Turbine – Donfang Turbine company

PPA

- DISCOM BIHAR PPA - 260 MW – 25 Years
- DISCOM HARYANA PPA - 310 MW -25 years
- DISCOM GRIDCO PPA – 247.4 MW – 25 years
- DISCOM TANGEDCO PPA – 102.56 MW – 5 years
- BALANCE POWER – 69.66 MW



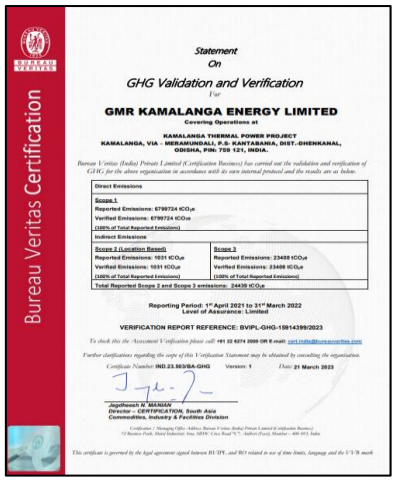
Policy and Certificate

2. ENERGY MANAGEMENT POLICY AND CERTIFICATES


Five Star Occupational Health and Safety Audit – Five Stars –

This is to certify that GMR Kamalanga Energy Ltd.

after an extensive evaluation by a British Safety Council auditor, has been awarded a rating of Five Stars.


Statement On GHG Validation and Verification For GMR KAMALANGA ENERGY LIMITED


National Productivity Council Certificate

This is to certify that GMR Kamalanga Energy Ltd., Dhenkanal is awarded उत्कृष्ट (Utkrisht) Category under 5S Certification Scheme of National Productivity Council.


GMR KAMALANGA ENERGY LIMITED

VILLAGE: KAMALANGA, CITY - DHENKANAL, POSTAL CODE – 759 121, ODISHA, INDIA.

Bureau Veritas Certification Holding SAS – UK Branch certifies that the Management System of the above Organisation has been audited and found to be in accordance with the requirements of the Management System Standard detailed below.

Standard

ISO 50001:2018

Scope of certification

GENERATION OF ELECTRICITY IN COAL BASED THERMAL POWER PLANT OF 3X350 MW

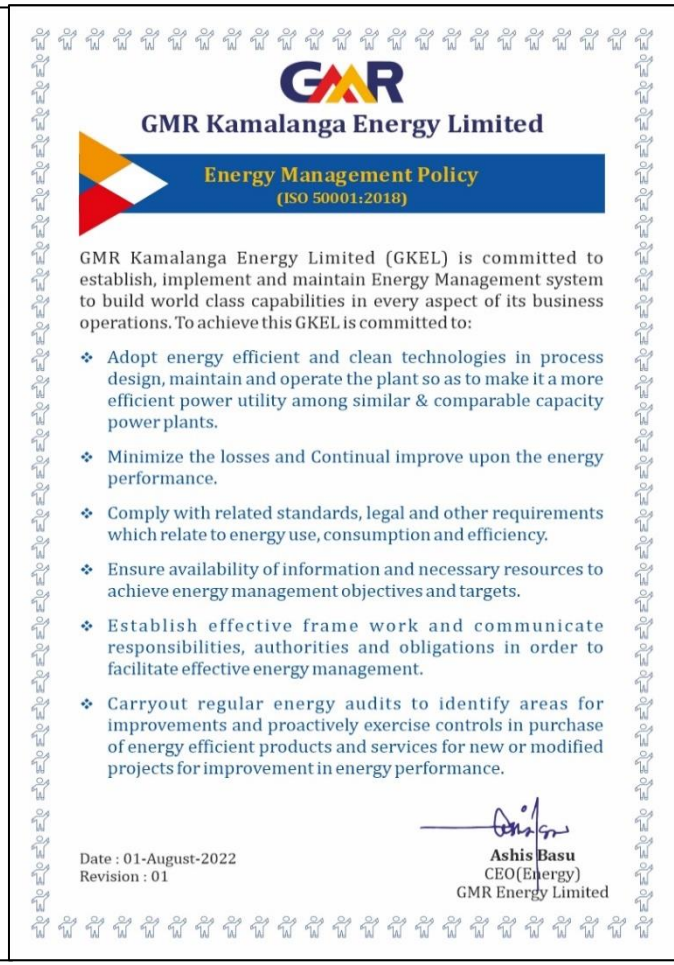
Original cycle start date: 20 May 2020
Expiry date of previous cycle: 19 May 2023
Recertification Audit date: 22 April 2023
Recertification cycle start date: 06 June 2023

Subject to the continued satisfactory operation of the Organisation's Management System, this certificate is valid until: 19 May 2026

Certificate No. IND.23.7548/EN/U Version: 1 Issue date: 06 June 2023

For certificate authenticity, click here https://certcheck.ukas.com/

Signed on behalf of BVCH SAS UK Branch
Jagdheesh N. MANIAN
Director – CERTIFICATION, South Asia
Commodities, Industry & Facilities Division


GMR Kamalanga Energy Limited

Energy Management Policy (ISO 50001:2018)

GMR Kamalanga Energy Limited (GKEL) is committed to establish, implement and maintain Energy Management system to build world class capabilities in every aspect of its business operations. To achieve this GKEL is committed to:

- Adopt energy efficient and clean technologies in process design, maintain and operate the plant so as to make it a more efficient power utility among similar & comparable capacity power plants.
- Minimize the losses and Continual improve upon the energy performance.
- Comply with related standards, legal and other requirements which relate to energy use, consumption and efficiency.
- Ensure availability of information and necessary resources to achieve energy management objectives and targets.
- Establish effective frame work and communicate responsibilities, authorities and obligations in order to facilitate effective energy management.
- Carryout regular energy audits to identify areas for improvements and proactively exercise controls in purchase of energy efficient products and services for new or modified projects for improvement in energy performance.

Date : 01-August-2022
Revision : 01

Ashis Basu
CEO(Energy)
GMR Energy Limited


GMR KAMALANGA ENERGY LIMITED

ISO 55001:2014

GENERATION OF ELECTRICITY IN COAL BASED THERMAL POWER STATION OF 3 X 350 MW


GMR KAMALANGA ENERGY LIMITED

ISO 9001:2015, ISO 14001:2015 & ISO 45001:2018

GENERATION OF ELECTRICITY IN COAL BASED THERMAL POWER STATION OF 3 X 350 MW


National Accreditation Board for Testing and Calibration Laboratories

CERTIFICATE OF ACCREDITATION

GMR KAMALANGA ENERGY LIMITED CHEMICAL LABORATORY

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

P.O. KAMALANGA, P.S. BHUSHAN, DHENKANAL, ODISHA, INDIA

in the field of

TESTING

Certificate Number: TC-5266
Issue Date: 29/05/2019 Valid Until: 28/05/2021

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.

Signed for and on behalf of NABL

N. Venkateswaran
Chief Executive Officer

To Adopt Energy efficient and clean technology	To Minimize the losses	To Comply legal and other requirements	To allocate resource	To frame Roles and responsibility	To purchase energy efficient product and Regular Energy audit

Performance Overview FY 2023-24

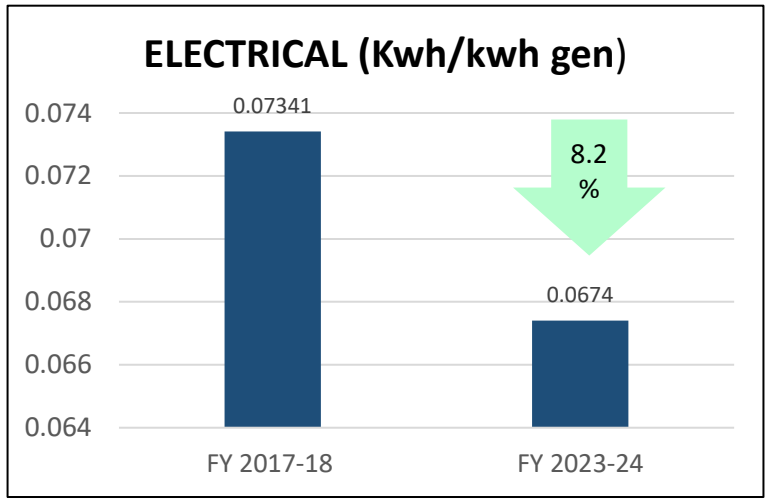
3. ENERGY CONSUMPTION OVERVIEW FY 2023-24

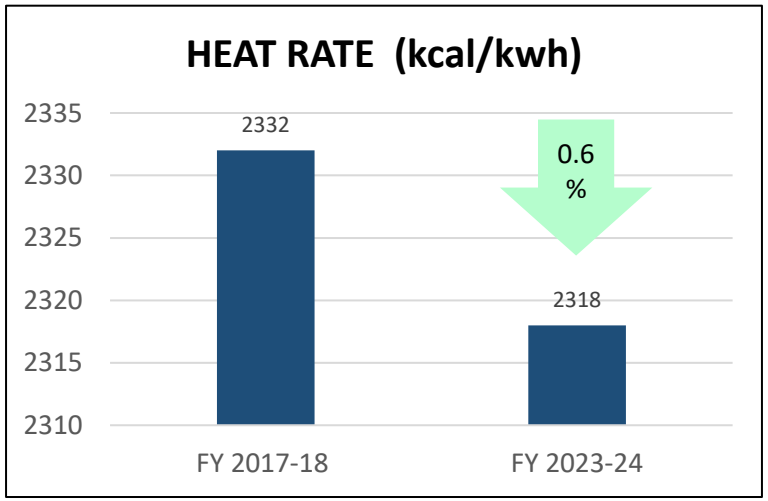
- **Annual Generation : 7581.73 MU**
- **PLF : 82.20 %**
- **Availability : 87.06 %**
- **Gross Heat Rate : 2317.75 kcal/kwh**
- **Auxiliary Power : 6.74 %**
- **UHR (UNIT 1/2/3) : 2318/2321/2314 Kcal/kwh**
- **BOILER EFFICIENCY : 87.17/86.73/87.30 %**
- **DM Water consumption : 0.13 %**
- **Raw Water Consumption : 2.10 M^3/ MWh generation**
- **Specific Oil Consumption : 0.10 ml/ KWh generation**

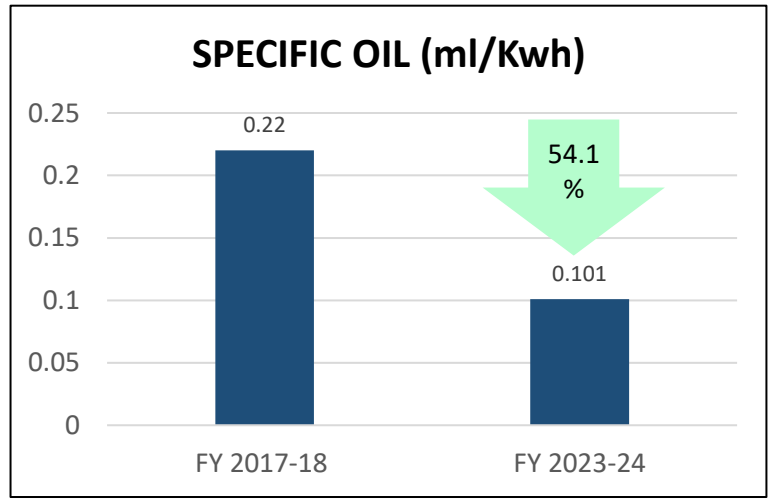
Energy Consumption

4. SPECIFIC ENERGY CONSUMPTION LAST 3 YEARS

Financial Year	Specific energy consumption			Improvement in specific consumption w.r.t base line		
	Electrical	Thermal		Electrical	Heat rate	Specific oil
	Kwh/kwh gen	Heat rate (kcal/kwh)	Specific oil (ml/Kwh)	(%)	(%)	(%)
FY 2017-18	0.0734	2332	0.220	Baseline Year		
FY 2021-22	0.0674	2318	0.082	8.2	0.6	62.7
FY 2022-23	0.0690	2329	0.080	6.0	0.1	63.6
FY 2023-24	0.0674	2318	0.101	8.2	0.6	54.1





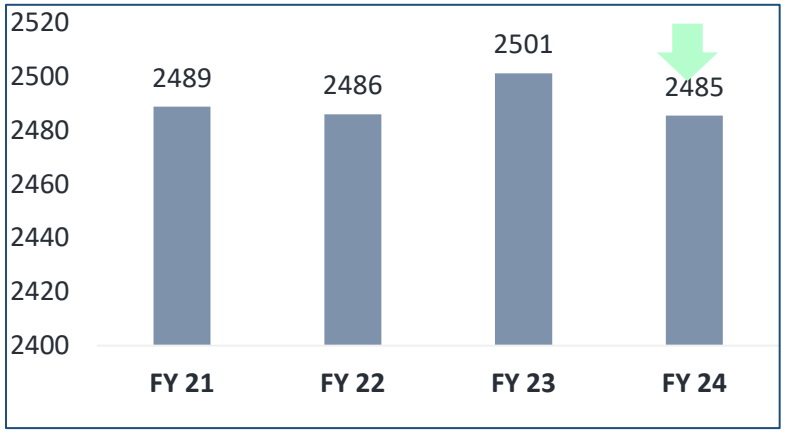


Benchmarking of Energy Consumption

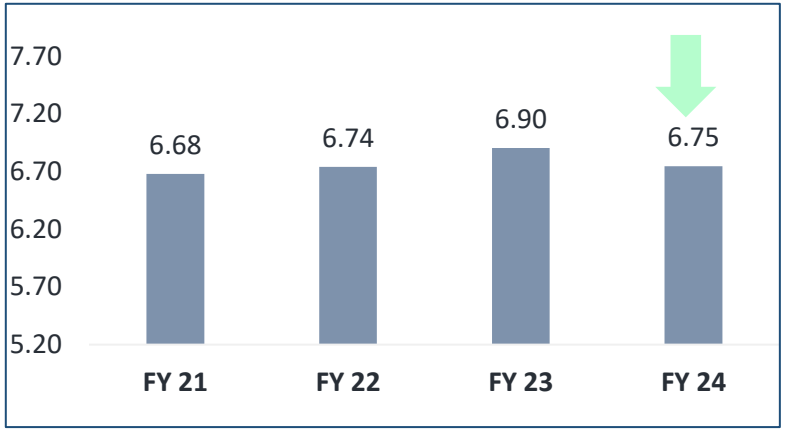
5. BENCHMARKING OF KPI

5.1 Internal Benchmarking

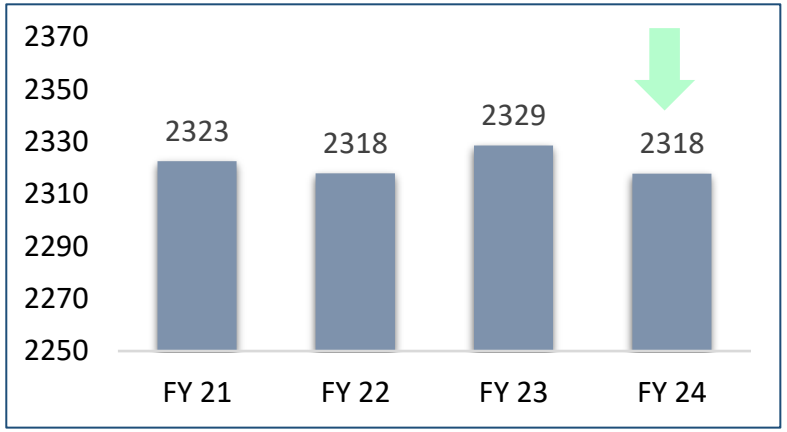
NET HEAT RATE (kcal/kwh)



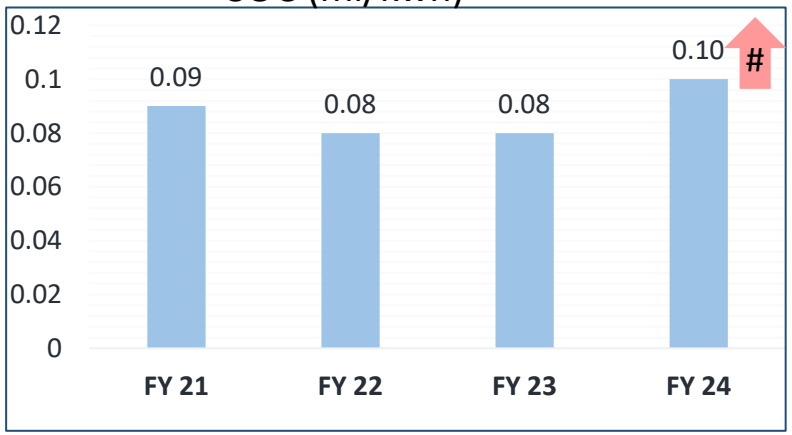
APC (%)



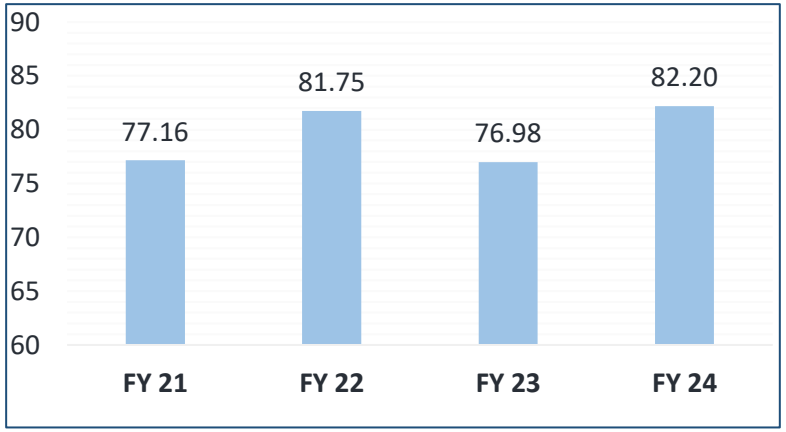
HEAT RATE (Kcal/kwh)



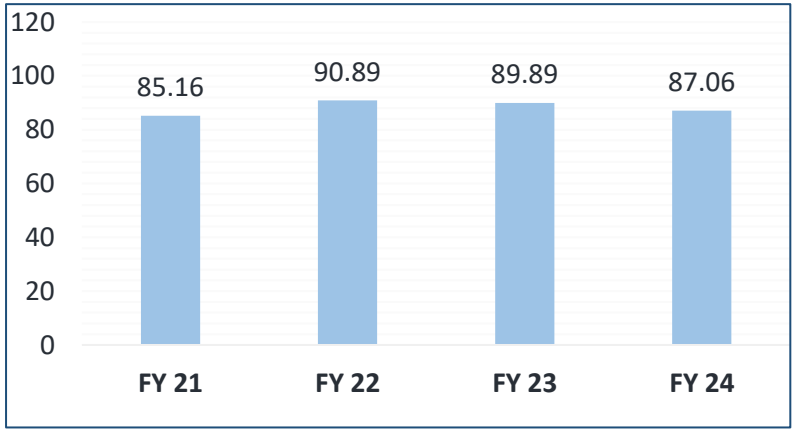
SOC (ml/kwh)



PLF (%)



AVAILABILITY (%)



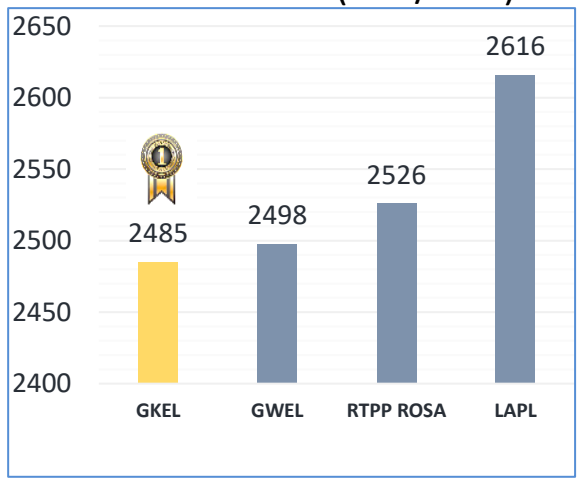
GKEL had planned two units COH IN FY 24. SOC increased due to cold Startup of Unit-2 & 3.

Benchmarking of Energy Consumption

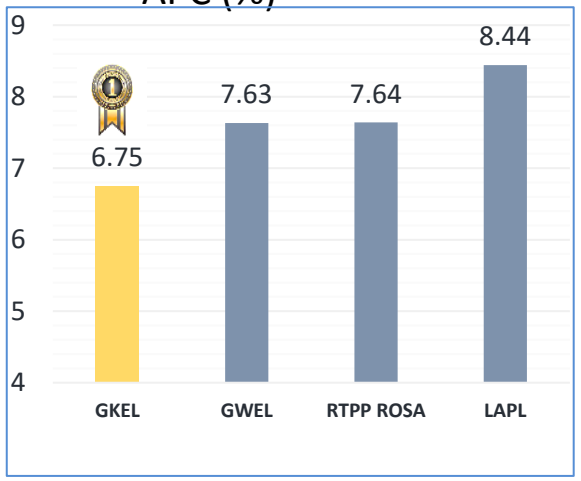
5. BENCHMARKING OF KPI

5.2 Benchmarking With Peer Companies for FY 23-24 (External Benchmarking)

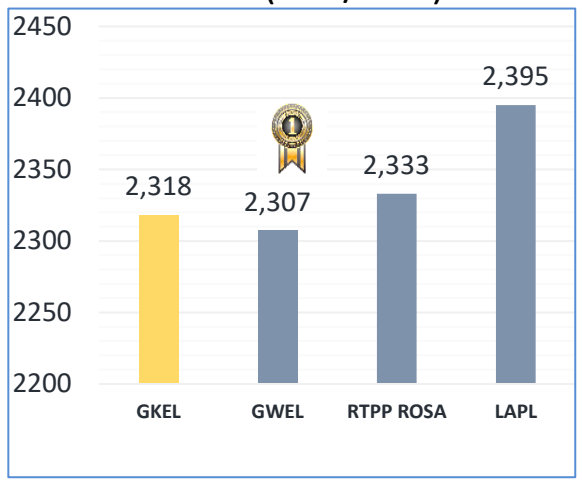
NET HEAT RATE (kcal/kwh)



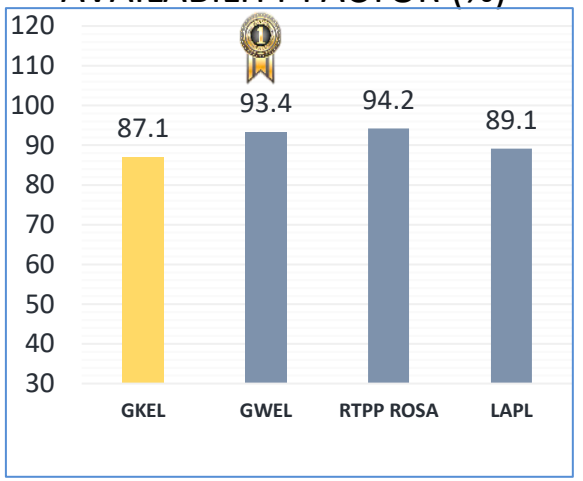
APC (%)



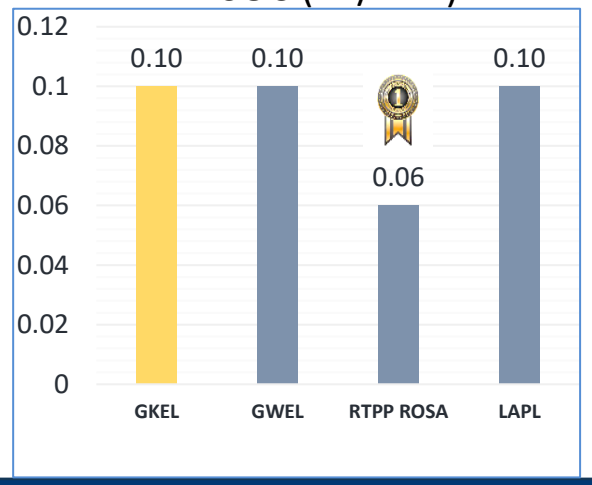
HEAT RATE (kcal/kwh)



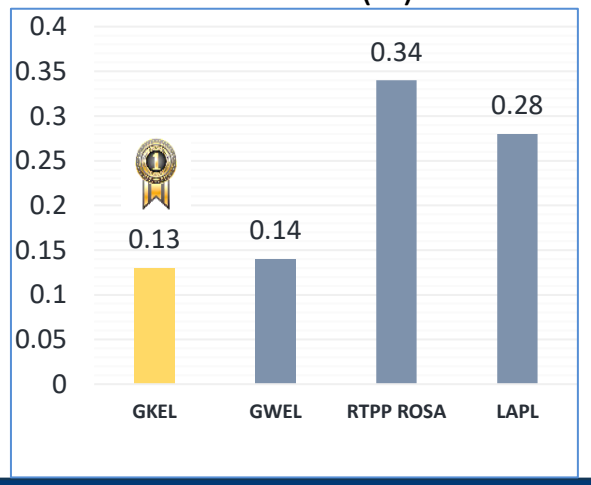
AVAILABILITY FACTOR (%)



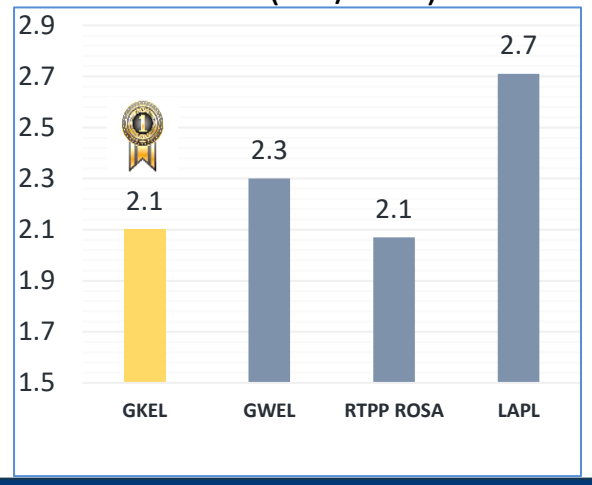
SOC (ml/kwh)



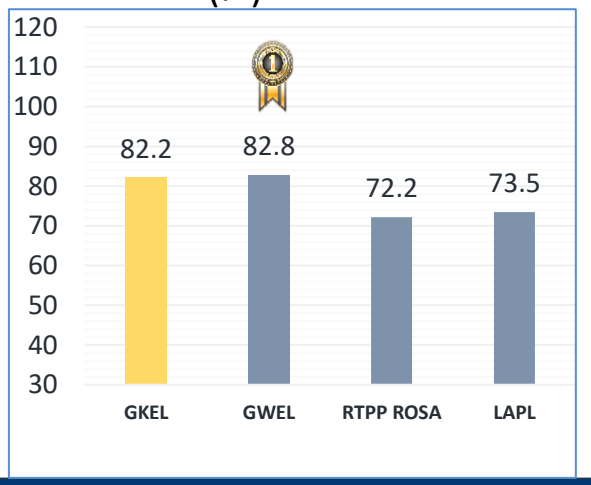
DM water (%)



SWC (m3/MW)



PLF (%)



GKEL is equipped with TDBFP so benchmarking done with Net heat rate.

Benchmarking of Energy Consumption

5. BENCHMARKING OF KPI
5.3 Road map to achieve benchmarking

Strategic objective:
To reduce station Net heat rate from 2485 to 2465 Kcal/kwh by FY 2026 , improving station APC and gross heat rate.

Action to achieve benchmark:

- Implementation of ENCON projects to have saving of 200 M-kcal/day
- To improve coal received GCV to 3400 Kcal/kg
- Minimization of forced outage to 1.5%.
- To achieve 90% PLF by improving exchange bilateral sale

PLANNING

- External and internal benchmarking
- Set Energy objective and target
- Identification of EC project
- Budget allocation for EC project
- Establishment of better monitoring system
- Action plan development

EXECUTION

- Prioritization of project
- Implementation of action plan
- Adopt best practices of sector
- Training and awareness
- Strengthening green suppy chain
- EC action beyond boundary

MONITORING

- .Deviation analysis
- RCA for each deviation
- Monitoring CAPA through digital ATR
- Project effectiveness stuy
- Sustenance

MOTIVATION

- Reward and regnition in business level and group level
- Workshop for energy conservation idea
- Appreciation in forum

NET ZERO

Strategic objective to achieve NET ZERO: GMR energy is committed to align with the sectoral energy targets and NET ZERO goals of India by 2070

Actions to achieve the target: By adding renewable capacity and replacing new energy sources with low emission.

Way forward for Energy Conservation

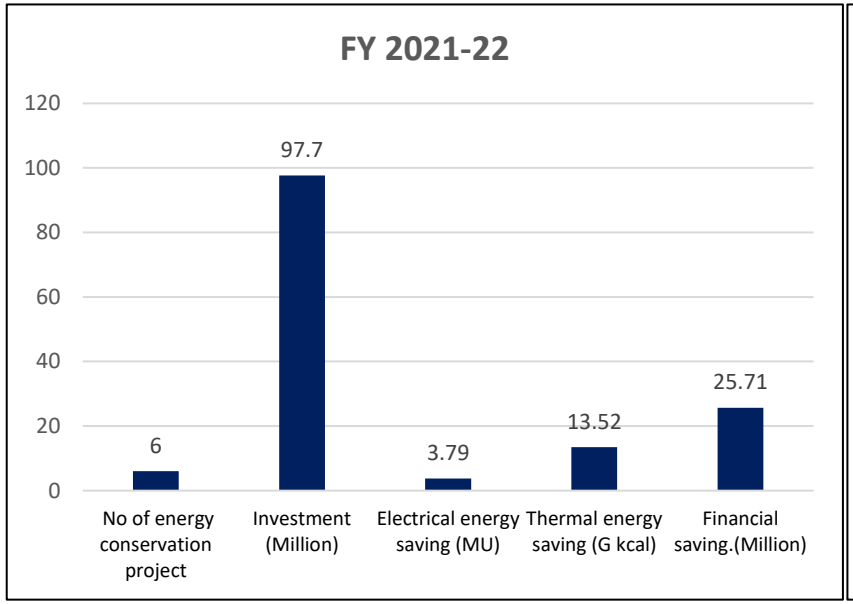
5.4 PROJECTS PROPOSED FOR IMPLEMENTATION IN FY 24-25

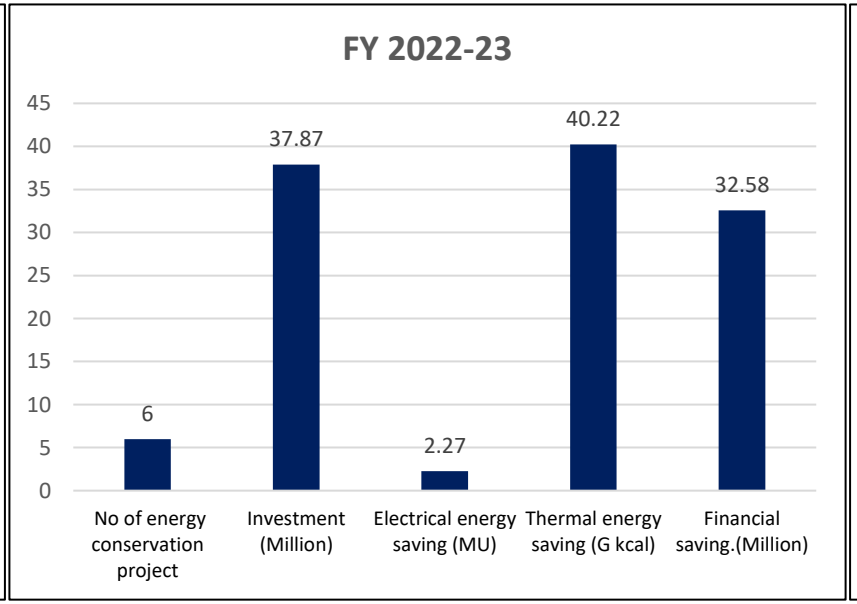
SL No.	Description of energy conservation measures	Investment (Rs in Million)	Annual Electrical Saving (Million kWh)	Annual Thermal Saving (Million Kcal)
1	Coal mill seal air fan power optimization by VFD installation in Unit-3	3.60	1.11	0
2	ESP hopper heater power consumption optimization by timer circuit	0.21	1.80	0
3	Segregation of air header for mill MRS and Ash conveying system	0.5	0.90	0
4	Installation of VFD in bottom ash slurry pump in Unit-3	3.00	0.39	0
5	Adopting Improved profile APH baskets for Unit-1 Boiler efficiency improvement	22.58	0.00	53230
6	Reduction in THR by improving HIP cylinder efficiency for Unit-1	13.40	0.00	87696
7	FAN power reduction by Arrest air in leakage in APH and furnace in leakage in Unit-1	16.22	1.28	0
9	Mill power optimization by MPO plate modification in unit 1	23.41	0.57	0
10	Replacement of Energy Efficient pumps in ETP Clarified Water Pump	0.54	0.51	0
11	Install level sensor based auto zero drain valves for compressed air receivers	0.30	0.04	0
12	Install VFD for Air Compressor in Instrument air compressor circuit	1.00	0.11	0
13	Air dryer power optimization by Replacement of dryer	2.00	0.26	0
14	Replacement of Energy Efficient pumps in Colony portable water	0.21	0.05	0
15	Installation of micro hydro turbine	0.80	0.02	0
Total		**87.77**	**7.04**	**140926**

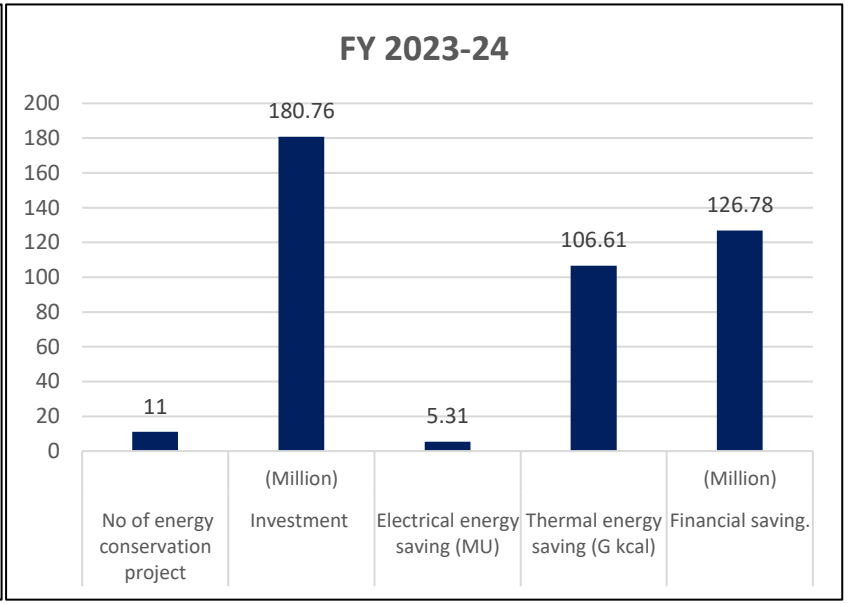
Summary of Energy Saving Projects

6.ENERGY CONSERVATION PROJECT LAST 3 YEARS

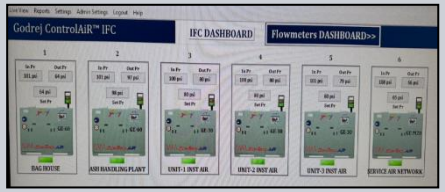
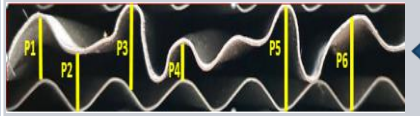
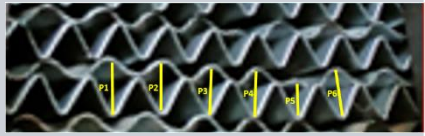
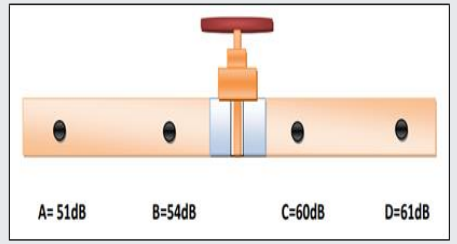
Financial Year	No of energy conservation project	Investment (Million)	Electrical energy saving (MU)	Thermal energy saving (G kcal)	Financial saving. (Million)
FY 2021-22	6	97.7	3.79	13.52	25.71
FY 2022-23	6	37.87	2.27	40.22	32.58
FY 2023-24	11	312.93	5.31	106.61	126.78







Energy Conservation projects under Technology absorption

6.1 IMPROVEMENT PROJECT / PRACTICES:	Relevant picture
Intelligent flow control (IFC) in compressor network Installation of IFC in compressed air network at Bag filter line, AHP & Silo line, Unit-1 BTG line, Unit-2 BTG line, Unit-3 BTG line and service airline. **Savings:** 9.31% reduction in compressed air power consumption (3.5 MW/DAY)	 
VFD in mill seal air fan and bottom ash slurry pump VFD assessment carried out in all process area and identified opportunity in ten drives . In FY 24 VFD installed in four drives (Seal air fan & BA Slurry Pump) **Savings:** 30% reduction in seal air fan power consumption (1.55 MW/day) : 20% reduction in seal air fan power consumption (1.08 MW/day)	
Installation of Improved profile APH baskets in APH Due to high DFG APH baskets needs to be replaced, there was two type of basket is available in market i.e. Conventional profile basket and Improved profile basket . which force us to have a risk assessments for decision making. **Savings:** Addition 6 degree improvement achieved over conventional profile which impacted on boiler efficiency by 0.3%.	 Conventional Profile basket Improved Profile basket 
High Energy drain passing survey through ultrasonic UE analyser Passing of high energy drain carrying high enthalpy steam without any work done, Ultrasonic UE analyzer detected passing drains in the respective areas and were attended in COH, **Savings:** 5kcal/kWh improvement in Turbine heat rate,	 

Innovative Project implemented in FY 2023-24

7. INNOVATIVE PROJECT IN FY 24

1. Innovative project: Dynamic analytics of Significant energy use with dynamic benchmarking backed on historical data.

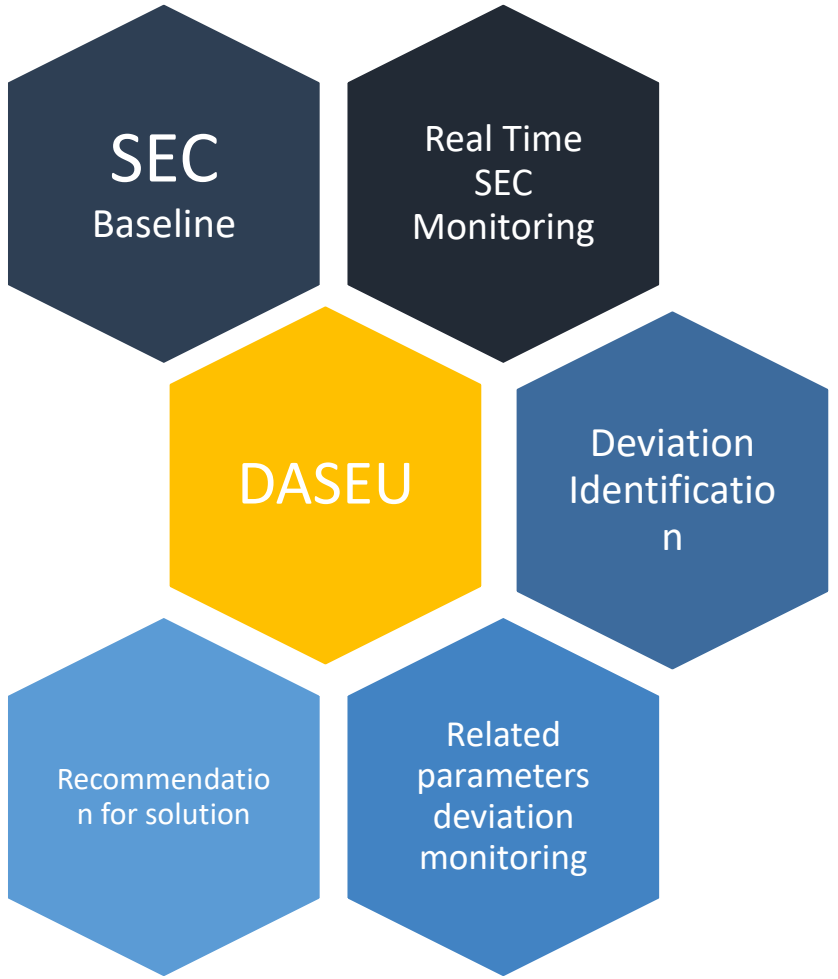
2. Why innovative: It is a DCS based real time monitoring of Significant energy use which enables operator for monitoring of real time and ideal specific energy consumption , identification of deviation. It also provides related parameter deviation analysis to identify cause of deviation and recommendation for operator control and maintenance control.

DASEU is completely unique in-house development with innovative approach. The approach adopted to utilizes the existing infrastructure to achieve a higher level of real time analytical capability and creation of value in terms energy performance

It covers 95% of total power consumption of GKEL including boiler, turbine ,BFPT and all 6.6 KV electrical drive .

3.Trigger for implementing the project

Specific energy deviation analysis was being carried out with manual intervention on next day which was creating a loss of opportunity for reducing losses/deviation in real time.



7. INNOVATIVE PROJECT IN FY 24

DASEU Enables Specific Energy Analysis

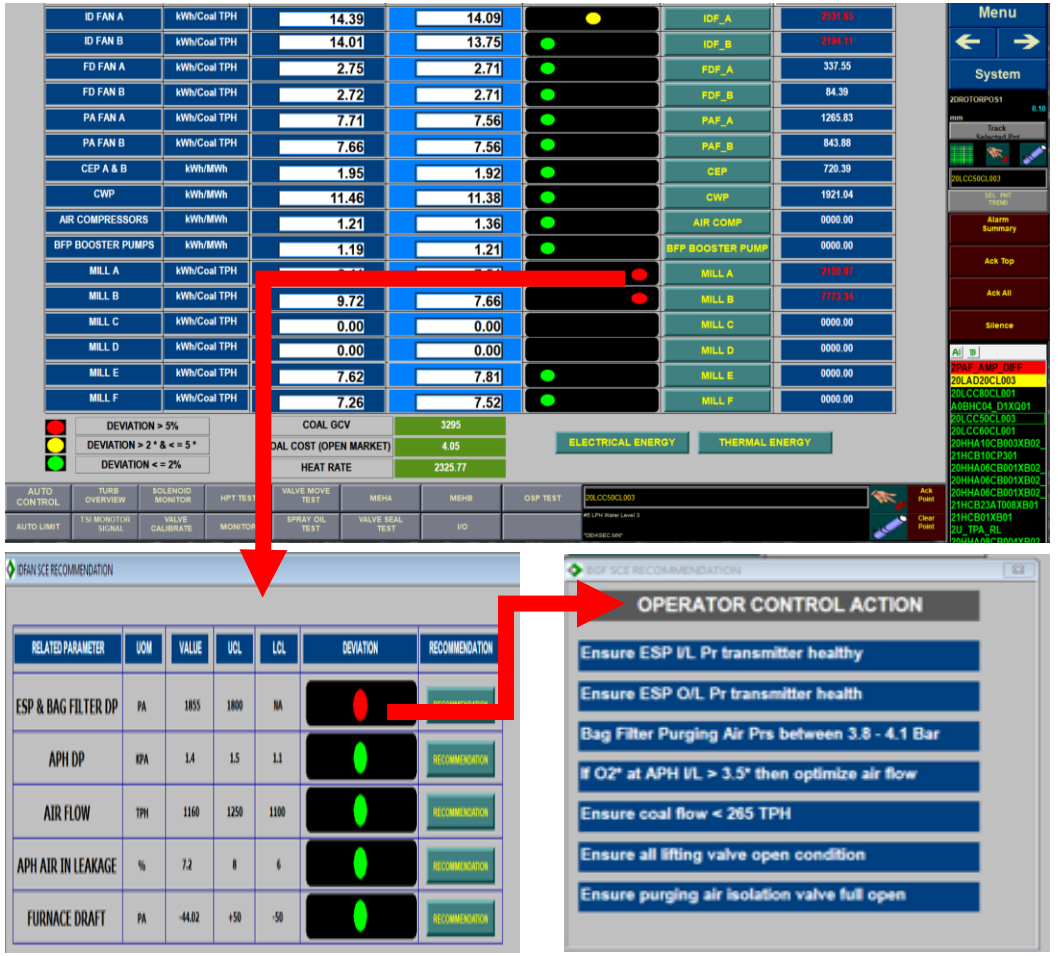
It calculates Real time SEC and compared with Baseline SEC which is based on function of Ideal SEC and recent past SEC (Last 300 sampling). Alarm integrated with LVS based on deviation %. Deviation is categorized as normal , moderate and high deviation.

DASEU Enables related parameter Analysis

The related parameter which can impact power consumption is identified and embedded in the system and Dynamic Control limit (UCL and LCL) set for all related parameter based on historical data equation. Operator access the related parameter deviations

DASEU Enables Operator control Recommendation

Based on related parameter deviation Operator can access operator control Recommendation and maintenance control recommendations.



- Financial impact of losses incurred shift-wise to sensitize the operator towards energy efficiency. Excursion report generation and percentage time block beyond baseline power consumption.

Benefits achieved : BTG Specific energy consumption from 31.75 KWH/MW to 29.86 KWH/MW.

8. RENEWABLE ENERGY PROJECT – STEP TOWARDS ENHANCING RENEWABLE CAPACITY

Renewable Energy Projects feasibility assessment

Type of system	Location	Capacity feasible for immediate use (MWp)	Capacity feasible for use with rework (MWp)	Capacity feasible for future use (MWp)
Ground mount solar PV	• Land Area Near Gate No-1 to 3 • Land Area Near Waste Hazard • Decantation Area • Existing Ash Pound (Slop Area) • Future Ash Pound Area • Slope area of reservoir • Land Area Near Organic Farm	17.79	39.04	1.01
Floating solar PV	• Plant Reservoir (B) • Khandanala Area • Admin building and parking area • O & M Building • Central Shop	7.16	2.87	
Rooftop solar PV	• Pushp Vihar Residential • GMR Varalakshmi DAV Public School • GMR Hospital and Parking Area • Chilika Guest House		0.99	1.43
TOTAL		**24.95**	**42.9**	**2.44**

Third Party Solar PV feasibility assessment done by TERI for onsite setting up 70.29 MW

Actions to implement

GKEL received Phase-1 SWC for 42 MWp (30 MW) from IPICOL

The Power generated from the installation will be evacuated using our existing 400 KV transmission line.

Presently we are scouting for a customer. We are in talks with captive customers for 10 ~ 25 MW solar power/bundled power

The project is to commence around Dec-24 and completed by Jan-26 subject to PPA Customer.

Battery Energy Storage System

Capattery has developed a BESS, patent-pending-nanomaterial technology extracted out of Graphene . Graphene with enhanced chemistry is used as BESS for Electrical vehicles and Grid-scale Energy storage. GKEL is installing 10 KWp Roof Top solar PV with Capattery BESS on a pilot basis and complete the PoC (Proof of Concept).

Solar panel performance improvement

Capattery has also developed a Coating material (Graphene) which will enhance the performance of Solar panel.(PoC test under progress)

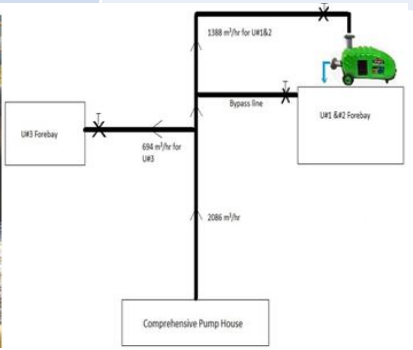
8. RENEWABLE ENERGY PROJECT- IMPLEMENTED PROJECTS

SL	Projects implemented	Capacity	(Generation Million KWh)
1	Wind operated Turbo ventilator installed (188 nos.) on TG Building and hydrogen builing.	250 Kwh	1.44
2	Security hub power supply from solar panel.	129 watt	0.001

Solar roof top Projects Implemented

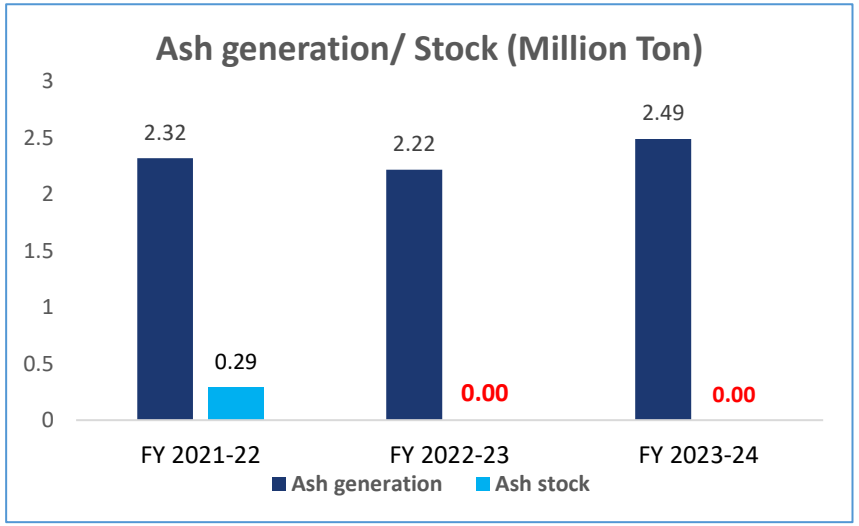
S. No.	Solar roof top project Name	Designed Capacity (KWP)
1	Chilika Guest House	57.225
2	GMR Shopping Complex	66.49
3	GMR Energy Development Centre	132.98
4	GMR Hospital	142.79
5	GMR Varalakshmi DAV Public School	241.98
	Total	**641.465**

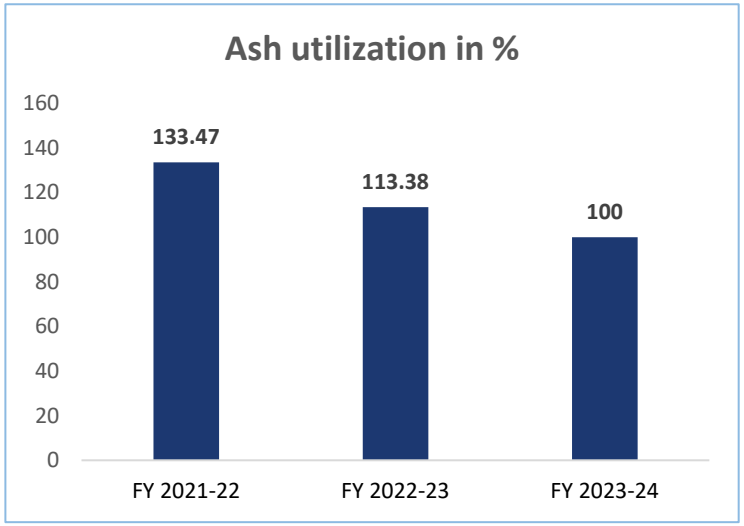
Type of Renewable Energy System	2023-24	
	Energy Generated (kWh)	Annual Savings (Rs. Million)
Solar Photovoltaic	151200	0.57

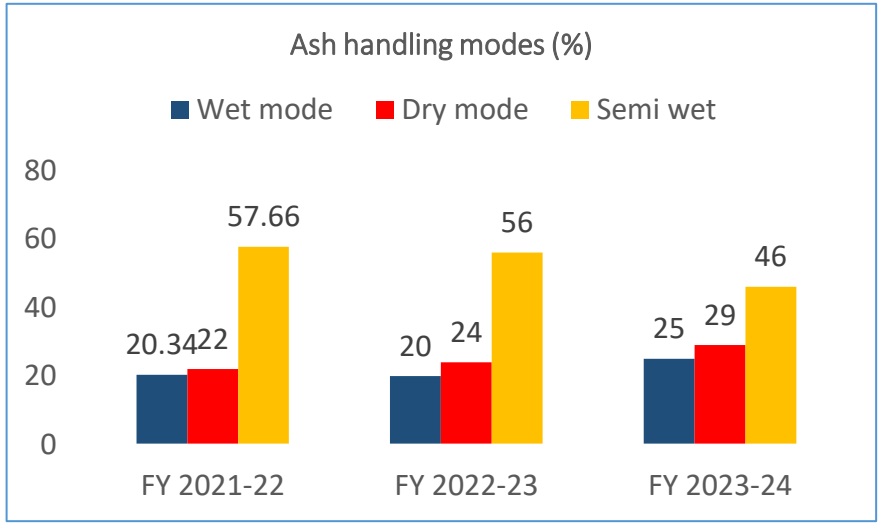


15 KWH Micro -Hydro turbine installation in progress and it be completed in FY 25.

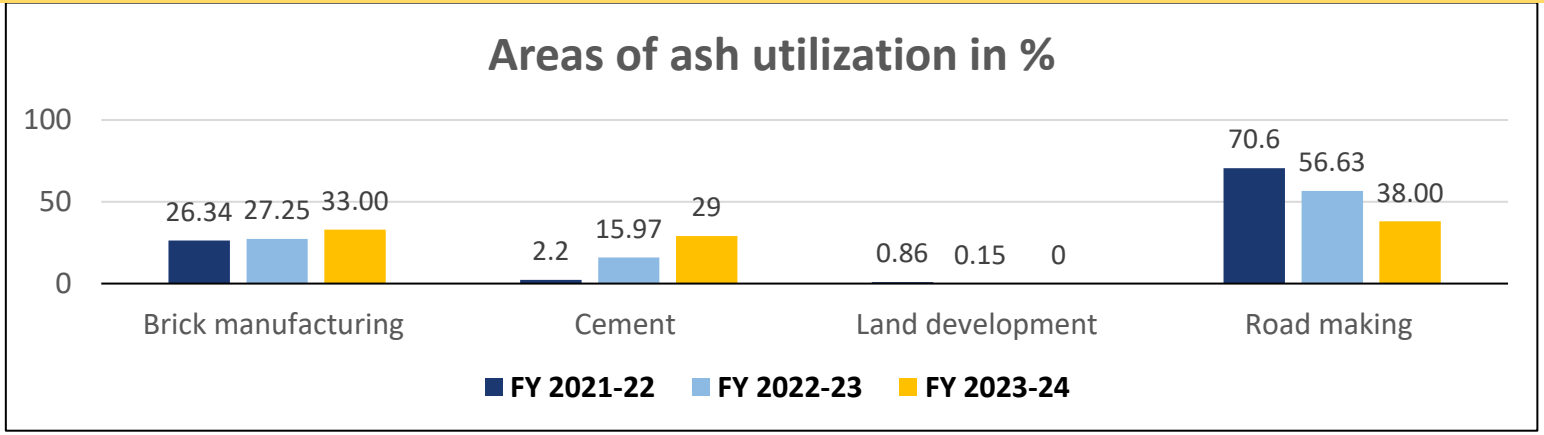
9.1 ENVIRONMENT MANAGEMENT - ASH UTILIZATION







0% legacy Ash stock



Modes of Ash Conveying

- Dry Ash conveying System with storage Silos
- Bottom Ash slurry conveying system with hydrobin water decanted system make it semi dry condition
- HCSD systems and ash pond with Ash water recovery System

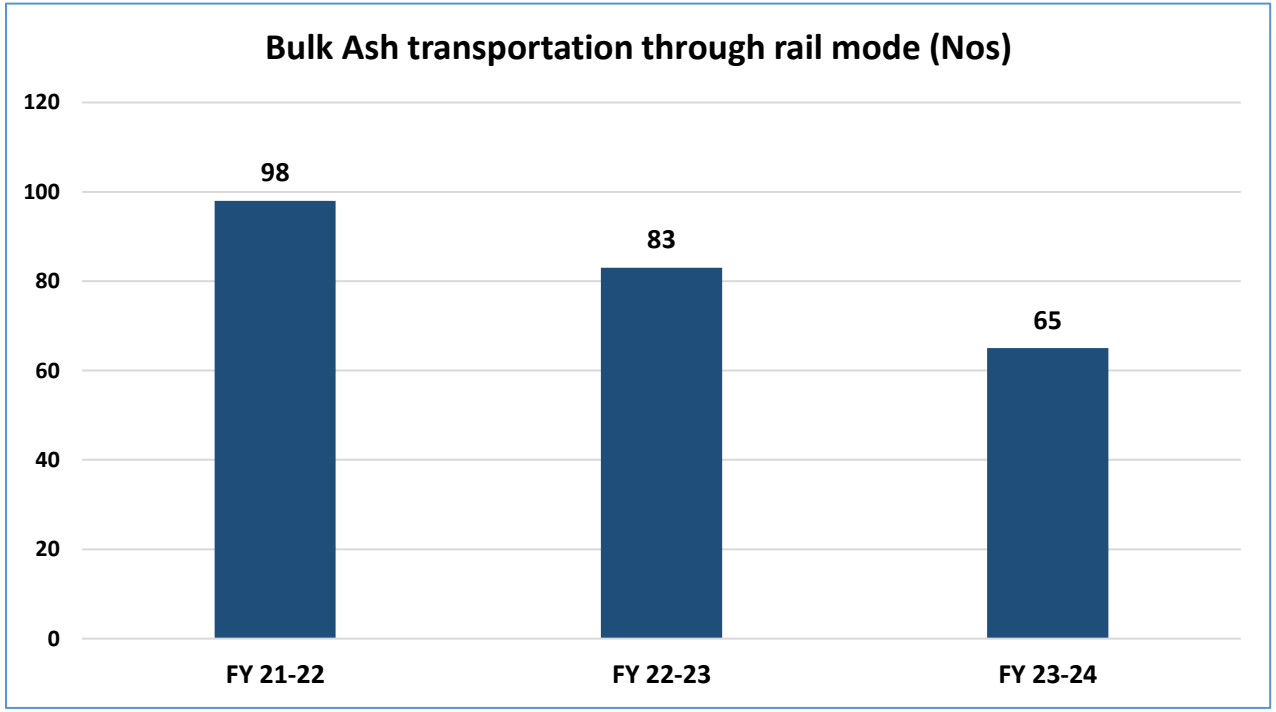
9.2 ENVIRONMENT MANAGEMENT - ASH UTILIZATION

In house Bricks/ Pavel blocks making unit – products is being sold to other and also used in-house for repairing & construction work of Township.

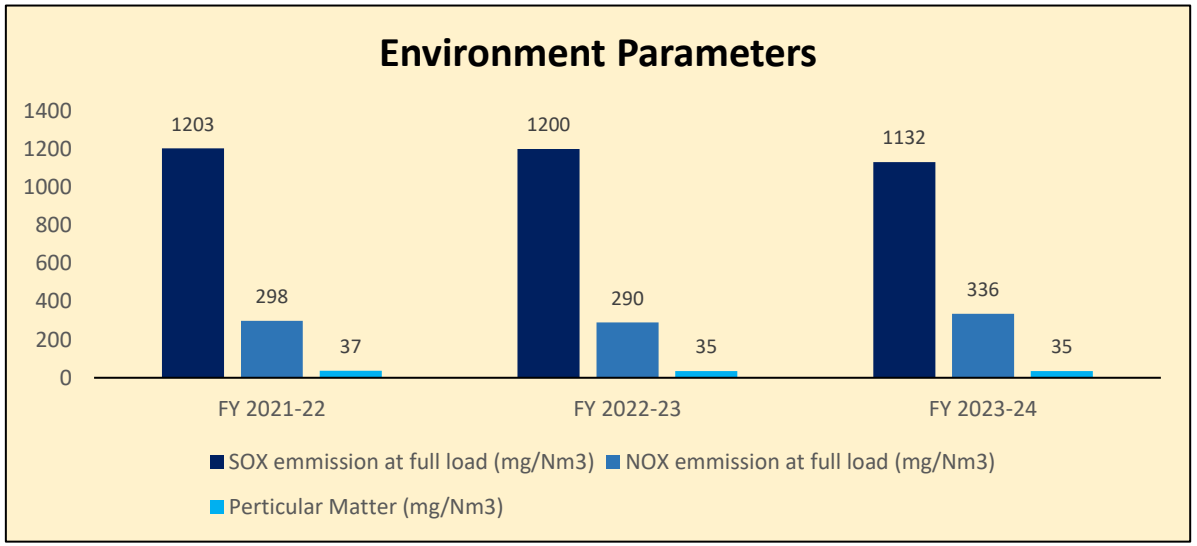
Utilization of fly ash in like Pavers and Bricks and supply to near by village

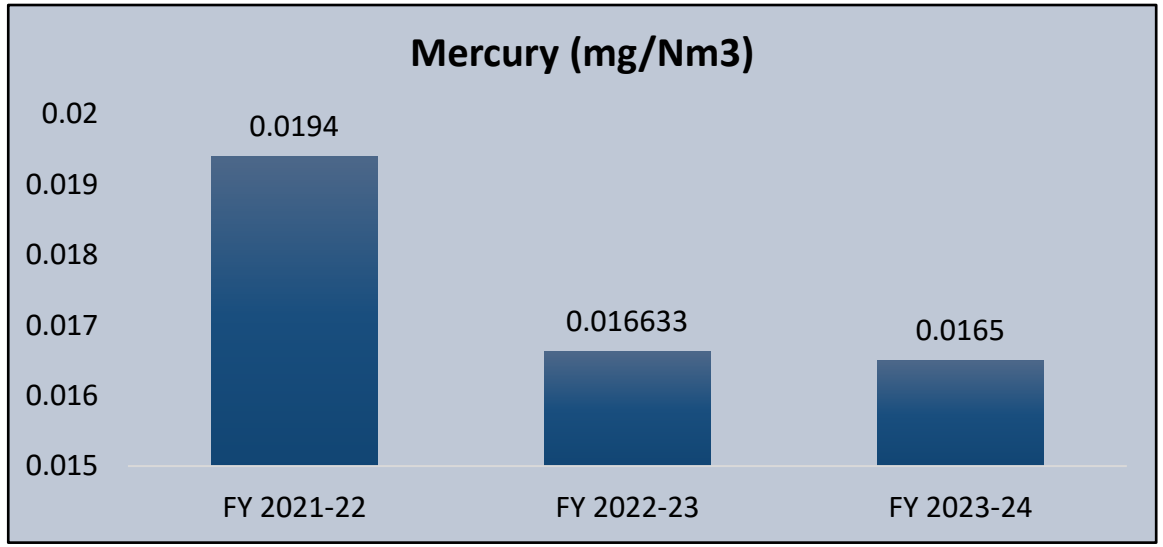
In-house Fly Ash Brick Manufacturing process establishment.

Supply to NH Authority for road construction project through trucks and bulk discharge through rakes



9.3 ENVIRONMENT MANAGEMENT – EMISSION





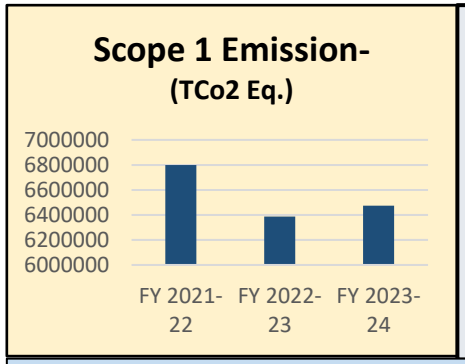
Best Practices for Emission control

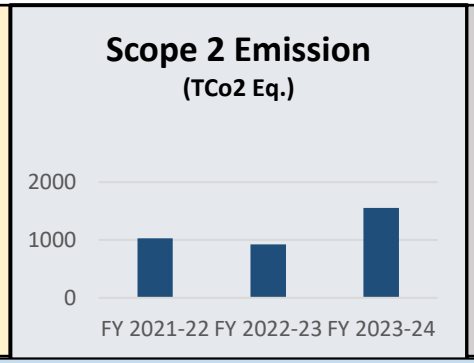
- Low NOx Burner and Over fire damper operation.
- Periodic checking of SADC for combustion control.
- Improvement in Fineness of coal particle
- Periodic replacement of Bag filters to control PM.
- Oxygen optimization for NOx control.
- Periodic monitoring of stack parameters.
- Daily ESP field healthiness monitoring.
- Online CEMS/ CEQMS is installed and data transmission to SPCB and CPCB
- Daily review of emission by EHS team

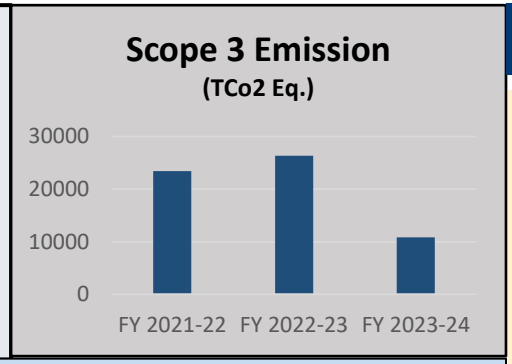
FGD Status :

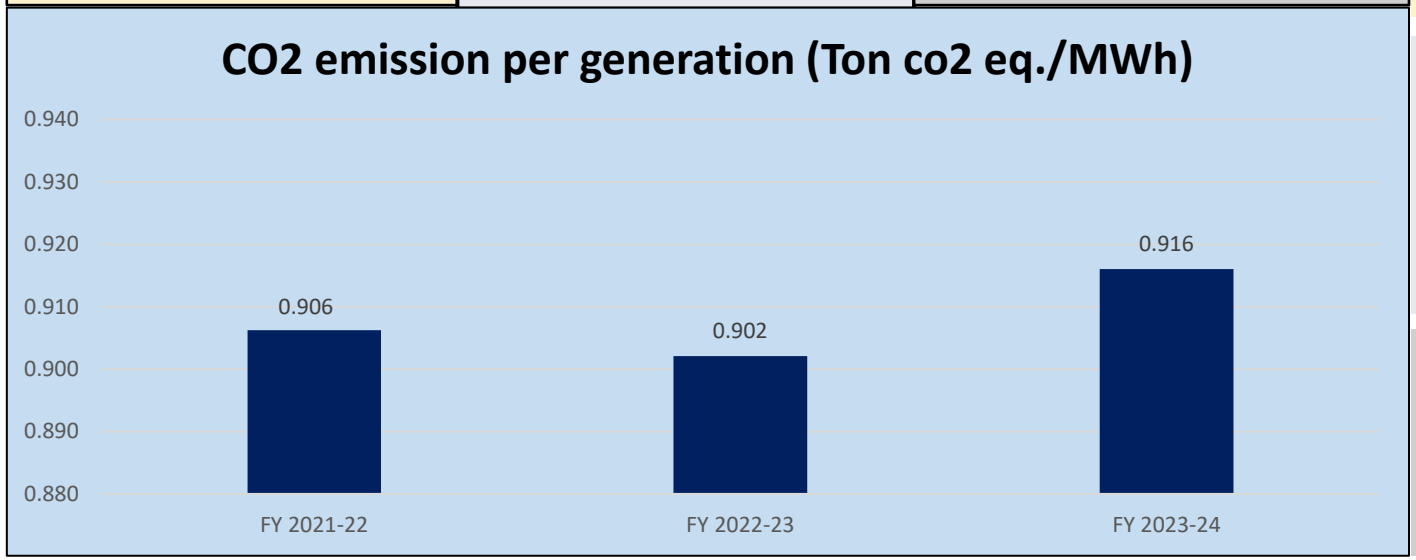
Technical sign off completed and commercial negotiation in progress for ICB. Due to limited participation in ICB, separate bidding process has been initiated for domestic bidders and NIT for the same has been published on 29th July'2022.

9.3 INFORMATION ON GHG INVENTORIZATION AND PUBLIC DISCLOSURE









GHG emission reduction Action plan

Scope -1

1. Reduction of Unit heat rate by 10 Kcal/kwh
2. Reduction of aux power consumption = target of 6.5 %
3. Solar power capacity addition under short-term plan 1 MW.
4. Solar power capacity addition under long-term plan 42 MW

Scope -2

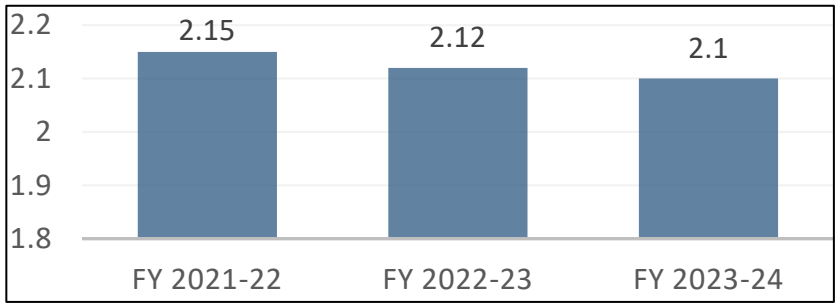
1. Reduction of import power by 10%
   1.1. Shutdown power optimization
   1.2. Relibality improvement initiative under the ABRIAL Programme to reduces force outage

Scope -3

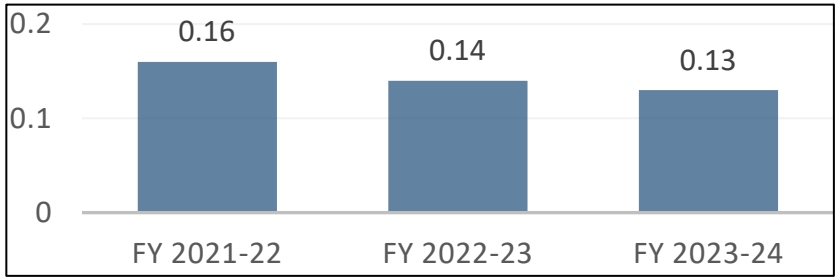
1. Maximization of Ash transportation by rail
2. 10 % RCR conservation into rail mode
3. SPDI of all spares

GMR Sustainability Report : Every year GMR group publishes its sustainability report for public. It is available on the following link:- https://www.gmrgroup.in/energy/

9.4 ENVIRONMENT MANAGEMENT -WATER



RAW water(m3/MWh)



DM WATER (%)

Bureau Veritas Certification

GMR KAMALANGA ENERGY LIMITED

At/P.O.: Kamalanga, Via: Mangalpur, Dist.: Dhenkanal, Odisha, Pin: 759 121, India.

Bureau Veritas Industrial Services (India) Private Limited has assessed the activities of the above organisation and found to be in accordance with the assessment protocol developed based on below criteria

Criteria

ISO 46001:2019

Water Efficiency Management System Standard

Scope of Assessment

Water Effiency management system compliance for

GENERATION OF ELECTRICITY IN COAL BASED THERMAL POWER STATION OF 3 X 350 MW

Assessment start date: **01 May 2024**

Subject to the continued satisfactory compliance during periodical assessment of the organisation's activities, this attestation is valid until: **30 April 2027**

Attestation No. **IND.24.2130/BA-WEM** Version: **1** Issue date: **01 May 2024**

Authorized Signatory
Jagdheesh N. MANIAN
Director – CERTIFICATION, South Asia
Commodities, Industry & Facilities Division

Local office: *Bureau Veritas Industrial Services (India) Pvt. Ltd.*
72 Business Park, Marol Industrial Area, MIDC Cross Road "C",
Andheri (East), Mumbai – 400 093, India.

Further clarifications regarding the scope of this assessment, the applicability of the criteria or to check this attestation validity please write to cert.india@bureauveritas.com

Best Practices for waste water utilization

ETP and STP for treating the water and used in

- Makeup to bottom ash handling system.
- Make up to Fire fighting storage tank.
- Truck wheel washing spray system.
- Ash Conditioning during loading .
- Boiler seal trough charging.
- Utilization in DS & DFDS for Dust suppression.
- Truck pre wetting system
- Rain water harvesting & recycling.
- Rain water recharging.

Water conservation projects

Water SCADA implementation	Reuse of MFST blowdown with treatment	Boiler refractory material modification by LC cement to reduce cooling water requirement	CT drift eliminator replaced with improved profile.	Construction of surface water runoff tank at fly ash loading area..	Relocation of underground utility pipes to over ground to reduce underground water leakages.

9.4 ENVIRONMENT MANAGEMENT –OTHERS PROJECTS

OTHER PROJECTS / PRACTICES FOR ENVIRONMENTAL PROJECTS

- Conversion of all DS to DFDS In CHP
- Installation of DFDS at fly ash silo
- Inline dust suppression arrangements in all conveyors
- Installation of online Mercury analyzer.
- Hazards waste reduction by reducing waste oil generation.
- Installation of truck wheel washing system
- Battery operated vehicle for employee & visitor movements in side the plant.

Mobile FOG Cannon

TRUCK WHEEL WASHING SYSTEM

FOG Cannon

WAGON PRE WETTING

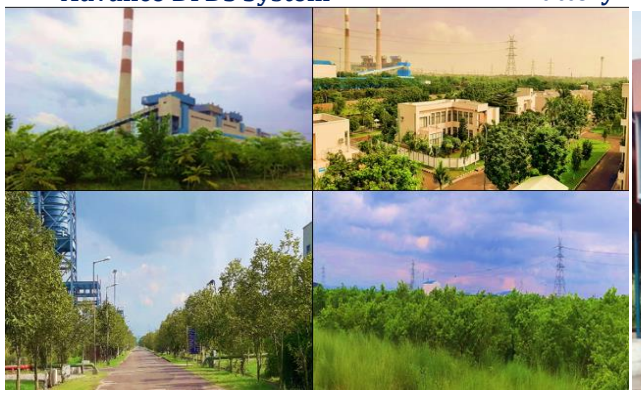
Advance DFDS System

Battery Vehicle

DFDS System in Conveyor belt

AFFORESTATION

- GKEL has fulfilled statutory requirement by effective plantation in 335 Acres
- Plantation of 3.97 Lakh sampling
- Mass plantation in plant premises
- Seedlings distribution to community
- Planation in community.
- 35 Acres landscape development
- 2 Acres of organic farming



Flexibilisation operation Journey

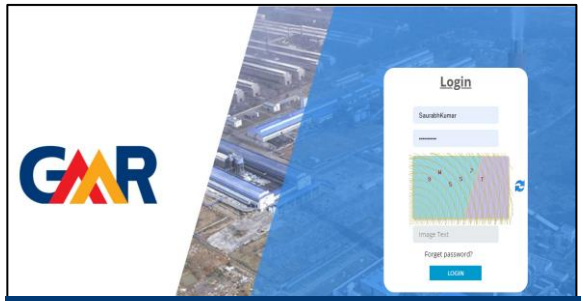
10. Flexibilisation

GKEL tested unit operation at 40% Loading for assessment of Operational constraints , Reliability , Heat rate & APC degradation .GKEL is further exploring for external assement with BHEL for Operational Challenges , Performance degradation and mitigation plan. Which is scheduled in 09th sept 24 to 14th sept 2024

PHASE	OCT 23	NOV 23	DEC 23	JAN 24	FEB 24	MAR 24	APR 24	MAY 24	JUNE 24	JULY 24	AUG 24	SEP 24	Remarks
1. In House Testing For Flexible Operation													In House Testing For Flexible Operation successfully completed in Unit-3.
2. Observation and Constraints													Compile all observation and constrain for validation
3. Vendor identification and Order Placement For Testing													PO issued to BHEL for third party analysis
4. Technical Data Sharing With Vendor													All technical data and variable data shared with BHEL
5. Desktop Analysis And Pre-consensus Meeting on test procedure													Desktop analysis done by BHEL
6. Testing Schedule													Testing will be carried out in 9-15 Sep 24.

ACTUAL PLAN

10. Digitalization

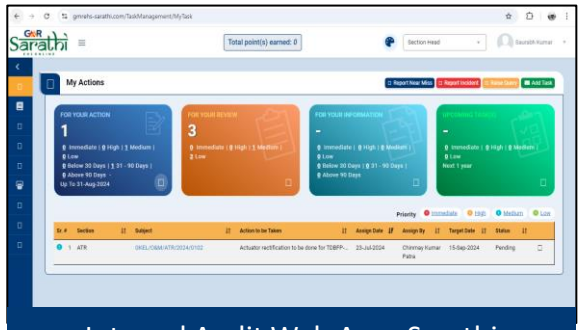


Smart Plant Web App.

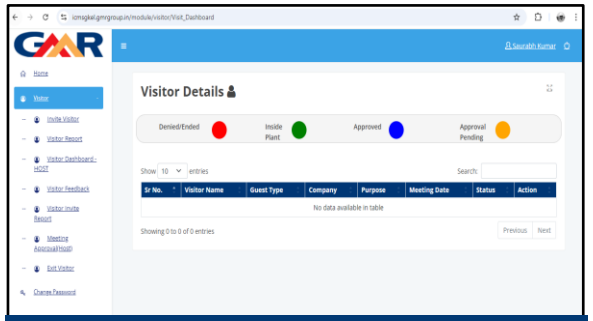
Compliance Management –Legatrix Web

Idea factory for Individual Idea

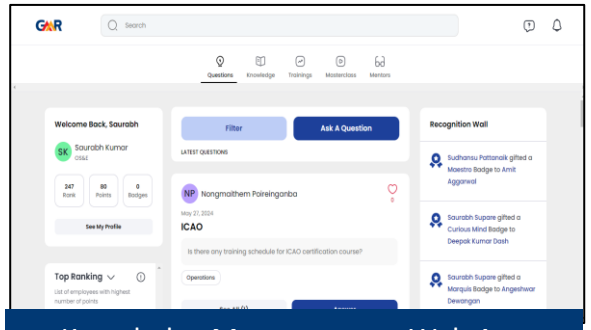
Android Based Application for Sarathi modules



Internal Audit Web App -Sarathi



Visitor Management –Mobile App



Knowledge Management –Web App

Smart plant implementation for coal management , ash management and visitor management	Compliance management, EHS management, Management Review & Sustainability reporting. -Legatrix.	SARATI portal for Internal audits , Change Management and Incident reporting	Idea Factory for registration of individual idea	ATR , SIP digitalization for tracking of CAPA	Mobile Based application for EHS Management , Quality management & feedback system

10. BEST PRACTICE –NON ENERGY EFFICIENCY

SIX SIGMA PROJECT

Six sigma is used as a tool tool to resolve chronic issues. Cross functional team working in these issues with clear mission statement. Following projects are under gone with six sigma.

1. Inventory cost optimization
2. Lube oil consumption reduction by 10% .
3. BA UBC reduction by 10% i.e. 1.8%
4. Boiler FG loss minimization by 10 Kcal/kwh
5. Overhauling cycle time minimization

CSR

1. GKEL certified with ISO:26000
2. Third party impact study by KSRM
3. Telemedicine program benefitted 645 patient
4. Medical expense reimbursement
5. Mobile Medical Unit and Blood Donation
6. Paddy farmers yield improvement

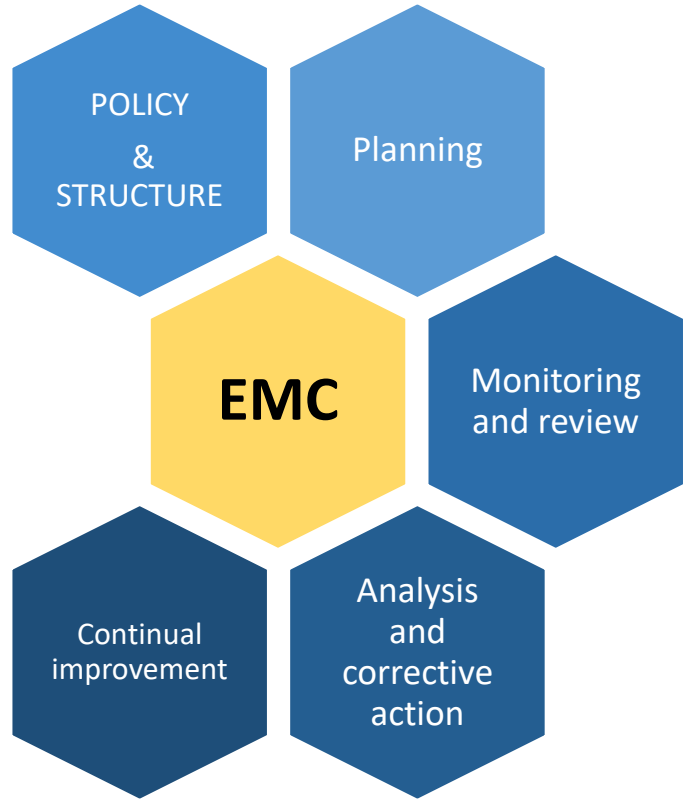
ASSET MANAGEMENT

1. SAP based maintenance
2. Preservation methodology
3. Min max process
4. Condition based monitoring
5. Regulatory compliance
6. Waste management
7. Certification of ISO 55001

11. ENERGY MANAGEMENT SYSTEM

11.1 ENERGY MANAGEMENT CELL

- **Energy review committee** : For overall review & support
- **Energy management Cell** : For Monitoring and developing
- **Zonal members** : For field level execution .
- **No of zones** : 6 zones better targeting and monitoring
- **Involvement** - : 31 Nos of employees associated.
- **Competency**- : 9 BEE Certified energy auditors
- **Review** : Energy review chaired by plant head



Statutory Compliance:

- Under **PAT cycle V** M&V audit GKEL is recommended for issuance of 6364 Es-certs.
- GKEL is expected to fall under **PAT cycle IX** with NHR target of 2481 Kcal/kwh.
- GKEL has set NHR target of 2465 Kcal/kwh by 2026.

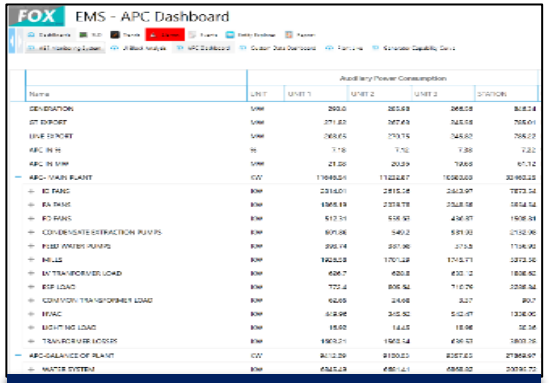
Objective of EMC to :

Monitoring of specific energy consumption	Deviation analysis of SEU and objective	Identification and cost benefit analysis of ENCON projects	Awareness. And Training	Ensure sustenance action plan.	ISO 50001 standard requirement.

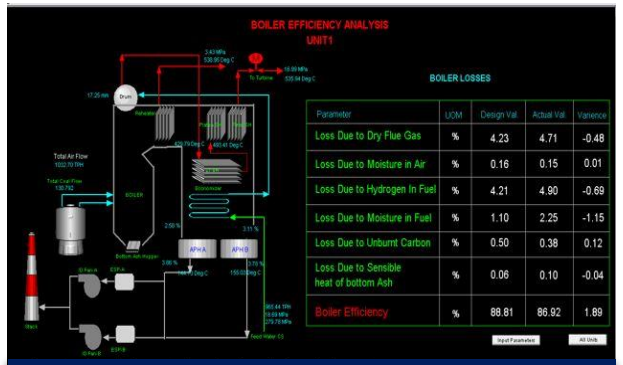
Energy Management System

11. ENERGY MANAGEMENT SYSTEM
11.2 MONITORING SYSTEM

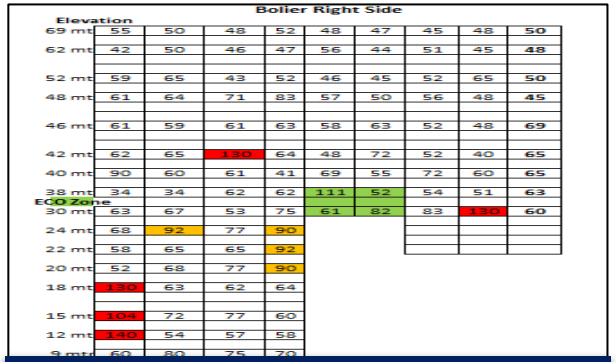
Monitoring system for Electrical energy	Monitoring system for Thermal energy	Workmen Involvement though SGA
Online Power Consumption-EMS	Online Turbine heat rate monitoring	High Energy drain passing through Ultrasonic Technology
Area Wise SP Energy Analysis	Online Boiler efficiency monitoring	Boiler Insulation Survey
SEU Deviation Analysis-DASEU	Online equipment performance	Boiler velocity mapping
RCA for deviation	Startup monitoring for cycle time reduction	Compressor FAD testing



ONLINE POWER CONSUMPTION



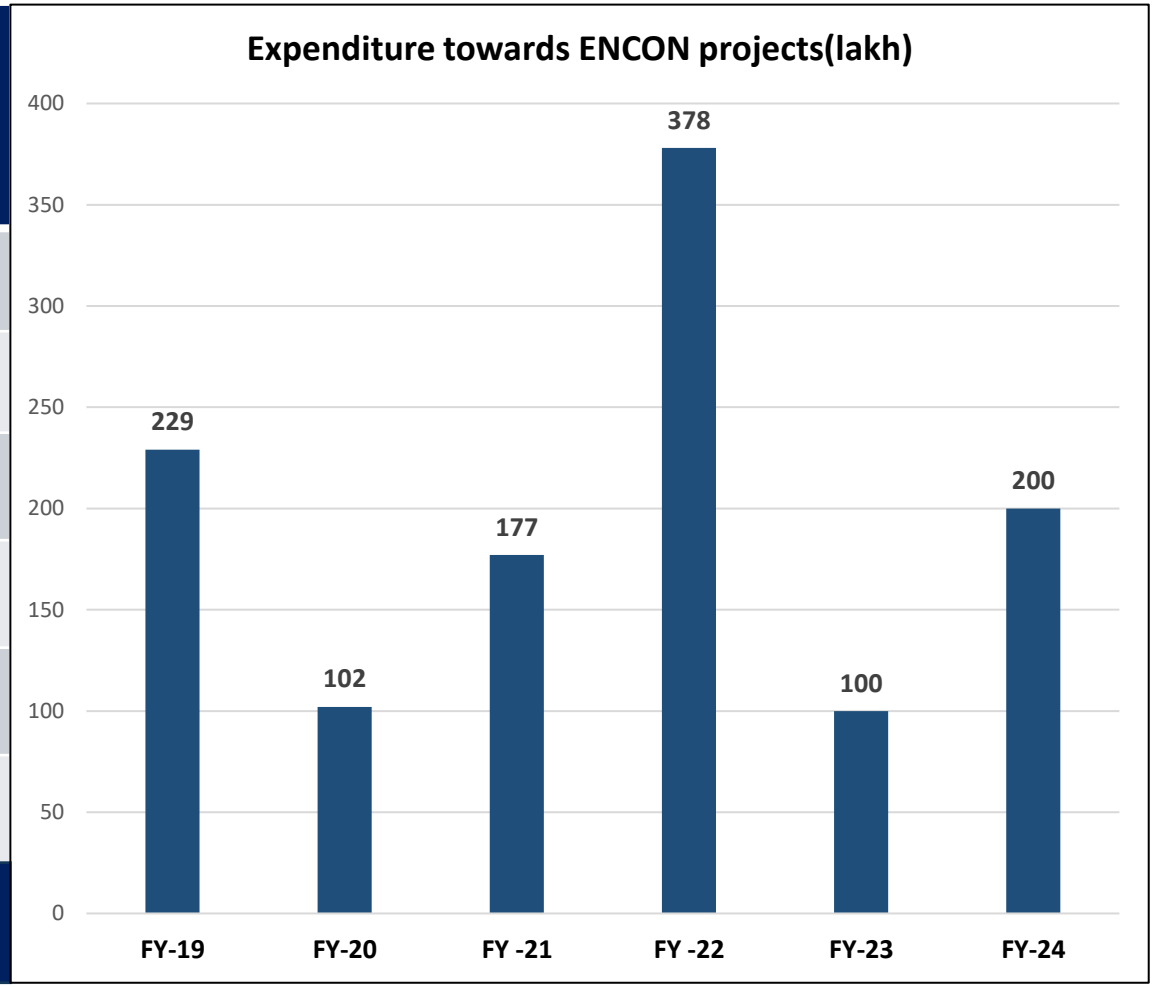
ONLINE EQUIPMENT PERFORMANCE



BOILER INSULATION SURVEY

12. BUDGET ALLOCATION

SL No.	Expenditure towards ENCON projects (Lakh)	Financial year
1	229	FY-19
2	102	FY-20
3	177	FY -21
4	378	FY -22
5	100	FY-23
6	200	FY-24
Budget allocation w.r.t turn over = 0.05%		



14.Award and accolades

13.AWARD AND ACCOLADES

2020-21

CII national Energy award-20

CII –ER ENCON Award

ICC Env excellence Award

Pollution control Award

2021-22

CII national Energy award-21

CII National award for most innovative environment project-21

State Pollution control excellence award-21

2022-23

CII national Energy award & leader awards-22

Group level CIP awards

ENCON Awards

2023-24

CII national Energy award-23

Group level CIP awards

Best success rate in RGMO

Idea Excellence

14. LEARNING FROM CII & OTHERS

GKEL participated in CII National level award for energy management for last Four years and awarded as excellent energy management unit & Leader Which turns to be great motivational factor for work force towards energy conservation. It helped the organization in following aspects.

- Adoption of best practices/ projects in energy conservation
- Adoption of best practice in environment aspects
- KPI benchmarking
- Motivations towards energy efficiency
- National level recognition.
- Employee engagement towards energy conservation

GKEL implemented IFC technology and exploring for hydro turbine in potential areas

Thank you