23rd National Award for Excellence in Energy Management 2022

TBM MEPZ - CHENNAI

August 2022

Agenda

1. Cognizant Overview
2. Facility Overview
3. Energy consumption overview
4. Specific energy consumption in last 3 years (2019-2021)
5. Information on Internal & National Benchmarks
6. Energy saving projects implemented in last 3 years
7. Innovative projects implemented
8. Utilization of renewable energy sources
9. Waste management
10. GHG emission and indoor air quality
11. Teamwork, employee involvement and monitoring
12. Standardization of Best Practices
13. Awards & Certifications

Cognizant Overview

Cognizant (Nasdaq-100: CTSH) is one of the world's leading professional services companies that engineers modern businesses. We help our clients modernize technology, reimagine processes and transform experiences so they can stay ahead in our fast-changing world. Together, we're improving everyday life.

318,400
Employees worldwide

$18.5B
Total revenue

194
Fortune 500
May 2022

350
Forbes World's Best Employers for Diversity
April 2021

113
Fortune's World's Most Admired Companies
Feb 2022

567
Forbes Global 2000
May 2022

327
Forbes 2021 World's Best Employer list
Oct 2021

Facility Overview

About the Zone

- Madras Export Process Zone (MEPZ), a multi-product zone.
- Established in 1984.
- Special Economic Zone : 1.1.2003.
- 262 acres with 120 multi-industrial units
- Uninterrupted power supply by a dedicated 33 KV substation and capable of supplying 30 MW to the units.

About Cognizant Unit

- Operational Since 1st Apr 2008
- Area of Cognizant Campus : 14.45 Acres.
- Built-up area : 1,87,890.14 Sq. M
- Four blocks (SDBs) with IT, BPO and IT IS projects, Cafeteria Block, Multi Level Car Parking, Meditation Centre, Auditorium, GYM, Open Air Theatre and Play courts.
- Present occupants : 11800 Approx. including vendor partners

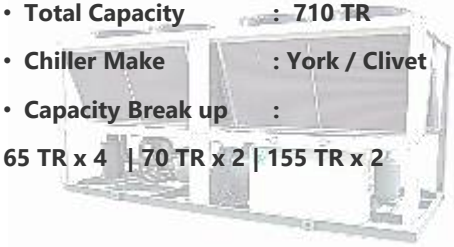
DC Utility overview

UPS

- Total Capacity : 2300 kVA (10 Nos)
- UPS Make : Schneider Electric
- Capacity Break up :

500 kVA x 2 | 150 kVA x 6 | 200 kVA x 2

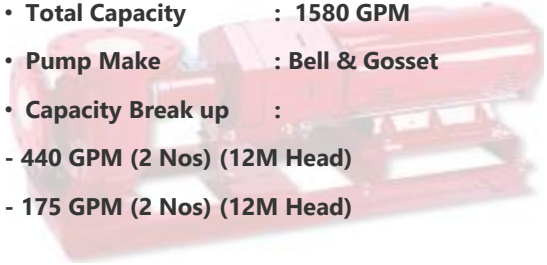
Chiller



- Total Capacity : 710 TR
- Chiller Make : York / Clivet
- Capacity Break up :

65 TR x 4 | 70 TR x 2 | 155 TR x 2

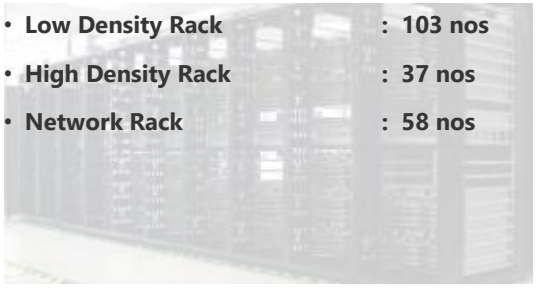
Primary Pumps



- Total Capacity : 1580 GPM
- Pump Make : Bell & Gosset
- Capacity Break up :

- 440 GPM (2 Nos) (12M Head)
- 175 GPM (2 Nos) (12M Head)

Racks

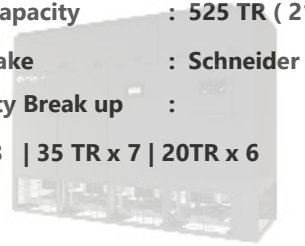


- Low Density Rack : 103 nos
- High Density Rack : 37 nos
- Network Rack : 58 nos

Racks Load

- Low Density Load : 309 kW
- High Density Load : 537 kW
- Network Load : 118 kW
-

PAHU / VAHU

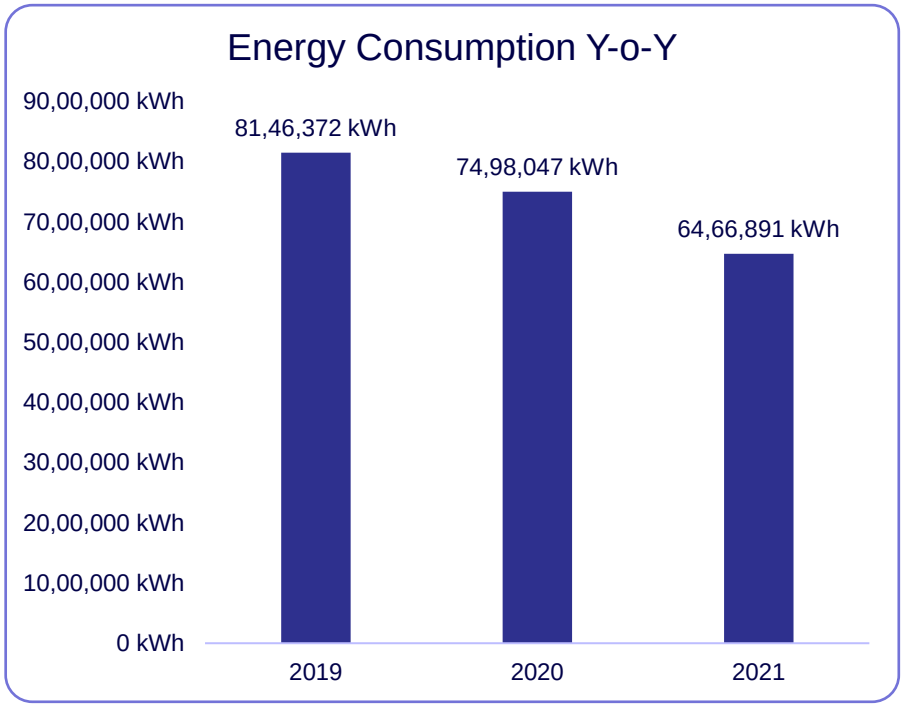


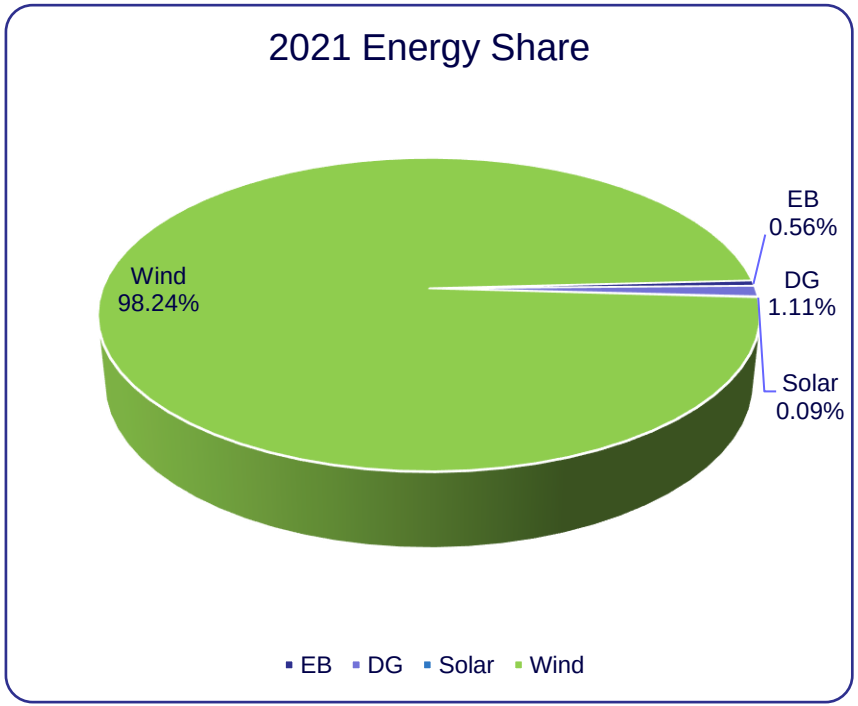
- Total Capacity : 525 TR (21 Nos)
- UPS Make : Schneider / Clivet

Capacity Break up :

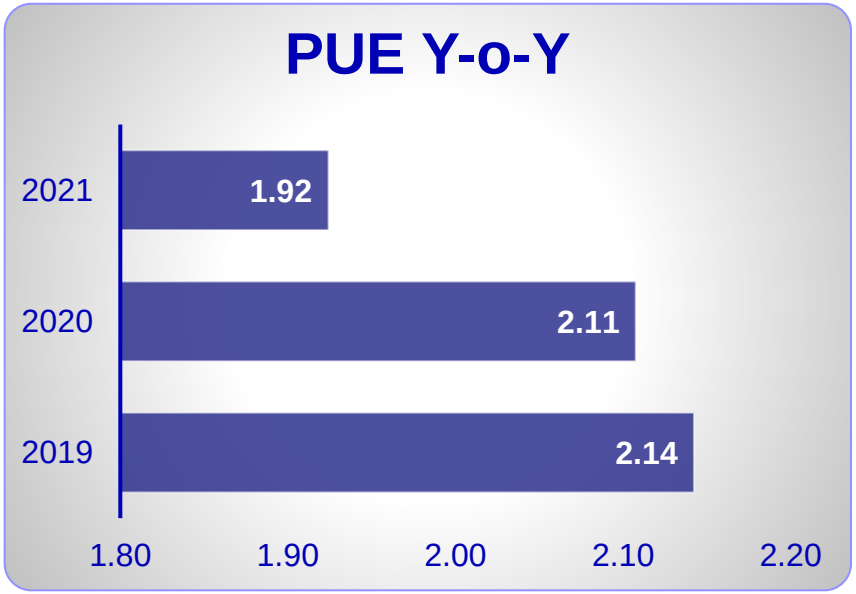
20 TR x 8 | 35 TR x 7 | 20TR x 6

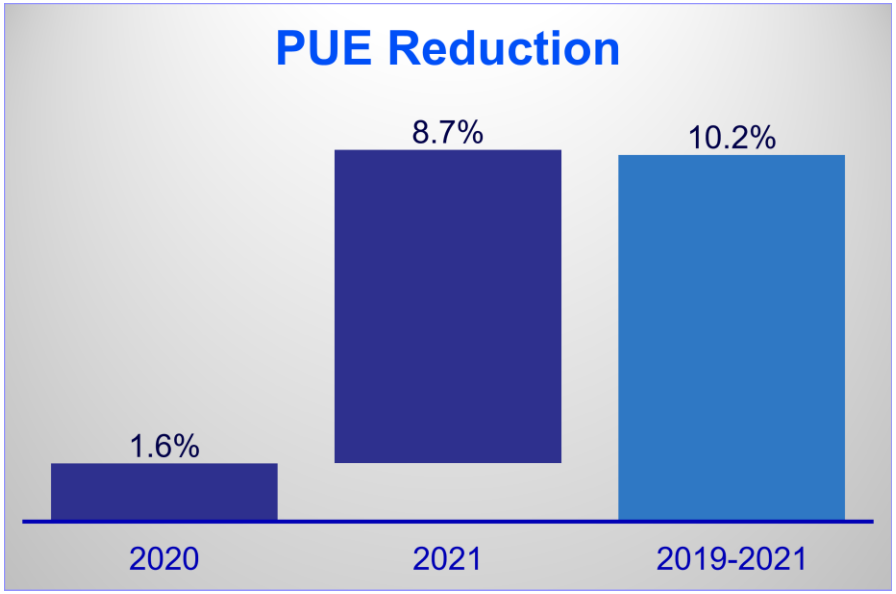
Energy consumption overview - 2019 to 2021





PUE in Last Three Years - 2019 to 2021





Inference : 10.2% of PUE reduced from 2019
Key initiative taken : UPS consolidation & upgradation and Chiller retrofit

National & Global benchmark

Global Benchmark			
Description	**Standard**	**Good**	**Better**
PUE	2	1.5	1.2
Temperature as per ASHRAE guideline : 19- 27 deg C			
Humidity as per ASHRAE Guideline : 40%-80%			

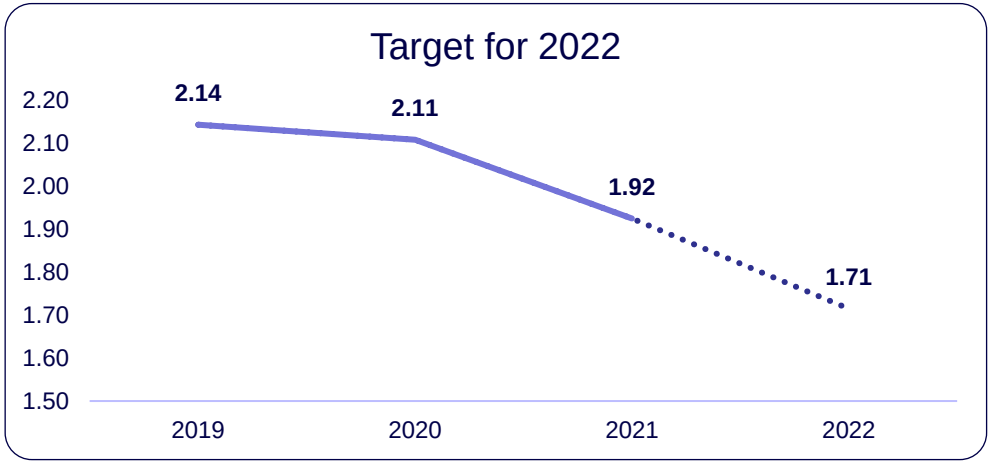
Region	Unit	Source	PUE
National	CtrlS Data center Hyderabad	CII	1.358
Global	Google Data Center US	Google	1.09

Energy Saving Projects Implemented in Last 3 Years

Year	No of Major Energy Savings Project	Investments (INR Million)	Electrical savings (Million kWh)	Savings (INR Million)	Impact on PUE
2019	1	0.4375	0.052	0.446	1%
2020	1	0.6184	0.065	0.9	1%
2021	2	11.1109	0.897	7.81	9%

List of Major Encon project planned in FY 2022-23

Title of Project	Annual Electrical Saving (kWh/ Year)	Saving in INR	Investment in INR	ROI (In Month)	Expected PUE Impact	Comment
Air balancing and other activity to avoid short cycling of Air circulation	2,23,000	21,18,500	41,00,000	23.2	3.4%	Operation optimization of air flow management to reduce the PAHU operation
Replace existing Chiller with Energy efficient Chiller	4,12,000	39,14,000	139,00,000	42.6	6.3%	Retrofit with high efficient chiller to reduce PUE
Deployment of cold aisle containment for enhanced air management	75,847	7,20,546.5	2,00,000	3.3	1.2%	Pilot implementation to avoid thw air mixing



Other Initiative:

- Installation of BTU meter to assess precise cooling requirement.
- Installation of blanking panel in all empty U space of racks
- Installation of wire brush floor grommets to prevent hot air recirculation.
- Closing of wall/ceiling opening to mix of air.

Innovative Project 1 : UPS consolidation and retrofit

Problem Statement

The UPSs installed is conventional type and crossed 12+ years. It caters Data Center (Low density) load.

Setup: 300 kVA x 4Nos

Goal/Success Measure

Replaced the existing monolithic UPS which have 84% efficiency with modular UPS of 96% efficiency with optimized capacity.

Setup: 150 kVA x 6Nos

Benefits

Technology upgradation provides us 12% energy saving when compared to existing set up

Capacity optimization by 28%, avoidance of Opex and Maintenance costs.

Other Key benefits

This cost includes redesigning of the UPS power output distribution to meet the requirements of concurrence maintenance concept.

KEY HIGHLIGHTS

Energy Savings	2,30,142 kWh / annum
Investment	INR 7,500,000
Cost Savings	INR 2,010,000
Payback period	3.7 Years
Emission reduction	188.7 Tons / annum

Innovative Project 2 : DCiM Implementation

Problem Statement

Data center lagging of monitoring key statistics, as well as the energy consumption of all hardware, facilities infrastructure components.

Goal/Success Measure

Implementation of DCiM to improved technologies' operational and energy efficiency in IT and Non-IT loads.

Benefits

DCIM software helps businesses plan for the future.

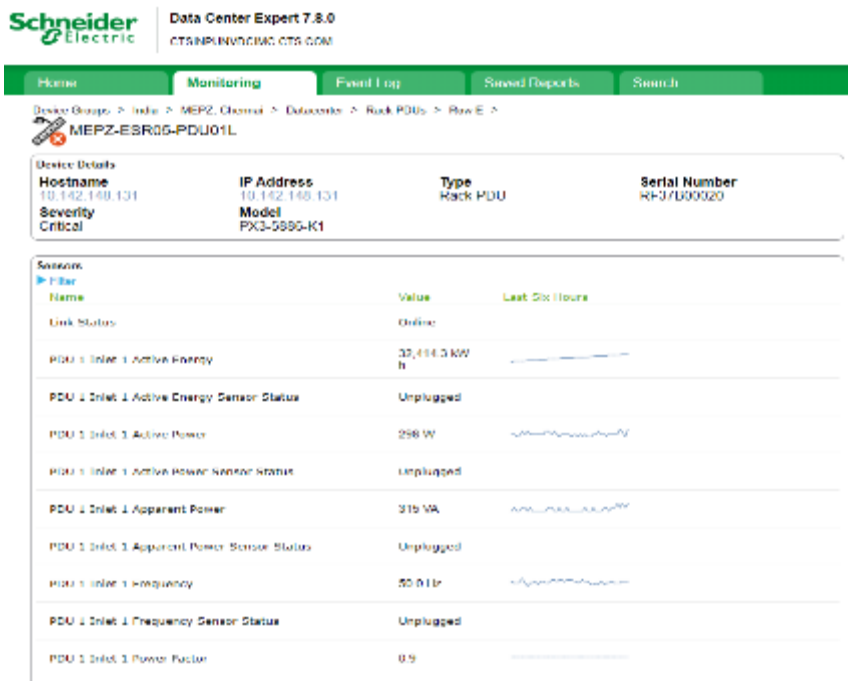
Streamlined Asset Management

Other Key benefits

DCIM enables our organization to measure energy consumption for all IT-related equipment and available load on each racks. This insight helps us to reduce energy usage and costs.

KEY HIGHLIGHTS

Individual rack level Temperature, RH and Power monitoring



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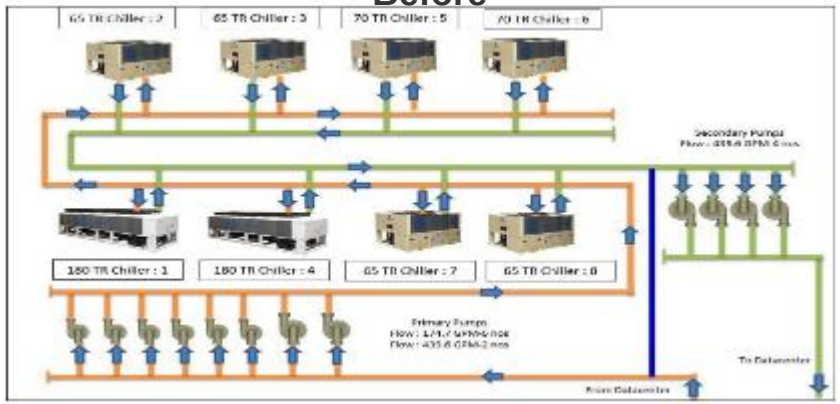
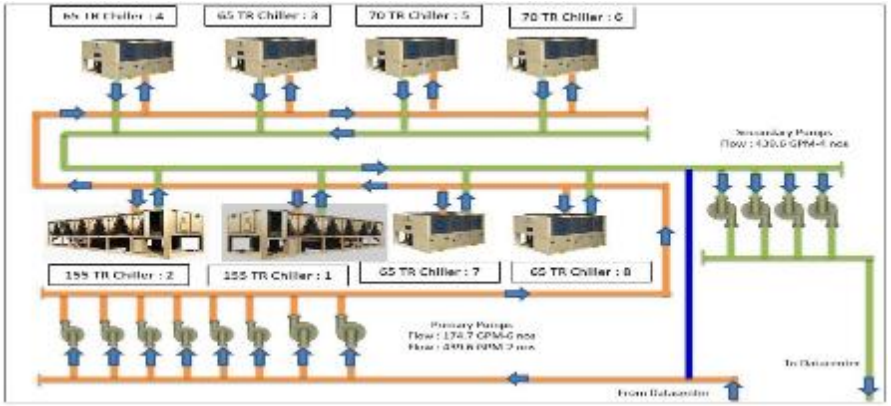
Innovative Project 3 : Chiller replacement

Before



After



Reason for changing the chiller:

- Existing clivet chiller is ageing and efficiency is dropped down.
- For existing chiller ikW/TR is fixed for all load, where as ikW/TR of York chiller vary as per % of loading
- There would be annual savings of 6,67,162 kWh/annum.
- Annual cost savings of INR 58.4 Lakhs

Innovative Project 3 : Chiller replacement

Problem Statement

The existing chillers have almost completed 12 years. Among the existing chillers Clivet :180 TR iKW/TR is 1.64

Goal/Success Measure

Replaced the existing chiller with available York chiller from Cochin site through IUT process.

Setup: 155 TR x 2 Nos

Benefits

SEC of chiller improved by 20% compare to existing chiller.

Reduced 6.6L kWh per annum by replacing existing chiller with available chiller.

Other Key benefits

Transferred York chiller is with VFD hence partial load operation and seasonal variance power consumption also reduced.

KEY HIGHLIGHTS

Energy Savings 6,67,162 kWh / Annum

Investment INR 36,10,920

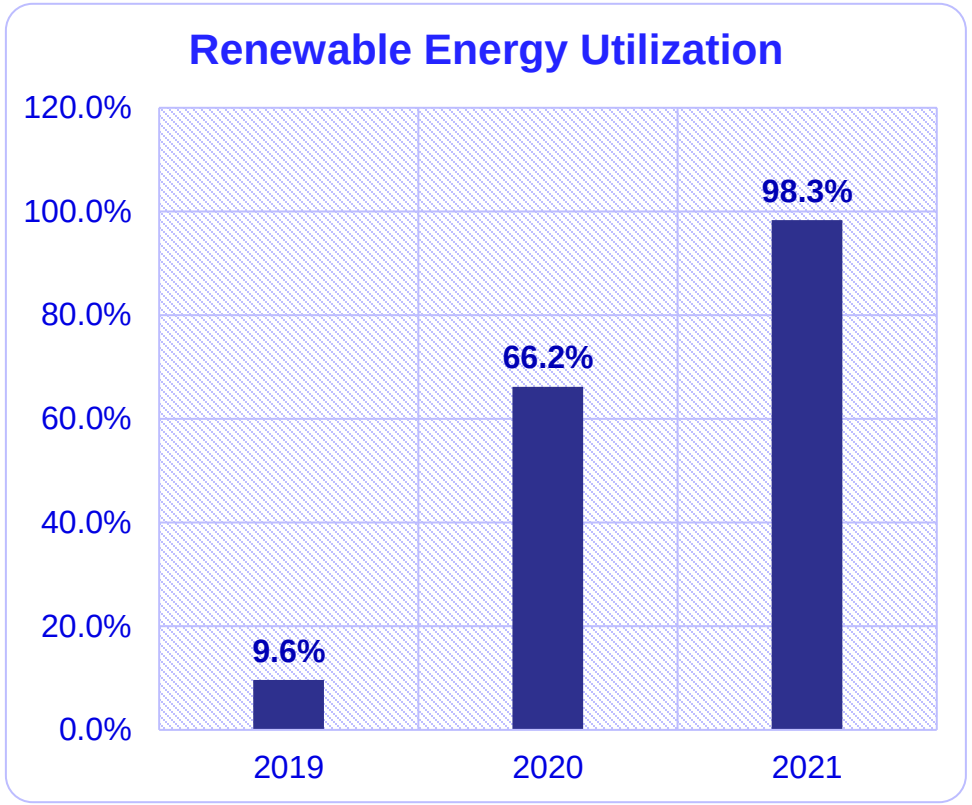
Cost Savings INR 58,00,000

Payback period 6 Months

Emission reduction 533.7 tons / annum

Utilization of Renewable Energy Sources

Source	2019	2020	2021
EB	73,50,728	24,73,583	36,807
DG	1,27,800	95,825	72,320
Solar	3,129	5,611	5,897
Wind	7,92,514	50,18,853	64,24,187
Total	**82,74,172**	**75,93,872**	**65,39,210**



Utilization of Renewable Energy Sources - FY 2019-2021

Year	Installed Capacity (MW)	Total Wind Energy Contracted Quantum (Lacs kWh)	Actual Supplied Wind Energy Quantum (Lacs kWh)	MEPZ DC Consumption (Lacs kWh)	Allocation contribution (%)
2019-20	256.85	525	509	7.9	2%
2020-21	256.85	525	379	50.2	13%
2021-22	256.85	525	339	64.2	19%

- In FY 2018-19 additional quantum of 200 Lacs kWh purchased with an investment of INR.200 Lacs
- Actual Supplied wind Energy Quantum reduction for FY 2020-21 & 2021-22
  - Non-BAU Actual Energy consumption got reduced
  - Renewable energy utilization (Wind) **2019 - 2% , 2020 - 13% & 2021 – 19%**

RPO & REC Summary

Year	Solar REC Requirement (%)	Non-Solar REC Requirement (%)	Solar REC requirement Qty (No's)	Non-Solar REC Requirement Qty (No's)	Remarks
2019-20	5%	9%	40	71	REC Purchase under progress
2020-21	8%	10%	402	514	
2021-22	11%	11%	675	675	

Waste Utilization and Management

Paper Waste – Recycle, Reduce & Reuse

- Limited access to printer
- Implemented E-Fit tool and optimized manual check list
- Eliminated Paper cups usages
- Digitalization of ACS – Cab trip sheets

Food waste – Recycle & Reuse

- Recycled through organic waste composter
- Organic waste convertor capacity: 500 kg/day
- Average food waste of 7,000 kilograms is converted in to 8,000 kilograms of manure

Hazardous / E waste/Battery Waste – Recycle & Reuse

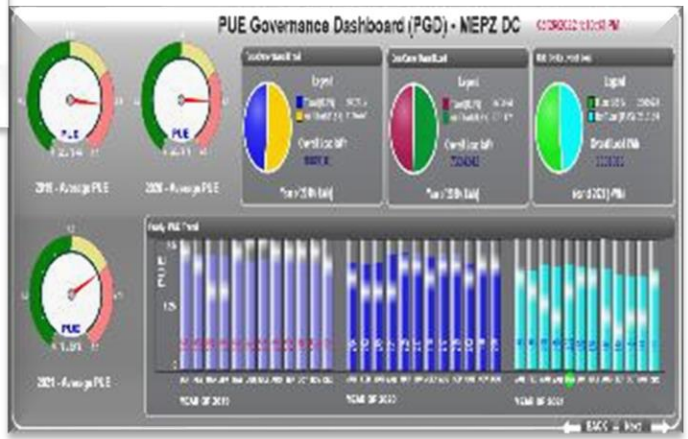
- E –Waste – CFL to LED retrofit to enhance the lifetime and reduce the waste generation

Solid waste- Recycle & Reuse

- Solid (Garbage) waste is segregated and stored separately.
- Solid (Garbage) wastes are disposed only through authorized recyclers.
- 1,000 Kgs approx. of Solid wastes are recycled / per day

Green Supply Chain

- Chillers with lesser iKW & VFD
- Energy efficient LED lights
- Hot Aisle containment for all server halls
- Energy efficient pumps
- Solar Panels
- Energy efficient UPSs systems.
- IOT based PUE dash board thereby minimizing the usage of hardcopies
- STP treated water using for flushing and garden.



GHG emission and indoor air quality

Year	Scope 1 (DG) Emission	Scope 2 (EB) Emission	Total Emissions in Tons of Co2 Equivalent
2018	963	5712	6675
2019	411	6028	6438
2020	210	2028	2238
2021	147	30	178

1) Cognizant will source 100% renewable energy by 2026. .

2) **A**bsolute emissions reduction by 50% in 2030

3) **A**bsolute emissions reduction by 90% in 2040

Indoor Air Quality (BAU)

Test Parameters	Units	Result	Permissible limit	Remark
Carbon Dioxide (CO2)	ppm	612	< 1000	**1. Testing through NABL Laboratory** **2. Random sampling will be done Monthly once for workstations**
Total Fungal Count	Cfu/m3	210	Max 500	
Total Bacterial Count	Cfu/m3	280	Max 500	

Standardization of Best Practices

Data center Temperature policy standardized:
24 °C to 26 °C

Maintaining and monitoring of data center High / Low temperature alarm
24 °C to 26 °C

Data center Light operation with Occupancy based operation

Blanking panels for Unused racks spaces

1. Avoid air short cycling
2. Saving of 2.7% on energy consumption.
3. Avoid Hot spots in Data centers.

Active tiles Used for even distribution of cold air

1. Impact of active tiles on data center flow and temperature distribution
2. The desirable approach is instead to provide additional cold air only where and when required, and avoid overcooling the entire data center
3. Saving of 2.7% on energy consumption.

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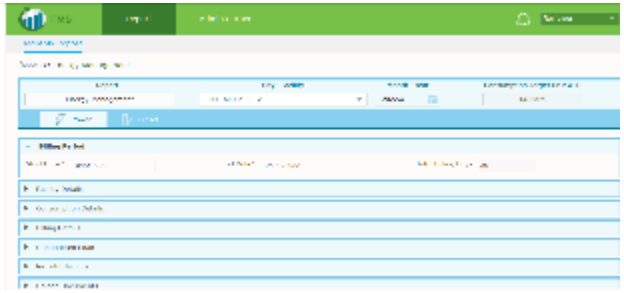
Measuring & Monitoring Device & Tool

DAILY MODULE

- Consumption Details
- Consumption Breakup
- Hourly Breakup- Transformer /DG/Chiller
- Diesel Consumption
- Water Report
- Refrigerant Status
- Equipment Status

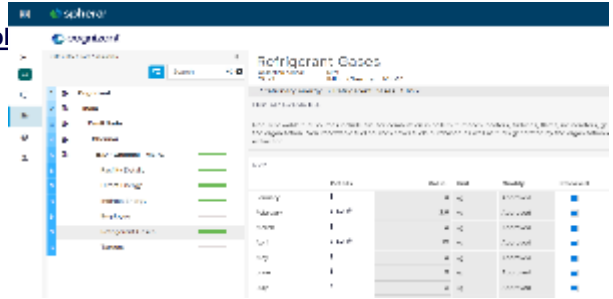
MONTHLY MODULE

- Facility Details
- Consumption Details
- Billing Details
- Diesel Consumption

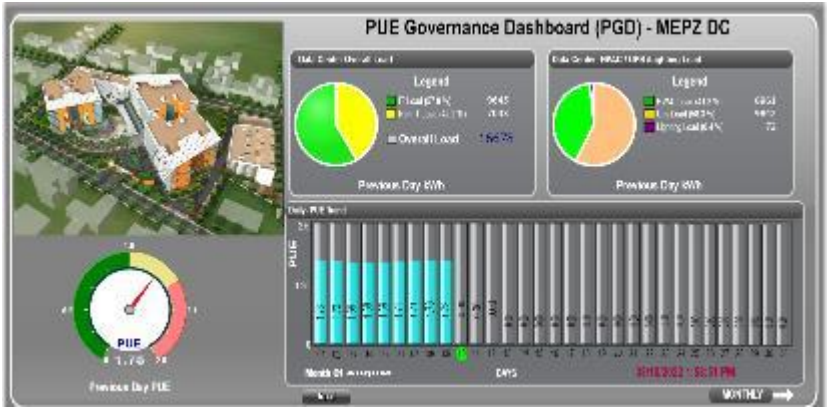


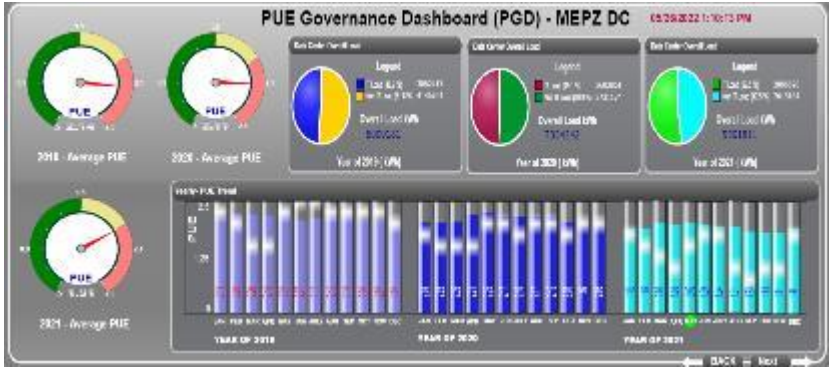
Sphera SW- Carbon Footprint Tool

- Facility Details
- Consumption Details
- Scope 1 & Scope 2 details



DAILY PUE DASHBOARD





MONTHLY PUE DASHBOARD

Awards

Energy efficient unit Awards 2019

Silver rating - CII Awarded– EHS Excellence 2021

LEED Certified – Gold (New Construction)

Thank You

23rd National Award for Excellence in Energy Management 2021

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