ITC Limited , Bangalore

Enduring Value

Team :
Chandan Das --Branch Engineer
Govind Singh -- Utility Engineer
Tharun Thomas --Utility Engineer

ITC: An Exemplar In Triple Bottom Line Performance

Environment

- **Water Positive :** 17 years in a row
- **Carbon Positive :** 14 consecutive years
- **Solid waste recycling positive :** 12 consecutive years
- Soil & moisture conservation to 10.12 lakh acres
- Renewable energy: Over 41% of total energy Consumption
- Social & farm forestry initiative has greened over 7,30,000 acres

Enduring Value

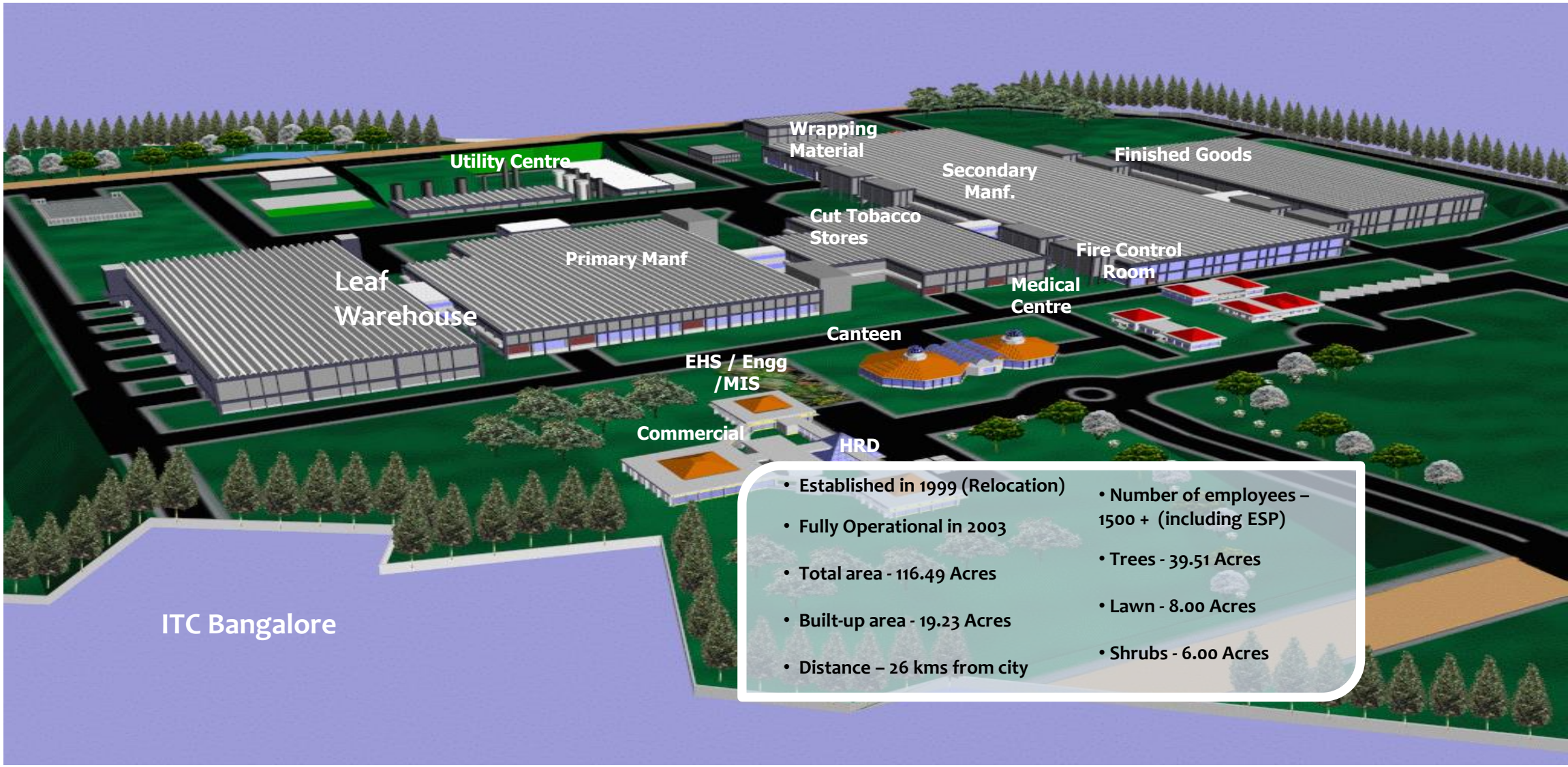
Economic

- Market Capitalization Over $ 50 billion
- Turnover: Over $ 10 billion
- Powered by the vitality of world-class brands

Social

- Creating around 6 million sustainable livelihoods
- Educating 4,60,000 children
- Benefitting 4 million farmers
- 100 million person-days of employment generated

Factory overview and layout



MANUFACTURING PROCESS FLOW

Cold Plasma

PMD

Cigarette Making

Dust Recovery Fans

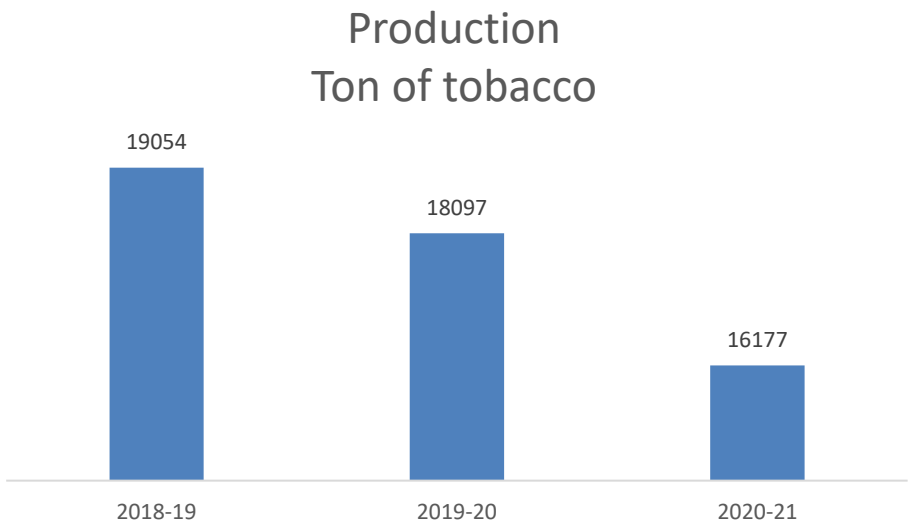
Cigarette Packing

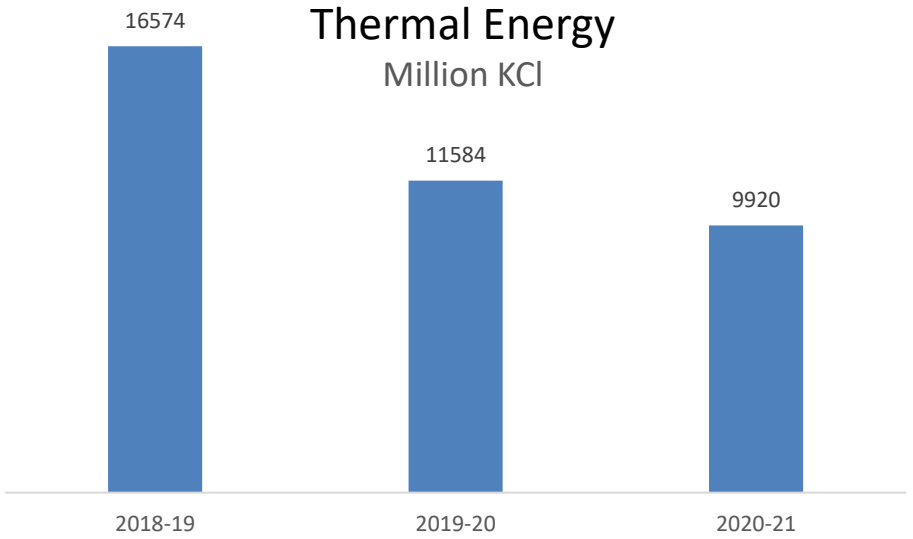
Finished Goods Storage

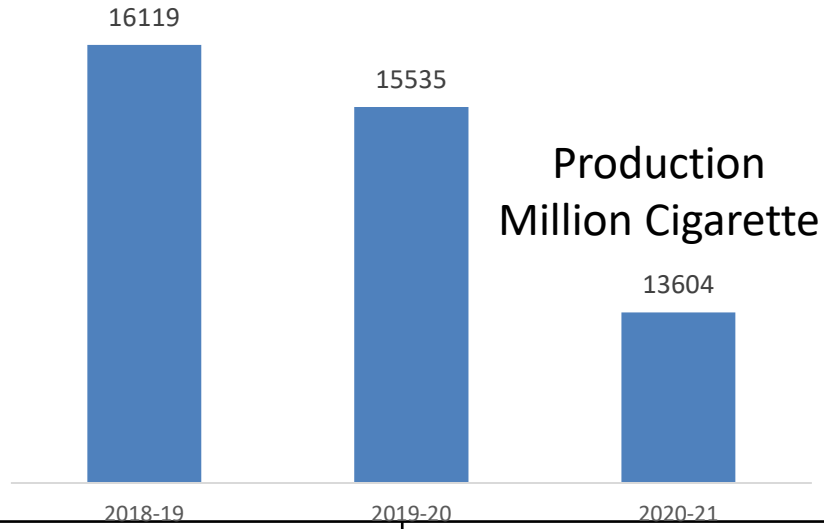
Shipping

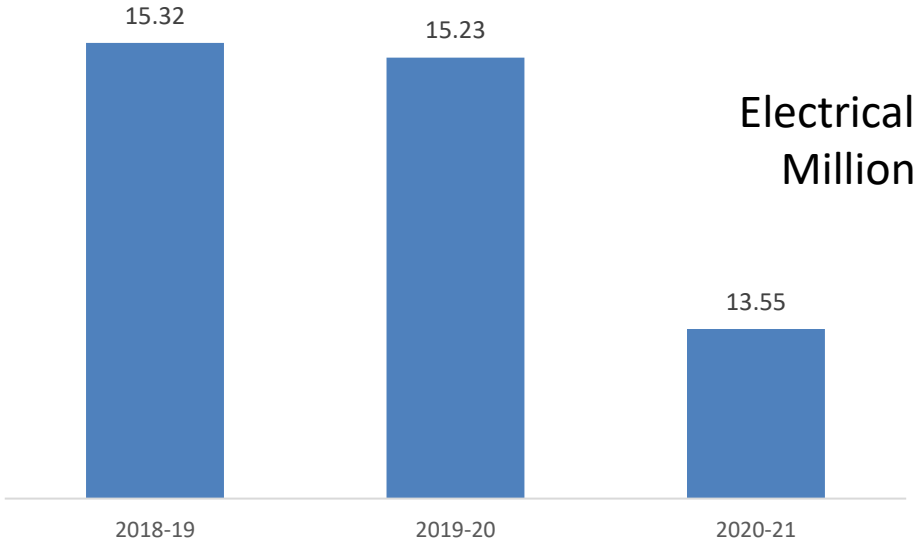
Automated Manufacturing Facility

Annual Production & Energy consumption



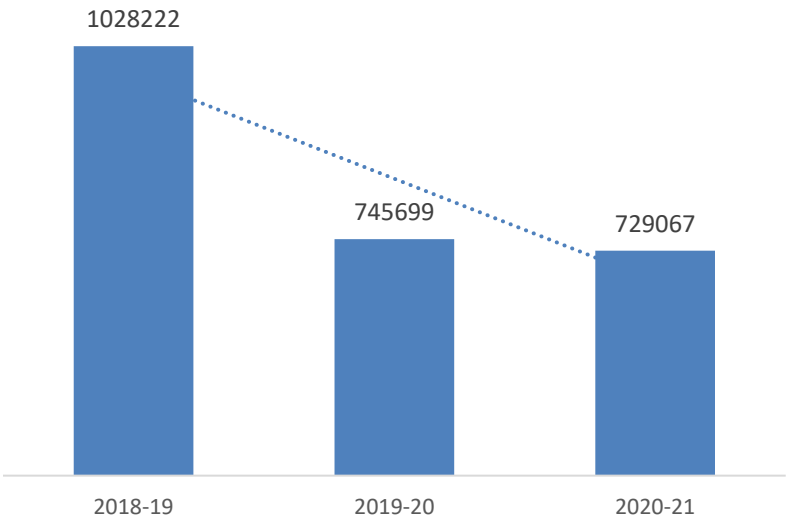




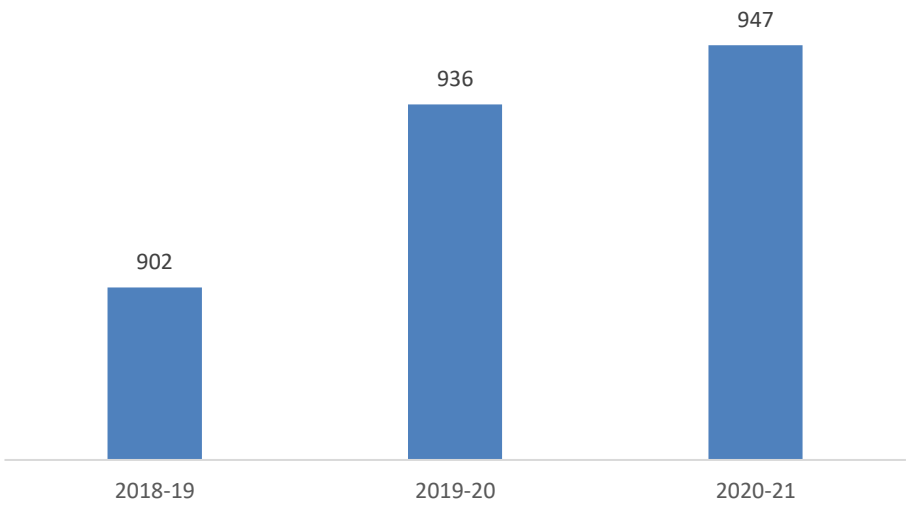


Specific Energy Consumption

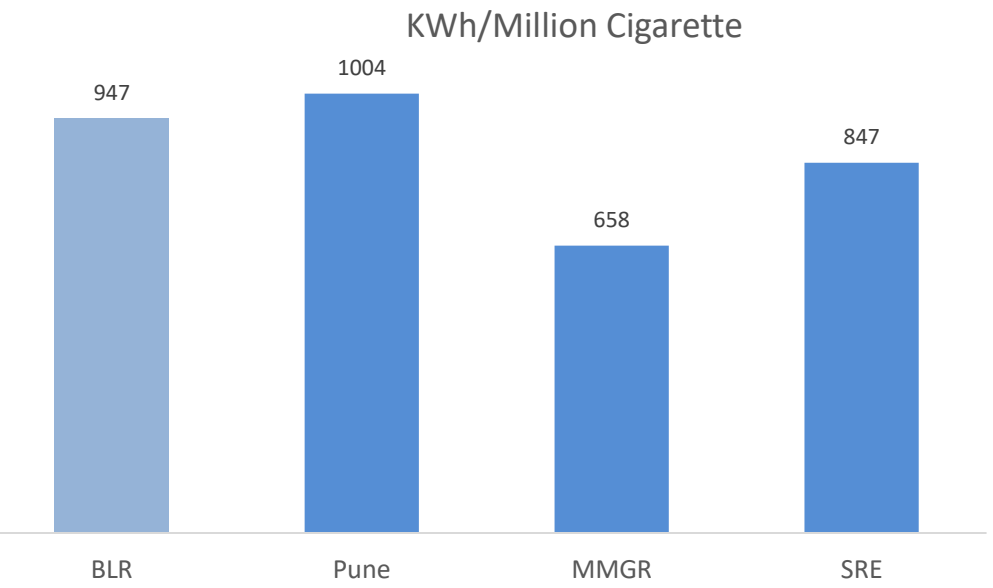
Thermal Energy
Kcal/Ton of tobacco

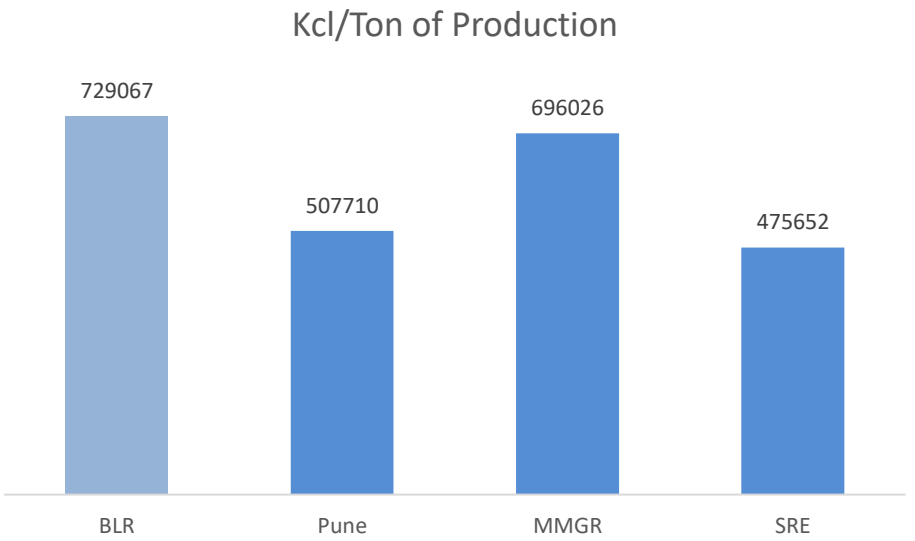


Electrical Energy
kWh/million Cigarette



Energy Benchmarking





Road map – Project planned for FY 2021-22

Project Title	Annual Electrical Saving (Million kWh)	Investment (Rs in Million)
Energy Efficient lights for PMD and other area	0.44	12.30
Energy Efficient fan for DRF	0.18	3.29
SMD Compressor demand monitoring	0.10	9.50
Replacement of old motors with energy efficient motors	0.08	2.60
Substitution of base load water heating	0.06	0.05
Energy Efficient fan for PMD and SMD DRF	0.04	4.00
DRF purging valve timing optimization	0.03	3.70
DRF Cyclone Bypass+ Fan speed optimization	0.03	0.04
Chilled water Pumps replacement for HVAC system	0.03	0.80
EC Fans for Diet fresh air circulation	0.02	2.30
Commissioning of EE compressor	0.02	8.20
VFD for case packers	0.01	0.01

ENCON –Project implemented 2018-19

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	2018-19	DIET chiller condenser single pump run	120000	0	0.480	0.5	1
2	2018-19	Drive for CTS AHU	3000	0	0.012	0.05	5
3	2018-19	Optimization of compressor running, interconnecting PMD & SMD	24000	0	0.096	0.8	10
4	2018-19	Improvement of PF of the electrical distribution system	144000	0	0.576	1.2	25
5	2018-19	Frequency optimization of DRF system	26640	0	0.107	0.55	62

ENCON –Project implemented 2019-20

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	2019-20	Efficiency enhancement of waste steam recovery		400	1.560	1.1	8
2	2019-20	Auto Shut off of all Steam valve with Machines running		810	3.160	2.1	8
3	2019-20	Optimization of New FGS lighting and recalibration of automation system	64000	0	0.256	1.5	70
4	2019-20	Optimization of AHU running in SMD	119000	0	0.476	0.2	5
5	2019-20	Interlocking of PMD DRF with process running	57000	0	0.228	0.7	37
6	2019-20	Interlocking of Diet water pump ,cooling tower with the process	66000	0	0.264	1.4	64
7	2019-20	Replacement of energy efficient motor for AHU	386000	0	1.544	6.9	54

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

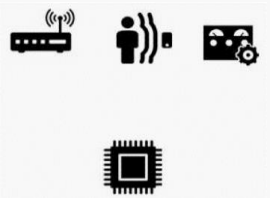
Innovation Project-1

In-house conversion of BOPT to AVS

Standard Warehouse Truck

From a battery operated
- Pallet Jack
- Forklift
- Tow trucks
- Reach truck

Novus Pilot



NOVUS SOFTBRAIN & HARDBRAIN
Set of sensors, controllers & Mechanical Hardware, Indigenously developed software framework

Self Driving Vehicle

- Upgraded to Autonomous vehicle
- Safe & Low maintenance

First time conversion of an existing BOPT to AGV **in Asia .**

KEY LEARNINGS IMPLEMENTED

- Simple user interface software
- Automatic Traffic Control
- New docking station

HIGHLIGHTS

- Commissioned 4 AGVs
- Configured 13 machine pick-ups
- Productivity gain- 9 ESPs/ day

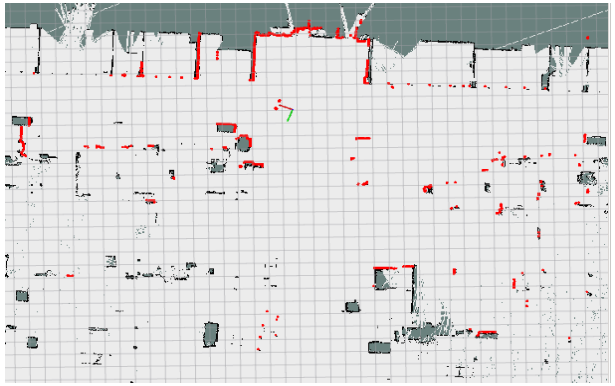
Appreciated by MD, TOYOTA Europe and Japan

Innovation Project-1

Path Planning & Navigation | Safety Features | Operational Challenges

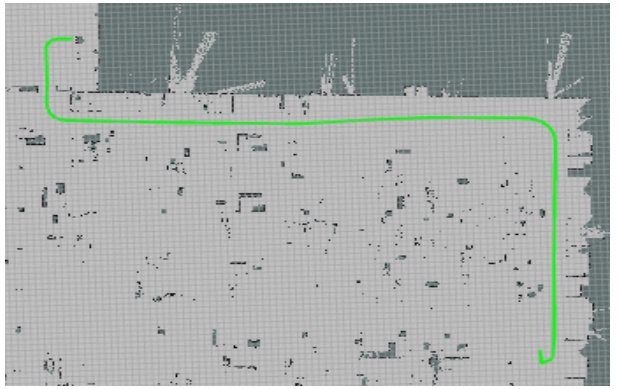
AGV locator

- 2D map generated by moving AGV across the shopfloor with laser scanner.



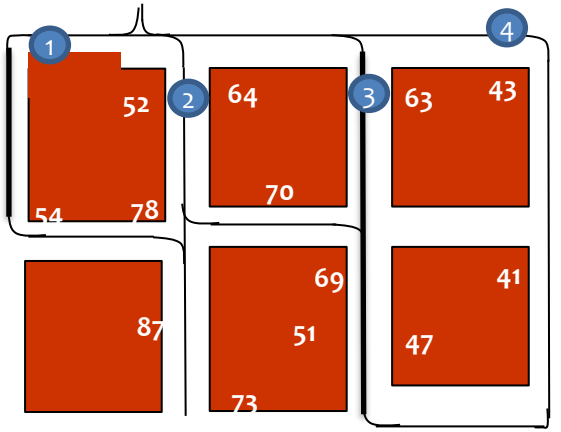
Path Planning

- Path follow algorithm will create a virtual path along with steering angle and velocity.



Traffic control

- If two AGVs are on a common path, central controller will stop one AGV at one of the designated location and let the other go.



Innovation Project-1

Benefits

- 100% Safe material movement
- Productivity gain- 9 ESPs/ day
- Cost Saving 50Lakh /machine
- IRR 30%

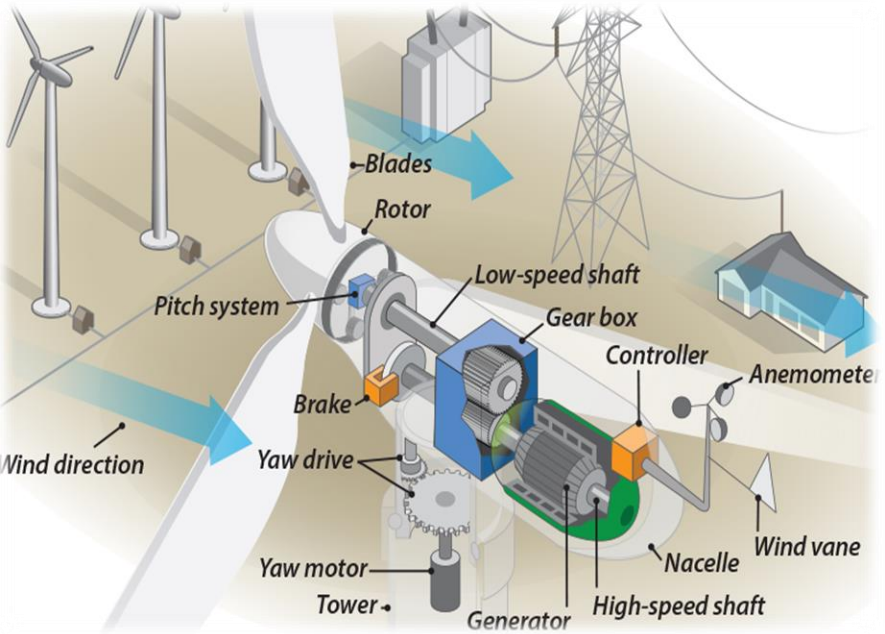
Investment 6.5 Lakh

Saving 27 Lakh/annum

Payback ~ 4Month

Innovation Project-2

IoT -Analytics & Failure detection in Wind Turbine Generators



WTG Model Training ✓

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

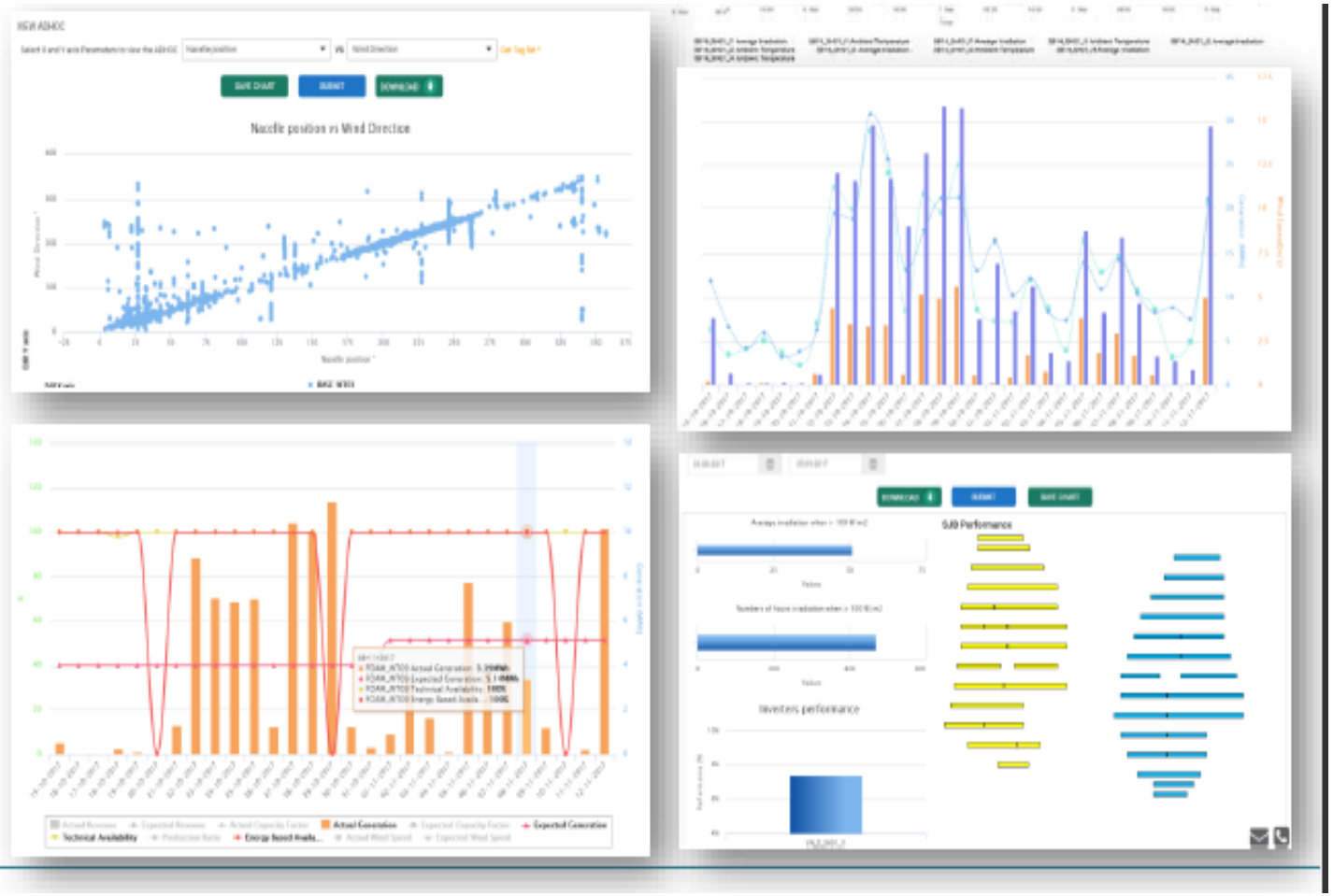
Investment 6.5 Lakh

Saving 20 Lakh/annum

Payback ~ 4Month

Innovation Project-2

Big data Analytics and decision making



Benefits

- Detection of all Key parameter of WTG like vibration, temperature , Generation, PLF etc.
- Deviation based alarm to the monitoring team and management
- Error prediction with ~95% accuracy
- Trigger proactive maintenance alarm
- Augment Reliability of WTG >97%
- Ensure PLF >30%

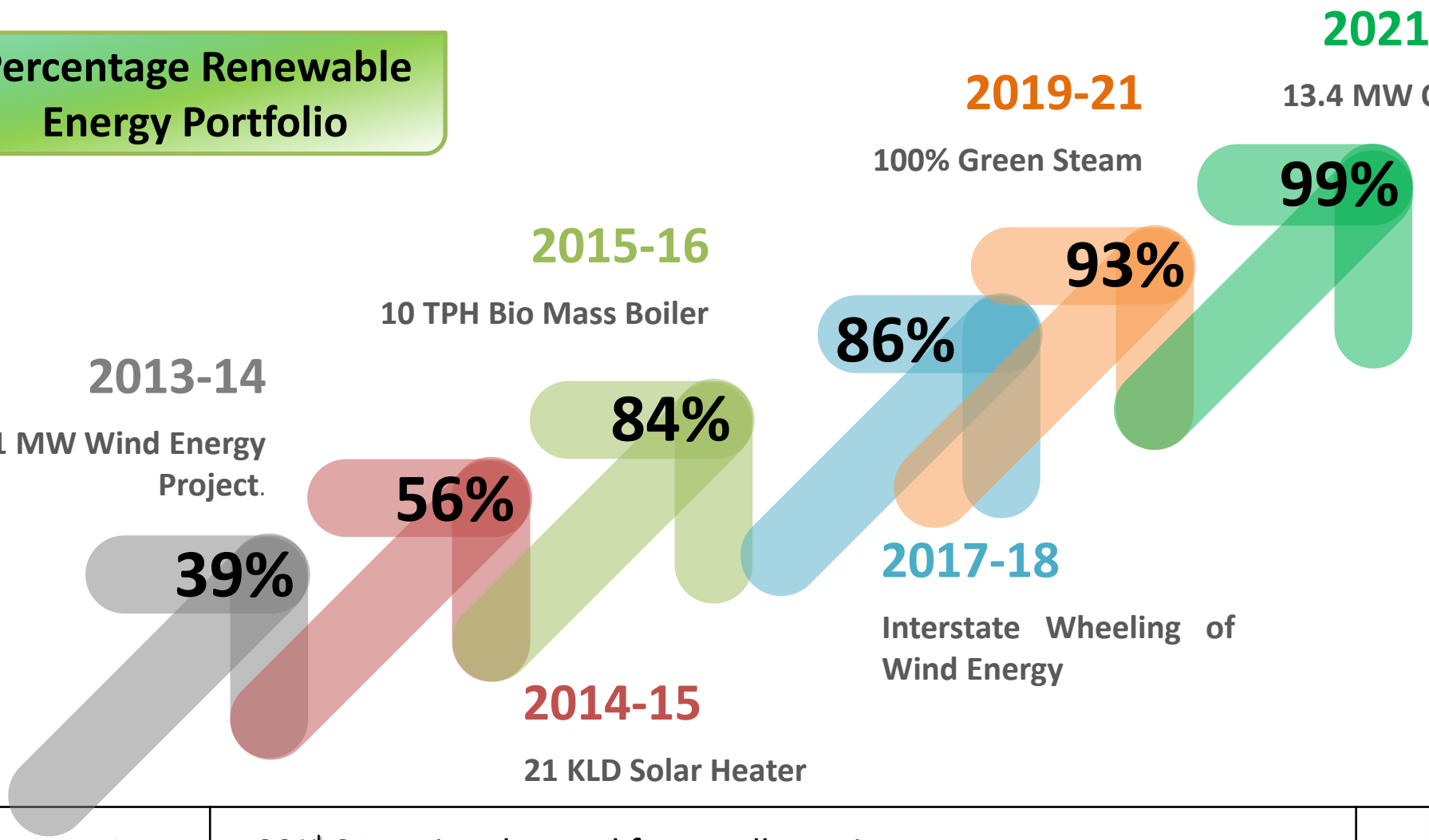
Utilisation of Renewable Energy sources

Year	Technology (electrical)	Type of Energy	Onsite/Offsite	Installed Capacity (MW)	Generation (million kWh)	% of overall electrical energy
FY 2018 -19	Wind Turbine	Wind	off-site	21	54.9	358.36
FY 2019 -20	Wind Turbine	Wind	off-site	21	51.2	336.18
FY 2020-21	Wind Turbine	Wind	off-site	21	48.8	360.15

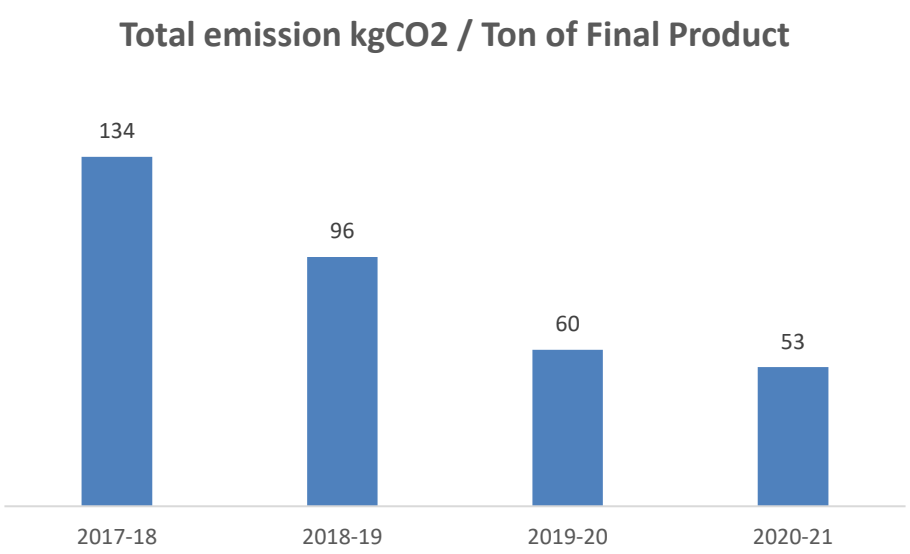
Year	Technology (Thermal	Type of Energy	Onsite/Offsite	Installed Capacity (Ton/hrs)	Usage (million kCal)	% of overall thermal energy
FY 2018 -19	Biomass Boiler	Biomass	Onsite	10	15745	95%
FY 2019 -20	Biomass Boiler	Biomass	Onsite	10	11468	99%
FY 2020-21	Biomass Boiler	Biomass	Onsite	10	9722	98%

ROADMAP-RENEWABLE ENERGY

Percentage Renewable Energy Portfolio



GHG Inventorisation



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.
- Solar power generation – off Site: to compliment the wind generation – 13.4 MWp

Waste Utilisation and Management

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

Year	Type waste	Quantity (Ton)	GCV	Waste as percentage of total fuel
FY 2018 -19	Biowaste Briquette	4144	3800	95%
FY 2019 -20	Biowaste Briquette	3018	3800	99%
FY 2020-21	Biowaste Briquette	2558	3800	98%

Solid Waste Management - *Organic Waste Converter*

Organic Waste Converter

Organic Waste Converter

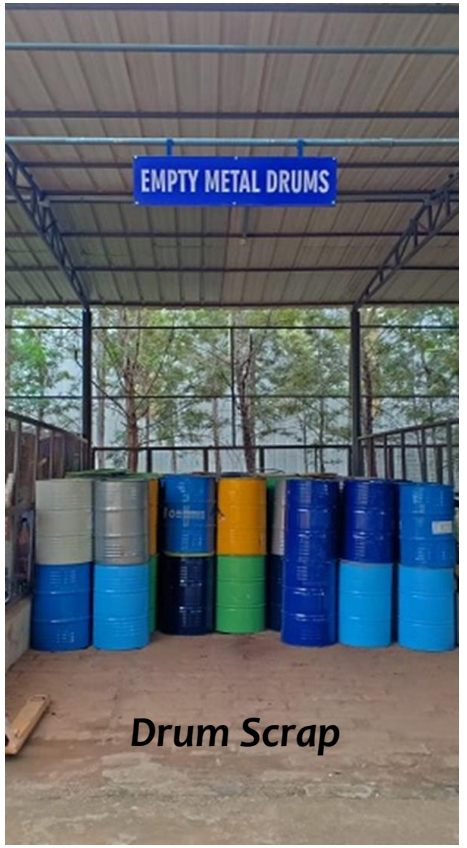
- Capacity of 1600 Kg/Day of Garden and Canteen Waste
- Organic Waste Converter installed in Year 12-13 and able to generate quality manure after processing
- Canteen vegetable and garden waste is converted into manure

Solid waste Management

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

Metal Scrap

Wood Scrap



Drum Scrap

Paper & Boards Scrap

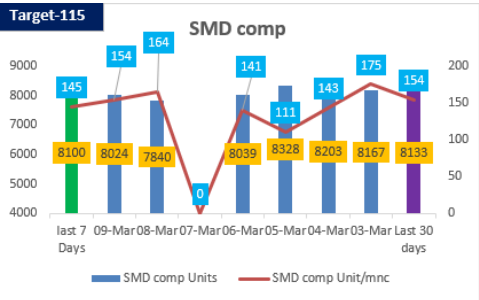
Plastic Scrap

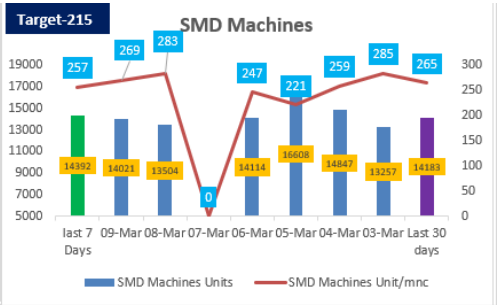
Energy Monitoring System

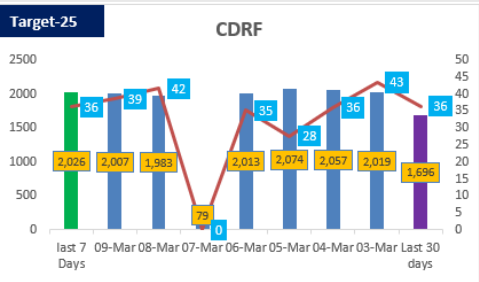
Report- Energy Monitoring System
ITC LTD, Bangalore

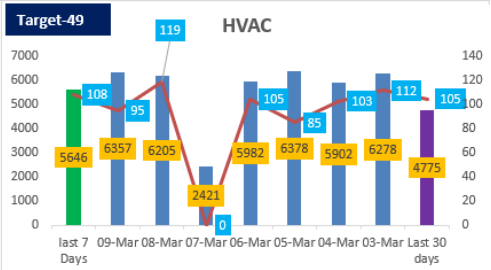
12/05/2021 6:00

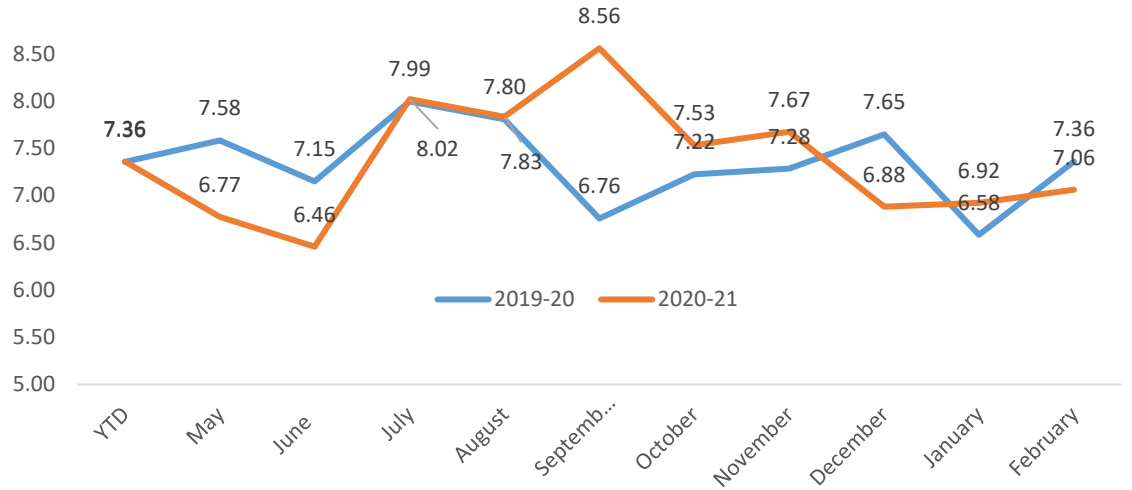
FEEDER NAME	CONSUMPTION			VOLTAGE ANALYSIS			AMP			KW ANALYSIS			PF ANALYSIS		
	INITIAL KWH	FINAL KWH	CONSUMPTION	AVG.	MIN.	MAX	AVG.	MIN.	MAX	AVG.	MIN.	MAX	AVG.	MIN.	MAX
HT DG-1	38507823	38507823	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CPD	1181269	1184116	2847	10938.36	10762.81	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





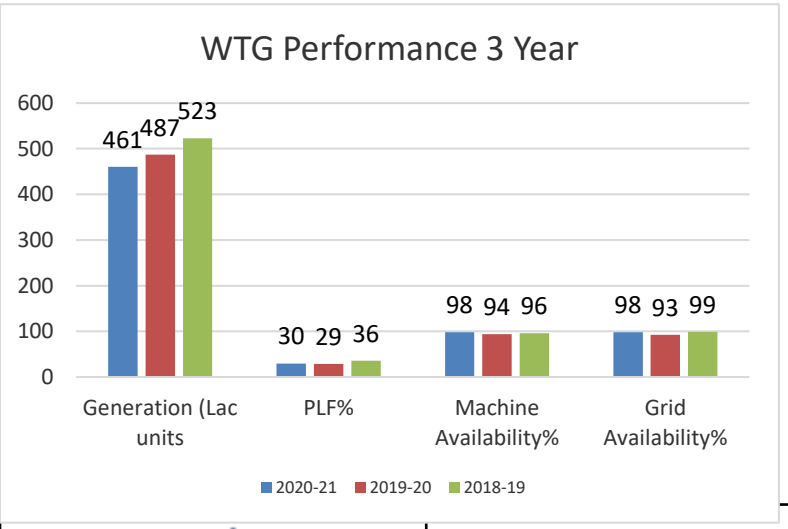






Wind Turbines Performance- Monitoring

	Feb-21					Year Till Date				
WTG No	Generation (lakh units)	PLF (%)	Machine Availability (%)	Grid Availability (%)	Overall Transmission Loss (%)	Generation (lakh units)	PLF (%)	Machine Availability (%)	Grid Availability (%)	Overall Transmission Loss (%)
SND 01	1.62	11.5%	99.51%	98.08%	2.70%	39.69	25.7%	98.45%	98.38%	2.75%
SND 03	2.33	16.5%	99.46%	98.08%	2.39%	46.06	29.9%	99.30%	98.38%	2.56%
SND 04	1.13	8.0%	37.30%	98.42%	2.61%	45.53	29.5%	93.28%	98.41%	2.82%
SND 05	2.96	21.0%	98.38%	98.08%	2.36%	49.57	32.1%	98.77%	98.38%	2.56%
SND 06	1.66	11.8%	97.80%	98.15%	2.57%	37.60	24.4%	97.18%	98.36%	2.68%
SND 07	1.57	11.1%	98.96%	98.15%	2.41%	40.33	26.2%	98.45%	98.36%	2.58%
SND 08	2.47	17.5%	99.54%	98.15%	2.61%	46.18	29.9%	99.07%	98.36%	2.68%
SND 09	2.84	20.1%	96.95%	98.15%	2.71%	51.81	33.6%	98.78%	98.36%	2.67%
SND 11	2.98	21.1%	93.94%	98.15%	2.68%	50.03	32.4%	98.82%	98.35%	2.71%
SND 13	3.46	24.5%	99.58%	98.08%	2.57%	53.75	34.9%	98.59%	98.67%	2.60%
OVERALL	**23.03**	**16.3%**	**92.14%**	**98.15%**	**2.56%**	**460.56**	**29.9%**	**98.07%**	**98.40%**	**2.66%**



Consumer	Units Wheeled (lakhs)
ITC Windsor	4.15
ITC Gardenia	6.25
ITC Infotech Park	7.20
ITC BCF	6.62
ITC LSTC	4.40
ITC Foods	-
ITC Juice Factory	-
Third Party Sale	-
OVERALL	**28.75**

Gross Savings for the month
Rs. 2.5 crores

Gross Savings-YTD
33.06 Cr (YTD)

Banked Energy (Feb'21)

16.1 lac units (considering 9 turbines generation till 25.06.20 ; Nil banking from 26.06.20)
NIL lac units (SND 13)

Unutilized energy to grid = NIL units

Major Issue:

SND04 breakdown from 12th Feb 2021 due to IMS shaft teeth chipped off. Restoration work under progress, same to be completed by 17th Mar-21

Key Highlights:

- SND 13 wheeling agreement signed by GESCOM and submitted to BESCOM
- Interstate transfer of wind energy for the month from PSPD to BCF – 4.3 lac units
- Total ISOA wheeling FY'20-21 – 122.35 Lac units.

Teamwork- Energy Awareness

Awards and Recognition

Sustainable Factory of the year – Frost & Sullivan

CII- EHS Excellence Award

Green Built environment- Excellence Award- IGBC

Innovative Environmental Project –CII

IGBC Platinum Recertification

Thanks