STTelemedia

CII ENERGY AWARD 2023

STT GLOBAL DATA CENTRE

DELHI DC GK1 INDIA

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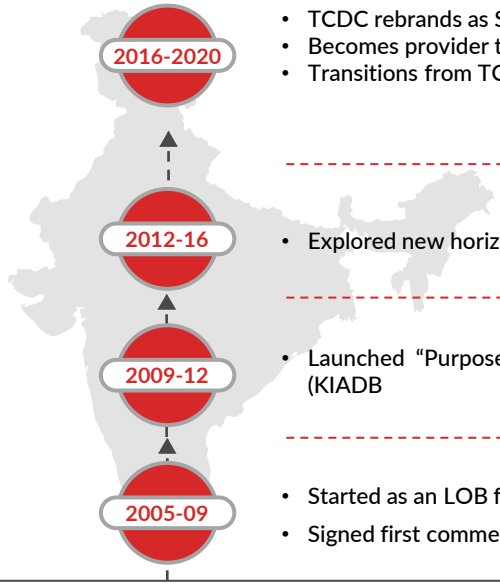
STTelemedia Global Data Centres

A COMPANY OF ST TELEMEDIA

STT GDC INDIA-OUR GROWTH STORY



2016-2020
- TCDC rebrands as STT GDC India in 2016
- Becomes provider to hyper-scalers
- Transitions from TCL shared services
- Self-sufficient STT GDC India sets sail with new vision
- Opens India's largest data centres
- Recognized as India's best DC operator

2012-16
- Explored new horizons

2009-12
- Launched "Purpose-Built" DCs in Mumbai (BKC), Pune and Bangalore (KIADB

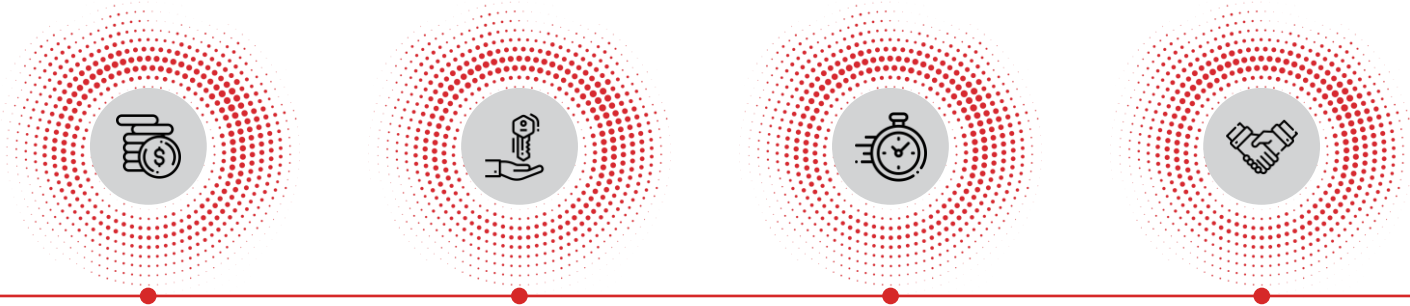
2005-09
- Started as an LOB for TCL, offers DC Colo services from VSB's
- Signed first commercial Colo deal in 2005

Key Achievements

9 Cities	**21** Data Centres	**>3.8** Million sq. ft.	**1000+** Customers	**>36%** Green Energy	**>200MW** IT Load	**30%** India Market Share	**350MW+** Power Load	**2.7X** Revenue Growth	**5.4X** Capacity Growth

OUR UNIQUE FEATURES

Most Credible Colocation Provider with Least Risk



Financially stable
strong reputation
and brand

No tenancy risk
Land parcels, large
capacities on short notice

Proven delivery track record
always On
Time delivery

Closest to customers
multi-city presence in India
and overseas

Network rich & carrier neutral
all DC Campus are also
PoPs

Design Excellence
strategic locations, high voltage
tap, enterprise grade

Operations excellence
decades of experience, low
maintenance window

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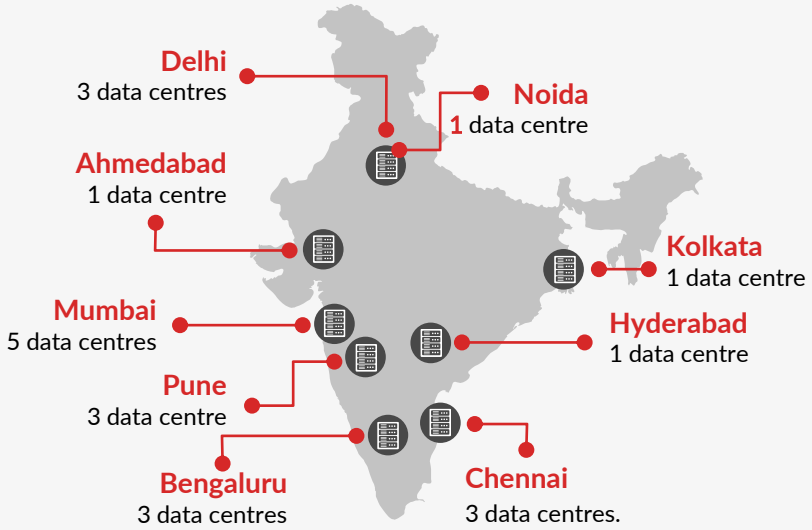
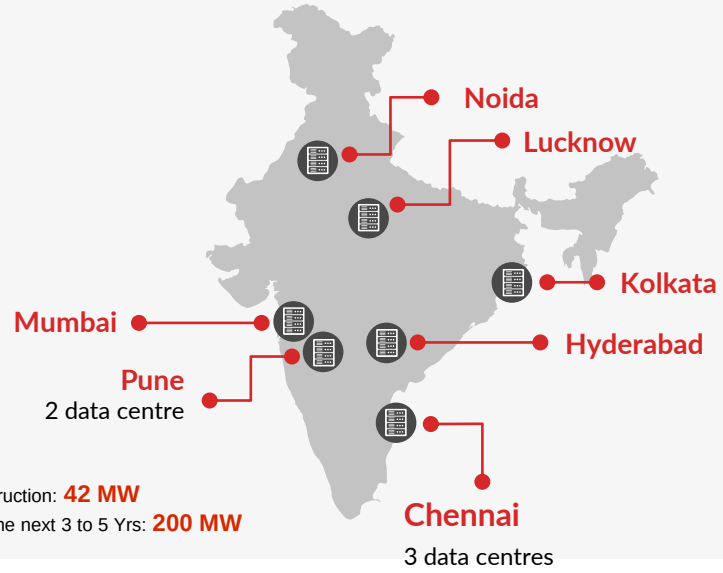
HOW IS STT GDC INDIA RIDING THE GROWTH WAVE ?

Operating since 2004 in India, 33% market share in India colocation market. 21 DCs in 9 cities, 220 MW IT load projected to double in 3 years.

21 DCs with 200 MW IT load



Upcoming DCs, total 2x of current IT load



Under construction: **42 MW**

Planned in the next 3 to 5 Yrs: **200 MW**

* included under construction facilities

RESILIENT AMIDST COVID-19

Overcoming Challenges with Strategy

5-PRONGED STRATEGY TO DEAL WITH COVID-19 AND LOCKDOWNS

DC Operations

- Coordinating with authorities
- Guaranteed customer support
- Ensuring safety and wellbeing and morale
- Facilitating OEM support
- Providing mobility and people availability

Employees

- Enablement with Collaboration
- Tools and Processes
- Remote Working for non-Ops Staff with timely advisories & engagement
- Health & Safety Initiatives – Advisories, Medical Tie-Ups and related Support

Customers

- Timely customer communication
- Proactive identification & address of churn/ downgrade prospects
- Focus on positively impacted sectors
- Proactive Customer Support
- Virtual A/c engagement

Projects

- Delivery acceleration for Top 10 customers
- Vendor engagement for prioritised supply resumption

Liquidity

- Adequate cash reserves maintained
- Completed FY closure on time despite remote working
- Managed to Waive DSCR Covenants
- Ensuring Collections – AR under was control

The Social

CII Gold A
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India's
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DC Initiatives
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2022

Centre
the Year

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2019/2021

rd 2019/2021

st in India

Energy Smart Award

CEO of the Year 2018
For Excellence in IT

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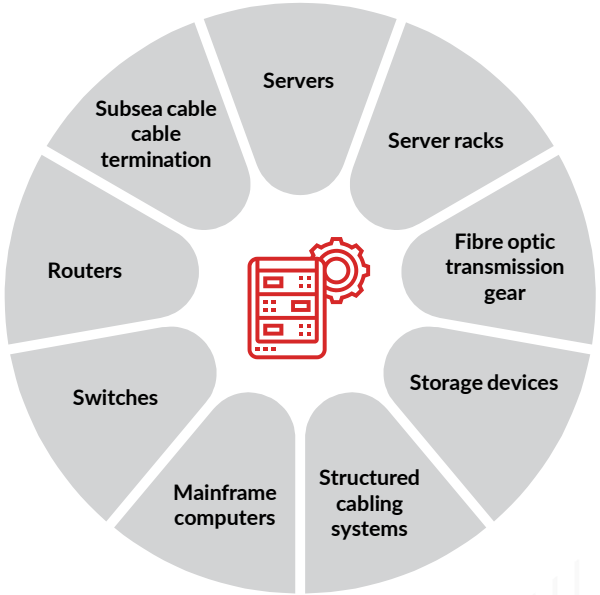
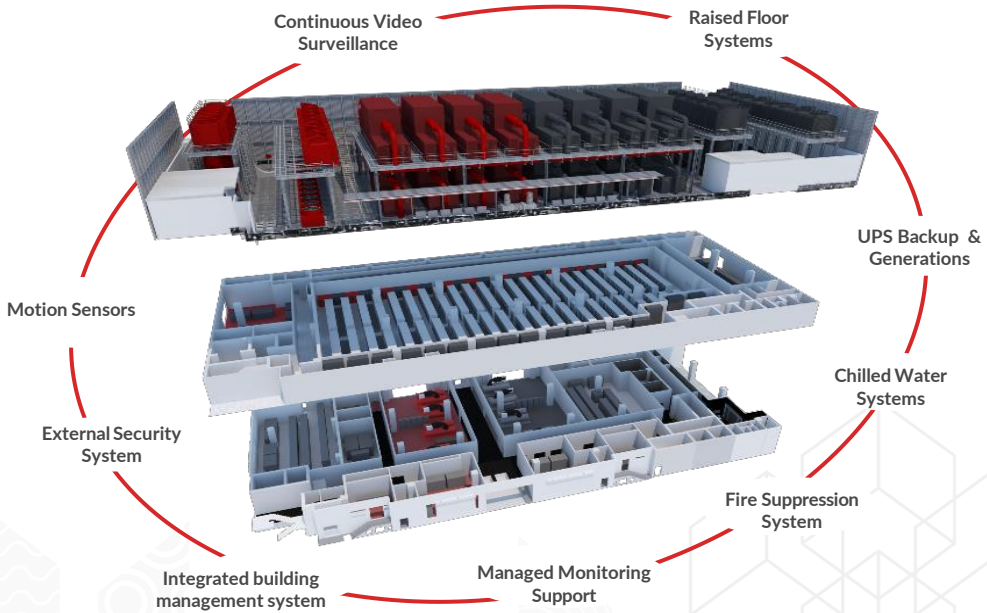
DATA CENTRE EQUIPMENT AND INFRASTRUCTURE

Highly specialized facilities designed to support the operation of customers' critical systems, networking, storage and information technology requirements

Data Centre Equipment



Infrastructure for Operations



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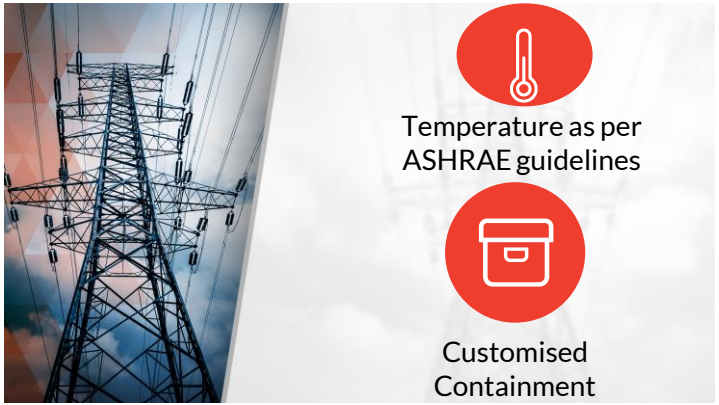
Energy Efficient Data Centres



Temperature as per ASHRAE guidelines

Customised Containment

Chiller based cooling

Optimal power consumption by computing resources

Less wastage = cost savings

STT GDC India -Operational Excellence

STTelemedia Global Data Centres

- Launch of Mock drills Practice with Various Simulated Scenarios FY22 ~ 180 Mock drills completed
- LoL – Learning over Lunch – Specific to Site SOP's and Practicing FY22 ~ 86 LoL Completed
- Weekly Action Tracker – for the Site rounds and observations to action on proactive measures
  | 9213 Observations , 586 WIP |
- Established formal waste management policies and procedures for hazardous and non-hazardous wastes, General Waste , Hazardous Waste and E waste Disposal completed Value INR 14.054 Cr Benefit till end of Feb 2023
- SOP's & RCA Standardization with the Quality Improvement , Simplified Block Diagrams , Site Walk thro Postures
- PMO – Key Projects drive and timely execution
- Dynamic Risk Register (DRR) Tracker and Monthly review , Operations Comprehensive Monthly dashboard and Publish
- Standardization of Energy measurements and Calculation formalized and practiced with the Uniformity Approach
- Various PoC Set ups and evaluation at our COE Centre (UPS –Li-ON Battery)
- Introduction of C10 Battery discharge Maintenance Program Across Sites , to check the health of Battery cells
- Automation Drive – Electrical Control and Mechanical Control Systems Implementation including the Complex VSB Sites

STT GDC INDIA ENVIRONMENTAL, SOCIAL, AND GOVERNANCE (ESG)

- STT GDCI and Group has Committed to be Net Carbon-Neutral by 2030
- 36% of our Electricity consumption is derived from Zero-Carbon Renewable Sources
- We are constantly updating our data Centre's with more efficient technologies and are implementing energy-saving initiatives to improve our PUE
- Women empowerment -Successful integration of women in mission critical operational roles
- Fostering a safe and diverse workplace
- 0 TRIR across our operations 3 years in a row

- Rainwater harvesting pits provided at the Storm water drains .At Delhi DC GK1 we have 24KL capacity of under ground storage for Rainwater.56KL to discharge the rainwater in ground and 100KL STP plant.
- We have the underground storage tank capacity of 2Lakh KL.
- We reduce our water consumption by installing Water-recycling technologies and using recycled water for all NON-IDC purposes.
- Tech refresh with zero / low Ozone depletion potential refringent (Ex. R22 gas is getting phased out)

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A CLOSER LOOK

into our state-of-the-art, certified and hig
reliable data centres in Delhi

VSB

GK1
CAMPUS

DC 2– KEY FEATURES

Plot Area (In acres)
~127 acres

Floor Loading
1500kg/Sq.Mts

Floor Height
4.42 Meters Height accommodate , up-to 48U racks.

Power Path
Dual power feed from 220 KV Substations with Diverse Route

DC Hall
6 DC Halls with designed IT load of 6MW

DG Set
5nos of 2.5 MVA DG Set with N+1 redundancy

Building
Purpose DC buildings, G + 5 Building

Floor Plate (in sq. ft.)
32,000 SFT approx

Security
5 Layers of Physical Security

Fibre paths
3 Nos of Fibre path with Multiple MMR Rooms

IT Power Capacity
9 MW of IT Load

UPS resiliency
UPS with N+N (System + System) redundant topology

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STT Delhi

GK1 POWER SYSTEM

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Dedicated 33kV onsite substation

Two express feeders- Masjid moth and Nehru place, tapping from 220kV main substation

Installed 2nos HT 33kV Distribution panel outgoing to 5Nos Transformers.
-HT-1 Outgoing – TRF1, TRF2, and TRF4
-HT-2 Outgoing – TRF3 and TRF5

Remotely operation of both HT-1 and HT-2 panel

SCADA Integrated with IBMS System for remote monitoring

2500kVA, 33/0.433kV 5nos Transformer for Substation.

DG YARD

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Design and installed for LT DG set of 2500kVA x4 (cummins) and 2500kVA x1 (sterling) DG feeding to MLTP 1 to MLTP 5

DG with N+1 redundancy & seamless power restoration when changeover from DG to EB.

Installed 5nos DG day tank for diesel flow with capacity 990 Liters.

Installed coil cooler system for 2nos of DG and 3nos DG have cooling tower system

Integrated with IBMS to monitor critical DG parameters

CCTV installed around the DG area for 24x7 monitoring

STT Delhi

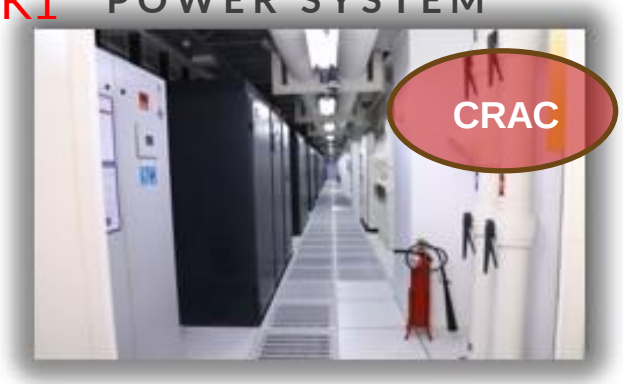
GK1 POWER SYSTEM

Battery Bank

Lithium-Ion battery 51.52V/64Ah - 10 no'sx6 battery banks for UPS 800kVA*8.

Battery backup for UPS rooms VESDA system installed for early fire detection

Rooms are protected by Novec 1230 Gas for Fire Suppression system
LMS battery health monitoring system (BHMS) configure with IBMS



CRAC/HVAC
- N+1 for each server hall
- Air 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

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Sustainable Initiatives @ STT Delhi GK1

Water Recycling

Lithium-Ion Battery Bank Installed

Located in Green zones

Reduces carbon footprint

Onsite Solar panels installed

Power from green sources through Solar and Hydro

65% energy from renewable sources and increasing

New Green Captive Power generation system

UTILIZATION OF RENEWABLE ENERGY SOURCE

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 and Hydro power producer. STTelemedia GDC India are using app. 36% of our Energy from renewable Energy sources .In Delhi GK1, 3 MW from Hydro plant through Open Access and 625kw onsite solar generation contributes app. 65% share of total consumption.

Site Building roof top alongwith forest area 625 KW Solar Plant Grid tied

625KW Solar installed onsite

3MW Hydro through OA

Green Supply Chain: STT GDCI is procuring Renewable Energy (Hydro, Wind & Solar Power) both from onsite & offsite sources (under Open Access route) and We will be increasing our Green Energy Percentage by 75% by next year

Delhi GK1: ~ 65 % of our Site Energy is from Renewable Sources

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GHG EMISSION TREND and NET zero Emission

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ENERGY DATA

Parameters		2020-2021	2021-2022	2022-2023
Annual Electrical Energy Consumption, purchased from utilities	kWh	17665063	12086472	24675198
Annual Electricity Generation (in-situ), through Diesel Generating (DG)/Gas Generating (GG) Set(s)	kWh	123481	161096	256279
Total Annual Electricity Consumption, Utilities + DG/GG Sets	kWh	17788544	12247568	24931477
Annual Cost of Electricity Consumed from utilities	million INR	21.5066593	17.3097613	32.6753355
Annual Cost of Electricity generated through DG/GG Sets	million INR	7.52863657	13.92352728	25.23066755
Total Annual Electricity Cost, Utilities + DG/GG Sets	million INR	29.04	31.23	57.91
Total facility Energy	kWh	34065628	35110426	38135300
IT Equipment Energy	kWh	18594000	21090533	22406315

EMISSIONS

Year	Scope 1 Emission	Scope 2 Emission	Scope 3 Emission	Total kgCO2 / Ton of Final Product
2022-23	693	17519		18213
2021-22	436	8581		9017
2020-21	334	14008		14342
2019-20				

Target (short term/ long term) for CO2 emission reduction and action plan to be mentioned

Shifting the emphasis to renewable energy. ONguard 4000 has been installed inside the DC halls

CO2 Emmssion Reduced

Year	Solar	Hydro	Discom	Total Green	DG	Total	Green percentage
20-21	638182	15638902.15	17665062.68	16277084.15	123481	34065627.83	48%
21-22	688484	22174374.65	12086472.4	22862858.65	161096	35110427.05	65%
22-23	608043	12595780.61	24675198.29	13203823.61	256279	38135300.9	35%

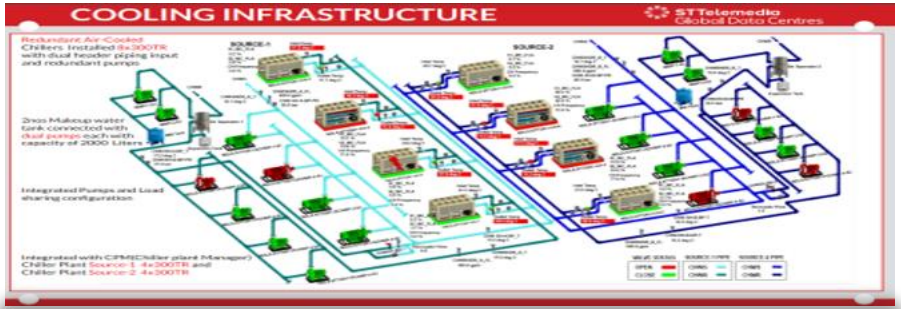
Co2 Emission avoided
12907.72773
16232.62964
9374.714763
38515.07213

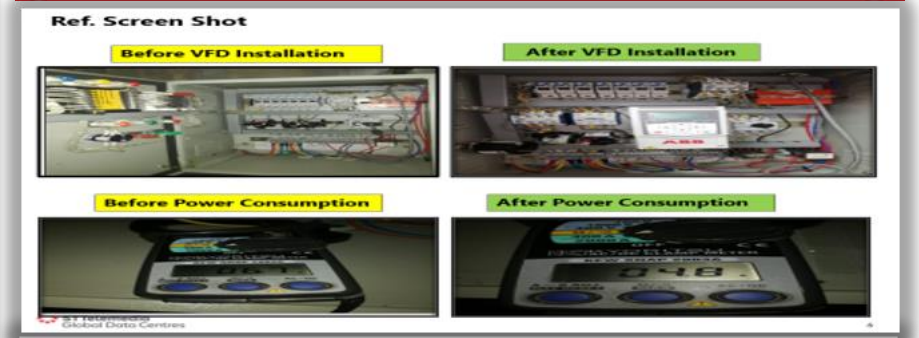
CO2e year	Scope 01	Emission factor CO2e / unit = 2.70	Scope 02			Total Emission, CO2 in tons
	Fuel consumed in litters	Total GHG emission in TCO2e	EB Energy consumption in kWh	Emission factor CO2e / unit	Total GHG emission in TCO2e	
FY 2020 – 21	1,23,481	334	17665063	0.793	14008	14342
FY 2021 – 22	1,61,096	436	12086472	0.71	8581	9017
FY 2022– 23	2,56,279	693	24675198	0.71	17519	18213

Innovative Projects@ STT Delhi GK1

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
- Air cooled chillers with CPM installed to use them efficiently.
- Selection of the Chillers and all associated equipment's are with high efficiency with highest Quality
- All secondary pumps and chillers are with VFD
- AHUs are equipped with VFD to save Electrical Power and Thermal Power.
- 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 & insulation to ensure the UPTIME.





Battery room

Without VFD	Phase Voltage	Current/phase R	Current/phase Y	Current/phase B	Total KVA	Units Consumed
	242.49423	7	6.9	7	5.06	40747.7
	Apparent Power	1697.46	1673.21	1697.46		
	KVA/Phase	1.69	1.67	1.6		

Battery Room

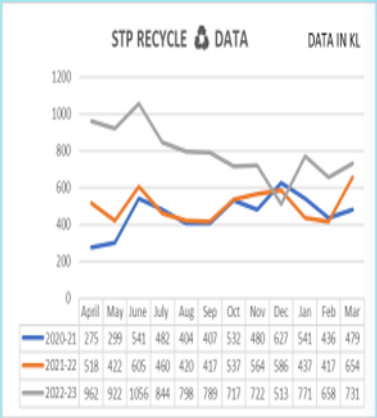
With VFD	Phase Voltage	Current/phase R	Current/phase Y	Current/phase B	Total KVA	Units Consumed
	242.49423	4.2	4.1	4	2.98	24207.7
	Apparent Power	1018.4	994.2	969.9769		
	KVA/Phase	1.018	0.99	0.96		

Sustainable Initiatives @ STT Delhi GK1

3. Water recycling

- We reduce our water consumption by installing water-recycling technologies and using recycled water for the
- Project initiated to reuse 100% of the wastewater of RO plant in the facility.
- Commissioned 100 KL STP plant to reuse 100% water for NON-IDC requirement. Saving more than 21023 KL.
- Rainwater harvesting installed, which connected to water treatment plant, reducing the external dependency on water.
- Coil Cooler have been installed in place of Water based cooling tower for DG.

Water is precious reuse and recycle

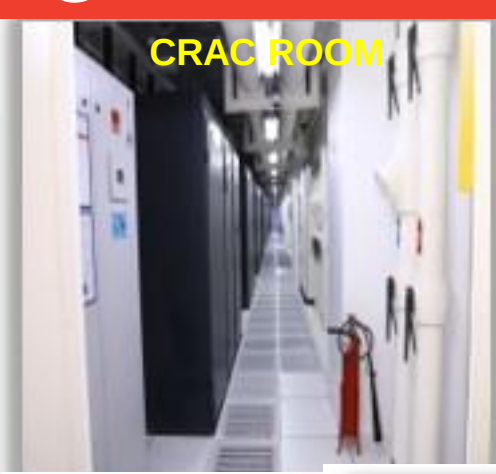


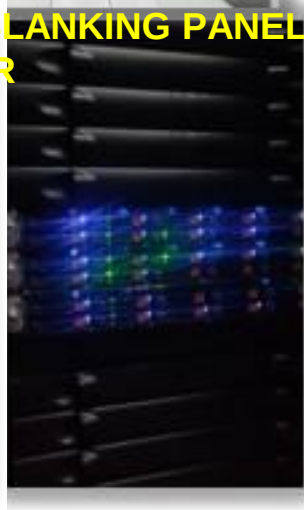
STP RECYCLE DATA			
Month	2020-21	2021-22	2022-23
April	275	518	962
May	299	422	922
June	541	605	1056
July	482	460	844
Aug	404	420	798
Sep	407	417	789
Oct	532	537	717
Nov	480	564	722
Dec	627	586	513
Jan	541	437	771
Feb	436	417	658
Mar	479	654	731

Operational Projects@ STT Delhi GK1

4.Data Centre best practises

- Strictly adopted hot and Cold Aisle containment into the complete DC raised floor area's i.e. all 80Ksq. Ft of DC
- Tightly hide air gaps using pedestal-sized openings cut from cold-locked cables and a custom sealing method applied where it clearly proves that the hot zone is warmer and the cold zone is colder, and the combination of AIR cold and hot is almost irrelevant.
- Tested the CRAC units operating efficiency realised at 90 % and Delta T with higher temperature value
- Using empty panels in unused rack space - this is one of the more difficult tasks as the shelves/cabinets are owned by the customers, but our constant focus through customer training has given them the awareness to ensure that the empty panels are recovered after use work - we also have a daily floor walk to re-inspect and repair the cover panels-





Operational Projects @ STT Delhi GK1

5.Aisle and Gaps Containment

- Strictly adopted hot and Cold Aisle containment into the complete DC raised floor area's i.e. all 80k sq. Ft of DC .
- All the opening of trays going inside the DC hall been closed to minimize cooling loss.

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

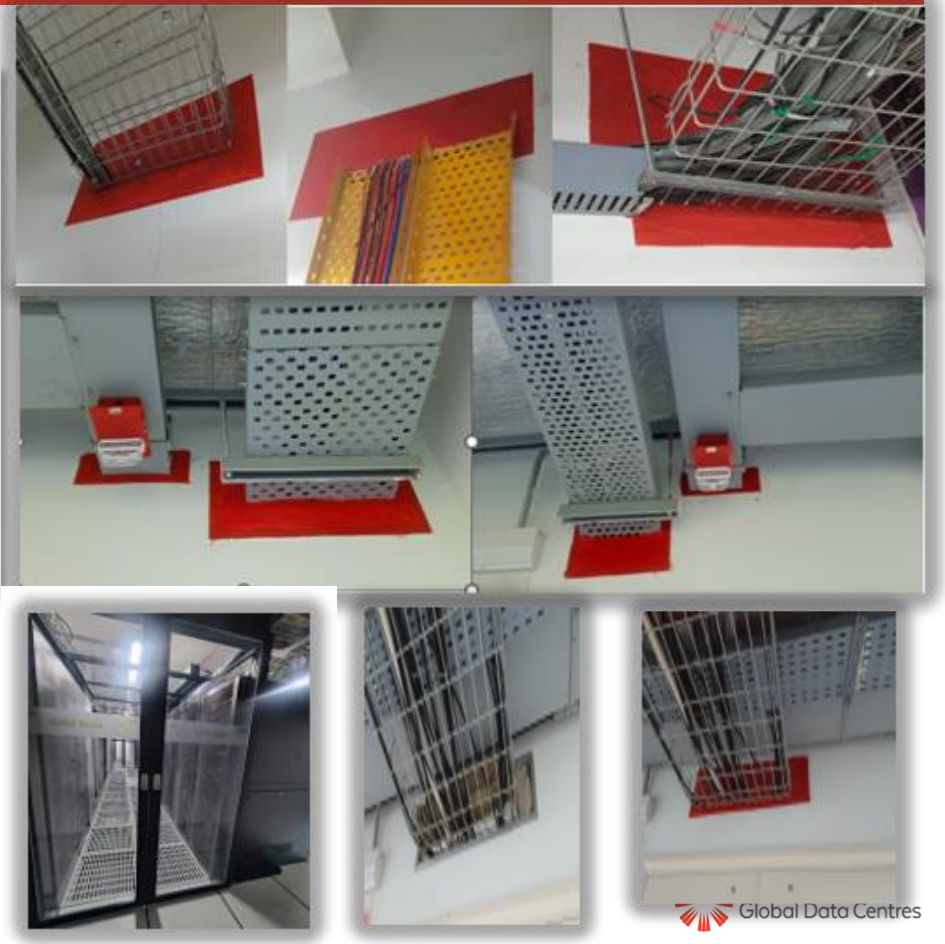
<u>Key highlights :</u>

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

Post Containment – CRAC Supply Temperature setting at 21 Deg C
CAC helps to eliminate the air leakages , Improves the Delta T

- Supply air measured in all CAC – 21 Deg C
- Return air measured in all CAC – 32 Deg C
- Delta T : 11 Deg C which is matching with the CRAC Design
- Humidification and dehumidification Cycle reduction
- Resulting high efficiency of the Cooling Infrastructure

Overall – Huge savings on energy and Water



Sustainable Initiatives @ STT Delhi GK1

6.Solar panels , Motion Sensor etc

- Motion Sensors installed on all floors.
- Energy efficient lighting fixtures – LED's
- 3.5MW Solar and Hydro power is directly connected to MLTP from where we are running the Gk1 exterior and interior lights

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BMS Projects@ STT Delhi GK1

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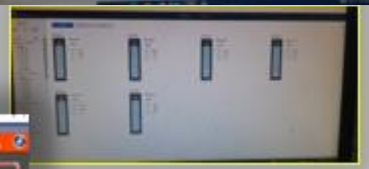
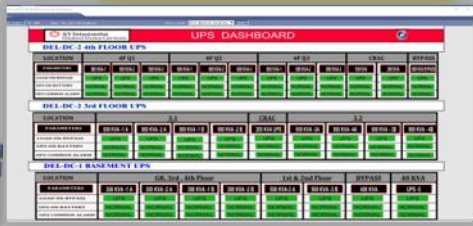
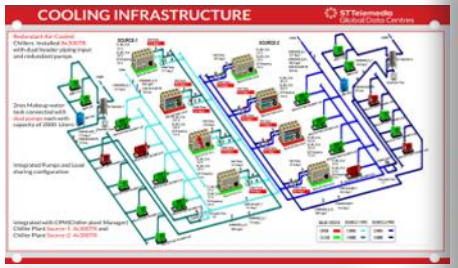
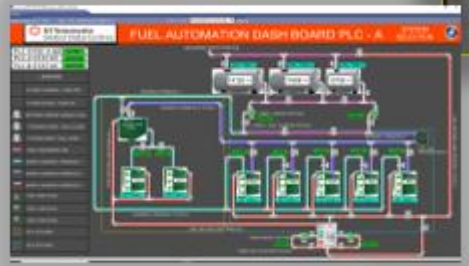
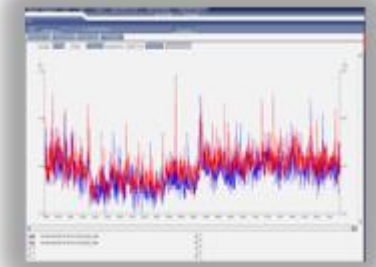
6.BMS Monitoring and parameters











Sustainable Initiatives @ STT Delhi GK1

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Plantation & Rainwater harvesting

- ❑ Our intend and initiatives are in line with Green Campus
- ❑ Plantation on many occasions
- ❑ Rainwater harvesting .(78KL)
- ❑ Largest green area covered in India.
- ❑ Recycling of water by Sewage Treatment plant (STP) installed. Recycled water is used to non-potable purposes

Sustainable Initiatives @ STT Delhi GK1

STTelemedia Global Data Centres

8.Management of Hazardous Waste

- Batteries are recycled as per the Battery Management rules

Battery Cells disposal completion @ 175 Tonnage

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

Waste lube oil disposal completion 8.53 Tonnage

- Strict enforcement of plastic management rules.

STT GDC India Operations –Approach

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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 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

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

Projects completed in 22-23 @ STT Delhi GK1

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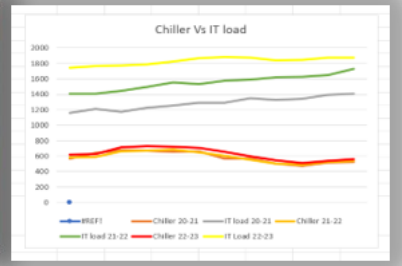
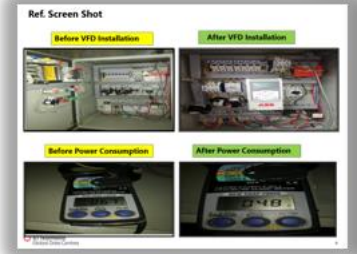
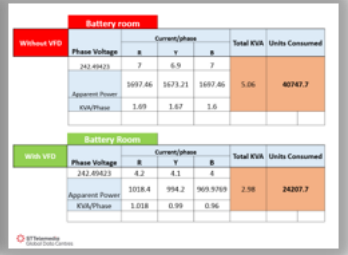
Sr No.	Title of Project	Annual Electrical Saving (kWh)	Annual Thermal Saving (Kcal)	Total Annual Saving in INR
1	PAHU/PAC three side bottom gaps closing impact and analysis.	35000	6655.3	428400
2	Installation of VFD in all AHU	32655.24	6109	399700
3	Dismantling of existing CFL light fixtures & Supply and Installation led tube light with fixture with required cable along with Motion sensors.	84273	7603.6	1021388
4	EOL old analog compressor-based replacement with New digital compressor-based PAC	120000	33276	1460000
5	SITC of old 1x40KVA UPS at GK	20000	5690	244000
6	Chiller automation	394200	6 11085	4777704
7	Gap closing on DC floor	20000	5690	242400
8	PAHU setpoints increase	70000	25689	848400







Saving with Motion Sensors		KWH			
BEFORE	Q1	2021-22	28382.4		
AFTER		2022-23	7000		
BEFORE	Q2	2021-22	28382.4		
AFTER		2022-23	6789		
BEFORE	Q3	2021-22	56764.8		
AFTER		2022-23	15467		
Anually Consumption before	TOTAL	2021-22	113530	KWH Saving	Saving in INR
Anually Consumption After	TOTAL	2022-23	29256	84273.6	1021396.032

Data Center Competitors National & Global benchmark

STTelemedia Global Data Centres

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%		

Sr No	National/Global	PUE	Remarks
1	National	1.5	Actual
2	Global	1.11	Source-Internet

Steps towards to achieve it

Few of those initiatives are,

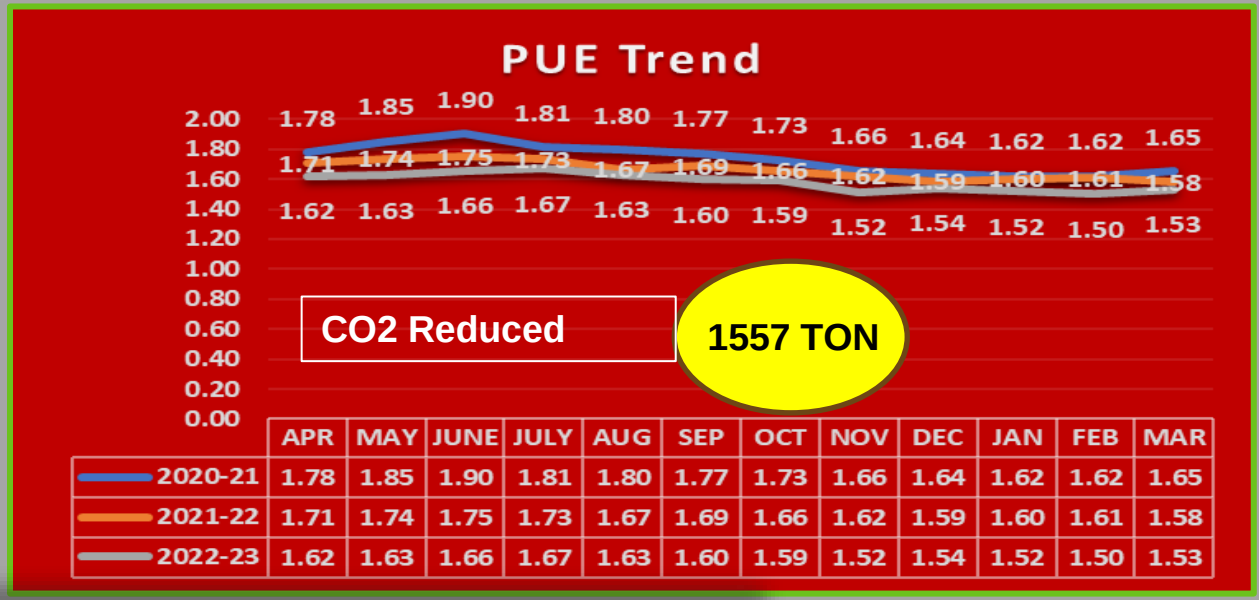
- Proper CFM analysis through external vendor.
- We are exploring Free cooling in winter to reduce the chiller usage.
- All Pahu and PAC three side bottom has been closed, directing all the air in the designated space only
- Liquid cooling proposed for STT GDC india sites.
- Replacement of old equipment with high efficient equipment even at lower operating load condition (part of H&H)
- Close monitoring of temperature in various parts of the facilities, balance and optimize.
- Initiative and continuous focused monitoring on leakages (CAC, HAC, False floor tiles) and arresting.
- Keeping the condenser approach as low as possible for the chillers.
- No deviation on the maintenance practices (filter cleaning, replacement, etc)
- Dedicated COE team formed to monitor and drive across PAN India.

PUE – Trend Last and savings.

Designed PUE of the Building is 1.70

STTelemedia Global Data Centres

Month	2020-21	2021-22	2022-23
APR	1.78	1.71	1.62
MAY	1.85	1.74	1.63
JUNE	1.90	1.75	1.66
JULY	1.81	1.73	1.67
AUG	1.74	1.66	1.58
SEP	1.80	1.67	1.63
OCT	1.77	1.69	1.60
NOV	1.73	1.62	1.52
DEC	1.66	1.59	1.54
JAN	1.64	1.60	1.52
FEB	1.62	1.61	1.50
MAR	1.62	1.58	1.53



		PUE			KW	KWH	RS
Avg FL-2020-21		1.74	Savings	0.08	124.16	1087641.6	12148956.7
Avg FL-2021-22	17.2%	1.66				Co2 Reduced	772 TON
IT load % Increase	21.6%						

		PUE			KW	KWH	RS
Avg FL-2021-22		1.66	Savings	0.08	142.3701	1247161.715	13930796.4
Avg FL-2022-23	12.9%	1.58				Co2 Reduced	785
IT load % Increase	17.8%						

Achievements and Proposed Projects

- Green and Smarter Energy Transformation of our Data centres i.e. 36 % of Energy usage on renewable's – Wind, Solar Hydro 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 recycled i.e.21023 KL water . .
- Potential Energy savings opportunity Via our smart Energy usage and minimising the losses 0.5 mw Potential savings opportunities through energy efficient drive.
- Adiabatic Cooling Pad for Chillers.
- EOL PDU replacement with Smart PDU.
- Emissions: with our Renewable energy percentage and PUE savings, our onsite and offsite green energy ventures have resulted in 40,072 Ton of CO_2 less emission.
- Proposed Gas based DG with negligible Exhaust hence the pollutants.

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