24th National Award for Excellence in Energy Management 2023

MEPZ Datacenter - Chennai

Sep 2023

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Cognizant overview

Cognizant is a multinational corporation that provides IT services, including digital, technology, consulting, and operations services. It is headquartered in Teaneck, New Jersey, United States

#194

On May 2022 **Fortune 500**

- Fortune

#567

On **Forbes Global 2000** for May 2022

- Forbes

#350

On **Forbes The Best Employers for Diversity** April 2021

- Forbes

12 Years

One of **Fortune's Most Admired Companies**

- Fortune

#63

On Forbes Top 100 Digital Companies for 2019

- Forbes

#19

On **Forbes America's Best Employers** 2020

- Forbes

Cognizant is included in the NASDAQ-100 and the S&P 500 indices. Cognizant had a period of fast growth during the 2000s

159+ delivery and operations centers globally and spread across 39 countries

The company has more than 3,55,300 employees globally, of which, 100000 are women

Total global footprint of 24 million+ built up area, of which 13.6 million SFT is owned Facilities

Majority of these operations are in hot and humid climates and operates on 24X7 basis

More than 80% of the space is air-conditioned

About the Cognizant unit

- Owned facility at MEPZ, operations from 2008.
- Campus area: 14.45 acres.
- Total built-up area: 1,87,890.14 sq. m.
- Five blocks (SDB1,SDB 2,SDB 3, SDB 4 MLCP & cafeteria).
- Exclusive medical center with ambulance service.
- Seating capacity: 12,000.
- BAU head count: 4,562 (present) .
- Contracted demand: 14,200 kVA.
- Incomer supply: 33kV / 433 V.
- Transformer capacity: 18,250 kVA.
- Diesel generator capacity: 14,625 kVA
- Chiller capacity: 5,545 TR.
- UPS capacity: 4,590 kVA.
- Certified for ISO 45001 and ISO 14001.

Datacenter utility overview

UPS

- Total capacity : 2,300 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 pump & Secondary pump

- Total capacity : 1580 GPM
- Pump make : Bell & Gosset
- Capacity break up : 440 GPM (2 Nos) (12M Head) and 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)
- PAHU/VAHU make : Schneider / Clivet
- Capacity break up : 20 TR x 8 | 35 TR x 7 | 20TR x 6

Passive design features

Passive Design Feature

Micro-climate : Warm and humid

Building orientation : East - West

Solar Heat Gain Coefficient (SHGC) of Glass : 0.25

Visual Light Transmittance (VLT) : 31

Type of DC : DC + Office

Area of the DC in square meters : 703

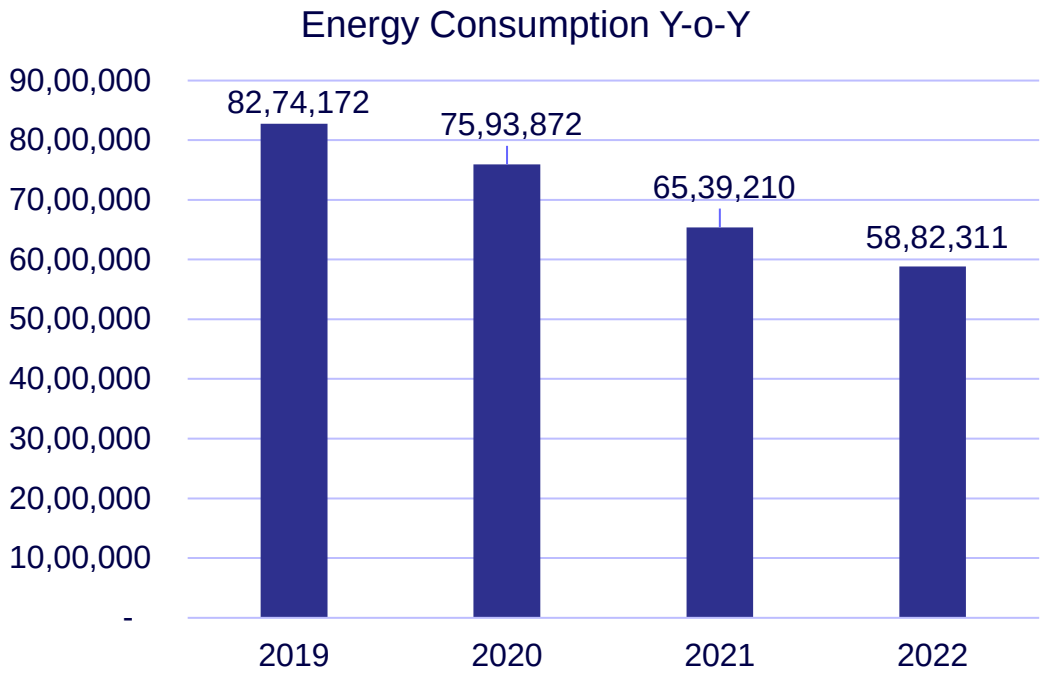
Area of the site in square meters : 1,87,890.34

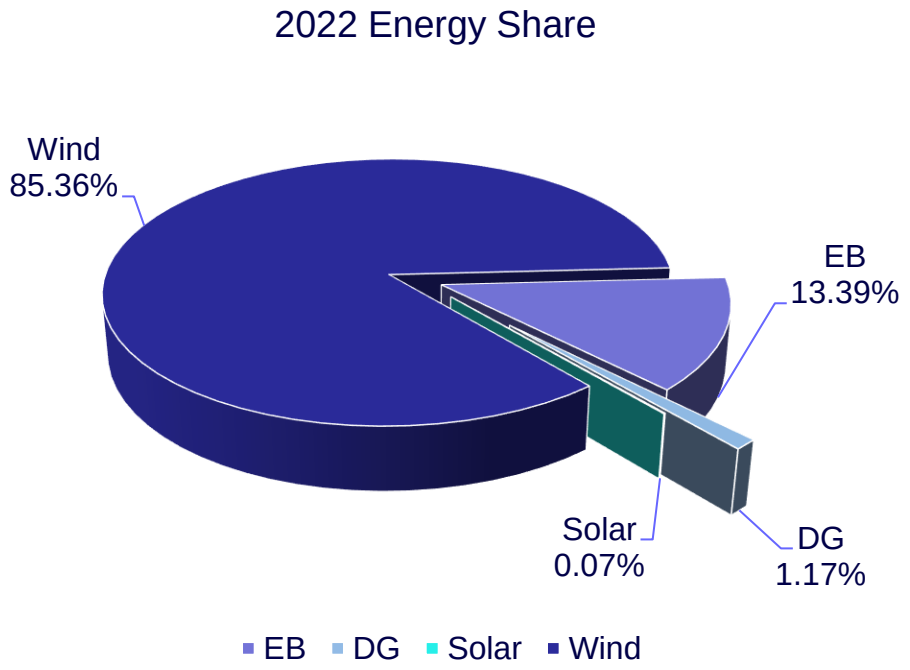
Ground coverage in square meters : 21,750.89

Soft green area in square meters : 7,432

Area of the terrace in square meters : 5,266

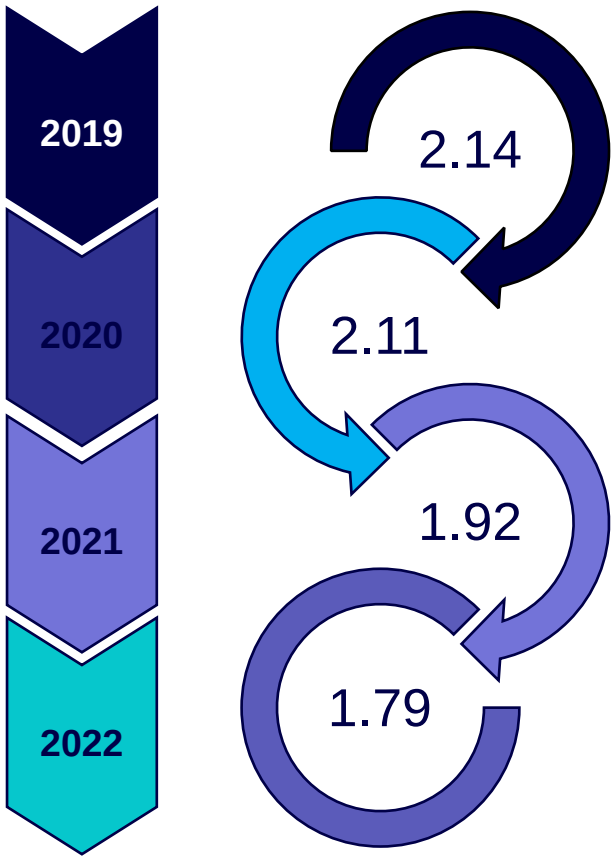
Energy consumption overview - 2019 to 2022

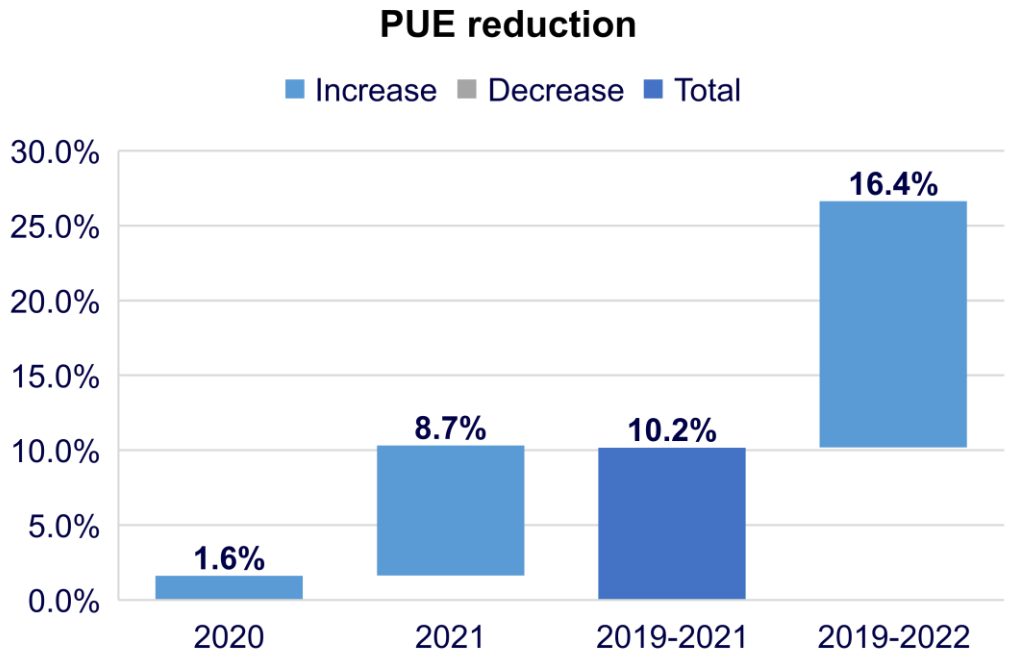




- Energy share contribution by wind energy is 85.4%, EB units is 13.4%, DG units is 1.17% and solar units is 0.07%
- Energy consumption reduction in 2020 is 0.68 MU, 2021 : 1.05 MU, 2022 : 0.66 MU
- Total energy consumption reduction from 2019 to 2022 is 2.39 MU which is equivalent to 29%
- Total carbon footprint reduction is 1937 MT

PUE - 2019 to 2022





Inference: 16.4% of PUE reduced (in comparison from 2019).

Key initiative: 1. UPS retrofit (Conventional to modular)

2. Implementation of DCiM

3. PAHU optimization by effective operational control

National & global benchmark

Global benchmark			
Description	**Standard**	**Good**	**Better**
PUE	2	1.5	1.2
Temperature as per the ASHRAE guideline: 19 – 27 degree Celsius			
Humidity as per the ASHRAE guideline: 40% – 80%			

Region	Unit	Source	PUE
National	CtrlS Datacentre Hyderabad	CII	1.358
Global	Google Datacentre US	Google	1.09

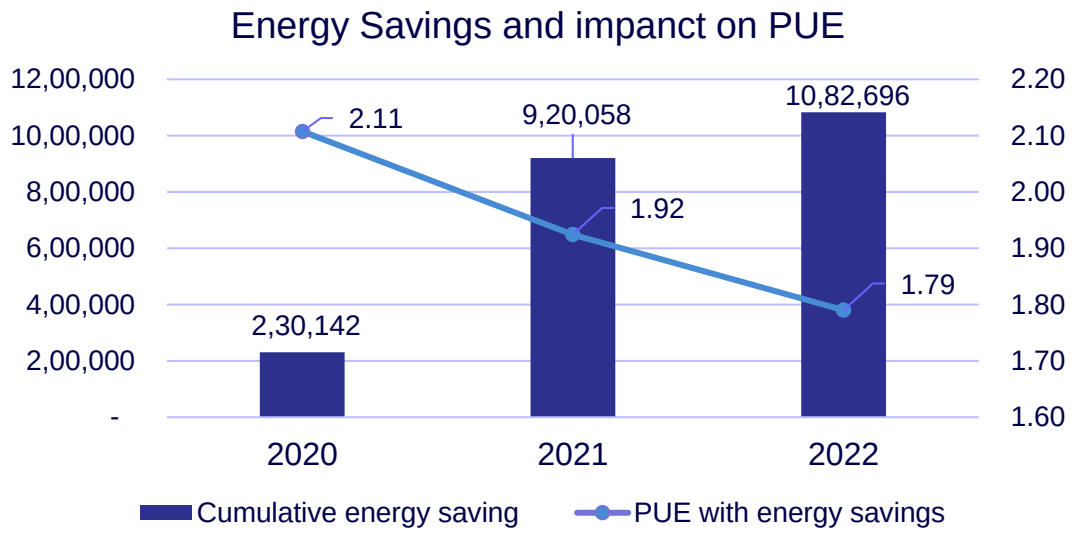
Internal benchmark

Location	Unit	Source	PUE
Pune	Pune CDC	Internal	1.69

Energy saving projects implemented in last 3 years

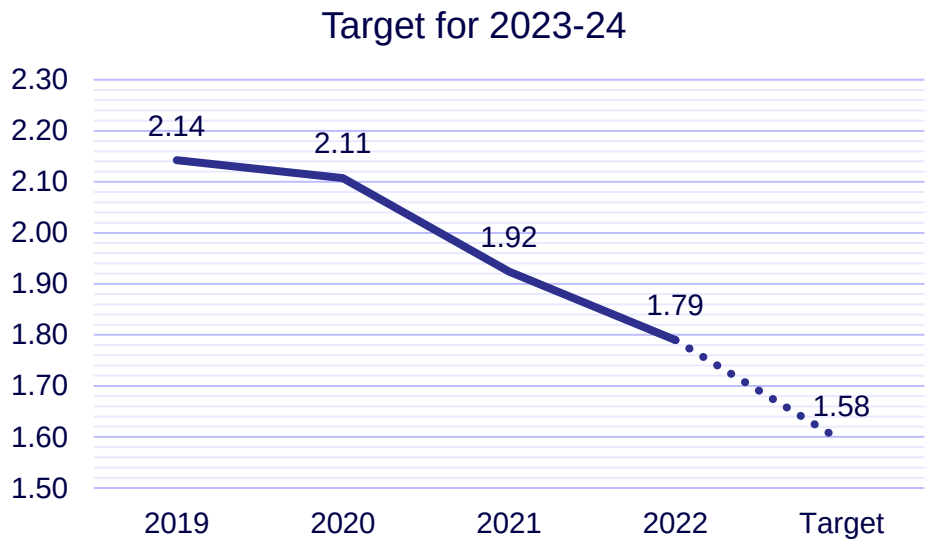
Year	Number of energy saving projects	Investments (INR Million)	Electrical savings (Million kWh)	Savings (INR Million)	Impact on PUE
2020	1	7.50	0.23	2.01	3%
2021	2	3.69	0.69	6.00	7%
2022	3	3.62	0.39	3.73	4%
Total	**6**	**14.81**	**1.31**	**11.74**	**14%**

Year	Energy savings (kWh)	PUE
2020	2,30,142	2.11
2021	6,89,916	1.92
2022	3,92,780	1.79
Total	**13,12,838**	**Reduction of PUE by 0.32**



List of major Encon project planned in FY 2023-24

Title of Project	Annual Electrical Saving (kWh/Year)	Saving in INR	Investment in INR	ROI (In Month)	Expected PUE Impact	Comment
Replace existing Chiller with Energy efficient Chiller	3,54,093	33,63,883	12,37,09,237	44	6%	Retrofit with highly efficient chiller to reduce PUE – ROI calculated on pro rate basis-DC
Replace existing primary and secondary pump with variable pump	39,344	3,73,765	88,54,218	28	1%	Replace existing primary and secondary pump with primary variable vertical inline pump - ROI calculated on pro rate basis-DC
EC Fan Retrofit for VAHU	70,080	6,65,760	10,00,000	18	1%	Retrofit of belt driven VAHU with EC Fan for low density UPS room
Air balancing and other activity	2,23,000	21,18,500	41,00,000	23	4%	Operation optimization of air flow management to reduce the PAHU operation
Total	**6,86,517**	**65,21,908**	**13,76,63,455**	**33**	**12%**	**PUE reduction expected around 12% by implementing the planned Encon projects**



Other initiatives:

- Installation of BTU meter to assess precise cooling requirement.
- Installation of pending blanking panel in empty U space of the racks.
- Installation of floor grommets to prevent hot air recirculation.
- Closing of wall/ceiling openings to avoid mix of air.

Innovative project 1: Effective operation control for PAHU optimization

Key highlights

Energy savings

2,95,779 kWh / annum

Investment

Nil

Cost savings

INR 28,09,897

Payback period

Immediate

Emission reduction

240 MT

Problem Statement

Identified improper air distribution irrespective of rack load and it leads to too cold and too warm alarm trigger in DC

Goal/Success Measure

Properly distributed the air as per the rack load requirement by doing the air balancing activity via available digital platform

Benefits

- Optimized the too cold & too warm alarm
- Eliminated the operation of 3 no. of PAHU (EC Fan) - 7 * 5.5 kW

Other Key benefits

- Stand by of 3 no. of PAHU for the same load
- Energy savings achieved and equivalent CO2 emission avoided

PAHU Operation – Before Air Balancing

Pre - Air Balancing				
PAHU Capacity	Quantity	Running	Stand by	Total Capacity
35 TR	7	7	0	245
20 TR	8	8	0	160
Total	**15**	**15**	**0**	**405**

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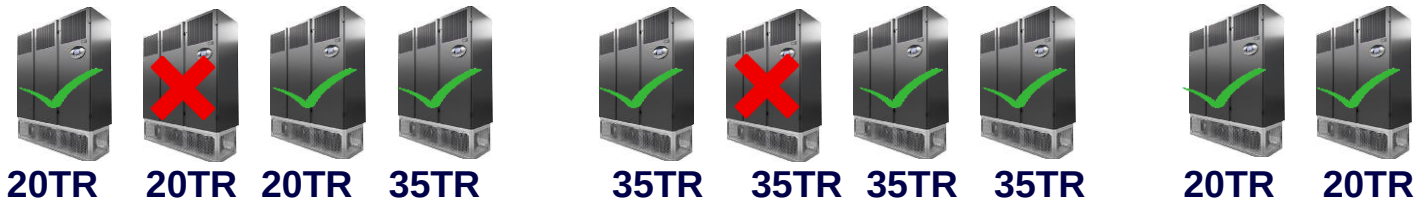
PAHU Operation – After Air Balancing



Post - Air Balancing				
PAHU Capacity	Quantity	Running	Stand by	Total Capacity
35 TR	7	6	1	210
20 TR	8	6	2	120
Total	**15**	**12**	**3**	**330**

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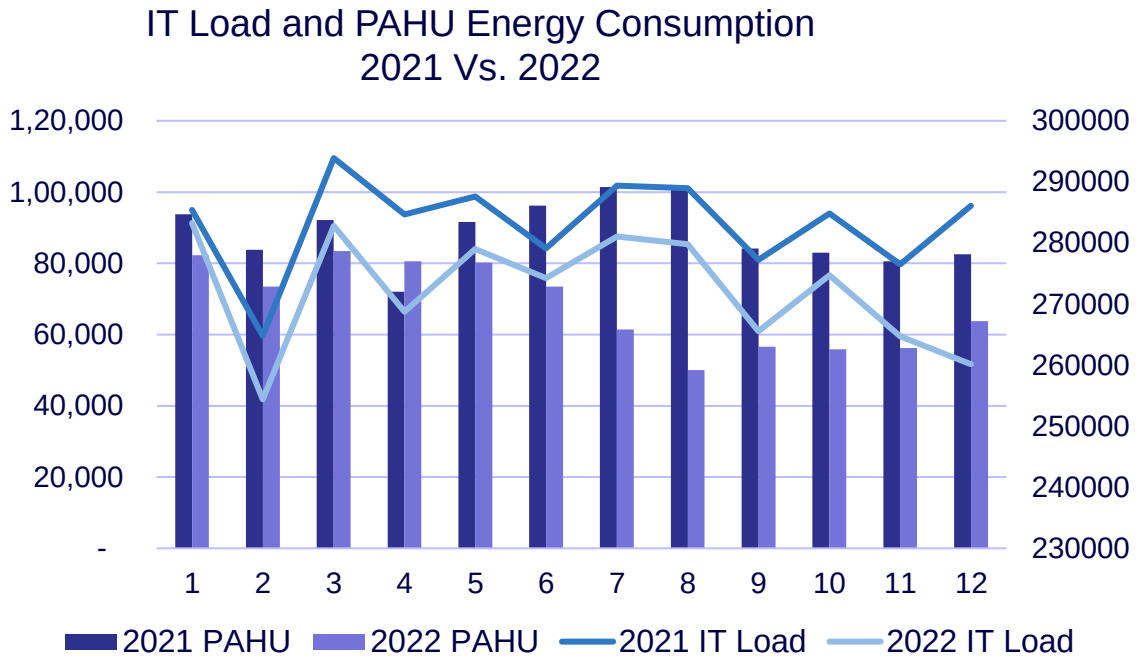
PAHU and IT Load Comparison

PAHU		IT Load		Deviation	
2021 PAHU	2022 PAHU	2021 IT Load	2022 IT Load	PAHU	IT Load
10,61,978	8,17,357	33,98,591	32,68,538	23%	4%

Alarm Type	Temperature (°C)	Humidity (%)
High	>27	>65
Low	<18	<35



- Optimization by air management has brings down the PDU alarm from July onwards
- High temperature alarm has been reduced by 5%
- Low temperature alarm has been reduced by 78%

Innovative project 2: Installation of blanking panels and floor grommets

Key highlights

Energy savings
28,673 kWh / annum

Investment
INR 31,70,633

Cost savings
INR 2,72,397

Payback period
12 Years

Emission reduction
23 MT

Problem statement

Identified hot spots and air short cycling in the datacenters.

Goal/success measure

Installed blanking panels in the empty compartments of rack and installed floor grommets to seal the gap between cables and rack base.

- Blanking panels installed : 1050 Nos.
- Floor Grommets installed : 300 Nos.

Benefits

Effective operation control for avoidance of short cycling and hot spot in the datacenter and it resulted 2.7% of energy saving on PAHU power consumption

Other key benefits

standardization of best practices.

Innovative project 3: UPS consolidation and retrofit

Key highlights

Energy savings

2,30,142 kWh / annum

Investment

INR 75,00,000

Cost savings

INR 20,10,000

Payback period

3.7 Years

Emission reduction

186 MT

Problem statement

All UPS installed are of conventional type and have crossed 12+ years operations. They cater Datacenter (low-density) load.

Setup: 300 kVA x 4Nos

Goal/success measure

Replaced the existing monolithic UPS (84% efficiency) with modular UPS – (96% efficiency) for optimized capacity.

Setup: 150 kVA x 6Nos

Benefits

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

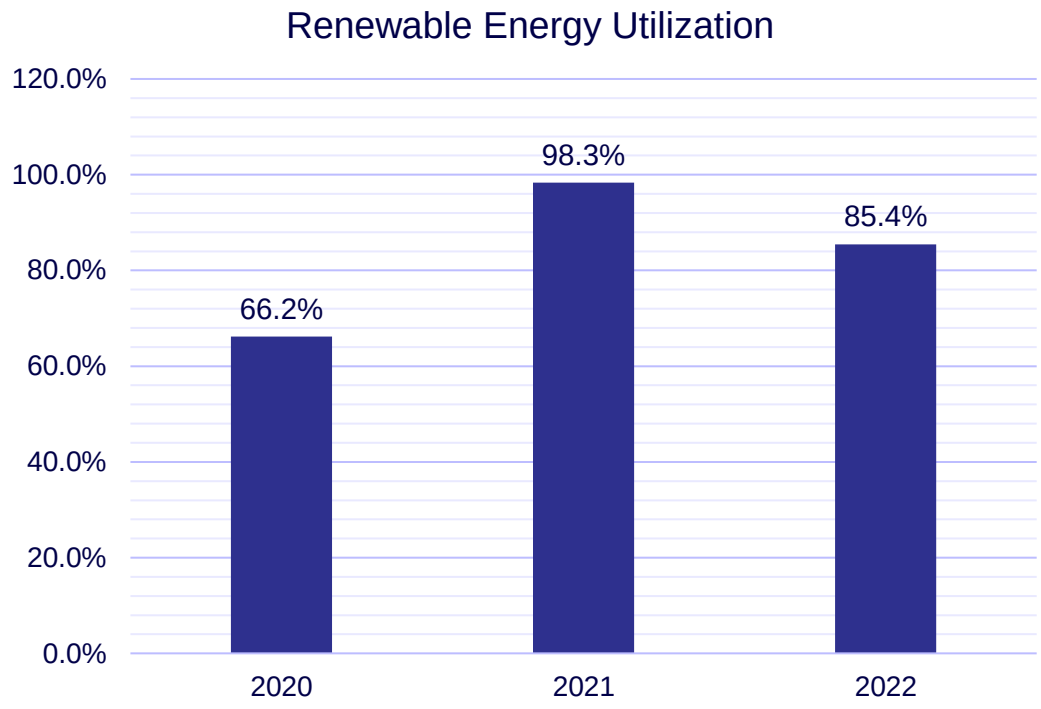
Capacity optimization by 28%, avoidance of opex and maintenance costs.

Other key benefits

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

Utilization of renewable energy sources

Source	2020	2021	2022
EB	24,73,583	36,807	7,87,934
DG	95,825	72,320	69,066
Solar	5,611	5,897	4,289
Wind	50,18,853	64,24,187	50,21,022
Total	**75,93,872**	**65,39,210**	**58,82,311**



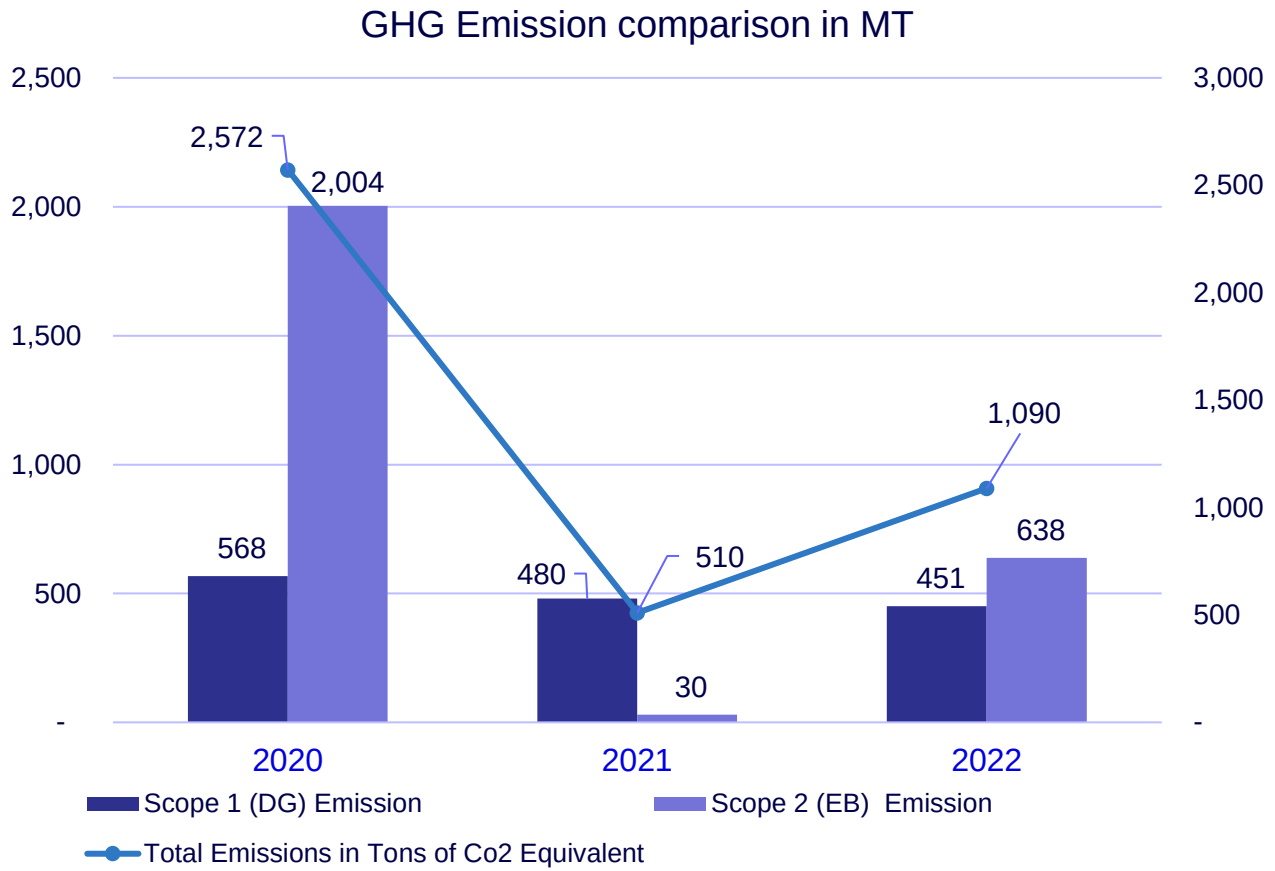
Wind energy utilization got reduced in 2022 compared to 2021 due to less wind generation and allocation

Utilization of renewable energy sources - FY 2020-2022

Year	Actual supplied wind energy quantum (Lacs kWh)	MEPZ DC consumption (Lacs kWh)	Allocation contribution (%)
2020-21	379	50	13%
2021-22	339	64	19%
2022-23	353	50	14%
Total	**1071**	**164**	**15%**

- Third party purchase under group captive agreement
- Installed capacity: 256.85 MW
- Total wind energy contracted quantum: 525 Lacs kWh
- Overall wind energy utilization in the actual supplied quantum is 15%
    - **2020 - 13% , 2021 – 19% & 2022 – 14%**

GHG emission comparison



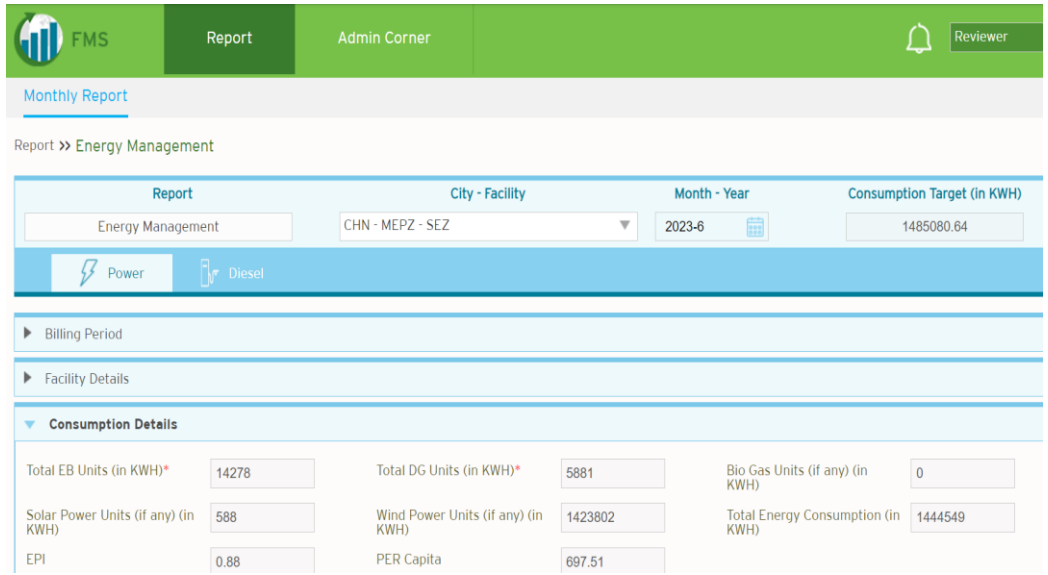
Year	Scope 1 (DG) emission	Scope 2 (EB) emission	Total emissions in tons of Co2 equivalent
2019	389	5,954	6,343
2020	568	2,004	2,572
2021	480	30	510
2022	451	638	1,090

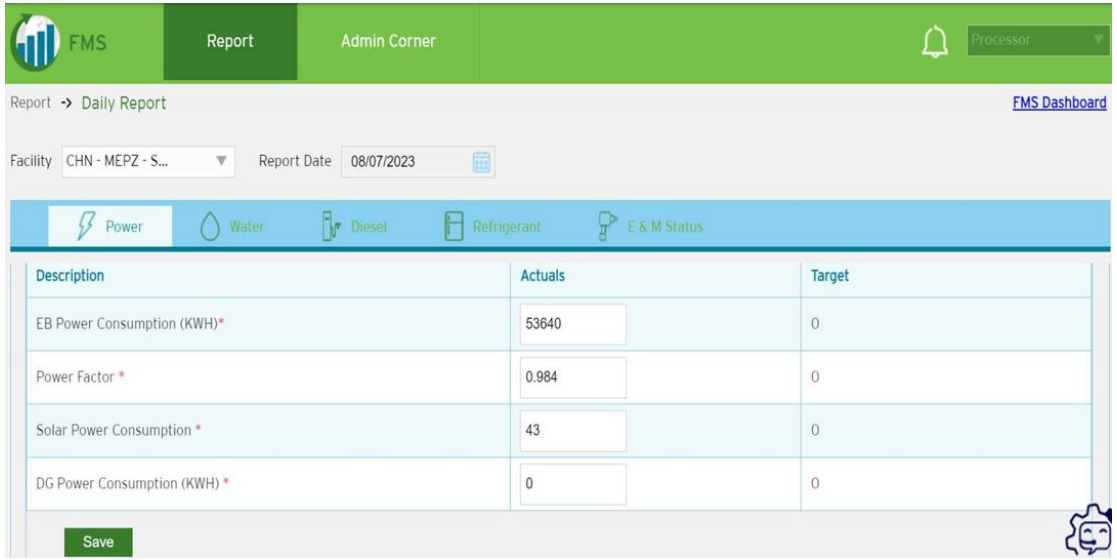
GHG Emission:

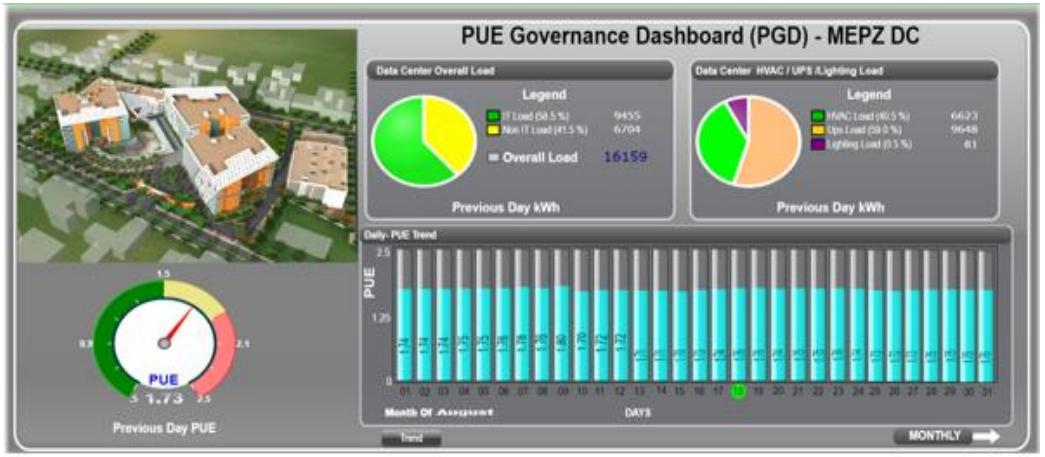
- Cognizant will source 100% renewable energy by 2026.
- Absolute emissions reduction by 50% in 2030
- Absolute emissions reduction by 90% in 2040

- Total CO2 emission has been reduced by 83% compared with baseline of 2019 (6343 MT)
- Wind energy utilization got reduced in 2022 compared to 2021 due to less wind generation and supplies

Measuring and monitoring device & tool







Daily PUE dashboard

- **<u>Daily module</u>**
- Consumption details & breakup
- Hourly breakup-transformer / DG / chiller
- Diesel consumption
- Water report
- Refrigerant status
- Equipment status

- **<u>Monthly module</u>**
- Facility details
- Consumption details
- Billing details
- Diesel consumption

Standardization of best practices

Temperature policy standard

Datacenter temperature policy standardized: **24 °C to 26 °C.**

Temperature alarm

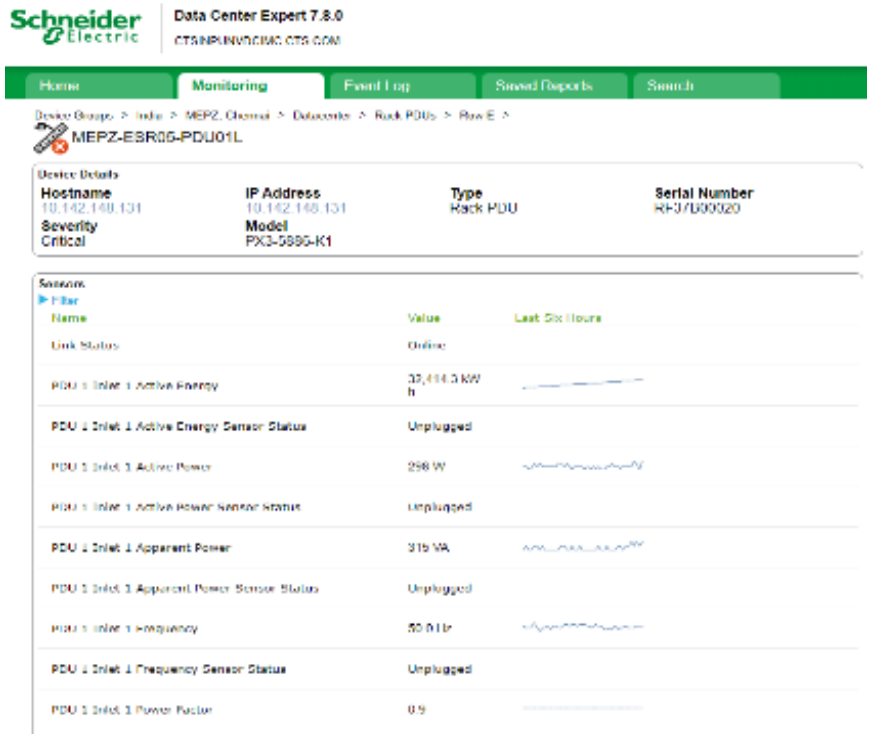
Maintaining and monitoring of datacenter high / low temperature alarm.

24 °C to 26 °C

Lighting operation

Datacenter light operation with occupancy-based operation.

Individual rack level Temperature, RH and Power monitoring



Implemented DCiM online monitoring tool for measure energy consumption for all IT-related equipment and available load on each racks. This insight helps us to reduce energy usage and costs.

Awards & Certifications

23rd National Award for Excellence in Energy Management 2022 – “Energy Efficient Unit”

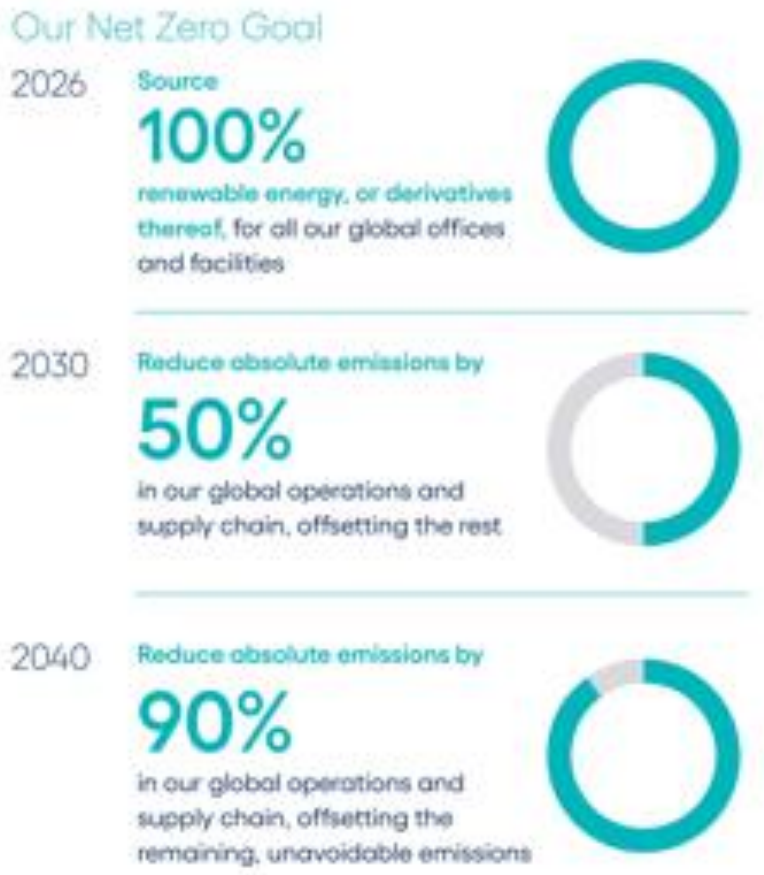
Net Zero Goal and Action Plan

- In 2021, we announced our **Net Zero Goal**, a science-based approach to eliminating or offsetting our GHG emissions in line with the Paris Agreement.

- Net Zero Goal (compared to our 2019 emissions baseline).
  - ✓ 2030 – Reduce absolute emissions by 50% in our global operations and supply chain, offsetting the rest
  - ✓ 2040 – Reduce absolute emissions by 90% in our global operations and supply chain, offsetting the remaining, unavoidable emissions

- We plan to achieve our Net Zero Goal through six main levers: Renewable energy, Green buildings, Travel reduction, Green IT and data centers, Supply chain engagement and Carbon offsets.

- In April 2022, we announced our objective to source 100% of our energy needs for our offices and facilities from renewable sources, solar and wind, by the end of 2026.



Learnings from CII Energy Awards

- Learning latest technology implemented by other competitors
- Comparing and improving performance with standard by adopting best practices practiced by best one
- Motivate us to take more initiatives in energy management for commitment towards energy conservation

Thank you