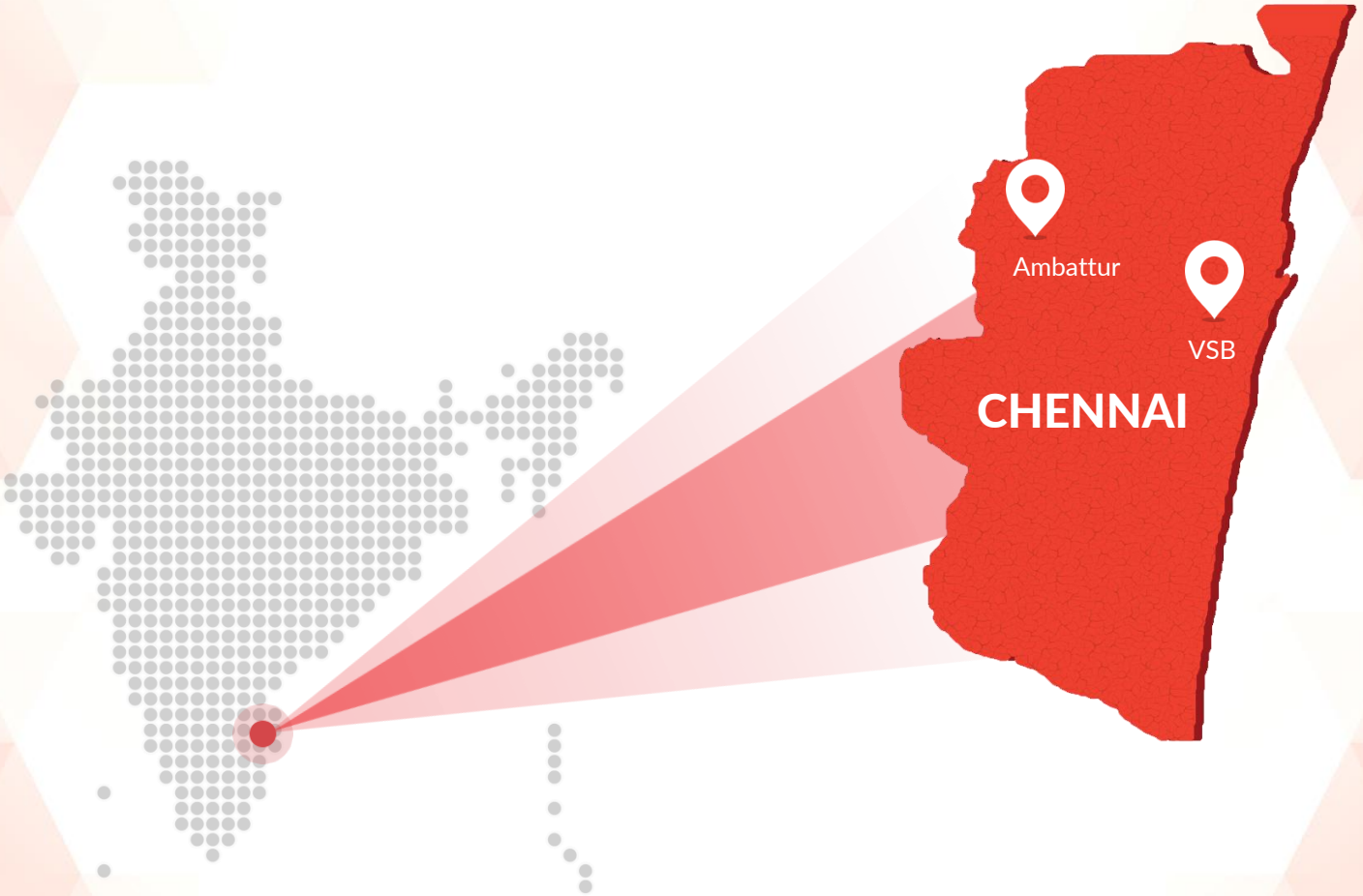

Ambattur
VSB
CHENNAI

STT Chennai DC2

Ambattur

SITE SPECIFICATION

Floor Loading – 1,500 kg/sq. meters

Heights

- Slab to Slab – 5 mts
- Raised Floor to False Ceiling height – 4.2m
- False Floor height - 0.8m

Loading Dock

- Dedicated Raised loading dock and staging area available

Elevators

- Passenger – 3 Nos
- Freight elevator – 2 Nos
- 2 x 3 Ton capacity,

Certification For **Green Data Centre's**

IGBC GREEN RATING — INDIAN GREEN BUILDING COUNCIL — IGBC — GOLD

CERTIFIED

CEEDA — Certified Energy Efficient Datacenter Award

CEEDA GOLD

CII — Confederation of Indian Industry

Indian Green Building Council (IGBC)

hereby certifies that

Tata Communication Regional Office & Network Centre

GK-1, New Delhi

has successfully achieved the Green Building Standards required for the following level of certification under the IGBC's Leadership in Energy and Environment Design (LEED) India Green Building Rating System

IGBC's LEED India for Core & Shell Gold

June 2015

C N Raghavendran	Dr Prem C Jain	S Raghupathy
Chairman, LEED India	Chairman, IGBC	Executive Director, CII-Godrej GBC

CII — Confederation of Indian Industry

Indian Green Building Council (IGBC)

hereby certifies that

Ambattur New Building Block

Chennai

has successfully achieved the Green Building Standards required for the following level of certification under the Leadership in Energy and Environment Design (LEED) India Green Building Rating System

LEED India for Core & Shell Gold

February 2012

C N Raghavendran	Dr Prem C Jain	Jamshyd N Godrej
Chairman, LEED India	Chairman, IGBC	Chairman, CII-Godrej GBC

STT Chennai DC2

Ambattur

POWER SYSTEM

Utility Power
- 2 X 110 kV feeders with substation on site
- N+1 transformers Bank
- Campus scalable up to 25 MW of IT Load

UPS
- Distributed Redundant (N+N/2) for each server hall with up to 13 mins of battery backup
- Concurrent maintainability no Single Point of Failure

Generator
- N+1 configuration

Fuel Tanks
- 135 KL U/G fuel tanks
- 16 hrs. backup on full load

Design Uptime
- 99.982% of power uptime in line with tier-3 specifications

STT Chennai DC2

Ambattur

ENVIRONMENTAL

CRAC/HVAC
- N+1 for each server hall
- Water cooled chiller system

Humidity Maintained – 35 to 70 %

Temperature
22 to 27 degree Celsius, customer specific to ASHRAE guidelines

Fire System
- Smoke detectors and VESDA for fire detection
- Inergen for fire suppression

STTelemedia Global Data Centres

Sustainable Initiatives @ Chennai DC-2

Water Recycling

Renewable fuel ready

Located in Green zones

Reduces carbon footprint

India's largest onsite solar power farm

Power from green sources

34% energy from renewable sources and increasing

New Green Captive Power generation system

Sustainable Initiatives @ Chennai DC-2

1.Renewable Energy

Meeting the present demand of our business require us to consume energy—primarily electricity—to power our data centres. Challenging climate change requires the world to changeover to a clean energy. That's why we have made it a top priority not only to become more energy efficient, but also to ensure the energy we purchase comes from clean sources, such as renewables.

STTelemedia GDC India is one of the largest user of renewable energy in India majorly from solar and wind power producer. To date, we've contracted to purchase **119.95 million of KWH** renewable energy for our Ambattur DC -2 facility and objective to reach more than the present usage of renewable energy.

Through we are looking beyond our business to drive wide-scale adoption of renewable energy. We're supporting new energy purchasing models such as our pioneering commitment to long-term contracts to buy renewable energy directly from developers (power purchase agreements, or PPAs) and our support of renewable energy purchasing programs with utilities.

Chennai DC-2: ~ 60 % of our Site Energy is from Renewable Sources

30MW dedicated OFFSITE solar plant with Grid tied concept

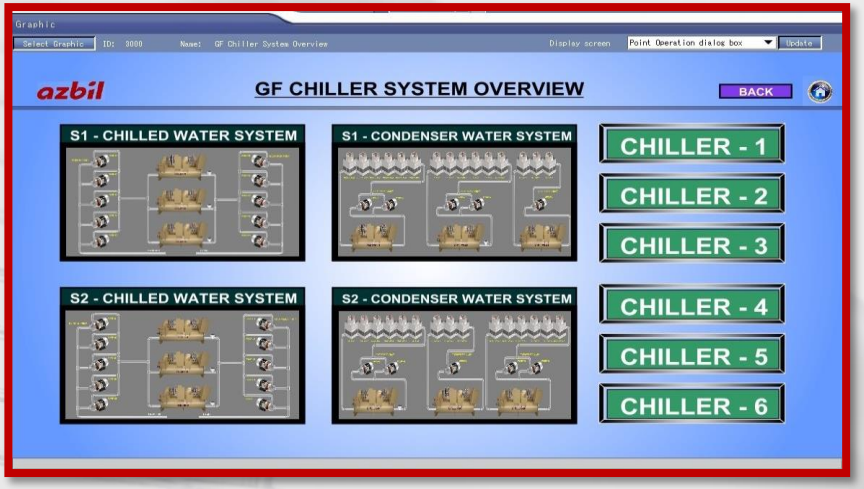
Site Building roof top 250 KW Solar Plant Grid tied

Green Supply Chain: STT GDCI is procuring Renewable Energy (Wind & Solar Power) both from onsite & offsite sources (under Open Access route) and year on year has rapidly increased its green power portfolio. Presently we are meeting our green power through 22 PPA entered with reputed green Power Suppliers.

Sustainable Initiatives @ Chennai DC-2

2.Cooling Infrastructure efficiency

- Data centre ~ 33% Energy utilization by cooling infrastructure – Hence our focus is high on the cooling infra right thro Design , Equipment's selections, Operations to achieve the higher efficiency and energy conservation
- Water cooled System with economizer high efficient water – Cooled chillers offers 0.52 TR for 1 KW of IT Load
- Selection of the Chillers and all associated equipment's are with high efficiency with highest Quality
- All secondary pumps & Cooling towers with VFD
- Automatic SCADA based Chiller Management Systems which improves the efficiency
- Periodic Energy audits to evaluate the Chiller efficiency & tracking
- Effective and periodic maintenance which includes validation of Quality of the water and to ensure no water wastage's and to ensure the UPTIME



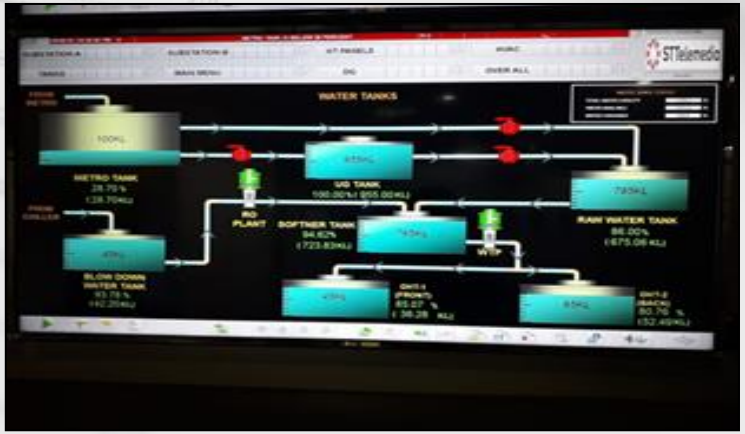
Sustainable Initiatives @ Chennai DC-2

3. Water recycling

We reduce our water consumption by installing water-recycling technologies and using recycled water for the water cooled chiller cooling tower purpose.

Project initiated to reuse 60% of the cooling tower blowdown water back to cooling tower make up.

Commissioned 100 KL RO plant to reuse 50 % chiller cooling tower blowdown water. Saving of 18 MLD of water per Annum



SCADA Based Integrated water management Systems

Native or adapted plants for landscaping require less irrigation.

Usage of water efficient fixtures saves water.

Dual Flush toilets

Waste water treated to tertiary standards on site

Treated water reused for irrigation and flushing reduces water usage by 30%.

Sustainable Initiatives @ Chennai DC-2

S.no	Title of project	Annual Electrical Saving (kWh)	Annual Electrical Cost Saving In ₹	Annual Thermal Saving Quantity	Annual Thermal Cost Saving	Total Annual Savings	Comments BRIEF about Project
1	Chiller descaling	345600	2764800	-	-	2764800	The chiller condenser approach is more than 6.5 °C at 80 % load condition. We started condenser descaling as per the our standard procedure and bring to the approach below 1.5 °C at above 90% of load chiller run tested **Benifits of De-Scaling** 1. Refrident pressure decreased, 2. Chiller effciency increased, 3. Condensor approach de-creased, 4. Chiller laoding in full load
2	Cooling tower fills	6480	51840	-	-	51840	We replaced cooling tower fills due to ageing factor and also the fills started broken as small pieces. And that small pieces blocking the condenser tubes it will cause of major damage in condenser tubes **Benifits of De-Scaling** 1. Refrident pressure decreased, 2. Chiller effciency increased, 3. Condensor approach de-creased, 4. Chiller laoding in full load
3	CAC Implementations			-	-	0	
4	Chiller automation	-	-	-	-	310447	To implement effective remote monitoring and reduce the man power.
5	SCADA integration – Automation (Monitoring)	-	-	-	-	301632	To implement effective remote monitoring and reduce the man power.
6	Water conservation	-	-	71	6887	6887	Initial stage Overflow line, which is closer to the height of tub level hence some quantity of water always flows to the drain line through the over flow line while running due to turbulence effect
7	RO Plant	-	-	5852	567644	567644	RO Plant implemented for Effective water conservation and cooling tower blow down water Recycling.
8	Drift eliminator in Cooling tower	-	-	3	291	291	BELL Cooling tower water drift loss seams high while running condition, because its constructed without louvers ,Hence we provided extended louvers around the Cooling tower which is fixed above the cooling tower base tub and near fan suction level , drift loss reduced and performance not affected.
9	LED fittings replacements	7741.44	73543.68	-	-	73543.68	For energy saving purpose all 36W Flourecent lamp replaced by 20W LED lamp
10	CRAC with EC fan and PIDC valves	207360	1658880	-	-	1658880	For Energy saving and improved cooling efficency, Noise reduction, and valve cut off & cut in purpose Q1 CRAC room 30TR PEX unit replaced 30TR PAHU unit

Sustainable Initiatives @ Chennai DC-2

S.No	Title of project	Power Consumptions in kWh/day	Annual electricity cost Savings in INR	Comments brief about project
1	Reduction of Load in new ACC	1550	₹ 48,00,000.00	
2	Occupancy sensor installation for lighting systems (Investment calculated for 350 Sensors)	455	₹ 14,11,637.50	We provided occupancy sensors to avoid the lights glowing in non-movement areas.
3	Switch OFF Dx units in GF Substation	250	₹ 7,75,625.00	
4	Optimization of UPS and Battery Room Temperature	240	₹ 7,44,600.00	

Sustainable Initiatives @ Chennai DC-2

4.Data Centre best practises

- Improved the effecting operations of new air cooled chiller by optimizing the de-coupler line and secondary pumps speed.
- Implemented the occupancy sensors for all the floors to control the lighting systems.
- Eliminated one of low efficiency UPS and this UPS load migrated to other HVAC higher efficiency UPS.
- AHU automation implanted in all battery room AHUs.
- Optimizing the CRAC units set points and air balancing in the data hall

Sustainable Initiatives @ Chennai DC-2

5.Aisle Containment

- ❑ Strictly adopted hot and Cold Aisle containment in to the complete DC raised floor area's i.e. all 2 L sq. Ft of DC

- ❑ Well-designed air flow management systems (cold and hot aisle system), we have minimized hot and cold air mixing leading to lesser energy consumption

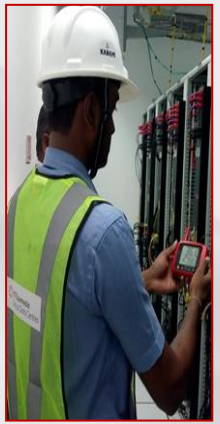
Key highlights :

CRAC – Supply temperature setting was 18 Deg C (Without CAC)

Post Containment – CRAC Supply Temperature setting at 23 Deg C

CAC helps to eliminate the air leakages , Improves the Delta T

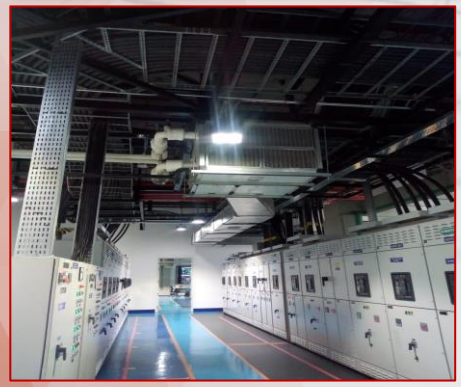
- Supply air measured in all CAC – 22.4 Deg C
- Return air measured in all CAC – 37 Deg C
- Delta T : 14.6 Deg C which is matching with the CRAC Design
- Humidification and dehumidification Cycle reduction
- Resulting high efficiency of the Cooling Infrastructure



Sustainable Initiatives @ Chennai DC-2

6.Campus Lighting & Parking roof on Solar Plant

- Entire Campus < 2 Acres > lighting is powered Via Solar
- Energy efficient lighting fixtures – LED's
- External Pavers and parking roof with high solar reflectance



Sustainable Initiatives @ Chennai DC-2

7.Planting ,STP & Rain water harvesting

- ❑ our intend and initiatives are inline with Green Campus
- ❑ Planting in many occasions
- ❑ Rain water harvesting
- ❑ Recycling of water by Sewage Treatment plant (STP) installed at major location. Recycled water is used to non-potable purposes

Sustainable Initiatives @ Chennai DC-2

8.Management of Hazardous Waste

- Batteries are recycled as per the Battery Management rules

Battery Cells disposal completion @ 17.2 Tonnage

- Hazardous waste (like used lube oil) is recycled through authorized recyclers

Waste lube oil disposal completion 8.6 Tonnage

- Strict enforcement of plastic management rules.

STT GDC India Operations –Approach

Datacenter Energy Efficiency improvement

Cooling Infrastructure Energy Efficiency Strategy

Cooling Tech Refresh

- Condenser + ODU
- CRAC + AHU's
- Explore Adiabatic
- Explore RDHx

Chiller efficiency improvement

Cooling Tower Efficiency improvement , VFD for Cooling tower motors with Temp.control

- HVAC efficiency drive

Best Practice-PUE Improvement

Qualitative Assessment of datacenter facility.

Equipment Optimization Approach, Efficiency Improvement, Site GAP –Improvement assessment

Provides recommendation of best practices for efficient functioning of DC

Best Practice –PUE Improvement

CAC /HAC Deployment + Tightening , Air Balancing

To FIX Blanking Panels in unused rack Space

Concealing of Air leakage, Temp Control at CRAC Rooms

Replacement of Return Air Grills, Cable dressing Management

Water Side

To start measuring – WUE

RWH , Cooling tower – Blow down water recycling , Auto-chemical dosing system,, Low flow fixtures on Taps

ZLD (Zero Liquid Discharge) Adherence

Assessment on Chillers temperature set points

Electrical Infrastructure Energy Efficiency Strategy

UPS Replacement + Consolidation

Continual PF improvement

Improve energy efficiency by controlling power use across the data center

Replacement of Conventional lights with LED lights, Motion Based lighting ;

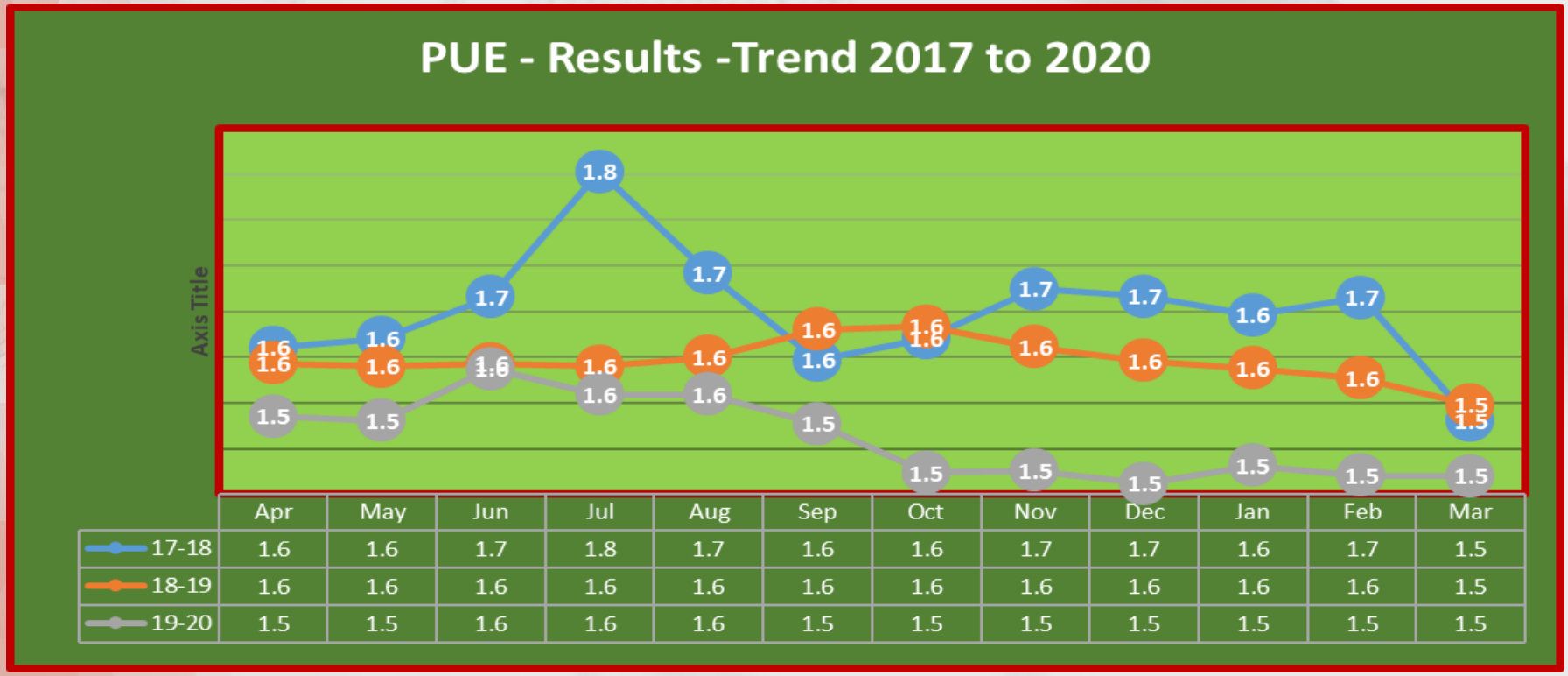
Solar Based Street Lightings

CUE Monitoring and control

DC Energy Savings /Greening

Sustainable Initiatives @ Chennai DC-2

Results 1. Site PUE

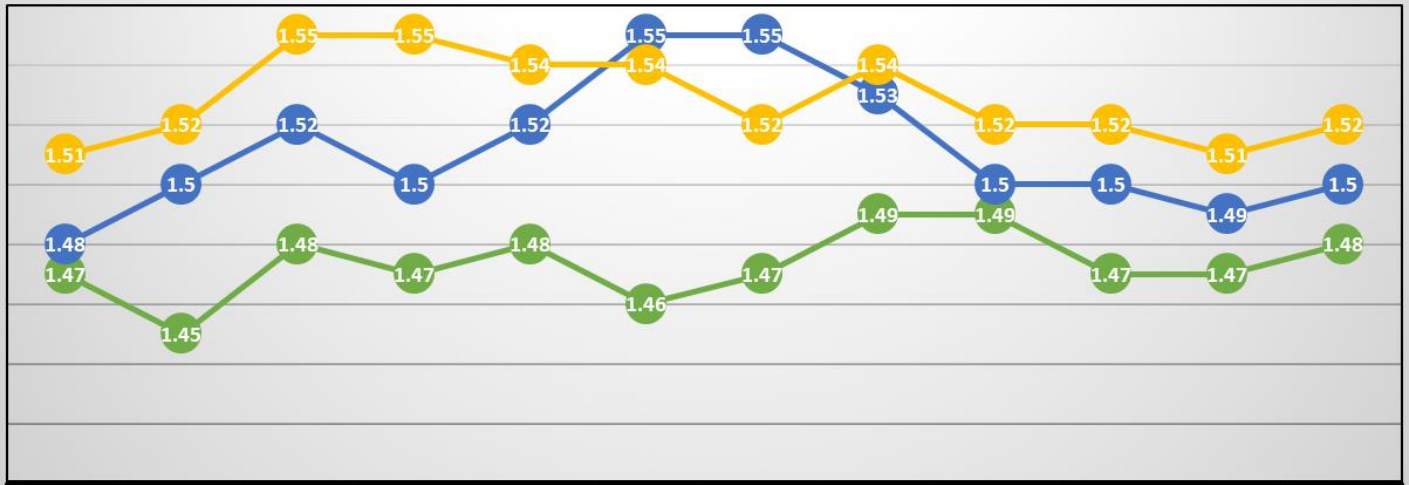


	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
17-18	1.6	1.6	1.7	1.8	1.7	1.6	1.6	1.7	1.7	1.6	1.7	1.5
18-19	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5
19-20	1.5	1.5	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5

PUE is consistent although IT load ramp up

Sustainable Initiatives @ Chennai DC-2

PUE - Result - Trend 2020 -2023



	January	February	March	April	May	June	July	August	September	October	November	December
FY 20-21	1.47	1.45	1.48	1.47	1.48	1.46	1.47	1.49	1.49	1.47	1.47	1.48
FY 21-22	1.48	1.5	1.52	1.5	1.52	1.55	1.55	1.53	1.5	1.5	1.49	1.5
FY 22-23	1.51	1.52	1.55	1.55	1.54	1.54	1.52	1.54	1.52	1.52	1.51	1.52

PUE is consistent although IT load ramp up

Data Center Facility Energy Data

Parameters	Units	FY20 – 2021	FY21- 2022	FY22- 2023
Annual Electrical Energy Consumption, purchased from utilities	kWh	8,15,94,178	12,97,97,580	16,30,38,387
Annual Electricity Generation (in-situ), through Diesel Generating	kWh	2,61,846	4,90,438	4,31,006
Annual Renewal Electricity (Solar + Open access)	Kwh	5,87,43,464	5,96,24,863	5,53,26,789
Total Annual Electricity Consumption, Utilities + DG/GG Sets + Renewal	kWh	14,05,99,488	18,99,12,881	21,87,96,182
Annual Cost of Electricity Consumed from utilities :	million INR	834.3	1,265.5	1,763.0
Annual Cost of Electricity generated through DG/GG Sets	million INR	5.7	10.6	14.2
Total Annual Electricity Cost, Utilities + DG/GG Sets	million INR	839.9	1,276.1	1,777.2
Built Up Area	Sq.m	35,396	35,396	35,396
No of floors in the building	Level	G+7	G+7	G+7

GHG EMISSION TREND

GHG EMISSION TREND						
CO2e year	Scope 01	Emission factor CO2e / unit = 2.70	Scope 02			Total Emission, CO2 in tons
	Fuel consumed in litters	Total GHG emission in TCO2e	EB Energy consumption in kWh	Emission factor CO2e / unit	Total GHG emission in TCO2e	
FY 2020 – 21	1,74,907	473	64872640	0.793	51444	51917
FY 2021 – 22	1,04,279	282	36530744	0.71	25937	26219
FY 2022– 23	1,56,965	425	9402971	0.71	6676	7101

Results: Sustainable Initiatives

Results 2.Summary

- ***Green and Smarter Energy Transformation of our Data centres i.e. 34 % of Energy usage on renewable's – Wind, Solar etc & The usage of renewable energy is expected to grow up through our continual PPA approach***
- ***Selection of High efficiency -next generation technology Equipment's such as UPS, Cooling etc to enhance our Energy conservations***
- ***Smarter Water conservation – Rainwater harvesting and recycle i.e.336 KL water savings annually***
- ***Potential Energy savings opportunity Via our smart Energy usage and minimising the losses 0.8 mw Potential savings opportunities thro energy efficient drive***
- ***Huge reduction on Carbon <CO2> footprint reduction***
- **Emissions: During the financial year ended 31 March 2020, our onsite and offsite green energy ventures have resulted in 108,820 tonnes of CO2 savings.**

Sustainable Initiatives

Results 3.Summary PAN India PUE improvement

- 1038.56 KW
- 8973158.4 KWH Annual

Energy Savings Opportunity

- Cost Savings & Avoidance
- Opex optimization

Cost Savings Opportunity

- 108,820 tonnes
- ✓CO2 avoidance

Carbon Emission reduction


Thank You