STTelemedia
Global Data Centres

CII National Award for Excellence in Energy Management 2023'

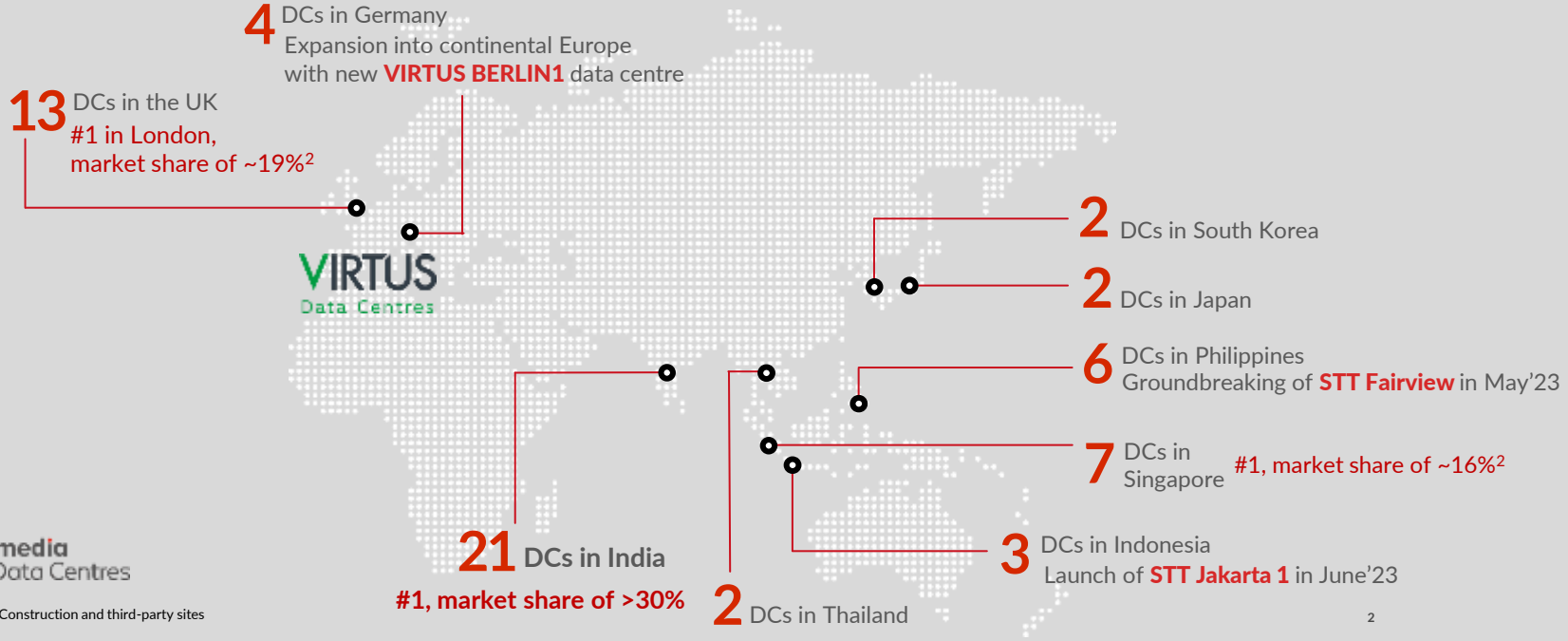
STT Global Data Centres India Private Limited – Bangalore DC3

Presented By-
Sandeep Seth (AGM- DC Operations)

STTELEMEDIA GLOBAL DATA CENTRES

Headquartered in Singapore, wholly owned by ST Telemedia (a wholly-owned subsidiary of Temasek)

More than 50 assets of over 1GW spanning 9 geographies



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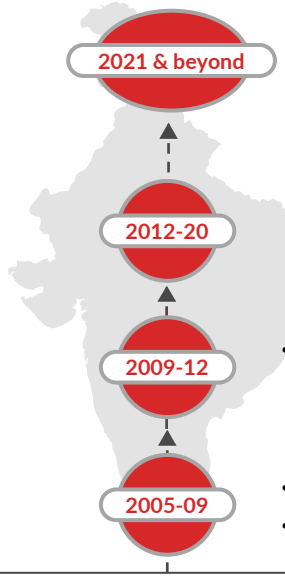
[1] In-Service, Under Construction and third-party sites

STT GDC INDIA-OUR GROWTH STORY



2021 & beyond

- Next Phase of expansion across 9 cities
- Focus on sustainable and green power
- World class quality and safety practices

2012-20

- 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

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

Operating since 2004, STT GDC India runs 21 DCs in 9 cities with ~220 MW IT load projected to double in 3 years

Key Achievements

- **9** Cities
- **21** Data Centres
- **3.72** Million sq. ft.
- **1000+** Customers
- **>36%** Green Energy
- **220MW** IT Load
- **33%** India Market Share
- **350 MW+** Power Load
- **3.3X** Revenue Growth
- **5X** Capacity Growth

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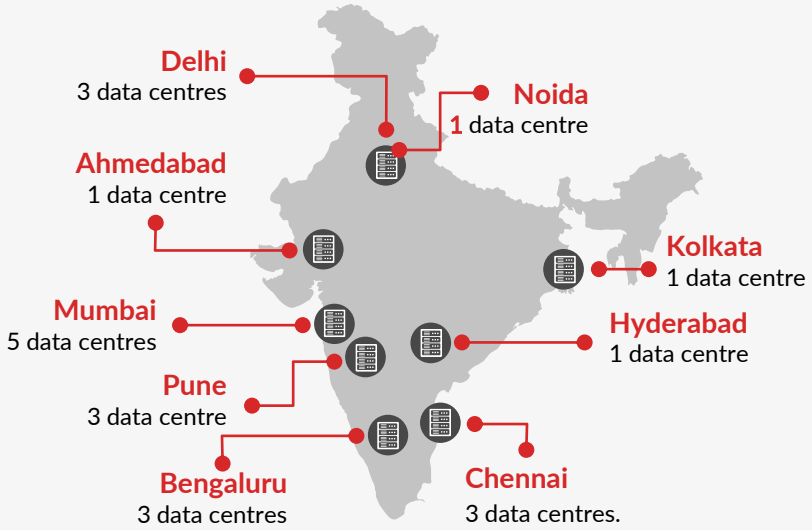
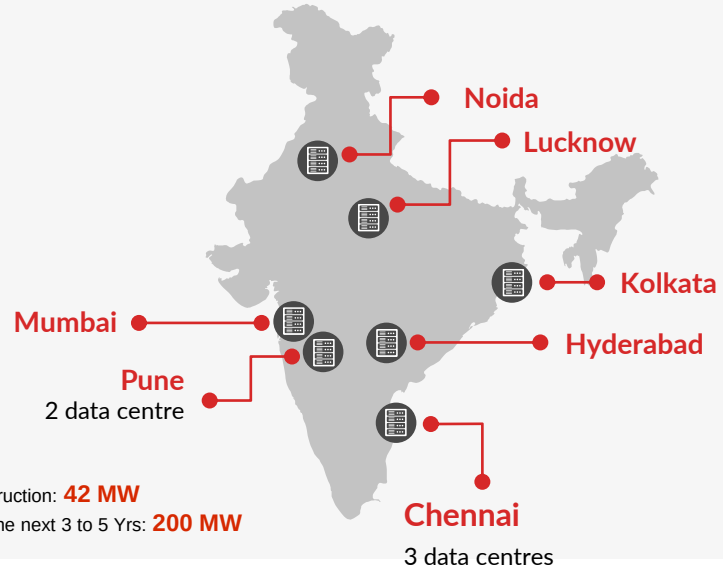
HOW IS STT GDC INDIA RIDING THE GROWTH WAVE ?

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

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OUR UNIQUE FEATURES

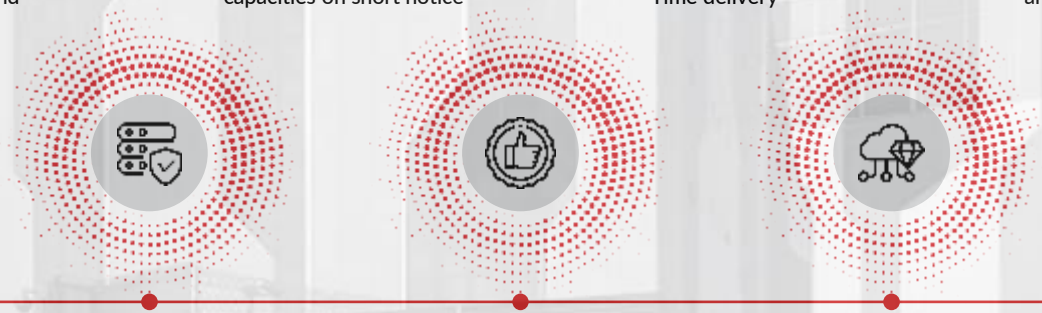
Most Credible Colocation Provider with Least Risk

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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OPERATIONAL EXCELLENCE

Consistent quality across our global portfolio

Strong global-local leadership

- Enabling market entry for our customers across our global platform
- Global strength matched by our local expertise, with accredited and qualified teams on the ground who know their home markets best

Built and operated to global standards of excellence

- Centre of Operational Excellence department to adopt best practices and communication across STT GDC platform

TIA-942 SS 564 SSAE18 ..and more

State-of-the-art, new data centres

- Purpose-built data centre designed to the highest technical specifications
- Modular approach providing customer expansion options in future

Reliability

- Robust systems and procedures in place to manage change control and incidents
- High power availability for customers' mission-critical data, providing peace of mind and reliability they need

Wide range of connectivity options

- Carrier-neutral
- Interconnection and peering fabrics
- Ready connectivity via both local and global network service providers
- Direct connectivity to Cloud Service Providers

Physical security

- Multi-layer security at all sites
- On-site security personnel
- Enhanced security measures
  e.g. intrusion detection, physical access controls, 24x7 CCTV monitoring

Energy Efficiency & ESG Approach

Datacenter Energy Efficiency improvement

ESG Measures DC Operations

- Water usage measurement
- Refrigerant top up
- Hazardous waste Management
- E-Waste Management
- Fuel Consumption
- PUE Monitoring

Cooling Infrastructure Energy Efficiency Strategy

Tech Refresh-Replacement:

- Condenser + ODU
- CRAC , Chillers , PAHU
- Automation of Chillers with CPM

Best Practices:

- Air balancing through CFM Grill
- Water Balancing through Chilled water Piping
- Temp control @ PAHU room
- Adequate Refrigerant level
- Cable dressing and management

Best Practice

- Qualitative Air Balancing Assessment of datacenter facility.
- Provides recommendation of best practices for efficient functioning
- CAC /HAC Deployment + Air Tightening
- Provided Blanking Panels in unused rack Space
- Concealing of Air leakage
- Replacement of Return Air Grills
- Filters replacement, Installation VAHU's

Electrical Infrastructure Energy Efficiency Strategy

- High efficiency UPS Tech refresh +Consolidation
- Continual PF improvement
- Energy Measurement points and data recording
- PUE Template standardization
- Watch on losses : TRX , UPS , Chillers
- Replacement of Conventional lights with LED lights

STT GDC Operations DC EEFY22-23

INFRASTRUCTURE

Building

~ 4 acres land parcel with State-of-the-art DC Infrastructure

Land, Building, Equipment owned by STT GDC India

Clear height of **~6 m** (Slab to Slab) for accommodating Racks up to **55 U** (Flexibility to go vertical)

No False Ceiling – C Structure introduced

Load bearing capacity of **1500kgs/**white space & 2000kgs/ Technical space

On-site fuel storage of **48 hours** at full load

Ramp less Design, Dual Fright elevator of **3 Ton each**

Electrical

Modular design with 2N Redundancy at GIS 66kV Onsite Substation, 30MW CD

2.25 MVA **HT DG Set**, N+1 Redundancy

Key systems equipped with **Dual Feed** from **Two independent paths**

Floor Level Infrastructure Design with **Distributed Redundancy**

Rack level power design with **2N** mode. Each rack is fed from two independent UPS & PDU Sources

IT Load

3.5L Sq. ft., **18MW IT** Load, 15kW/55U racks

Designed for **up to 17 kW** density and average rack density of 5 kW

3 Nos of Fibre path with Multiple MMR Rooms

Cooling

Redundant Chillers – Designed for **430TR** *14 Nos

Primary Pumps 1050gpm 15kW & **Redundant Secondary Pumps** 1663gpm 30kW

48kL Thermal Energy Storage tank, **6 min Backup**

Dual Coil CRAC 62TR *10 with EC fans and dual power feeds

BUILDING ARCHITECTURE

Building Orientation
North-South

Front

Top

Google Earth

Climate Zone
Temperate

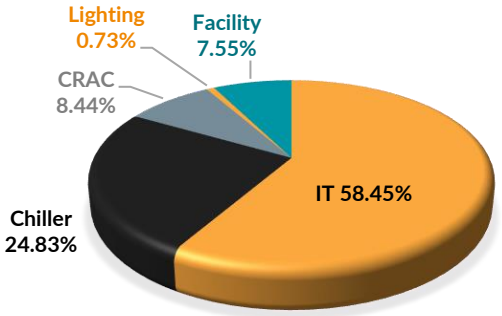
Side View

Side View

Sub-Station

ENERGY CONSUMPTION OVERVIEW

Annual Measurement	UoM	2020 – 21	2021 - 22	2022 -23
Electrical Energy Consumption, purchased from Utilities	kWh	34,17,600	63,68,747	1,47,74,545
Electricity Generation (in-situ), through DG Sets	kWh	6,800	31,300	71,319
Total Electricity Consumption, Utilities + DG/GG Sets	kWh	34,24,400	64,00,047	1,48,45,864
Cost of Electricity Consumed from Utilities	Million ₹	27.34	50.949	137.7
Cost of Electricity generated through DG/GG Sets	Million ₹	0.1324	0.609	2.74
Total Electricity Cost, Utilities + DG/GG Sets	Million ₹	27.47	51.56	140.44
Built Up Area	Sq. M	32644.96	32644.96	32644.96
Floors in the building	Nos	G+5	G+5	G+5



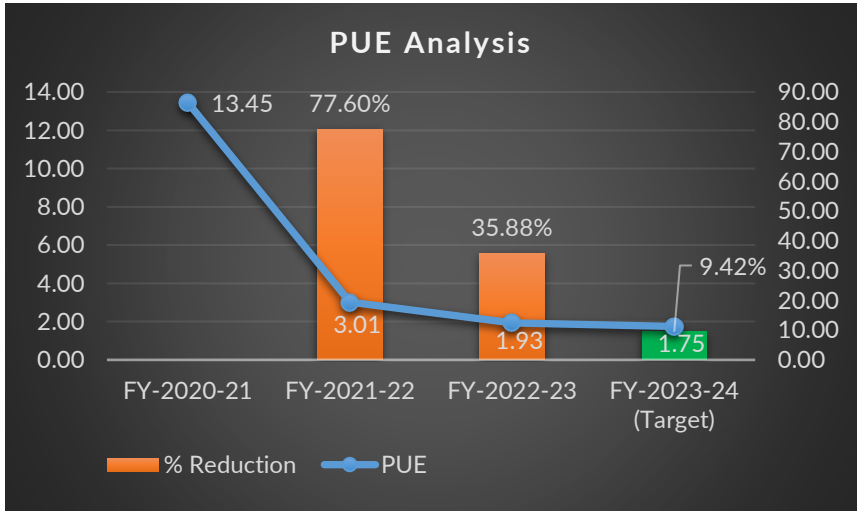
POWER CONSUMPTION BREAK-UP 2022 - 23

ENERGY CONSUMPTION OVERVIEW

Year	2020 - 21	2021 - 22	2022 - 23
Total Energy (MU)	3.42	6.40	14.85
IT Energy (MU)	0.25	2.12	7.68
PUE	13.45	3.01	1.93

Site is Operational from FY 2020-21 -> PUE is high (13.45) in this respective year

Current Year PUE as on Date – 1.75



Competitors, National & Global Benchmark

National / Global	Name of Competitor	PUE	Remarks
National	STT Global Data Centres India Private Limited, Pune	1.60	Actual
National	STT Global Data Centres India Private Limited, Chennai	1.60	Actual
Global	Google Data Centres, US	1.11	Source: Internet

★ **Long Term PUE target- 1.60 (FY-24-25)**

Planned Major Encon Projects – 2023 -24

#	Title of Project	Investment (Million ₹)	Annual Electrical Saving (Million kWh)	Annual Cost Saving (Million ₹)
1	Cold Aisle Containment and Blanking Panel Installation	1.5	0.073	0.6789
2	SOLAR PANEL INSTALLATION	2.5	0.219	2.0367
3	Optimization of Technical Room Temperature (UPS Room, Transformer Room etc)	0	0.21	1.953
Total		**4**	**0.502**	**4.6686**

Energy Saving Projects Implemented 2020-21

#	Title of Project	Investment (Million ₹)	Annual Electrical Saving (Million kWh)	Annual Cost Saving (Million ₹)
1	500KVA*12 UPS Load optimization (Switching Off UPS which was not serving to Customer	0	0.108	1.00
2	Cold Aisle Containment of Servers	0.5	0.0438	0.41
Total		**0.5**	**0.152**	**1.412**

★ **Energy Saving achieved INR 1.412 Million with the investment of INR 0.5 Million**

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Energy Saving Projects Implemented 2021-22

#	Title of Project	Investment (Million ₹)	Annual Electrical Saving (Million kWh)	Annual Cost Saving (Million ₹)
1	Light Motion Sensor Installation	0.5	0.0876	0.815
2	Blanking Panel Installation in Racks	0.25	0.0365	0.339
3	SOLAL LED Light Installation	0.5	0.00876	0.081
4	Chiller Plant Manager (CPM) Installation	4	0.219	2.037
Total		**5.25**	**0.352**	**3.272**

★ **Energy Saving achieved INR 3.272 Million with the investment of INR 5.25 Million**

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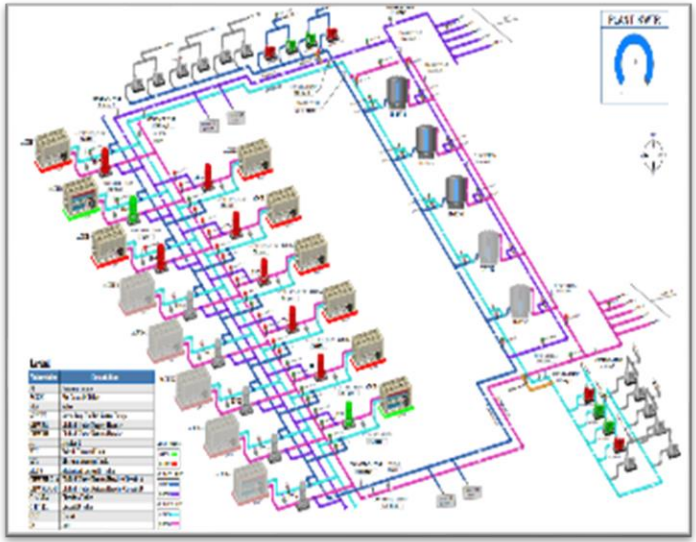
Energy Saving Projects Implemented 2022-23

#	Title of Project	Investment (Million ₹)	Annual Electrical Saving (Million kWh)	Annual Cost Saving (Million ₹)
1	Chiller Supply Water Temperature Optimization	0	1.189	11.062
2	CFL to LED light replacement	0.25	0.009	0.081
3	Blanking Panel Installation in Racks	0.5	0.073	0.679
4	Cold Aisle Containment of MMR Room	0.5	0.037	0.339
Total		**1.25**	**1.308**	**12.162**

★ **Energy Saving achieved INR 12.162 Million with the investment of INR 1.25 Million**

Innovative Project - Chiller Plant Manager

- Controls chiller plant function automatically based on the temperature threshold setting.
- Reduces Manual intervention for chiller operation
- Reduced operating cost of the chiller operation by energy conservation
- It will switch off/switch on the chiller compressors as per the heat load requirement
- Reduced energy and operating cost up to 10%.
- Saved ≈ INR 20 Lac/Year with this installation

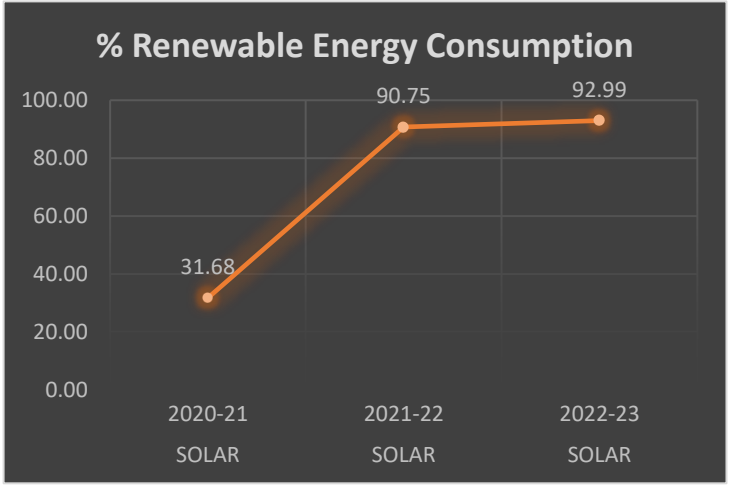


Utilization of Renewable Energy Sources

- Procurement from Renewable Power Plants through PPA
- Partnership for Offsite Wind & Solar Power Plant with Installed capacity of 2.2MW. STT GDC Bangalore will utilise 100% power generated from this plant.
- Presently we are using more than 93% renewable energy at site

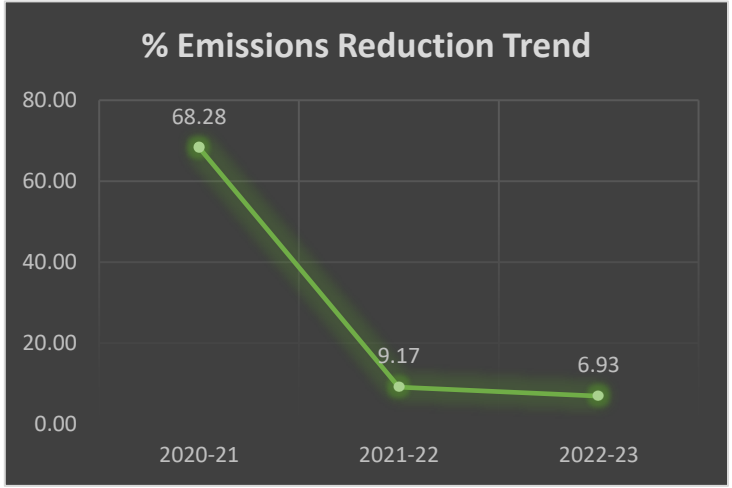
Solar Energy Usage

Year	Mode	Annual Consumption (Million KWH)	% Share
2020-21	PPA	1.09	31.68
2021-22	PPA	5.81	90.75
2022-23	PPA	13.81	92.99



GHG Emission Trend

Year	Scope-1		Scope-2		Total
	HSD Consumed (Liters)	Emissions (CO2) Tons	EB Consumption (KWH)	Emissions (CO2) Tons	Emissions (CO2) Tons
2020-21	1789	4.83	2332600	1982.71	1987.54
2021-22	8237	22.24	560747	476.63	498.87
2022-23	18768	50.67	969545	824.11	874.79



★ Presently we are using more than 95% Renewable Energy

AIR QUALITY ANALYSIS

- ✓ Regular monitoring of Indoor Air Quality critical parameter – CO2, SO2, NO2
- ✓ All Air quality Parameters are well within limit of standard limit
- ✓ DG Stack parameters review monthly basis

TEST REPORT

Cooling Infrastructure Efficiency

- ✓ Data centre ~ 33% Energy utilization by cooling infrastructure –Hence our focus is high on the cooling infra right through Design, Equipment's selections, Operations to achieve the higher efficiency and energy conservation
- ✓ Selection of the Chillers and all associated equipment's are with high efficiency with highest Quality
- ✓ All secondary pumps are operated with VFD
- ✓ Automatic SCADA based Chiller Plant Manager (CPM) which improves the efficiency
- ✓ Periodic Energy audits to evaluate the Chiller efficiency & tracking
- ✓ Effective and periodic maintenance which increases efficiency of the Cooling System

Water Recycling / Conservation

- Bangalore DC3 is zero Liquid discharge Site
- Capturing Surface rainwater Example : 160kL roof rainwater collection sump and treatment for reuse @ Bangalore DC3
- Rainwater harvesting pits provided at the Storm water drains .
- 1.5KL Per day water consumption for Entire Site
- Usage of water efficient fixtures saves water
- Wastewater treated from STP and reused for irrigation and flushing reduces water usage by 30%.

Sustainability Initiatives

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Data Centre Best Practices

- Firmly adopted hot and Cold Aisle containment into the complete DC raised floor areas
- Use of Blanking panels on the unused rack space
  - Most challenging task due to the racks / Cabinet's ownership with the customers
  - Constant focus Via Customer education created awareness to them to ensure the blanking panels refix post their work
  - We do have daily floor walk through to get this recheck and fix the blanking panels -

Integrated Building Management System

- Integrated with respect to Electrical, Cooling, Security & Safety Infrastructure
- Fully Automated Cooling System & Fuel Management System
- Tailor made Dashboards like BMS Network, Fire Safety, Security systems
- Redundant BMS network path from Distribution Level, Switch Stacking
- Addressable Safety Systems & Advanced Suppression systems best fit for various Technical areas
- Integrated ACS, CCTV & Video Analytics

CERTIFIED GREEN DATA CENTRE

IGBC

CII
Confederation of Indian Industry

Indian Green Building Council (IGBC)

hereby certifies that

STT GDC India - Bengaluru DC 3

(IGBC Registration No: DC 19 006)

has successfully achieved the Green Data Center Standards required for the following level of certification under the

IGBC Green Data Center Rating System

(New Data Center)

Gold

December 2020

(This certification is valid for next 3 years)

Shaheen Meeran	V Suresh	S Raghupathy	K S Venkatagiri
Chair, IGBC Green Data Center	Chairman, IGBC	Deputy Director General, CII	Executive Director, CII-Godrej GBC

NET ZERO COMMITMENT

STT GDCI and Group has Committed to be *Net Carbon-Neutral* by 2030

Plan to use *100% Renewable* Energy by 2030.

STT GDC INDIA – AWARDS & CERTIFICATIONS

Colocation Service Provider of the Year award 2018, 2019, 2020, 2021 and 2022

Great Place to Work Certification 2020, 2021, 2022, 2023

CII Gold Award for overall EHS Practices 2021

STT GDC Net Zero Commitment DC Operations Carbon Neutral by 2030

ISO 27001, ISO 14001
ISO 20000, TL 9000
ISO 45001

The Payment Card Industry Data Security Standard

SOC 1 TYPE 2
Formerly SAS70

IGBC –Green Gold

DATA CENTRE STANDARDS

ANSI/TIA-942-B:2017
Rated 3 Certified

OPERATIONAL EXCELLENCE

ISO 14001: 2015

OPERATIONAL EXCELLENCE

TL 9000-V R6.2/R5.6

OPERATIONAL EXCELLENCE

ISO 45001 : 2018


CERTIFICATE OF CONFORMANCE
CONSTRUCTED FACILITY

STT Global Data Centres India Private Limited

ANSI/TIA-942-B-2017
Rated-3

TIA-942


bsi.

Certificate of Registration


CERTIFICATE

STT Global Data Centres India Private Limited

TL 9000-V R6.2/R5.7 ISO 9001 : 2015

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bsi
ISO/IEC 27001
Information Security Management
CERTIFIED

OPERATIONAL EXCELLENCE

bsi
ISO/IEC 20000-1
Service Management
CERTIFIED

OPERATIONAL EXCELLENCE

PCI DSS CERTIFIED BY
NETWORK INTELLIGENCE
Global cybersecurity provider

DATA SECURITY


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Certificate of Registration
INFORMATION SECURITY MANAGEMENT SYSTEM - ISO/IEC 27001:2013
...making excellence a habit.


bsi.
Certificate of Registration
IT SERVICE MANAGEMENT SYSTEM - ISO/IEC 20000-1:2018
...making excellence a habit.


THIS
CERTIFICATE
OF COMPLIANCE
IS PRESENTED TO
STT Global Data Centres India Pvt. Ltd.

E Mail - sandeep.seth@sttelemediagdc.in