Phoenix Market City, Bangalore

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Chief Engineer

1. Introduction

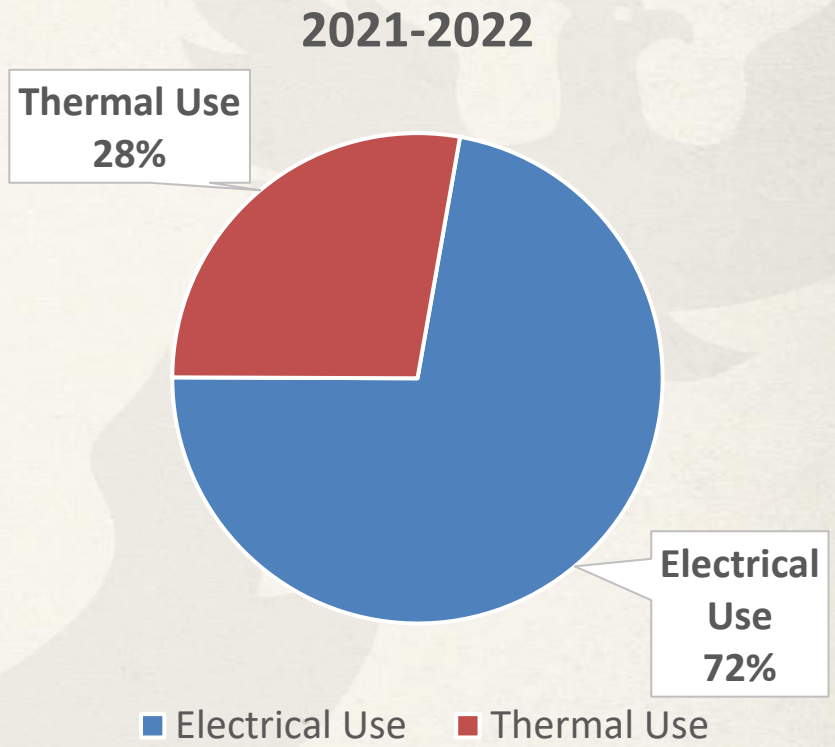
OUR UNIQUE FEATURES

- **Ultimate destination** for shopping, dining, entertainment.
- **Ease of accessibility** to major IT Belts of the city
- Spread over 5 stories of retail space covering **1 million sq. ft.**
- Mall houses **over 350 premium** and high street brands
- Elegant and thoughtfully placed **seating areas**
- The mall offers a **variety of entertainment** options
- Massive **entertainment Courtyard** as the biggest outdoor venue in the city

2. Overall Energy Consumption

Overall Energy Consumption data				
Year	KWh	Area sqm	SEC (KWh/Annum/sqm)	Remark
2019-2020	2,04,95,256	98,473	208	
2020-2021	1,28,59,335	98,473	131	
2021-2022	1,38,21,058	98,473	140	

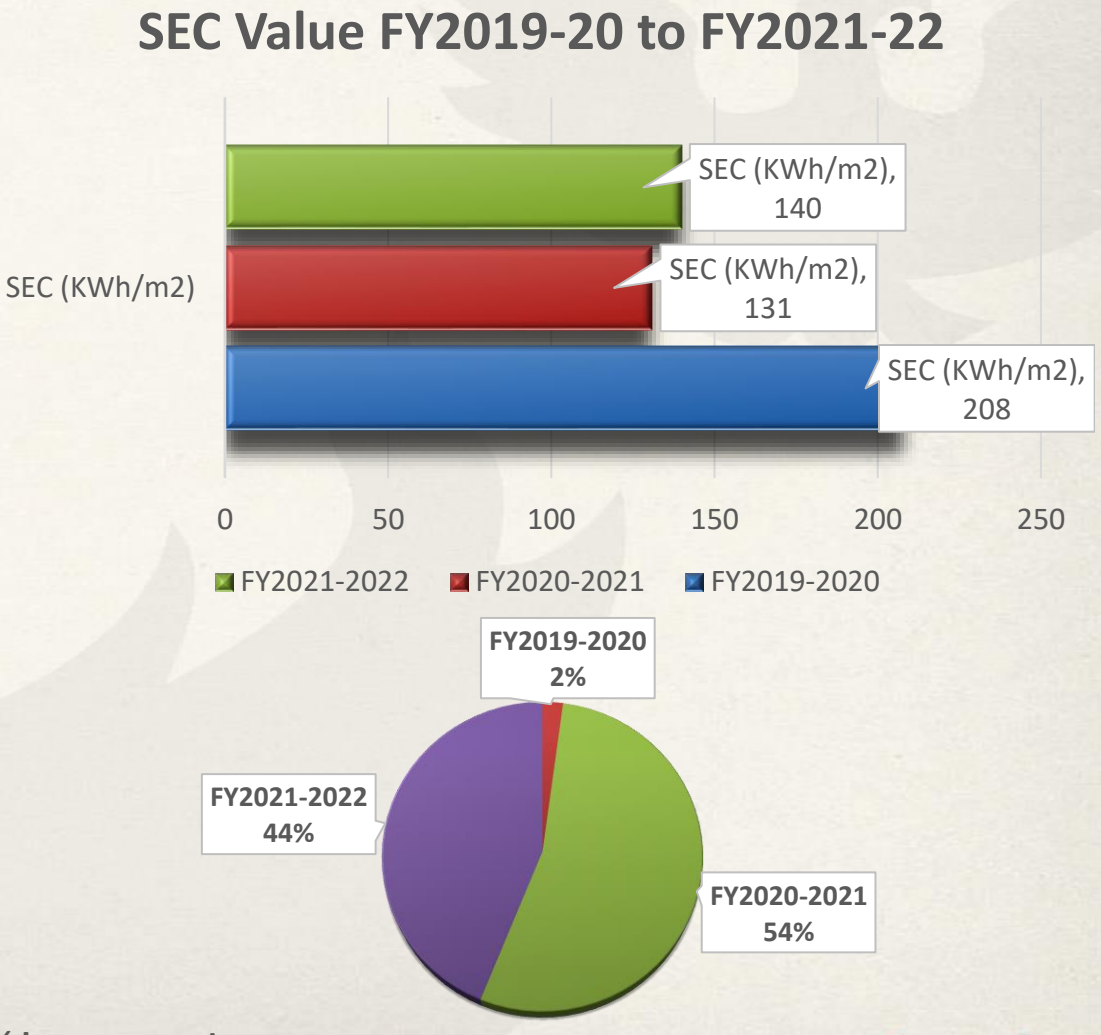
Electrical and Thermal usage FY 2021-22		
Year	Electrical Use	Thermal Use
2021-2022	99,90,385	38,30,675



Architectural Design of the building and Energy efficient features architecturally
> Automated sliding door installed in all entry and exit to avoid conditioned air escape
> Polycarbonate Reflector louver sheet installed in all atrium roof top for better sun light and heat reflection
> Building Structure design in L shape for better use of daylight & Ventilation.
> All the façade glass are of Teflon with heat reflection.

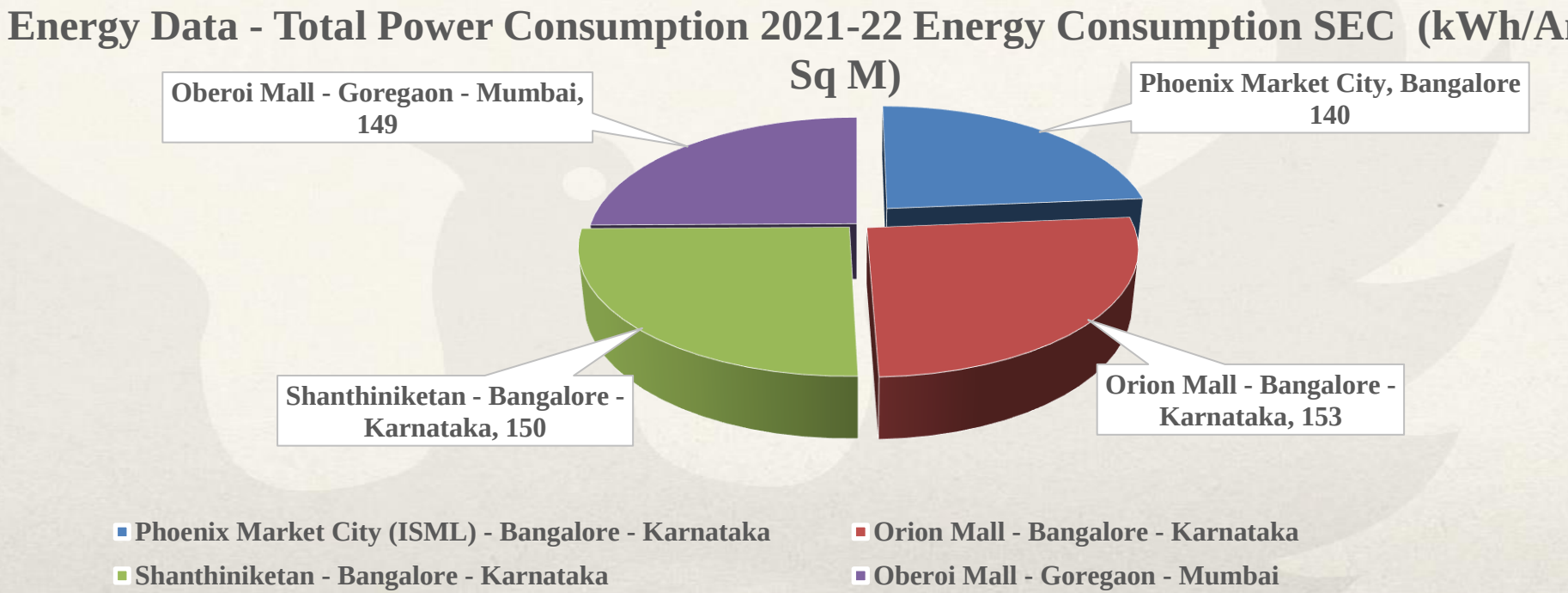
3.1 Total Energy Consumption FY2019-2020 to FY2021-2022

TOTAL ENERGY CONSUMPTION FY 19-20 TO 21-22				
SI NO	MONTH	FY 2019-20	FY 2020-21	FY 2021-22
1	APR	1837467	222864	1067818
2	MAY	1961065	924828	236148
3	JUN	1851955	841979	270487
4	JUL	1799176	779696	1128131
5	AUG	1764413	1155864	1297172
6	SEP	1715539	1126786	1298562
7	OCT	1809723	1222090	1485741
8	NOV	1680584	1255753	1461226
9	DEC	1748644	1311873	1532988
10	JAN	1753644	1351295	1221298
11	FEB	1649619	1216570	1297798
12	MAR	923427	1449737	1523690
Total Kwh Comsumption		20495256	12859335	13821058
Built up area in Sqm		98473	98473	98473
Annual Kwh Consumption/m2		208	131	140
Reason: Non Operating days		12 days	80 days	63 days
% Improvement		2%	59%	48%

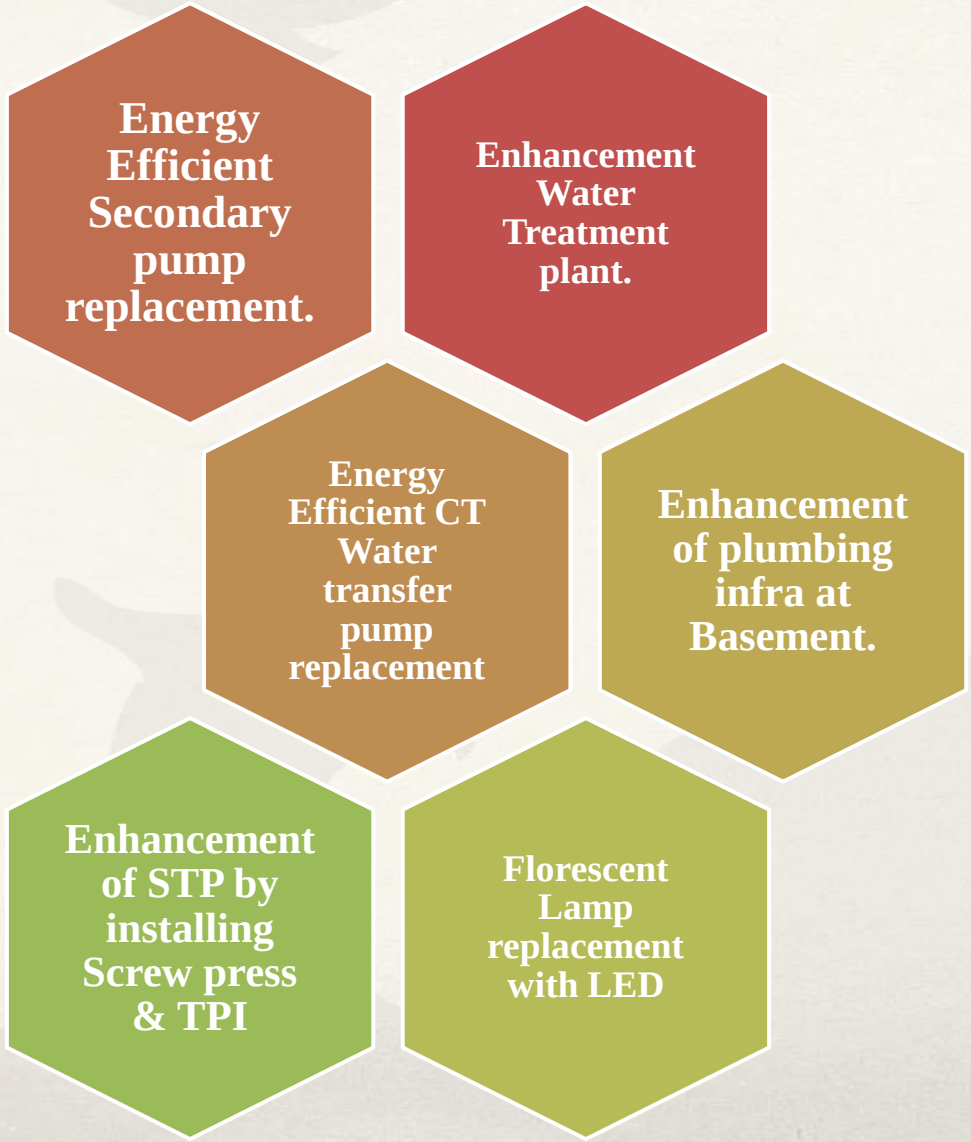


4. Internal & External Benchmarking

Mall Name	KWH	Area Sq .m	Energy Consumption SEC (kWh/Annum/ Sq M)	kWh/Month/ Sq M
Phoenix Market City - Bangalore - Karnataka	1,38,21,058	98473	**140**	**12**
As per BEE EPI Benchmark for shopping mall			**257**	
Orion Mall - Bangalore - Karnataka	1,16,57,400	76180	153	13
Shanthiniketan - Bangalore - Karnataka	82,96,520	55310	150	12
Oberoi Mall - Goregaon - Mumbai	58,35,152	39272	149	12



4.1. Major encon Projects planned :2022-23



4.2. Major encon Projects planned :2023-24

❖ Proposed : IOT based automation on Complete Chiller plant.

- ❑ Trigger for Implementation: Chiller are switched manually and it is not loaded based on the requirements.
- ❑ Innovative description: Currently our chiller plant is monitored through BMS but not controlled in BMS. Low side like AHU and lighting systems are monitored and controlled through BMS.

Benefits

- ✓ Energy saving by 20 To 40 %
- ✓ Maintenance & Operation cost reduced by 10 to 12%.
- ✓ Efficient Man power utilization

4.3. Major encon Projects planned :2023-24

- Proposed : Baltimore (BAC) imported Cooling tower Installation

  - Trigger for Implementation: Summer cooling tower outlet water temperature is observed to be above 30 degree and it impact on chiller efficiency.
  - Innovative description: Existing cooling towers are not preforming compare to design.
  - Existing Towers are 2011 Vintage it require replacement

4.4. Major encon Projects planned :2023-24

- Proposed : New Energy Efficient condenser pump installation
  - Existing Pumps are 2011 Vintage it require replacement
  - Trigger for Implementation: Designed flow not achieved and abnormal heating while in operation, consuming more energy.
  - Innovative description: improve the efficiency of the chiller and enhance the flow in condenser line.

5. Energy Saving Project implemented in last three Fy.

FY2019-20

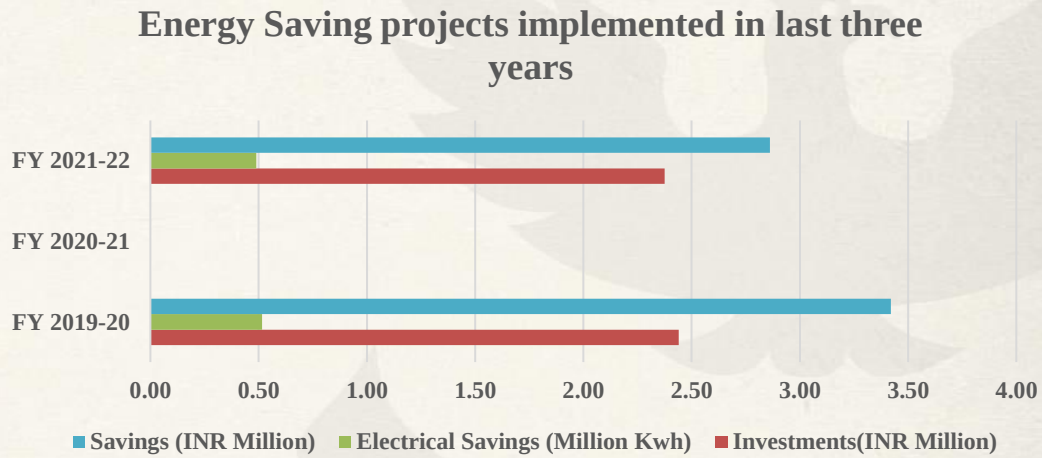
- VFD Installation for 25nos. AHU
- STP Treated water pump & motor replacement.
- PVR Jockey pump and motor replacement.
- Energy efficient pump installed for WTP transfer pump

FY2020-21

- Nil

FY2021-22

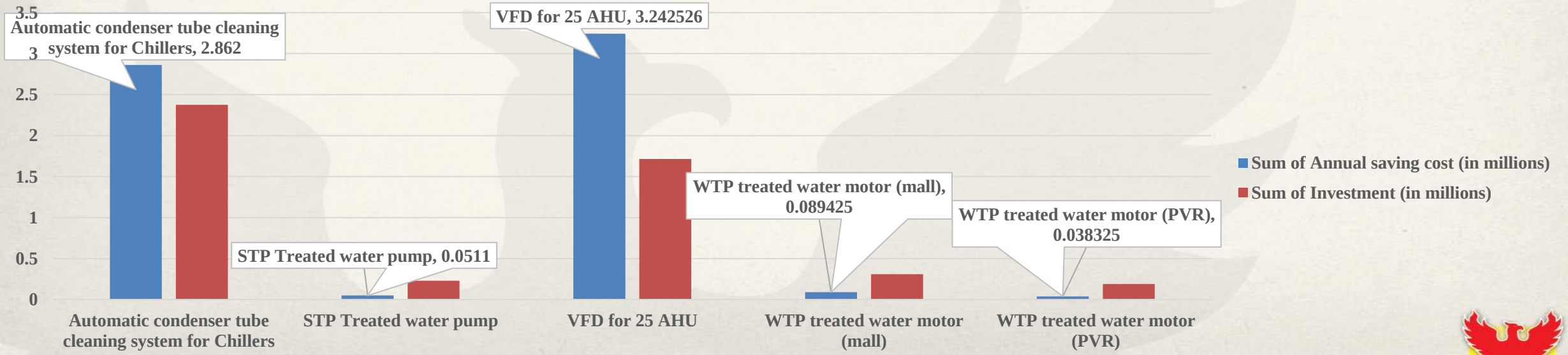
- Installation of Automatic condenser tube cleaning system for Chiller's.



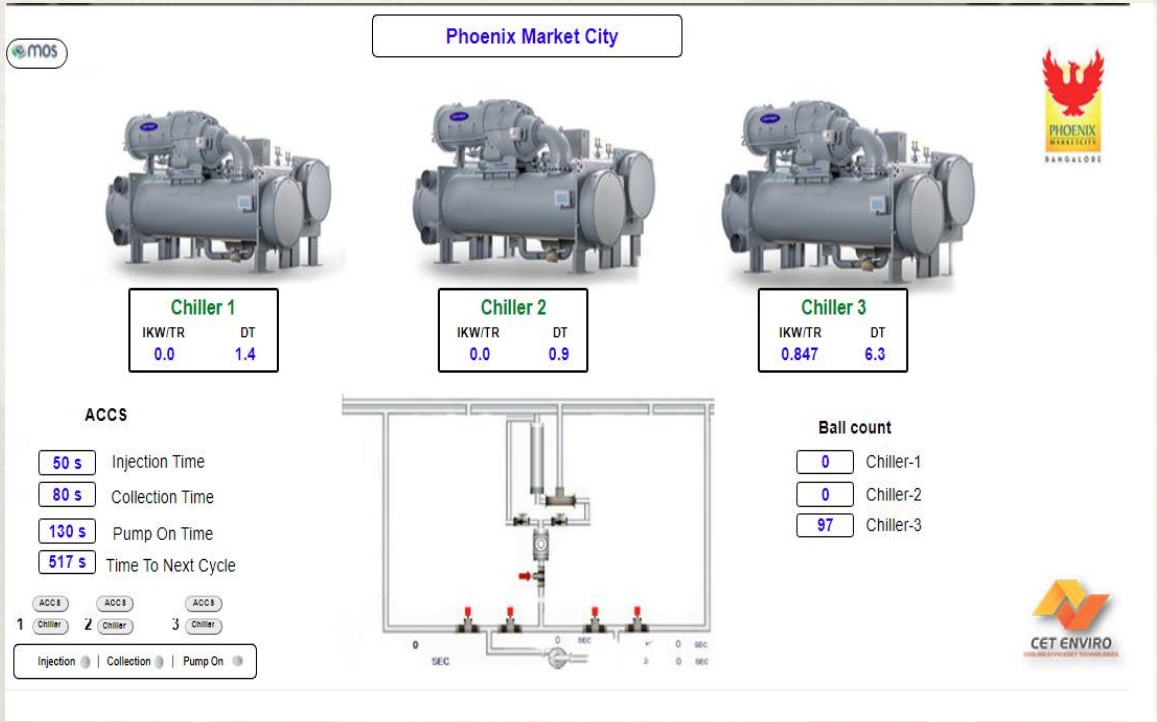
Year	No of Energy saving projects	Investments (INR Million)	Electrical Savings (Million Kwh)	Thermal savings(Million Kcal/MTOE)	Savings (INR Million)	Impact on SEC (Electrical, Thermal)
FY 2019-20	4	2.44	0.52	0.00	3.42	
FY 2020-21	0	0.00	0.00	0.00	0.00	
FY 2021-22	1	2.38	0.49	0.00	2.86	

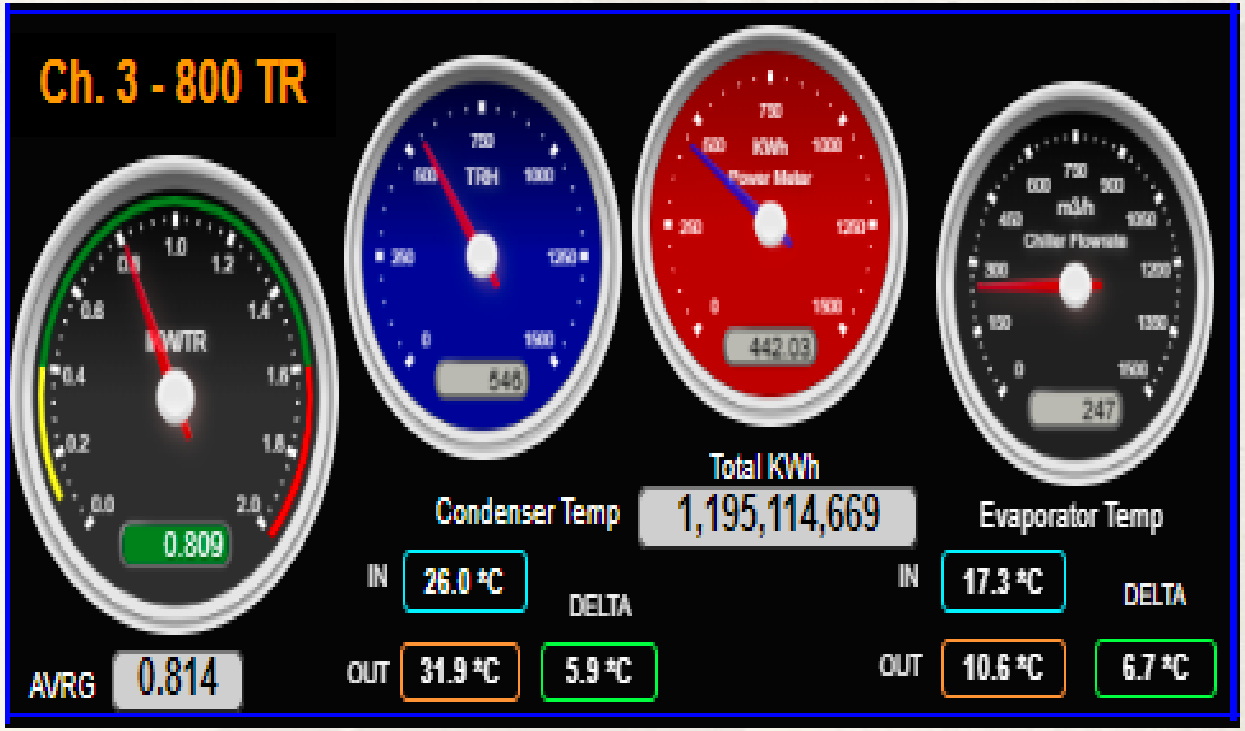
6.1. Innovative projects implemented in last three Fy.

Year	Project	Annual saving kWh	Annual saving cost (in millions)	Investment (in millions)
2019-20	WTP treated water motor (mall)	12775	0.089425	0.309671
2019-20	WTP treated water motor (PVR)	5475	0.038325	0.189494
2019-20	STP Treated water pump	7300	0.0511	0.229582
2019-20	VFD for 25 AHU	463218	3.242526	1.714889
2021-22	Automatic condenser tube cleaning system for Chillers	489000	2.862	2.376



6.1. Innovative projects implemented EMOS FY21-22





Highlights:

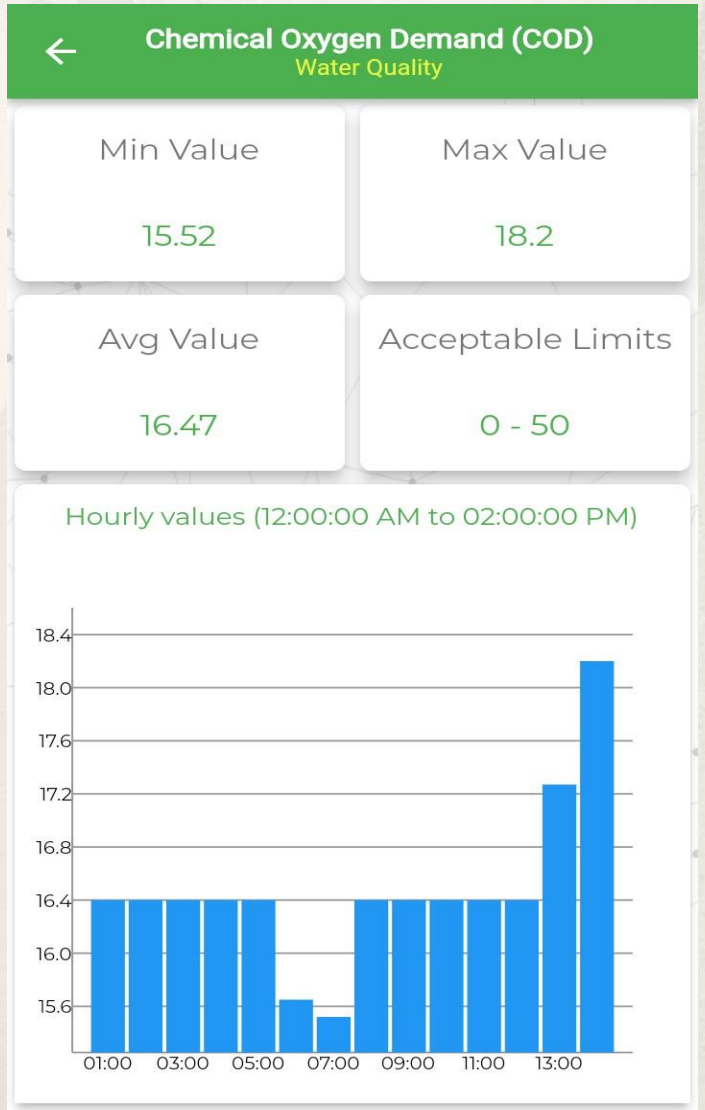
- **Online Monitoring of IKW/TR.**
- **Online monitoring of power consumption of chiller.**
- **Online monitoring of chiller evaporator inlet & Outlet temperature.**
- **Online monitoring of chiller condenser inlet & Outlet temperature.**
- **Online monitoring of Condenser approach.**

6.1. Innovative projects implemented ATCS FY21-22

Highlights:

- **It is Installed for all the 800TR X 3nos. Chiller.**
- **489000kWh energy saving per year.**
- **Descaling of condenser tubes avoided to increase the chiller life cycle.**
- **Reduced Energy use by Optimizing Chiller Performance .**
- **Reduced labor associated with HVAC Maintenance.**
- **Reduced HVAC Operations and Maintenance Costs.**

6.1. Innovative projects implemented STP-RTM FY21-22

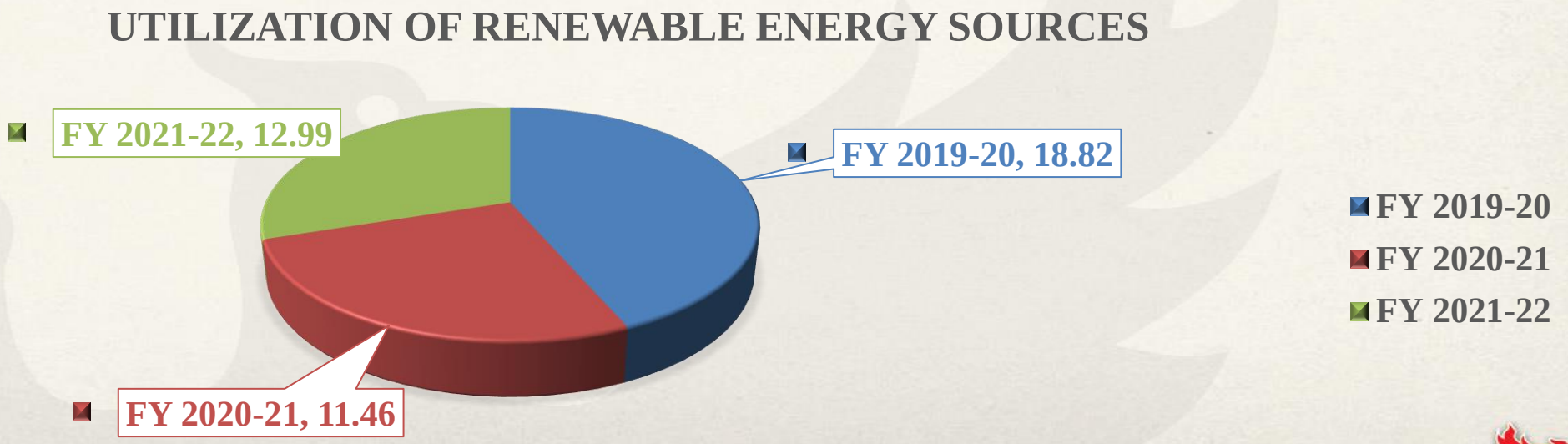


Highlights:

- **Online Monitoring of STP inlet & outlet water flow.**
- **Online monitoring of COD & BOD.**
- **Online monitoring of TSS & TDS.**
- **Online monitoring of pH & Turbidity.**

7. Utilization of Renewable Energy Sources

Year	Technology (Electrical)	Type of Energy	Onsite/Offsite	Installed Capacity (MW)	Generation (Million KWh)	% of overall Electrical Energy
FY 2019-20	Electrical	Solar PV	Offsite	50.00	18.82	91.82%
FY 2020-21	Electrical	Solar PV	Offsite	50.00	11.46	93.91%
FY 2021-22	Electrical	Solar PV	Offsite	50.00	12.99	93.82%



8. Waste management

- **Installed 500 KLD Sewage Treatment Plant in year 2011 for recycle of waste water and In year 2021-22 period 89859 KL water has treated and used for Flushing , HVAC and Gardening.**
- **Installed Organic Waste Convertor in year 2011 and in year 2021-22 period converted 650 Kg/Day wet waste into manure and use for Gardening.**
- **Recycled 1200Kg/day dry waste paper plates, cup, cardboard and shredded papers.**

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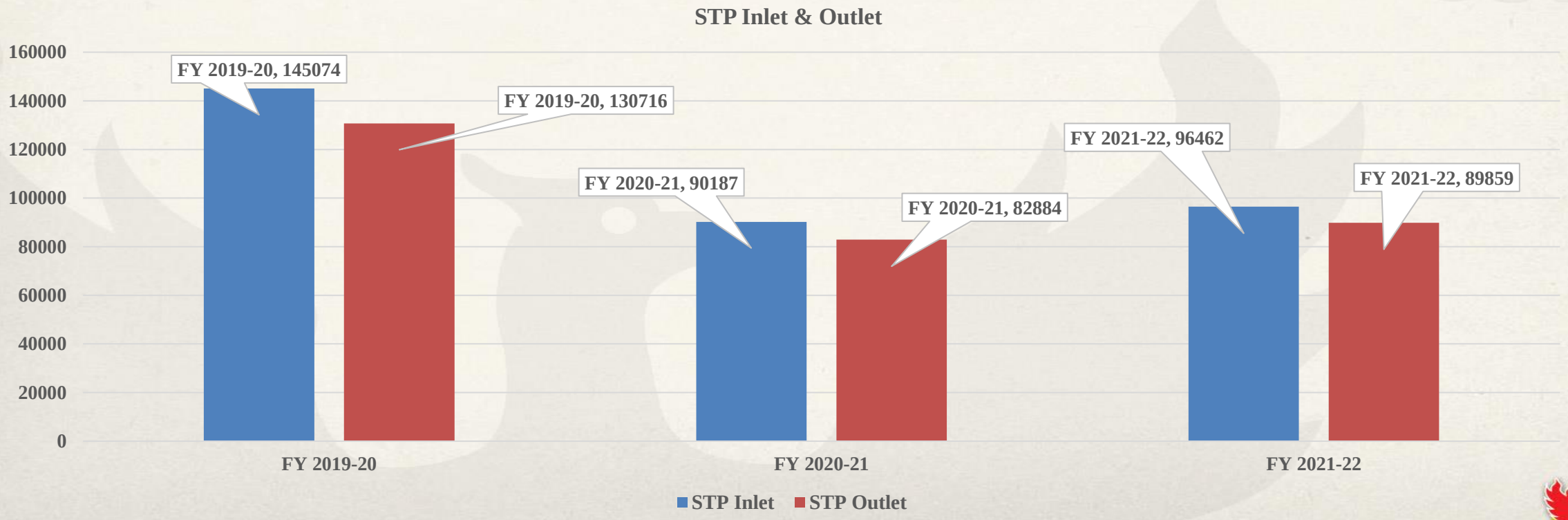
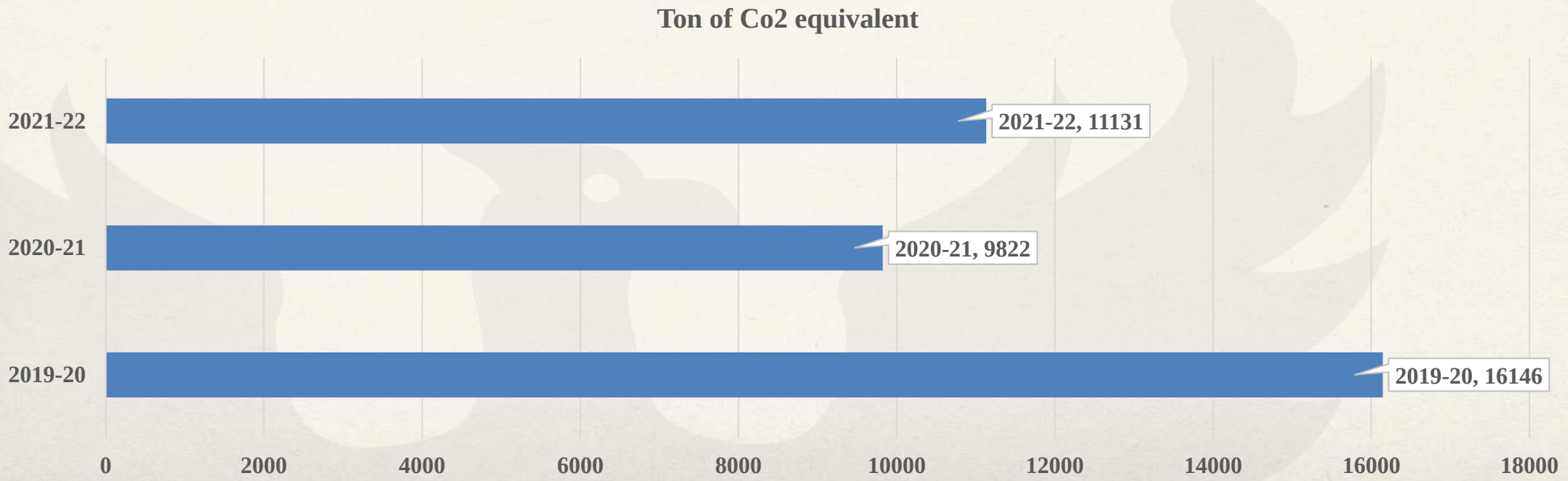


9. GHG emission and indoor air quality

Year	Scope 1 Emission (Electricity)	Scope 1 Emission(Water)	Ton of Co2 equivalent
2019-20	15997	149	16146
2020-21	9741	81	9822
2021-22	11044	87	11131



9.1. GHG emission and indoor air quality

Sustainability Roadmap 2030

- Our commitment to achieving carbon neutrality in our India operations has been operationalized through a host of initiatives, including enhancing resource efficiency as well as moving to renewable alternatives.
- We have made our employees a part of this journey by including them in volunteering activities and reducing their travel footprint.
- Phoenix Market City has and had been on Sustainable future carbon foot print reduction.

10. Teamwork, Employee Involvement & Monitoring

Equipment Operation & Monitoring through BMS, updating on the developments frequently.

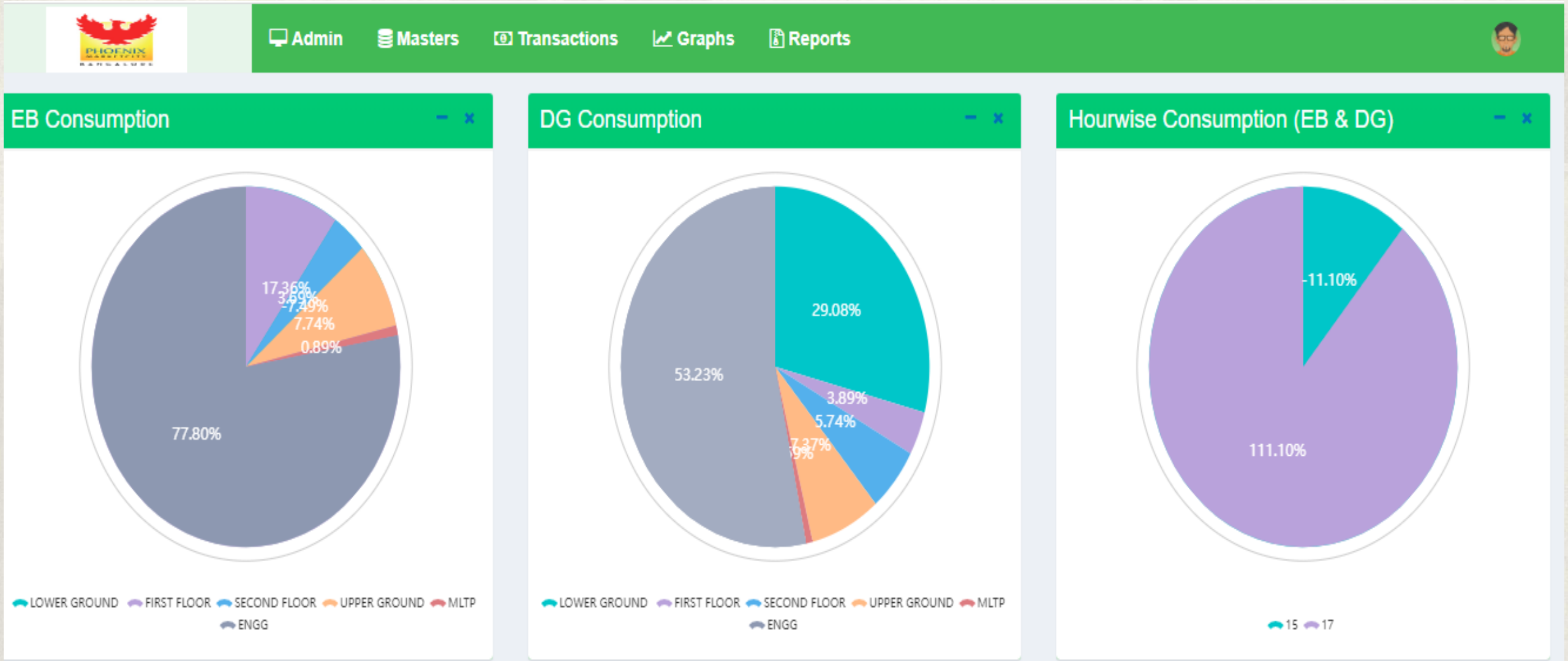
Daily, weekly & Monthly report, Equipment status reviewed by HOD.

Capex project planning & execution, Energy efficiency/awareness training by Team.

10.1. Teamwork, Employee Involvement & Monitoring

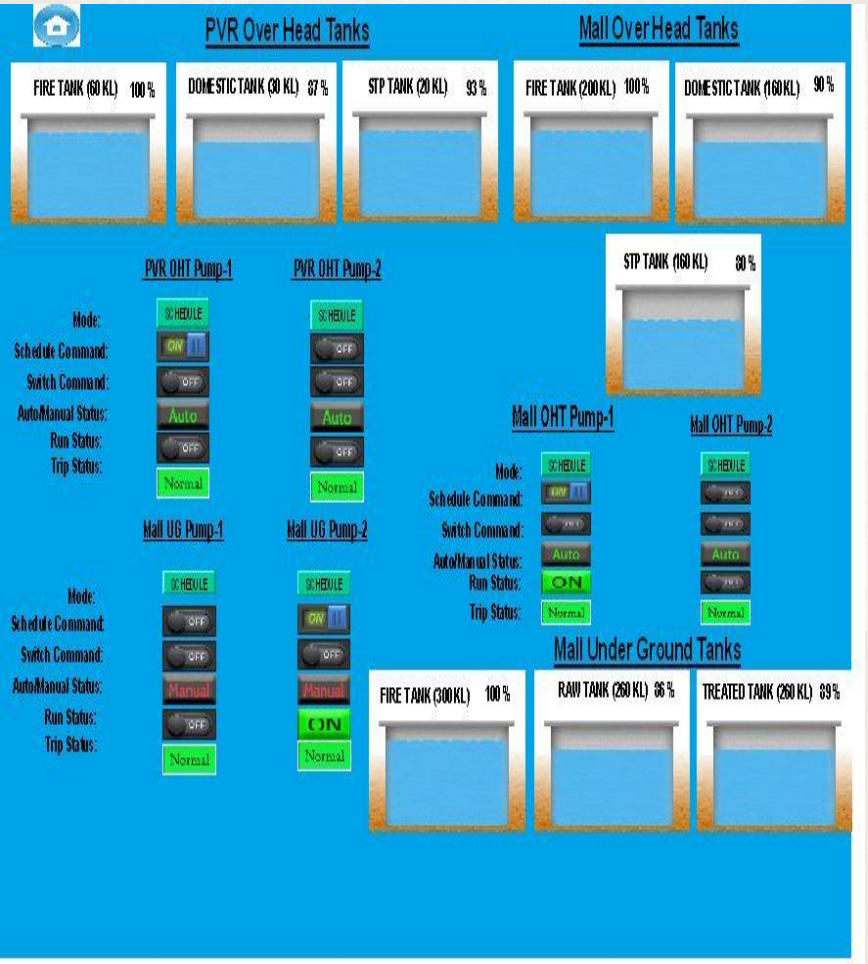
- Skill development Training.
- On-site training.
- Briefing on daily activity and follow up.
- R&R program to motivate the team.

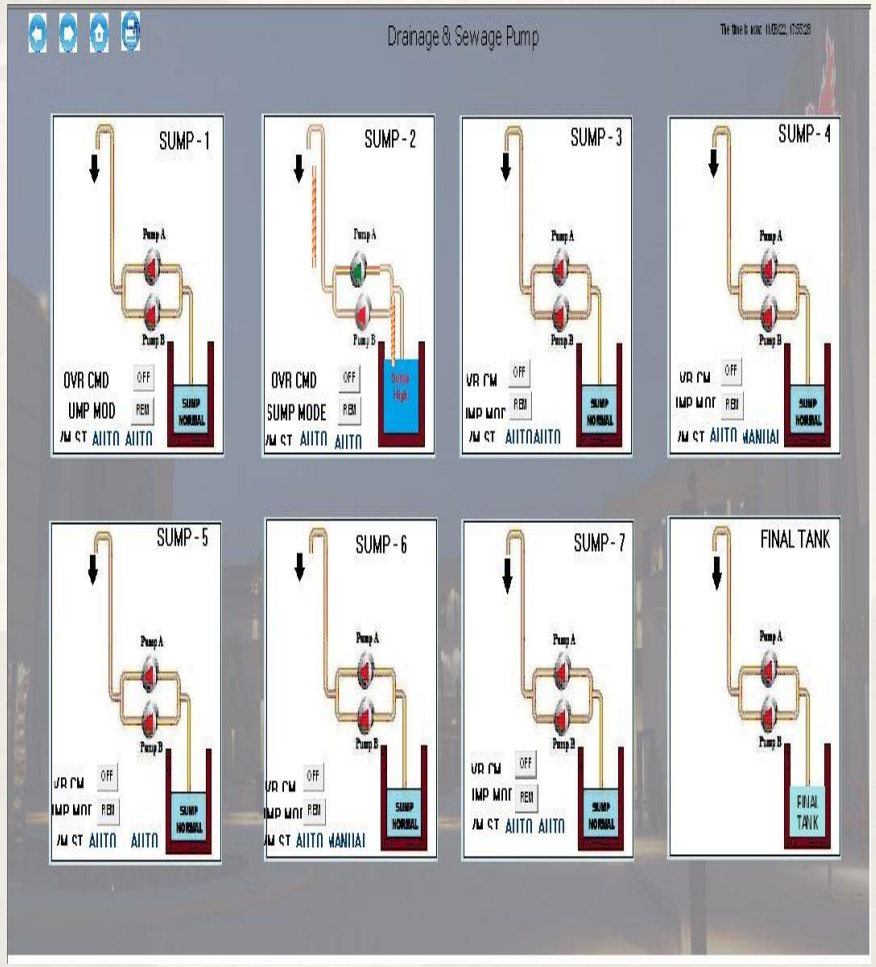
10.2. Teamwork, Employee Involvement & Monitoring

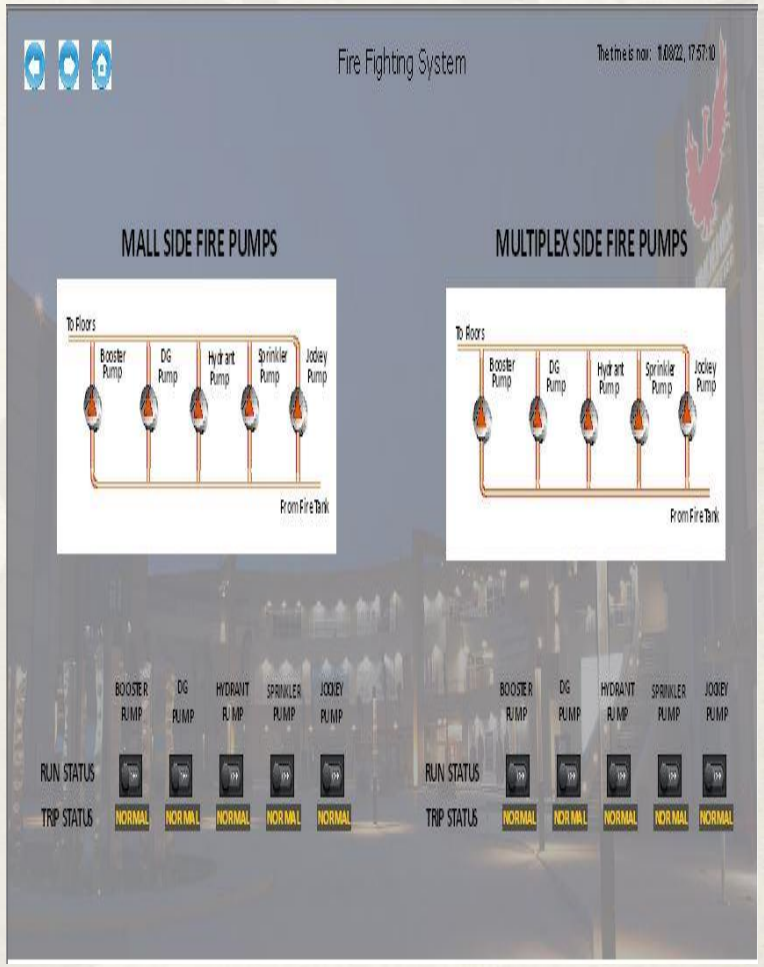


❖ **Online Energy Monitoring System**

10.2. Teamwork, Employee Involvement & Monitoring







❖ **BMS Monitoring System**

12. Learning from CII Energy Award or any other award program

- The build up towards the nomination process has helped us to recognise and identify projects which has helped our company's excellence in the reduction of energy consumption and innovation. Our mission towards use of clean energy and reduction of carbon footprints is helping us scout for new avenues and techniques of resource conservation.

- We appreciate the organizer for providing this platform to share our experience, implementations and concepts, we believe that our efforts at mitigating climate change and prioritising a circular economy will ensure our sustained growth in the future.

- This exercise has been enriching in more ways than one.

13. Any Other relevant information

Project Name : Atrium Sky light sheet installation 12mm thickness

Year of Installation-2021-2022

Benefits :-

- Improved lux level 200% increase, helping save on day time lights.
- Floor temperature reduce 1.3 C.

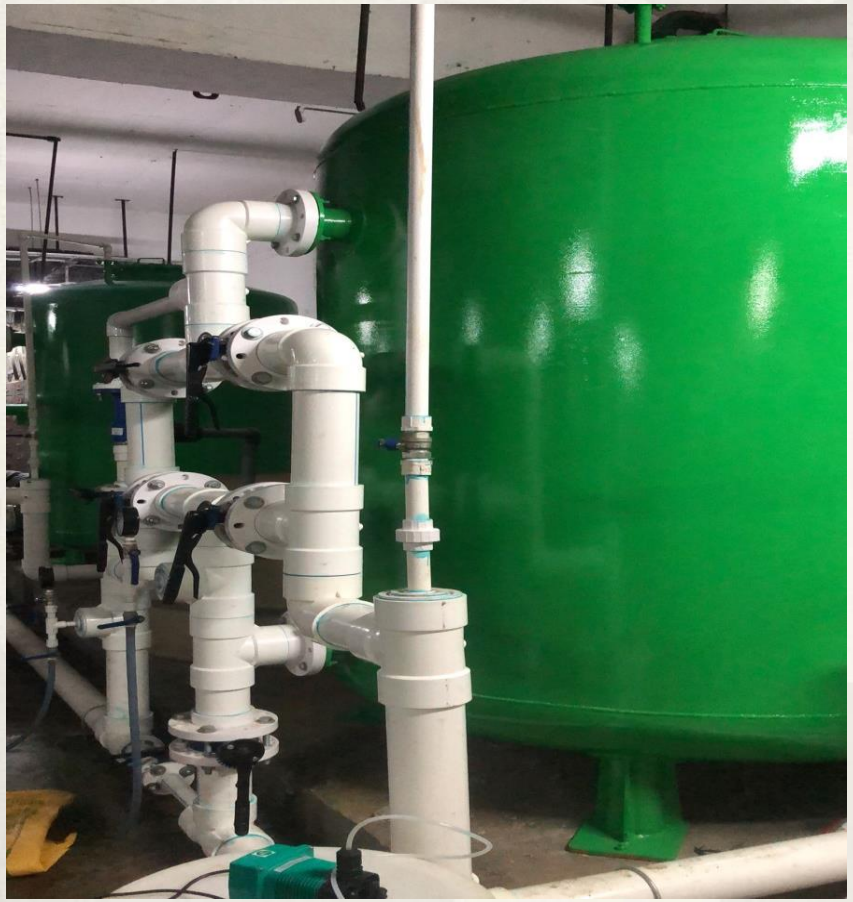
13.2. Any Other relevant information

- sensor based taps installed to minimize the water usage.
- Aerator installed in all the tap to reduce the Gravitational pressure.

Rain water Harvesting and Recharge pit

- Total Water conserved thru Rain Water Harvest System in FY 2021-22 is 894 KL , ie 1.6% of the Potable water Purchase
- It decreases the demand for water.
- It reduces the need for imported water.
- Tt promotes both water and energy conservation.It
- improves the quality and quantity of groundwater.

13.4. Any Other relevant information



- **Enhancement of WTP filters to improve the efficiency of Plant.**

- **Electric vehicle charging stations have been established to promote clean environment and lesser conventional energy dependencies.**

Thank You

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