ITC Limited , Bangalore

Enduring Value

Team :
Chandan Das --Branch Engineer
Govind Singh -- Utility Engineer-E
Chandan Kumar –Utility Engineer-M

ITC -The organization "for all our tomorrows"

Vision

- **Sustain** ITC's position as one of India's most valuable corporations through world class performance, **creating growing value for the Indian Economy and the company's stakeholders**

Mission

- To enhance the wealth generating capability of the enterprise in a globalising environment, delivering superior and **sustainable stakeholder value**

Core Values

- Trusteeship
- Customer Focus
- Respect For People
- Excellence
- Innovation
- Nation Orientation

ITC – Triple Bottom Line Performance

Triple Bottom Line Highlights

Environmental

Only Company in the world to be:

- Carbon Positive – 18 consecutive years
- Water Positive – 21 years in a row
- Solid Waste Recycling Positive – For the last 16 years

Social

- Creating over 6 million sustainable livelihood
- Educating 10 lac Children
- Empowering 4 million farmers

Economic

- Market Capitalization: $ 51.03 billion
- Turnover: Over $10.95 billion
- Powering Growth with multiple business drivers

Creating freshwater twice that consumed

Rural education programme

Livestock development

Empowering women

Recycling waste from operations + post consumer waste

Sequestering twice the emissions

Manufacturing Process Flow

Wet Cold Plasma

Dry odour abatement

PMD

Cigarette Making

Cigarette Packing

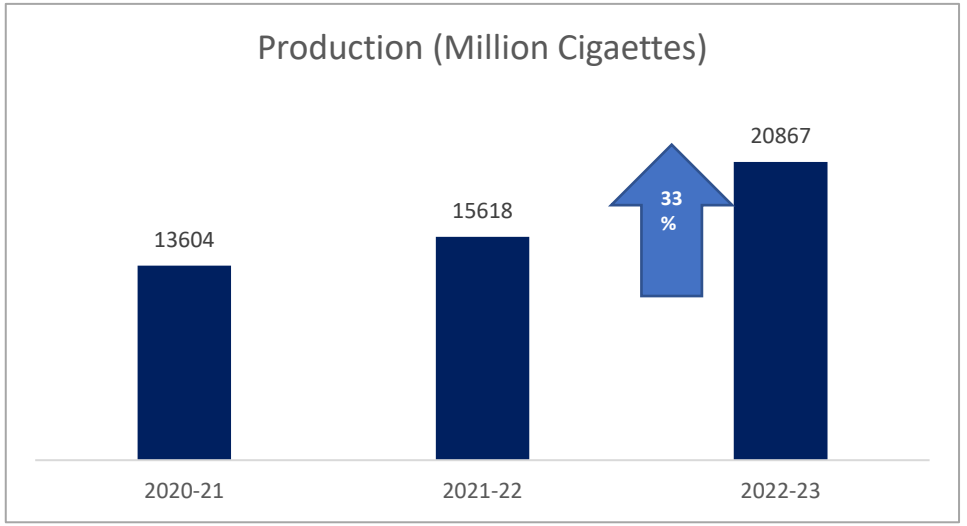
Finished Goods Storage

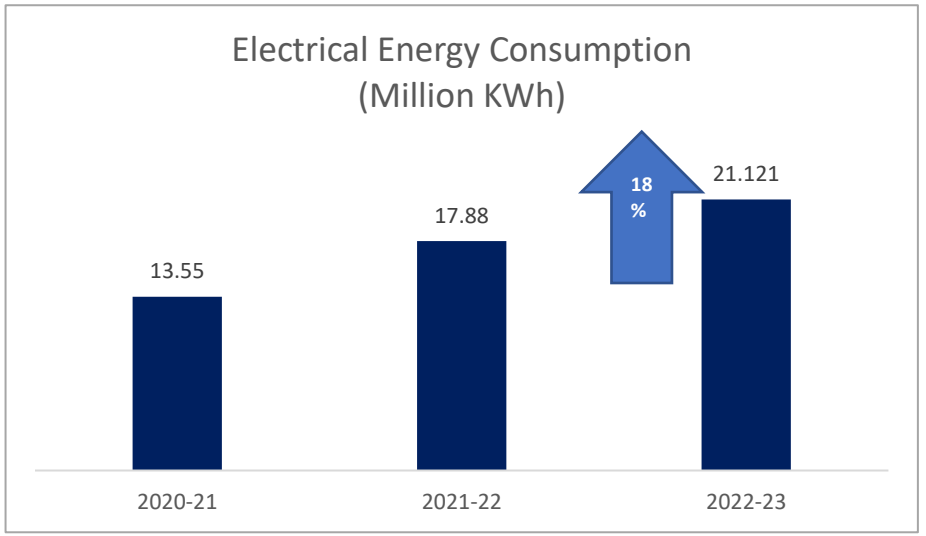
Shipping

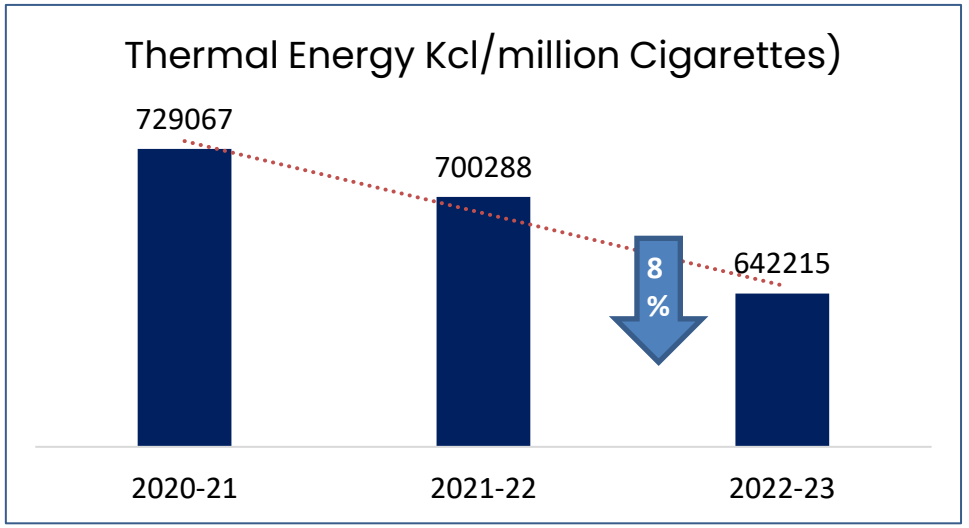
Dust Recovery Fans

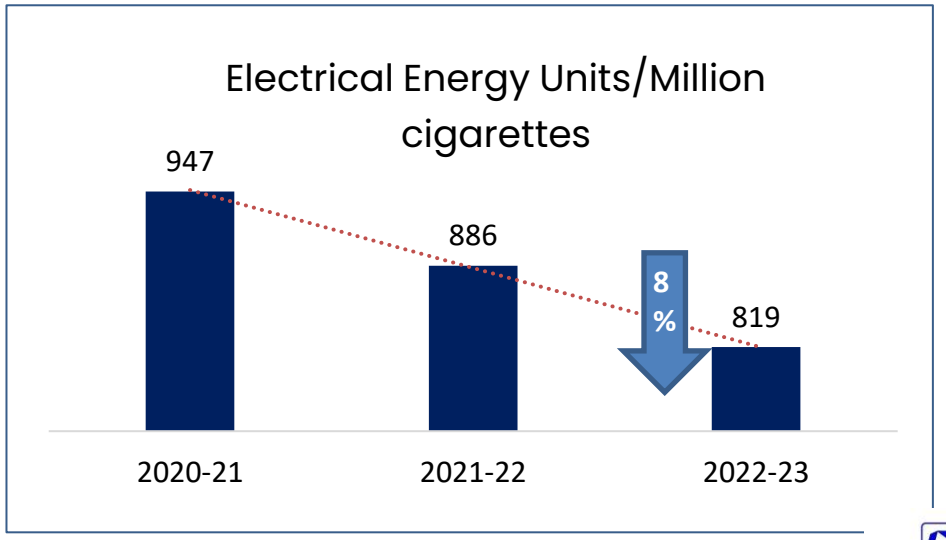
Automated Manufacturing Facility

Specific Energy Consumption

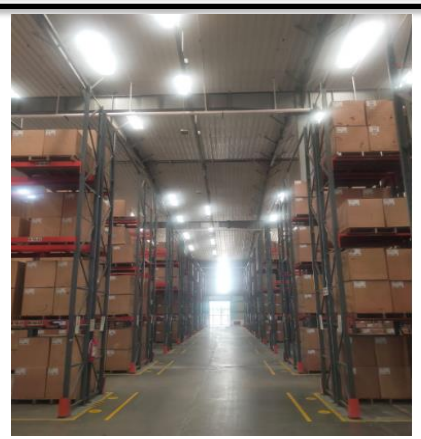




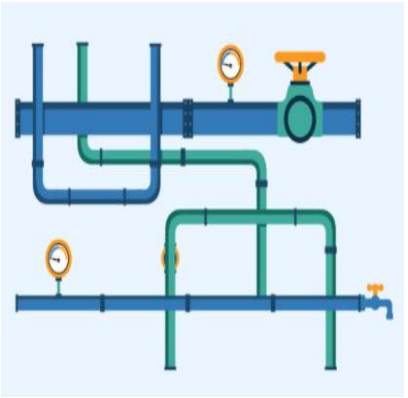




Energy Consumption-Measures adopted:



LED Lights
(LG/FGS/WMS)



PMD Comp. Supply side intervention

Energy Efficient Motors

VRV System

LSHS Premium–
Alternate fuel

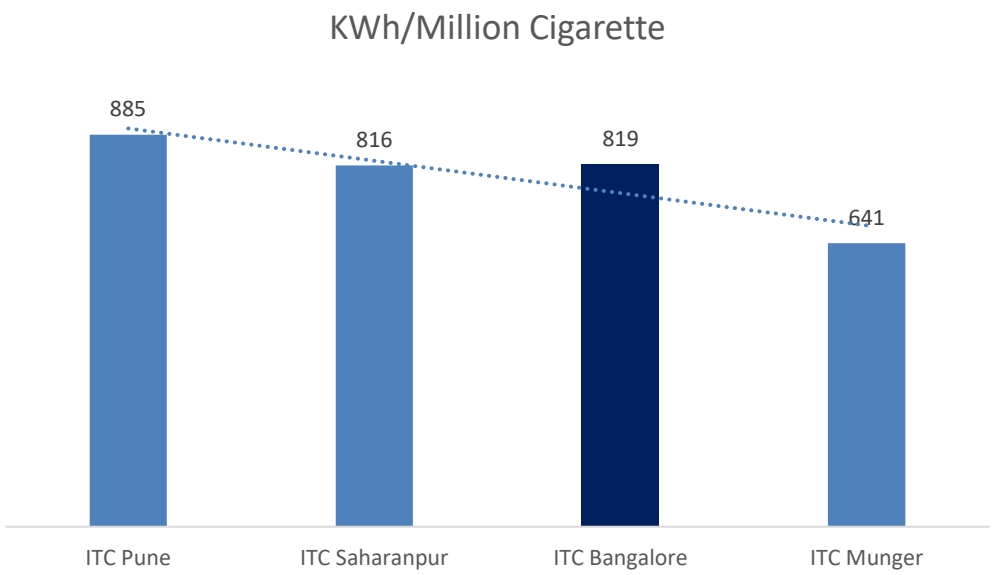
Scheduled Steam
Trap Monitoring

Online Steam
Trap Monitoring

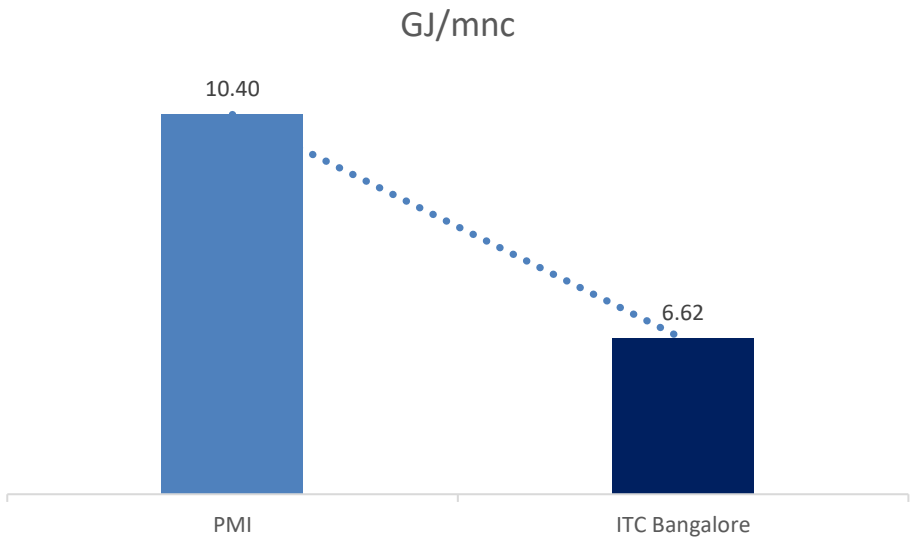
8 TPH Burner
Upgradation

Energy Benchmarking

National Benchmarking



International Benchmarking



ITD being unique in size of its kind of product, specific energy consumption at national level comparison is done within different cigarette manufacturing units of ITC Limited

ITC Bangalore is having SEC higher than some of other ITD units as ITC Bangalore is processing multiple grade/ brand of tobacco which is consisting of complex process is being used as raw material by other ITD units

ENCON – Project Implemented last Three Year

Year	No of Energy saving projects	Investment (INR Million)	Electrical savings (Million kWh)	Thermal savings (Million Kcal)	Total Savings (INR Million)	Payback period (in months)
FY 2020-21	5	8.85	0.402	00	1.61	66.00
FY 2021-22	5	6.58	0.615	00	2.60	30.13
FY 2022-23	7	8.9	0.33	00	2.70	39.56
Total	**17**	**24.33**	**1.347**		**5.91**	

Encon Road map – Project planned for FY 2023-24

Title of Project Annual	Annual Electrical Saving (Million kWh)	Investment (Rs in Million)
Monitoring the effectiveness of DRF Bag cleaning	0.029	0.08
Energy saver for ACs	0.030	0.05
High Pressure humidification for PMD	0.086	1.80
Optimization of compressed air demand	0.070	0.80
Replacement of CDRF with energy efficient Fan	0.058	2.50
Isolation of cyclone in SMD DRF	0.043	0.40
Off site Solar plant - 14.5MWp	-	950.0
Total	**0.316**	**955.63**

ENCON –Project implemented 2020-21

SL No.	FY	Description Of the Project	Annual Electrical Saving (kWh)	Annual Thermal Saving (Million KCl)	Annual Electrical Cost Saving (Rs million.	Investment Made (Rs million)	Payback (Months)
1	2020-21	Demand side optimazation of AHU	189000	0	0.756	0.25	4
2	2020-21	Energy Efficient BLDC Fan for Canteen and other area	12500	0	0.050	1.2	288
3	2020-21	AHU fan replacement with EC type	100138	0	0.401	4.4	132
4	2020-21	SMD lighting replaced with LED type (Savings of 7500 units/month X 7 months)	52500	0	0.210	1.8	103
5	2020-21	cDRF frequency optimization	48000	0	0.192	1.2	8
		Total	**402138**		**1.609**	**8.85**	**66.00**

ENCON – Project Implemented for FY 2021-22

SL No.	FY	Description Of the Project	Annual Electrical Saving (kWh)	Annual Electrical Cost Saving (Rs million.	Investment Made (Rs million)	Payback (Months)
1	2021-22	Advanced Analytics in HVAC	15409	0.07	0.26	44.57
2	2021-22	DRF purging valve timing optimization	33048	0.14	0.59	50.57
3	2021-22	VFD for FD fan and RO Pump	35136	0.15	0.08	6.40
4	2021-22	Substitution of base load water heating	91250	0.39	0.05	1.54
5	2021-22	Energy Efficient lights for PMD and other area	440000	1.87	5.6	35.93
		Total	**614843**	**2.60**	**6.58**	**30.13**

ENCON – Project Implemented for FY 2022-23

SL No.	FY	Description Of the Project	Annual Electrical Saving (kWh)	Annual E0lectrical Cost Saving (Rs million.	Investment Made (Rs million)	Payback (Months)
1	2022-23	Energy savers for AC	36720	0.3	0.04	24
2	2022-23	Enhancement in efficiency of Motors	10800	0.09	1.6	213.33
3	2022-23	High speed MAC valve in DRF	36720	0.3	0.12	4.8
4	2022-23	Leakage arrest -SMD compressed air	31200	0.26	0.08	3.69
5	2022-23	Heating substitution of Base load DG se	54750	0.45	0.04	1.07
6		Heating elimination -LSHS	32850	0.27	0.02	0.89
7		Utility Management System	124800	1.03	7.0	81.55
		Total	**327840**	**2.7**	**8.9**	**39.56**

Innovation Project-1: Utility Management System

The Process

DIGITIZE → **ANALYZE** → **OPTIMIZE**

Factory Automation (New SCADA)

- New SCADA system for Compressors and DRFs

Integrated Energy View

- Centralized Data Collection (~330 parameters)
- Designing Energy KPIs
- Dashboarding of Utility areas

Asset performance and energy usage

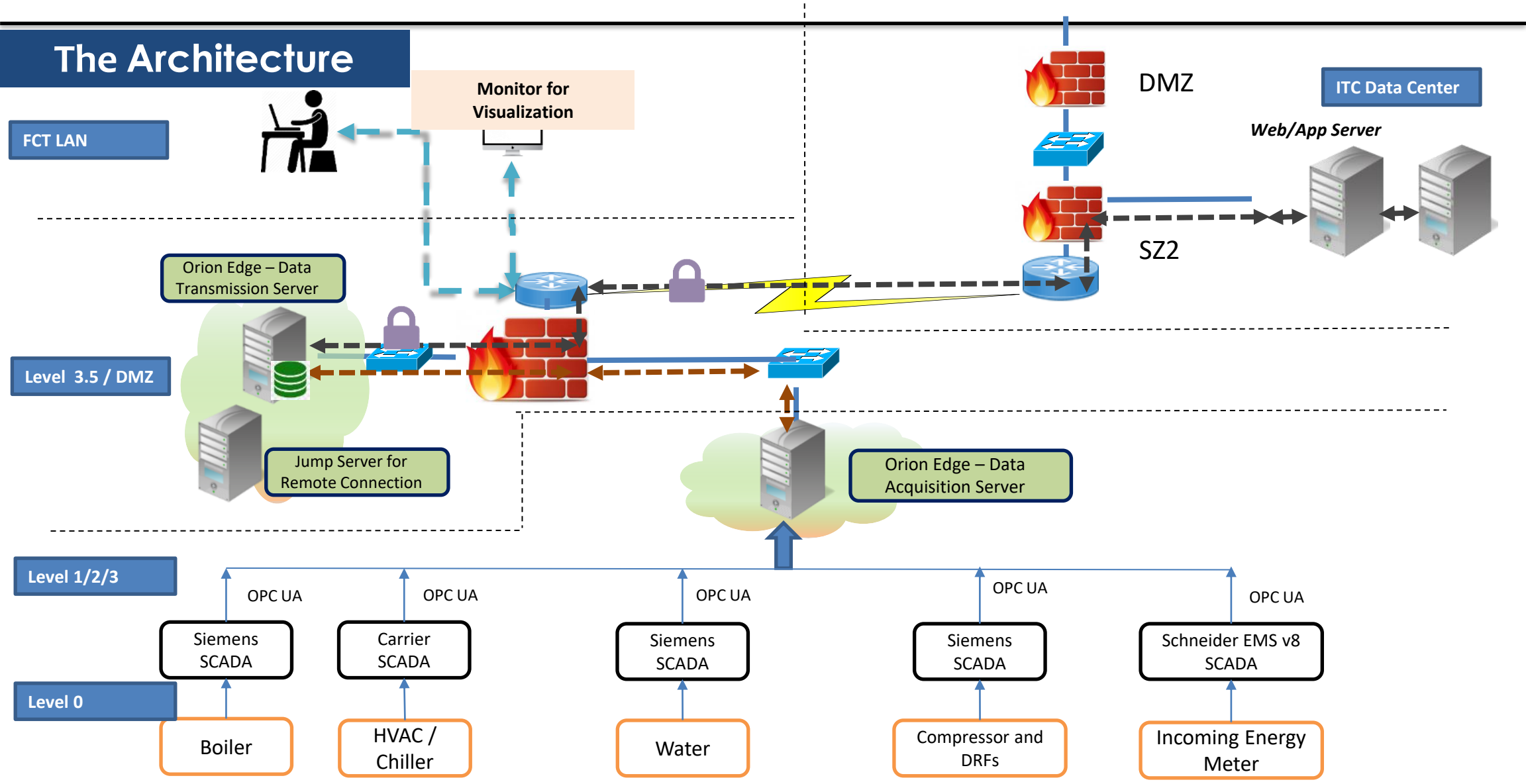
- Demand and Supply side benchmarking
- Analyze asset performance
- Map energy wastages
- Automated reports

Improve and Sustain Energy Performance

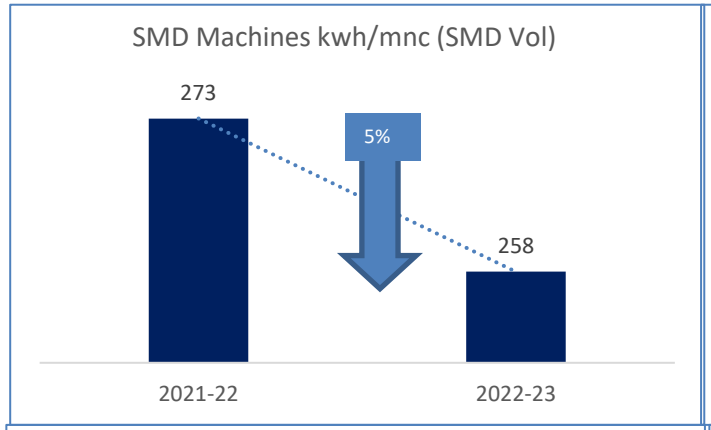
- Threshold based alerts
- Anomaly detection and pattern recognition
- Troubleshooting through system recommendations

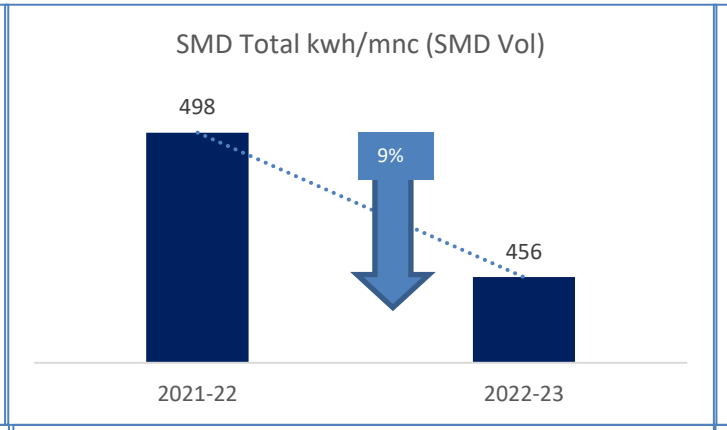
Innovation Project-1: Utility Management System

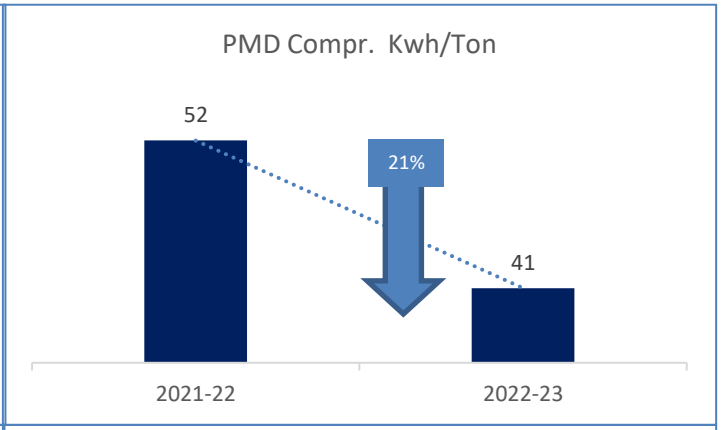
The Architecture

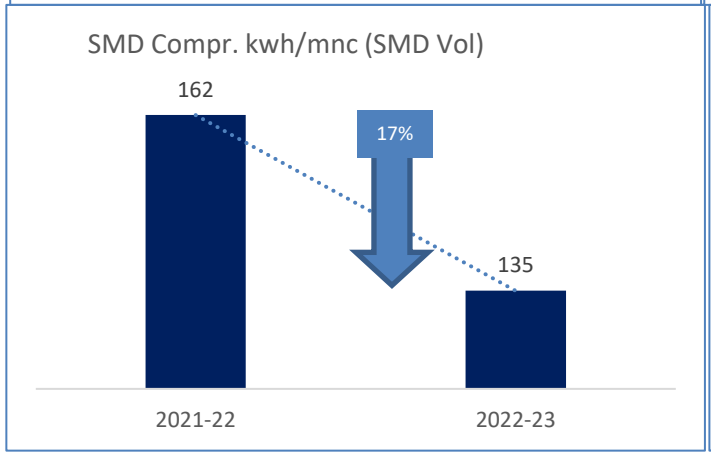


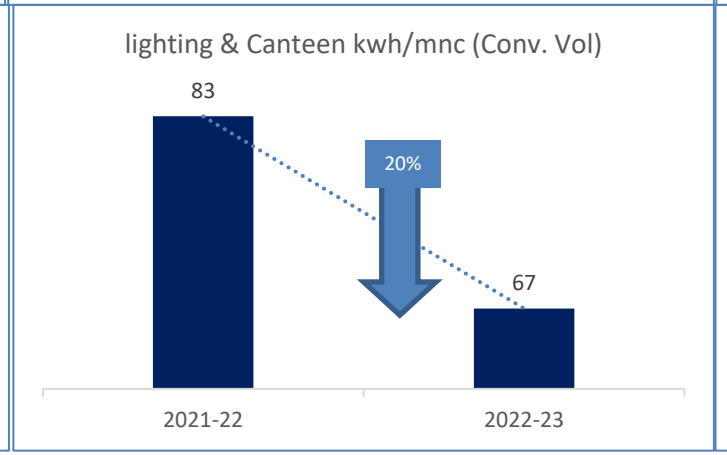
Utility Management System : Direct Benefits

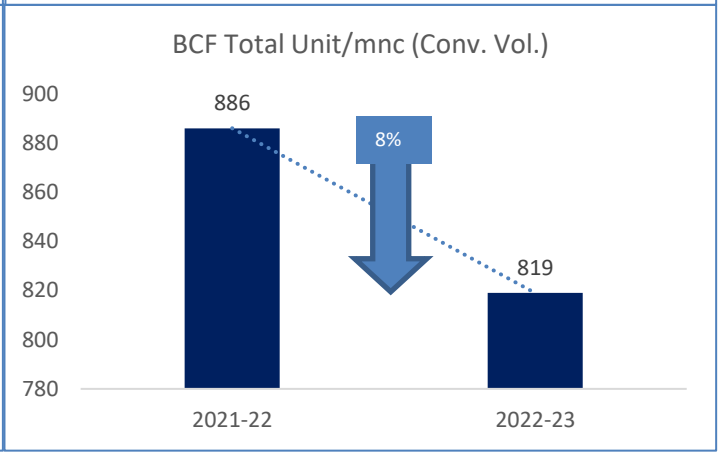












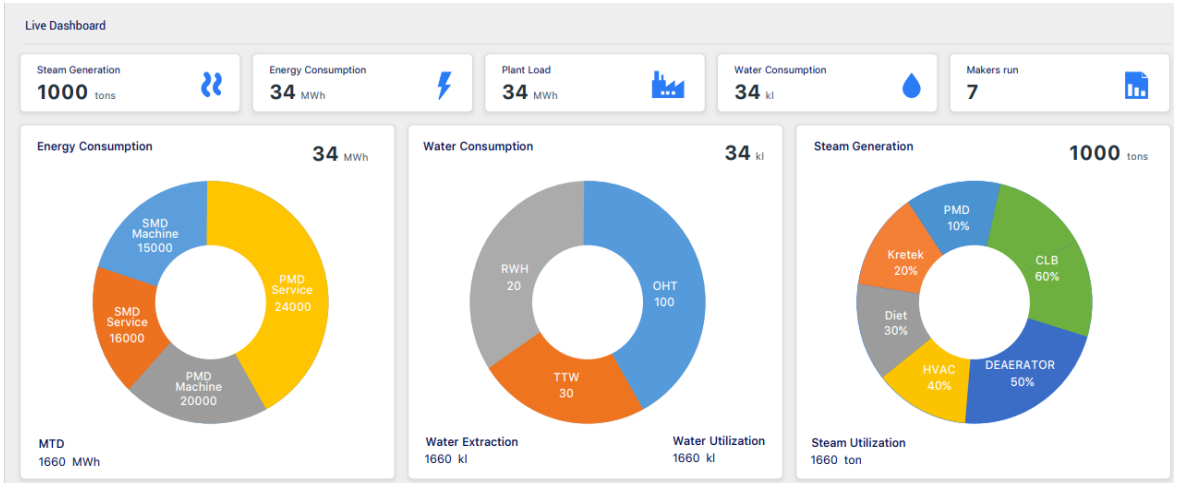
Capex Cost: 51L

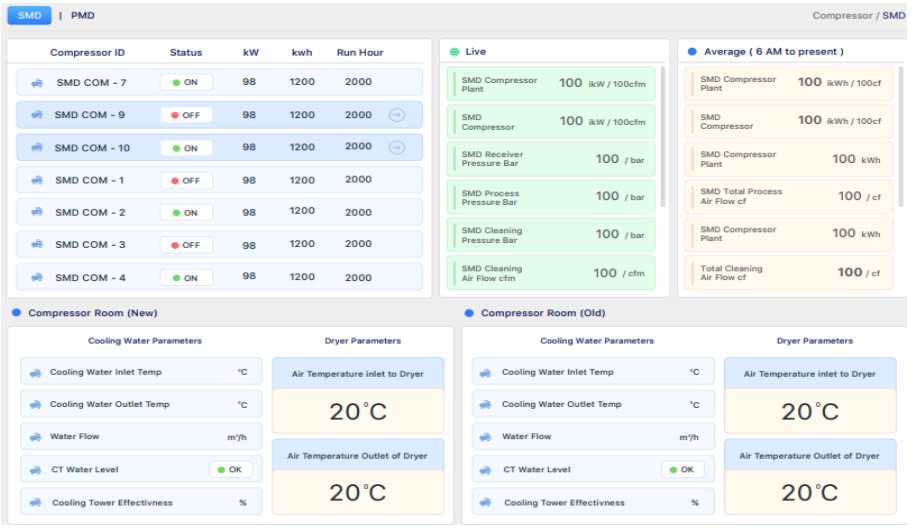
Annual Saving : 10 L

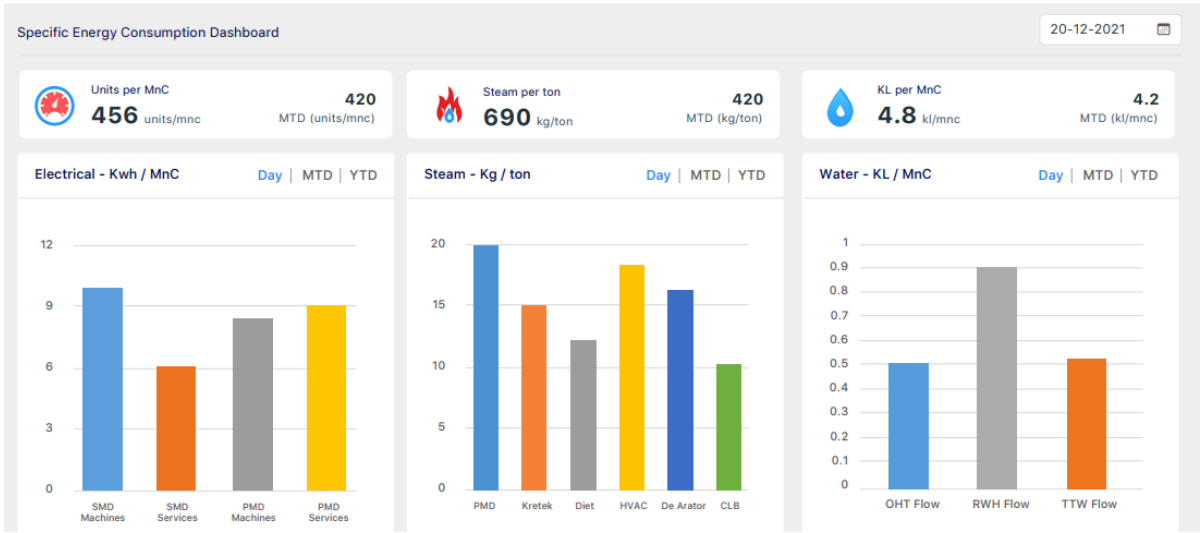
IRR: 18%

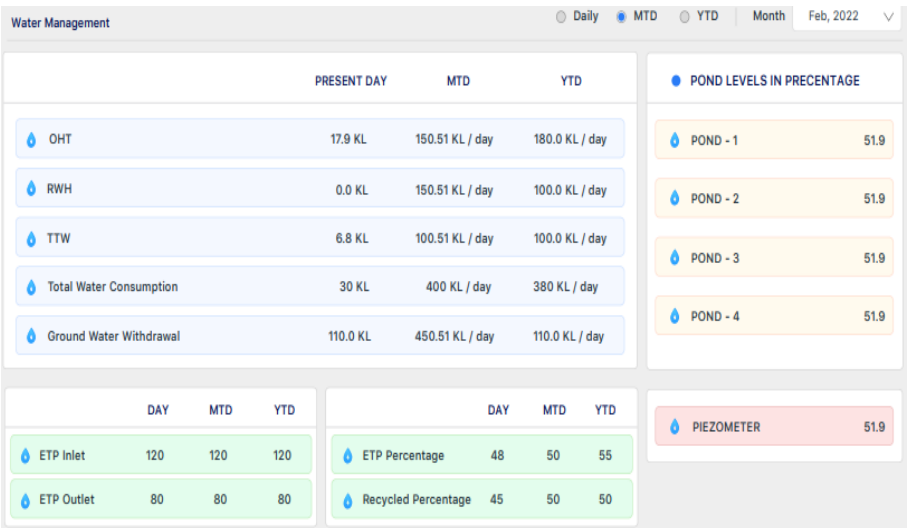
Innovation Project-1: Utility Management System

Utility Live Dashboards





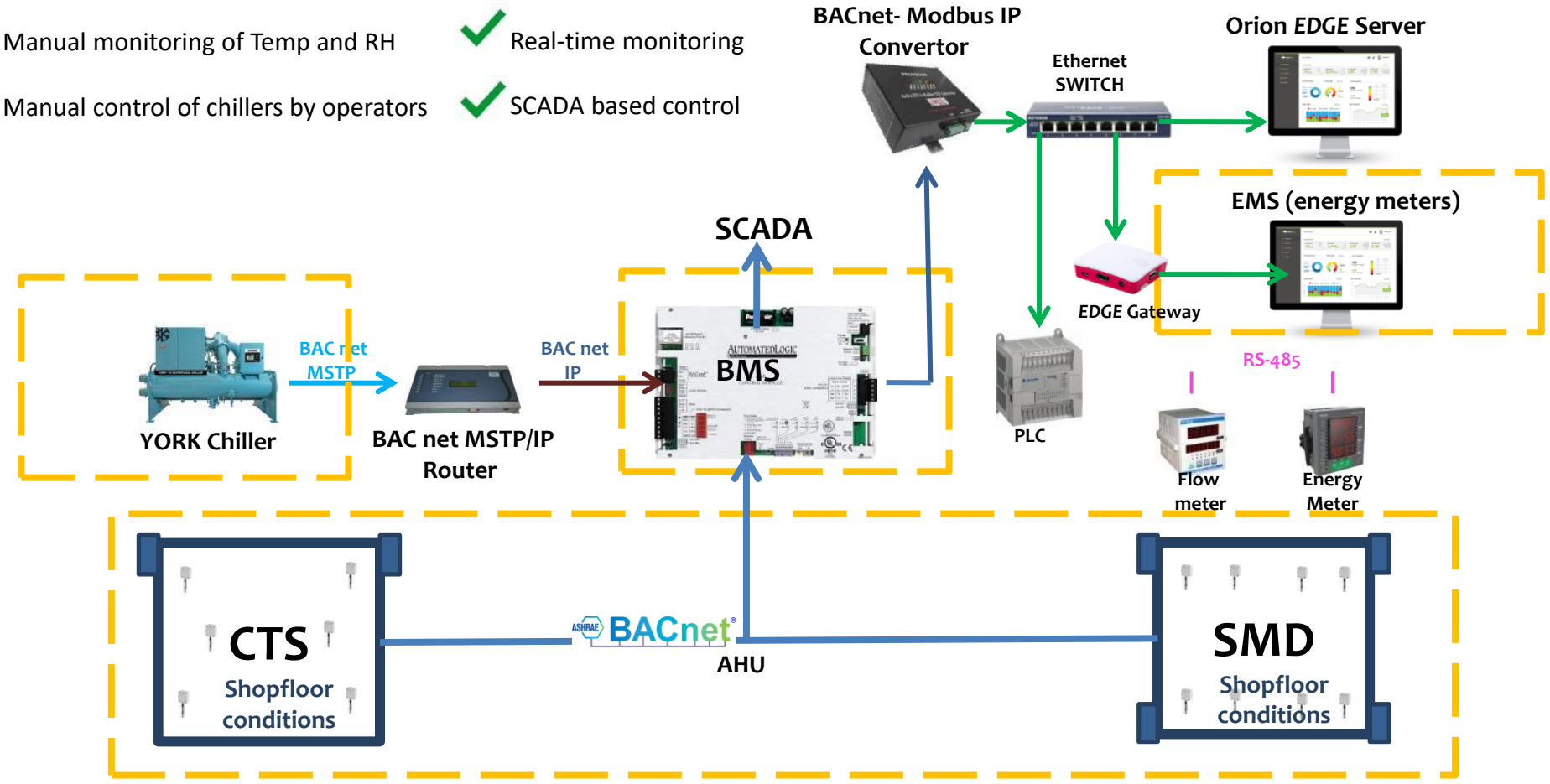




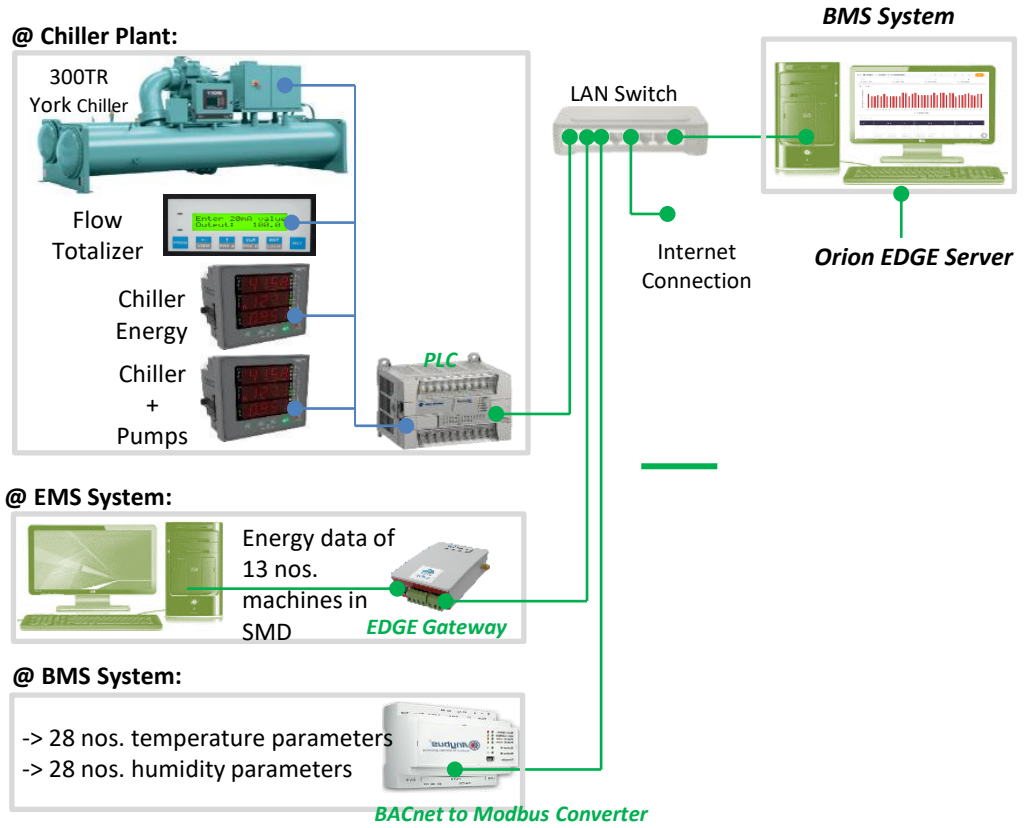
Innovation Project-2: Advanced Analytics in HVAC

- ✗ Isolated nature of HVAC systems
- ✗ Manual monitoring of Temp and RH
- ✗ Manual control of chillers by operators

- ✓ Integrated
- ✓ Real-time monitoring
- ✓ SCADA based control



Innovation Project-2: Implementation approach - based on ML Model



- Sensors installed in 12 AHUs and shopfloor locations
- Connection of Chiller parameters such as Chilled water temp, Condensate water temp, Condenser pressure and energy readings to BMS
- Upgradation of BMS SCADA
- Installation and configuration of local server and deployment of ML model
- Training of ML model with historic data
- Deployment of model and control of chiller

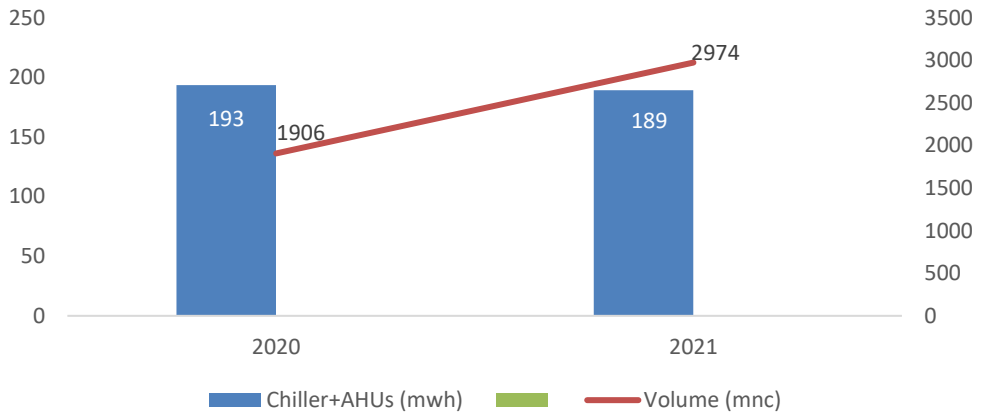
Innovation Project-2: Benefits

Confusion Matrix

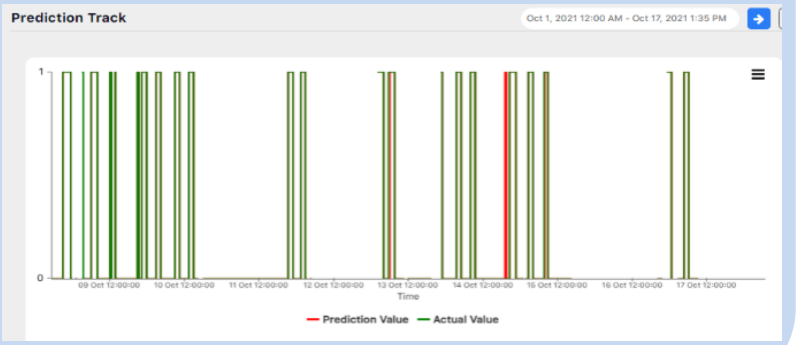
Actual	Command Turn OFF	Command Turn ON	Status OFF	Status ON	All
Status OFF	0.07	7.78	73.95	0.02	81.84
Status ON	5.57	0.07	0.19	12.34	18.16
All	5.64	7.85	74.14	12.36	100.00

Accuracy of 99.65% during testing

Energy comparison (AHU + Chiller) - Oct & Nov



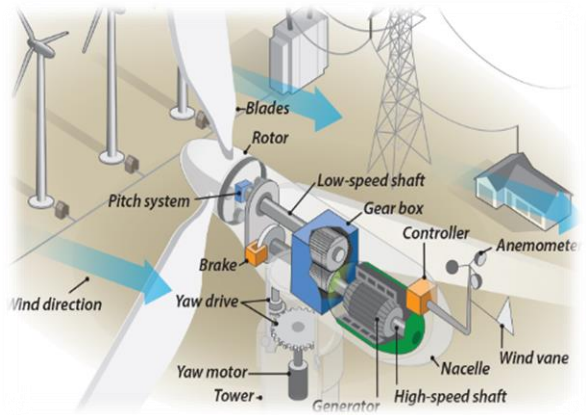
Snapshot of predicted/Actual chiller run hours during testing



Energy Savings
Rs 6 lakhs/annum

10 year
IRR 16.5%

IoT –ML based Analytics & Failure detection in Wind Turbine Generators



- Sensor I&C at strategic locations
- Identification of abnormality tags
- Data monitoring using Trinity
- Abnormality benchmarking
- Big data analysis – Power curve, scatter plot etc.

Benefits

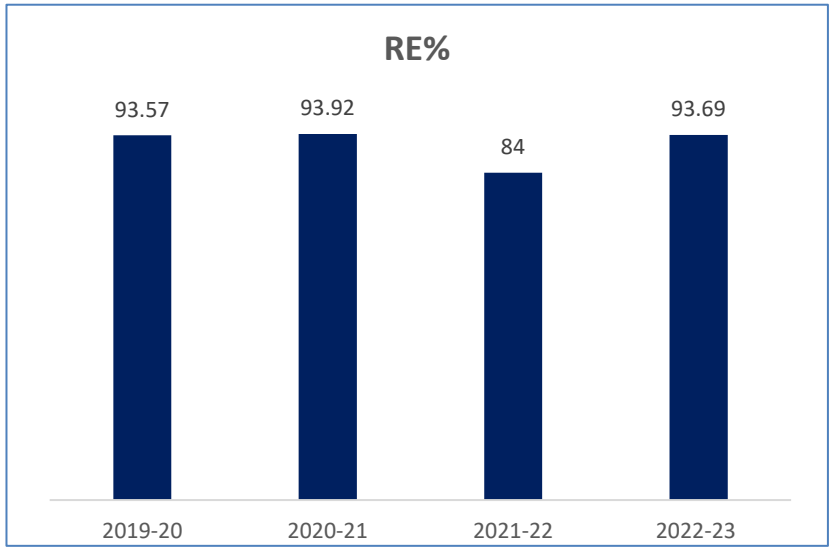
- Detection of all Key parameter of WTG like vibration, temperature , Generation, PLF.
- Deviation based alarm to the monitoring team and management
- Error prediction with ~95% accuracy
- Trigger proactive maintenance alarm
- Augment Reliability of WTG >97%
- Increase in PLF >3%

Investment
6.5 Lakh

Annual Saving
20 Lakh

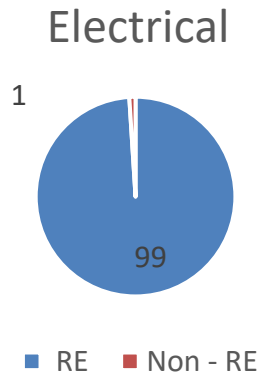
Payback period
4 Month

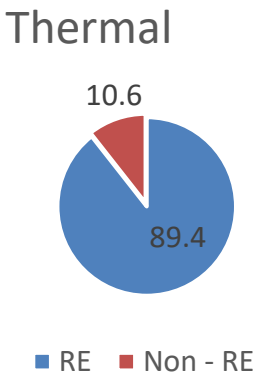
Renewable Energy Management – ITC Bangalore



Electrical RE % (FY22-23) -99 %

Thermal RE % (FY22-23) - 89.4 %





Initiatives :

- *21MW wind power plant*
- *10TPH biomass Boiler*
- *Biodiesel for oil fire boilers*
- *21KLDSolar hearing for boiler feed water*
- *Inter state open access of energy from ITC's Captive plant*

Renewable Energy initiatives

ITD 21 MW – Wind Mill Generators

21 KLD heater for boiler water feed

2 KLD for bathing

Solar tree connected to internal network

Interstate Wheeling - First time by Captive consumer in Karnataka

6 KLD for bathing

Rooftop solar

15 MW offsite solar power plant coming soon

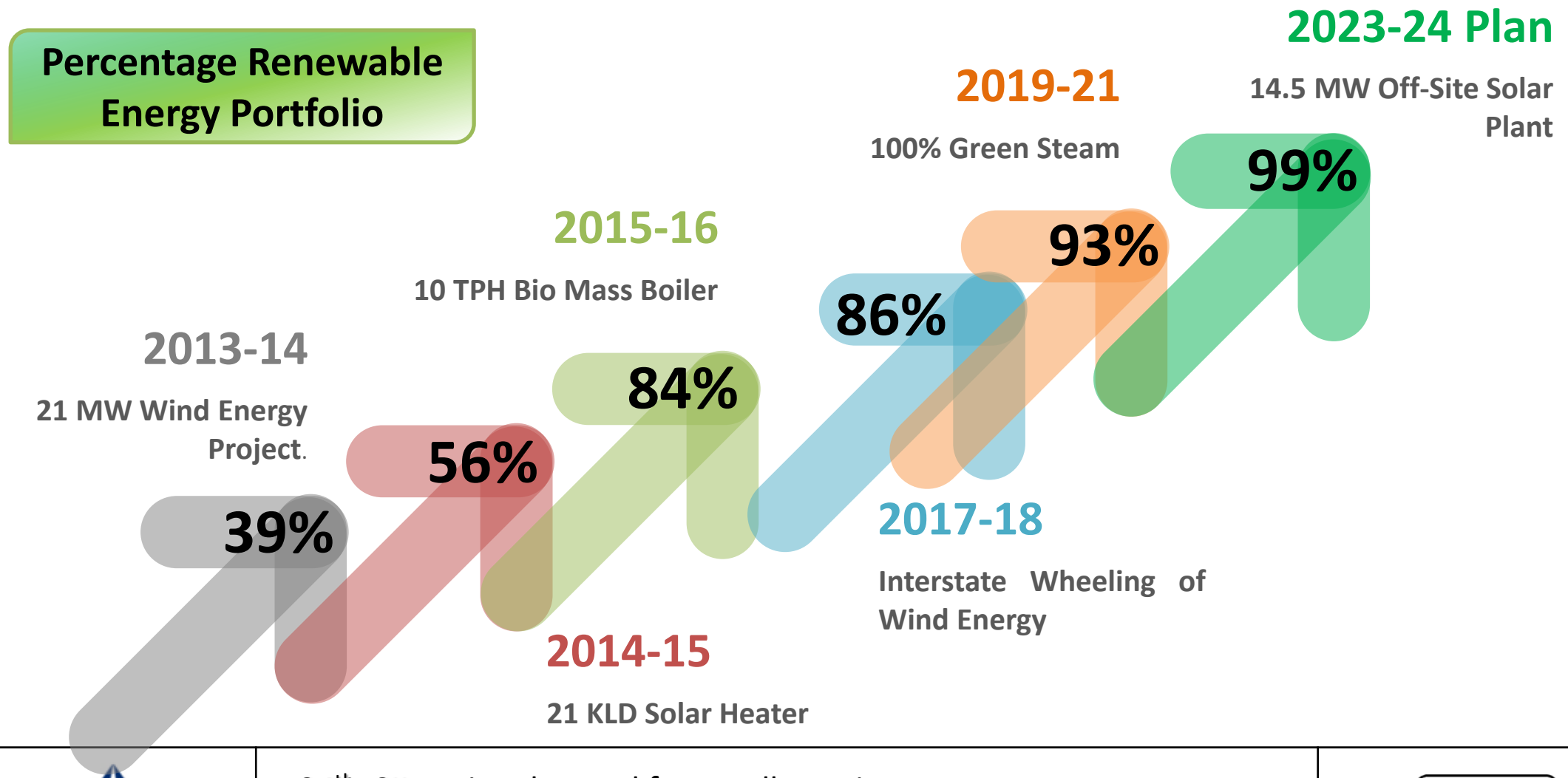
Utilisation of Renewable Energy sources

Year	Technology (electrical)	Type of Energy	Onsite/Offsite	Installed Capacity (MW)	Generation (million kWh)	% of overall electrical energy
2020-21	Wind Turbine	Wind	off-site	21	48.8	360.15
2021-22	Wind Turbine	Wind	off-site	21	49.1	274.89
2022-23	Wind Turbine	Wind	off-site	21	46.8	221.23

Year	Technology (Thermal	Type of Energy	Onsite/Offsite	Installed Capacity (Ton/hrs)	Usage (million kCal)	% of overall thermal energy
2020-21	Biomass Boiler	Biomass	Onsite	10	9722	98%
2021-22	Biomass Boiler	Biomass	Onsite	10	10937	99%
2022-22	Biomass Boiler	Biomass	Onsite	10	14449	99%

ROADMAP-RENEWABLE ENERGY

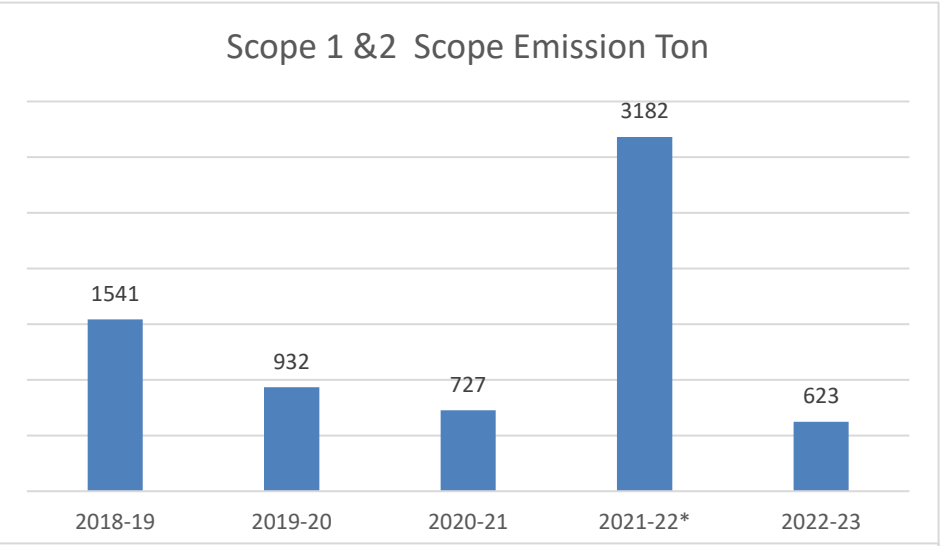
Percentage Renewable Energy Portfolio

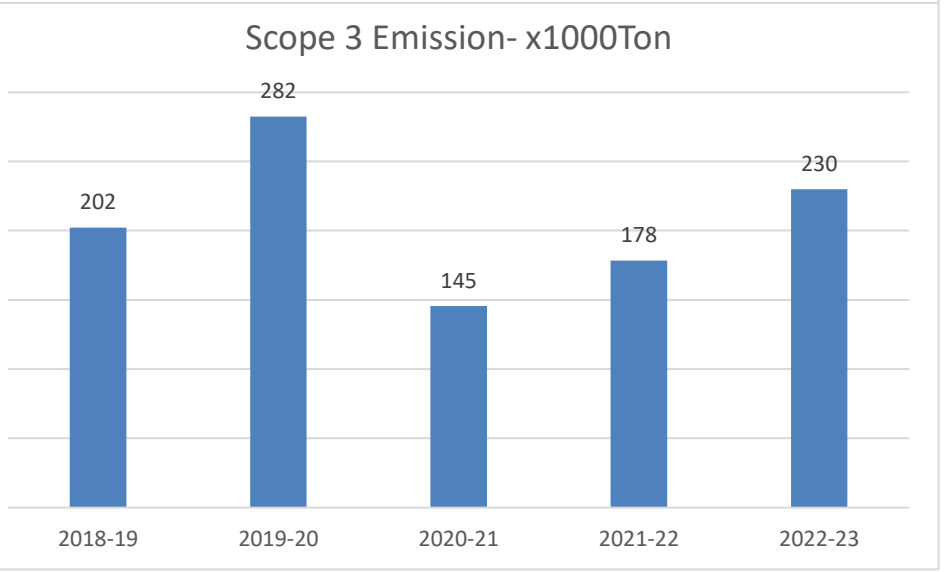


Roadmap -Net Zero : 2030

ITD 2030 S2.0 Target	2018-19 Baseline	2022-23 (Plan)	2022-23 (Achieved)	2029-30 (Plan)	Remarks/Challenges
50% Renewable Energy (Overall)	55%	55%	54%***	**70%**	**2022-23 OL: Reason for drop in RE% / Increase in GHG Emissions** • Lesser allocation of ISOA from PSPD due to coal crisis • Benefit of UP solar to be realized in PY1 against that projected for this FY **Overall RE- Plan:** • FY22-23 – Offsite solar UP • FY23-24 (PY1) – Offsite solar Karnataka • FY 24-25 (PY2) – Biomass Boiler in SRE, offsite solar Bihar • FY 25-26 (PY3) – Offsite Solar WB • FY 27-28 (PY4) – Adoption of energy storage based on feasibility **Challenges for 100% RE Electrical:** • Banking restrictions in Karnataka and Maharashtra • Peak TOD restriction for banked energy in UP and Bihar • Turbine-wise allocation to consumption points leading to lapse in surplus energy (Maharashtra)
100% Purchased Grid Electricity	66%	67%	62%***	**84%***	
50% Reduction in GHG Emissions -0.188 Ton/MNC	0.375	0.367 (2%↓)	0.404 (8%↑)	**0.185 (51 %↓)**	
40% Reduction in Specific Water 2.12 KL/MNC	3.53	2.86 (19 %↓)	2.75 (22 %↓)	**2.55 (28 %↓)**	• Pursue with water saving projects
30% Reduction in Specific Energy 3.89 GJ/MNC	5.55	5.17 (7%↓)	5.06 (9 %↓)	**4.79 (14 %↓)**	• Pursue with energy saving projects based on financial feasibility

GHG Inventoriation





increase in CO2 emission in 2021-22 due to nationwide coal cries and green energy diverted to run the coal based plant

Short Term & Long Term Plan For Co_2 Emission Reduction

- Sustenance of usage of Bio-waste Boiler – 99%
- Sustenance of usage of Bio-Diesel fuel in Canteen & CPD Boiler.
- 10MW off Site Solar power Plant Commissioning
- Enhancement of machine ability of 21MW wind power plant
- Usages of Bio fuel for captive power generation
- Utilization of green energy tariff

Waste Utilization and Management

<u>Utilization Of Waste As Fuel</u>: Use of biowaste briquette in bio mass boiler for steam generation

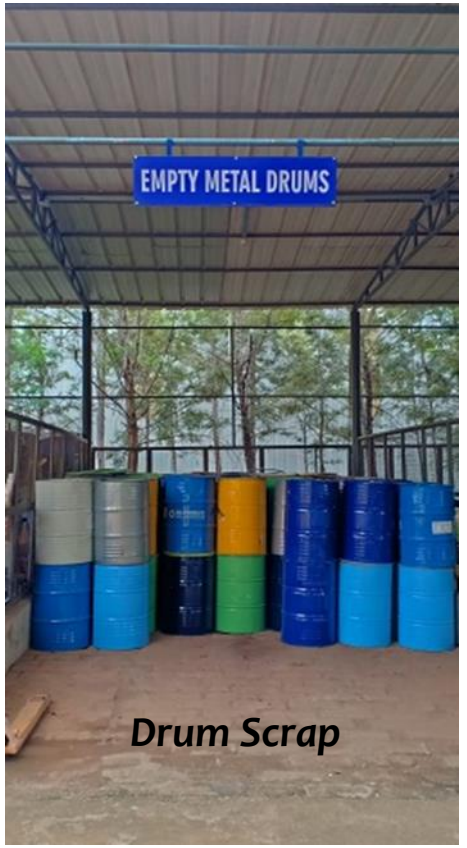
Year	Type waste	Quantity (Ton)	GCV	Waste as percentage of total fuel
2020-21	Biowaste Briquette	2558	3800	98%
2021-22	Biowaste Briquette	3484	3829	99%
2022-23	Biowaste Briquette	4638	3826	100%

Solid waste Management

Waste Management Process (Waste Stream Mapping & Disposal/ Recycling Process)

Metal Scrap

Wood Scrap

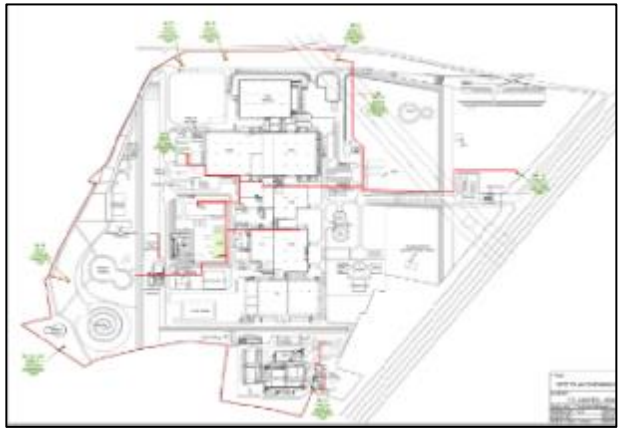


Drum Scrap

Paper & Boards Scrap

Plastic Scrap

Industry 4.0 Projects-Smart Water Management System



Communication Network

- ✓Optical fiber network across water management areas
- ✓Covered Areas-
  All Borewells, Piezometer RO Plants, ETP,WTP

Borewells & Major consumption points

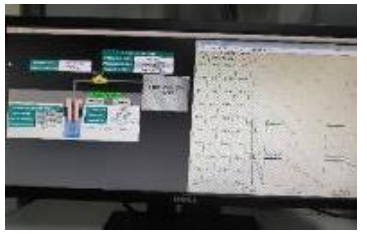
- ✓Individual smart PLC for each borewell
- ✓Electromagnetic – SMART flowmeters at Borewell level
- ✓Energy monitoring of submersible pumps

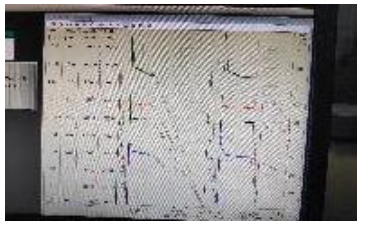
Ground water

- ✓Revamping Old well to Piezometer
- ✓Digital Piezometer installation
- ✓24X7 Realtime ground water monitoring
- ✓Shift wise data capturing for future reference

Monitoring & Analyzing

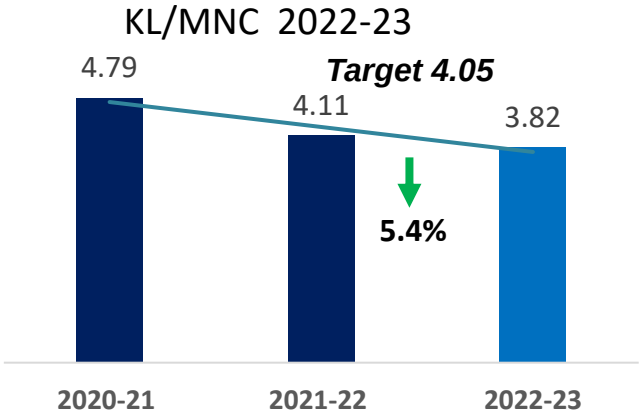
- ✓Upgraded Siemens based scada for data capturing
- ✓Trend analyzing
- ✓Deviation Triggering
- ✓Auto generated daily reports





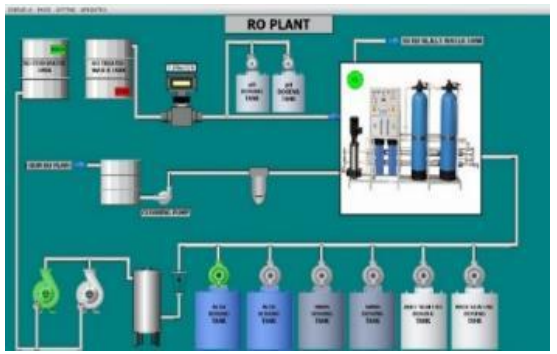
Water Management

Achieved Lowest Ever Sp. Water Consumption in FY 2022-23



- ✓ Flowmeter for all consumption and borewells
- ✓ borewell efficiency based operation

- ✓ RWH Pond-1 Capacity increased by 1100 Kl.
- ✓ Reduction in GW abstraction by ~2%.



- ✓ SCADA System
- ✓ Online monitoring
- ✓ analysis

Key Interventions

Reduce, Recycle & Reuse

- ✓ Increased Utilization of ETP Recycled Water by ~2500Kl
- ✓ Extension of Auto taps & Aerated Nozzles
- ✓ Pipeline Rerouting for better leakage detection
  - Overground TTW Line – PMD to SMD
  - Labour Canteen OHT Line

1. Reduce

- Leveraging Utility Management System
  - Real time trend analysis to monitor unaccounted losses
- Introducing the HPLV cleaning system - PMD drains
- Evaluate Adiabatic cooling system for Compressors

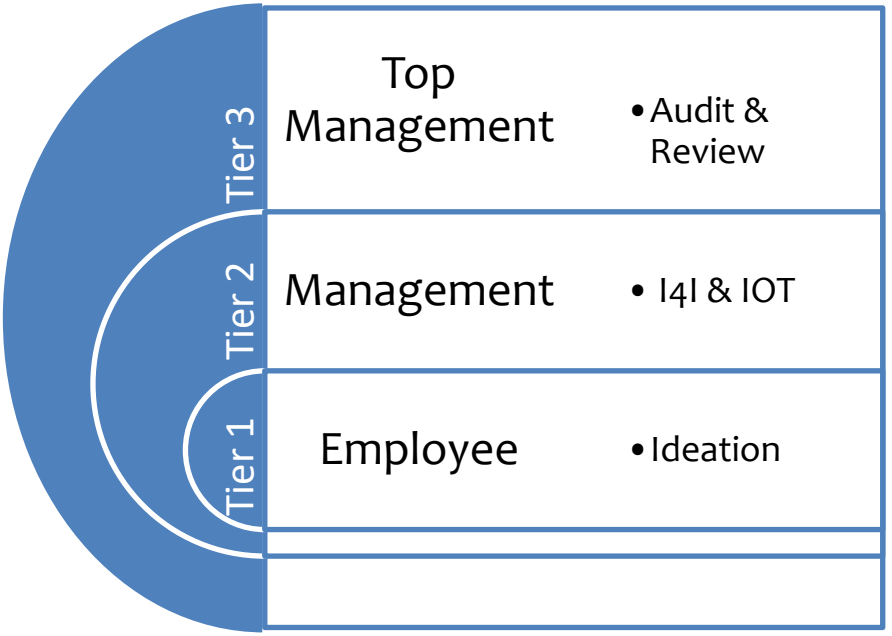
2. Reuse & Recycle

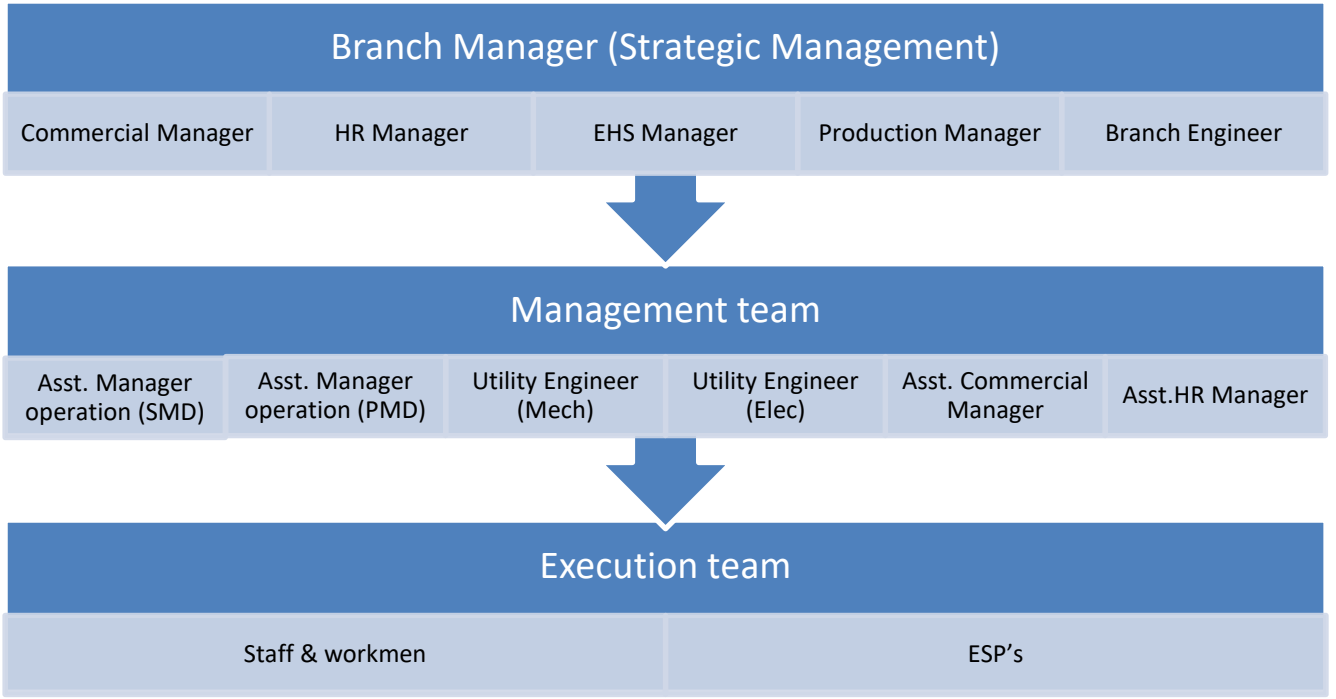
- Condensate Recovery from AHUs in CTS
- ETP recycle water for flushing in rest of the washrooms

3. Industry 4.0

- Online leak detection system for Water Pipelines - POC

Energy Management System And Performance Monitoring

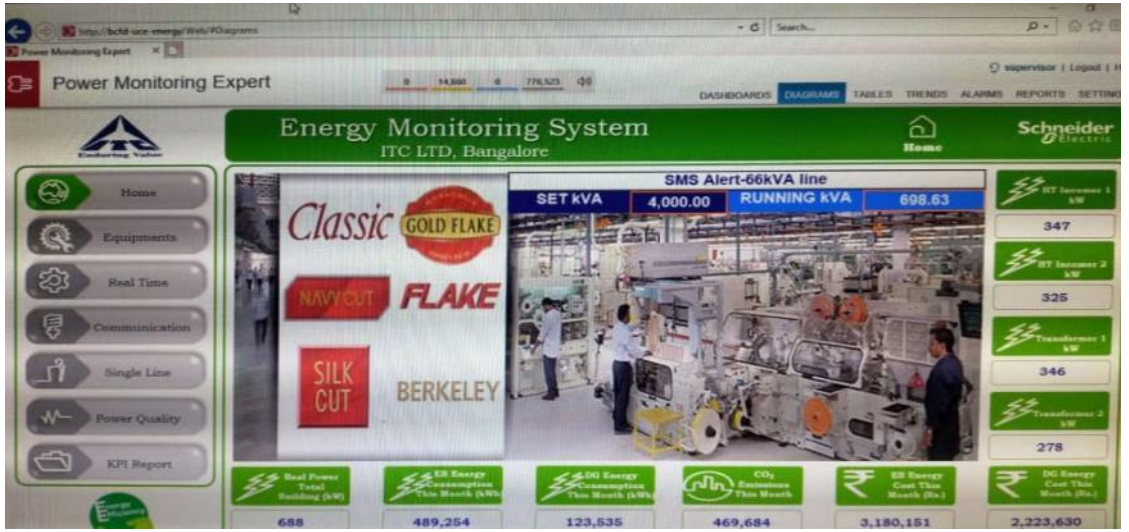




Peer level Audit | Divisional Audit | Corporate Audit | Energy Audit | Water Audit

ENERGY MANAGEMENT SYSTEM AND PERFORMANCE → Idea sharing platform → Organization structure → Audit and Review

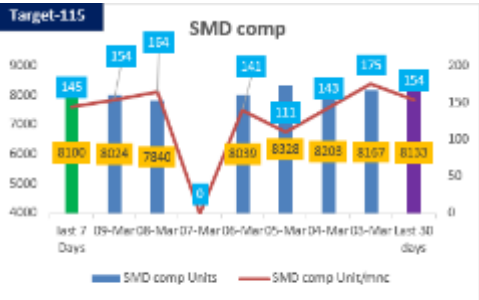
Energy Monitoring System

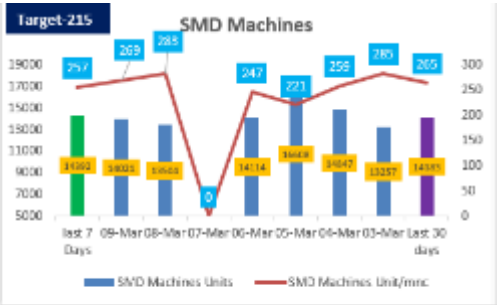


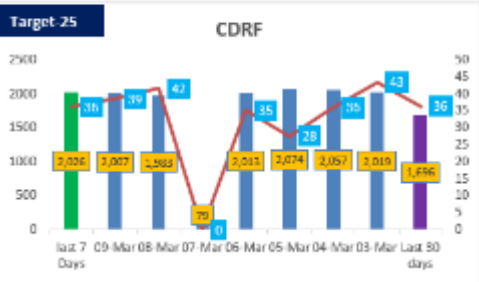
Report- Energy Monitoring System
ITC LTD, Bangalore

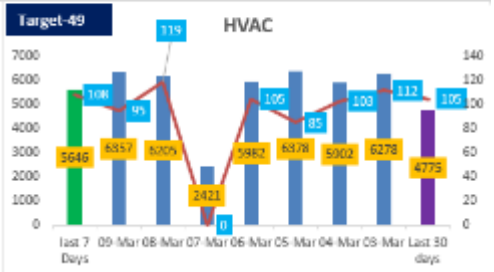
12/05/2021 6:00

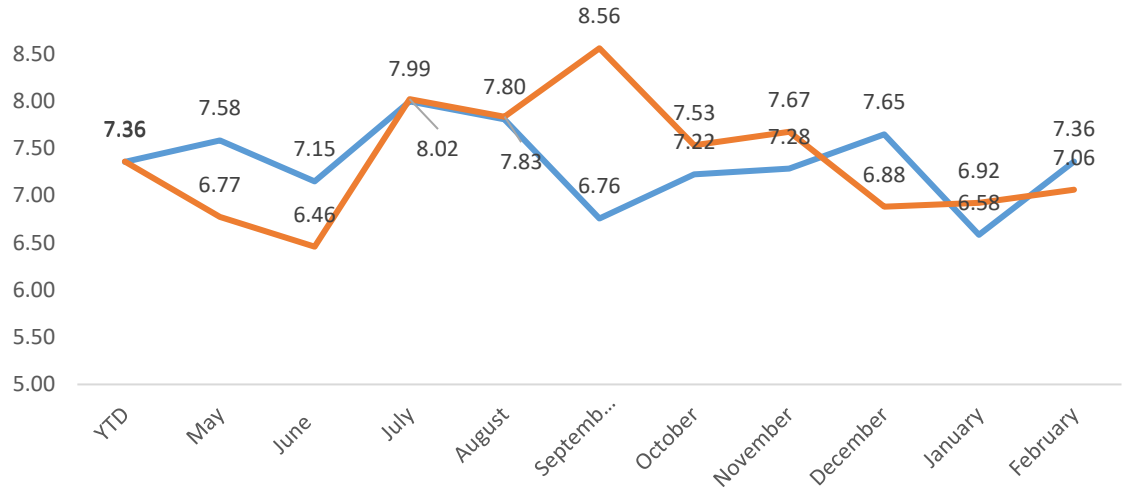
FEEDER NAME	CONSUMPTION			VOLTAGE ANALYSIS			AMP			KW ANALYSIS			PF ANALYSIS		
	INITIAL KWH	FINAL KWH	CONSUMPTION	AVG.	MIN.	MAX	AVG.	MIN.	MAX	AVG.	MIN.	MAX	AVG.	MIN.	MAX
HT DG-1	38507823	38507823	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CPD	1181269	1184116	2847	10938.36	10762.81	11195.04	6.50	3.23	12.39	116.74	57.03	234.64	0.94	0.90	0.99
LT DG1	772286	772286	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LT DG2	725404	725404	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LT DG3	682188	682188	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LT DG4	675845	675845	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LT DG5	716083	716083	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
O/P 1 TRMR 1	3194489	3197083	2594	411.86	406.94	415.79	153.69	113.88	239.93	108.57	79.59	170.20	0.99	0.98	1.00
O/P 2 TRMR 2	1206194	1212396	6202	417.16	411.91	421.65	363.16	202.70	536.45	258.12	132.01	387.75	0.99	0.98	1.00
ACP1	463112	465602	2490	417.20	412.48	421.70	176.10	32.76	386.51	108.27	20.46	237.08	0.87	0.76	0.92
KRETEK	255776	255905	129	416.99	411.92	421.43	9.08	3.35	23.28	5.24	2.28	13.44	0.84	0.72	0.97
AHMP 1	197567	198364	797	417.66	412.59	422.16	48.82	25.22	53.09	33.45	17.11	35.96	0.95	0.94	0.95
GALT	5063709	5064038	329	417.38	412.54	421.88	19.67	15.72	22.66	13.60	10.85	16.10	0.98	0.98	0.98
DIET	472267	472575	308	417.56	412.50	422.03	24.66	21.02	97.21	12.01	9.03	64.26	0.93	0.62	0.97
NEW FGS	2214405	2214548	143	417.69	412.54	422.16	8.40	5.56	10.81	5.84	3.78	7.57	0.96	0.94	0.97
MLP	1404264	1406042	1778	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MSNP 1	1814844	1814852	8	417.81	413.01	422.32	1.78	1.60	4.88	0.50	0.28	0.85	0.00	0.00	0.00
MBLP	2376409	2376578	169	417.44	412.71	421.96	10.35	9.73	14.09	7.08	6.68	9.15	0.95	0.89	0.96
DGAP 2	17328	17361	33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CCP 2	597588	597711	123	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00







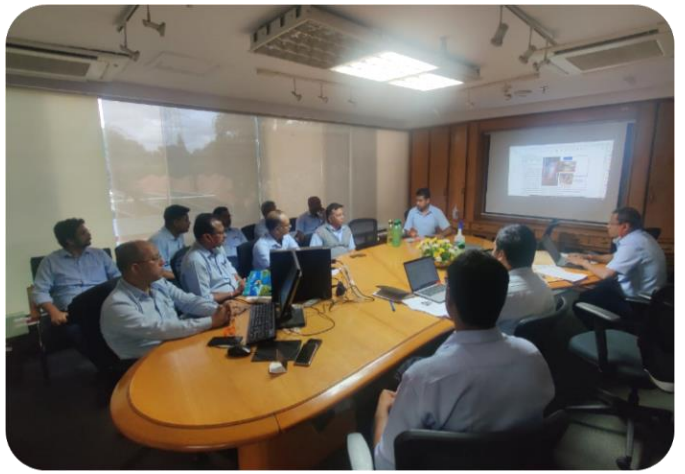




Teamwork- Energy Awareness and training Across Departments

Engineering

Canteen



SMD

PMD

WMS

Admin

Implementation of ISO 50001 & IGBC Certification

IGBC GREEN FACTORY BUILDING
INDIAN GREEN BUILDING COUNCIL
ITC Limited, Bengaluru
PLATINUM
2020 - 2023

IGBC Platinum Rating

DNV

MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of
ITC Limited
Bengaluru Factory Meenakunte Village, Jala Hobli Bengaluru North Taluk, Bengaluru - 562157, Karnataka, India

has been found to conform to the Energy Management System standard:
ISO 50001:2018

This certificate is valid for the following scope:
Processing of cut tobacco and manufacturing of cigarettes

Erin Koek
Management Representative

EMS ISO 50001:2018

Awards 2022-23

Responsible Manufacturer – Platinum Medallion award by Kaizen Hansei Institute

CII Leadership in Performance for Solar & Wind Plants 2022 under Wind Category

The "Best performing wind farm" by Indian Wind Power Association (IWPA).

CII SR 2023–Special Category Awards

Awards 2022-23

CII National Award for Excellence in Water Management 2022 : "Noteworthy Water Efficient Unit" in "Within the Fence Category"

National award for Excellence in Energy Management for the year 2022.

Best Waste & Water Management Certificates by CII Southern region

Awards 2022-23

Gold (Second) Prize in "Smart Operations" Category (Large) by FICCI Industry 4.0 Awards.

Silver Jubilee Award (25 Years of Continuous Cert. from DNV)

Certification


DNV

MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of
ITC Limited
Meenakunte Village, Jalahobli, Bangalore North Taluk, Bangaluru - 562 157, Karnataka, India

has been found to conform to the Occupational Health and Safety Management System standard:
ISO 45001:2018

This certificate is valid for the following scope:
Processing cut tobacco and manufacture of cigarettes

ISO – 45001:2018


DNV

MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of
ITC Limited
Meenakunte Village, Jalahobli, Bangaluru North Taluk, Bangaluru - 562 157, Karnataka, India

has been found to conform to the Environmental Management System standard:
ISO 14001:2015

This certificate is valid for the following scope:
Processing cut tobacco and manufacture of cigarettes

ISO – 14001:2015


DNV

MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of
ITC Limited
Meenakunte Village, Jalahobli - 562 157, Bangalore, India

HACCP (Non-Accredited)

This certificate is valid for the following scope:
Processing of cut tobacco and manufacture of cigarettes

HACCP


DNV·GL

CERTIFICATE OF COMPLIANCE

This is to confirm that cGMP assessment of

ITC Limited
Meenakunte Village, Jalahobli, Bangalore 562 157, Karnataka, India

has been carried out and found to comply with the GMP guidelines as per:
requirements of CFR - Code of Federal Regulations Title 21 Part 110 (Current Good Manufacturing Practice in Manufacturing, Packing, or Holding Human Food) checklist

This statement is valid for the following scope:
PROCESSING OF CUT TOBACCO AND MANUFACTURE OF CIGARETTES

DNV·GL

CGMP

Thanks

Govind Singh
Govind.singh@itc.in
Mob: 991755588