25th National Award for Excellence in Energy Management 2024

CANDOR KOLKATA ONE HI-TECH STRUCTURES PRIVATE LIMITED

(KOLKATA)

Energy & Sustainability Team

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Mr. Ratnesh Kumar
Senior Executive
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Ms. Nupur Tomar
Assistant Manager
ESG

Ms. Kritika Sharma
Executive
ESG

BROOKFIELD PROPERTIES INDIA

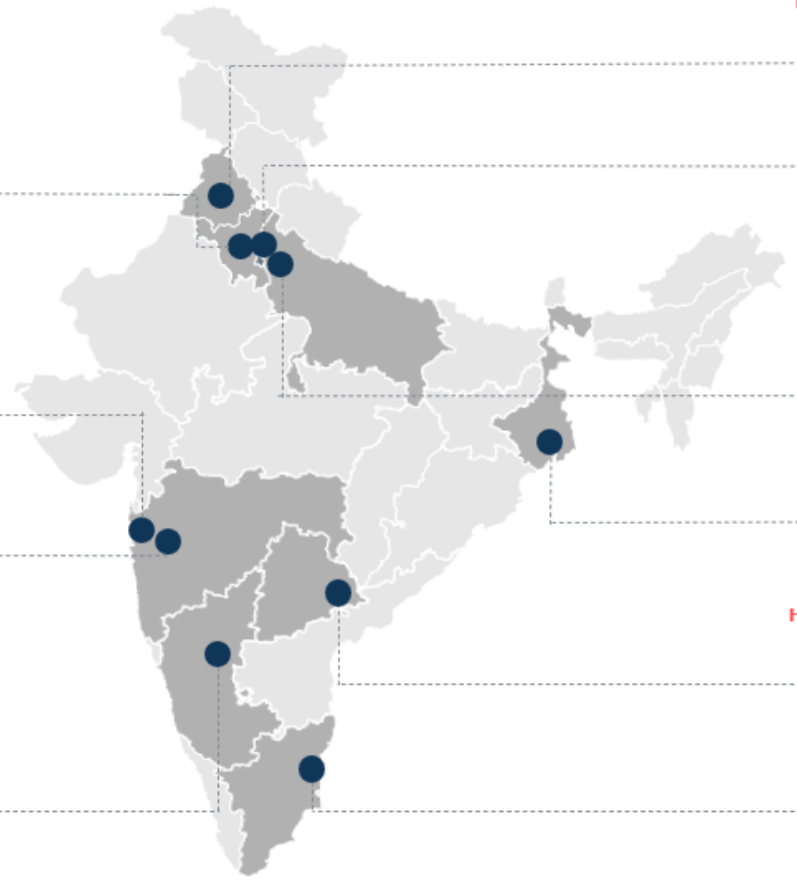
Brookfield Properties | India

Gurugram 9.2M SF
- Candor TechSpace, Sector 48
- Candor TechSpace, Sector 21
- Worldmark, Sector 65
- Airtel Center

Mumbai 8.5M SF
- Downtown Powai
- Equinox
- Floors in Godrej BKC
- Waterstones

Pune 2.1M SF
- 45Icon
- Bluegrass Business Park

Bengaluru 13.9M SF
- Azure
- Centennial
- Ecospace
- Ecoworld
- Ecoworld 4D
- Galleria
- NXT



Ludhiana 0.4M SF
- Pavilion Mall

Delhi 1.4M SF
- Worldmark, Aerocity

Noida 7.3M SF
- Candor TechSpace Sector 135
- Candor TechSpace Sector 62

Kolkata 5.7M SF
- Candor TechSpace
- Baytown

Hyderabad 3.6M SF
- New development

Chennai 2.6M SF
- Millenia Business Park

Brookfield Properties Assets

Under development

#Area stated above includes under construction area and future developments potential
#For Godrej BKC 0.1 M SF is future acquisition (under ROFR)

26	Assets
10	Cities
55	M SF total area
41	M SF operational area
~5	M SF under development area
~9	M SF future development
$8B	Gross asset value
450+	Diverse tenants

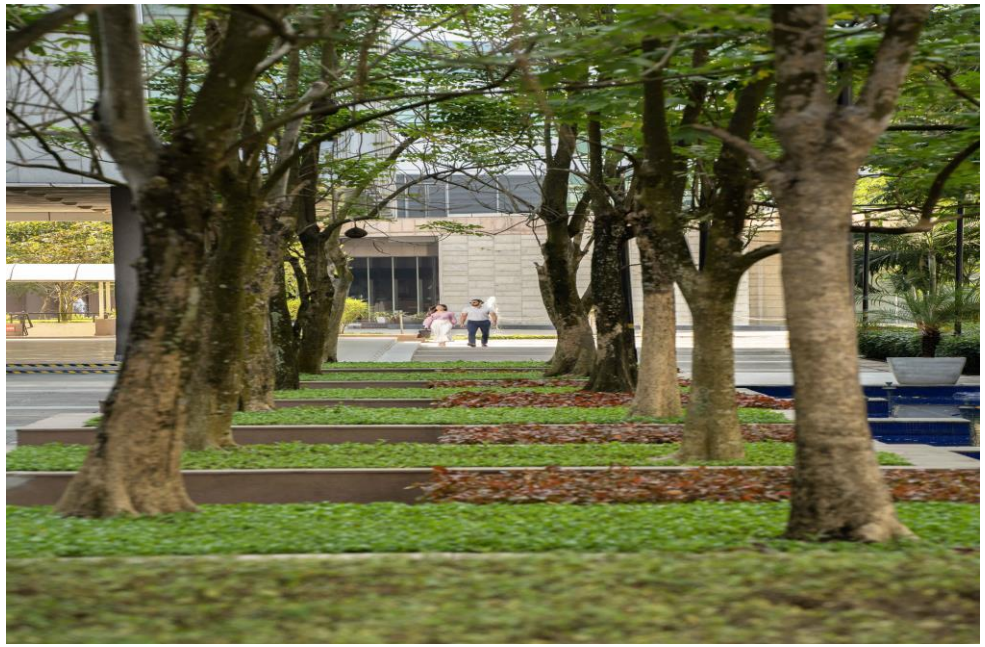
CAMPUS AT GLANCE

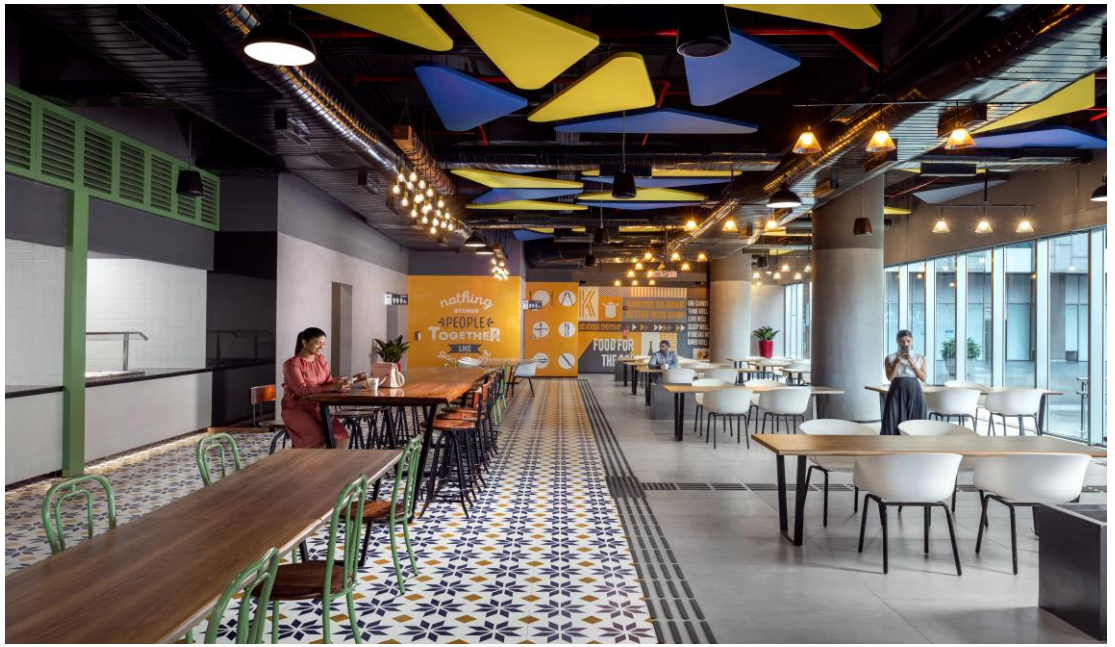
PLOT AREA	BUILDINGS	FLOORS	GREEN AREA	PARKING
32 ACRES	12 NOS.	06 TO 10	38%	5194

FACILITIES

DISABLED FRIENDLY CAMPUS	EXCELLENT CONNECTIVITY/ HIGHWAY	INDOOR AND OUTDOOR GAMES	CAFES & QUICK SERVING RESTAURANTS	SWIMMING POOL & GYM	DAYCARE WITH PLAY AREA

PROPERTY PHOTOGRAPHS





ENERGY INITIATIVES SNAPSHOT

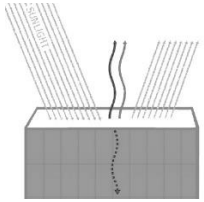
LED Lighting

Centrifugal Chillers Targeted COP 0f 6.3

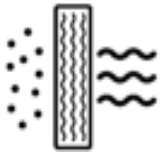
Demand Controlled Ventilation

90% Space Receives day light > 110 lux

VFD’s in Chillers and Pumps



High SRI Roof



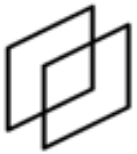
MERV 14+ FILTERS

EV Charging Stations

IAQ Monitoring

Energy Submetering

BMS Integration



Double Glazing

Rooftop solar

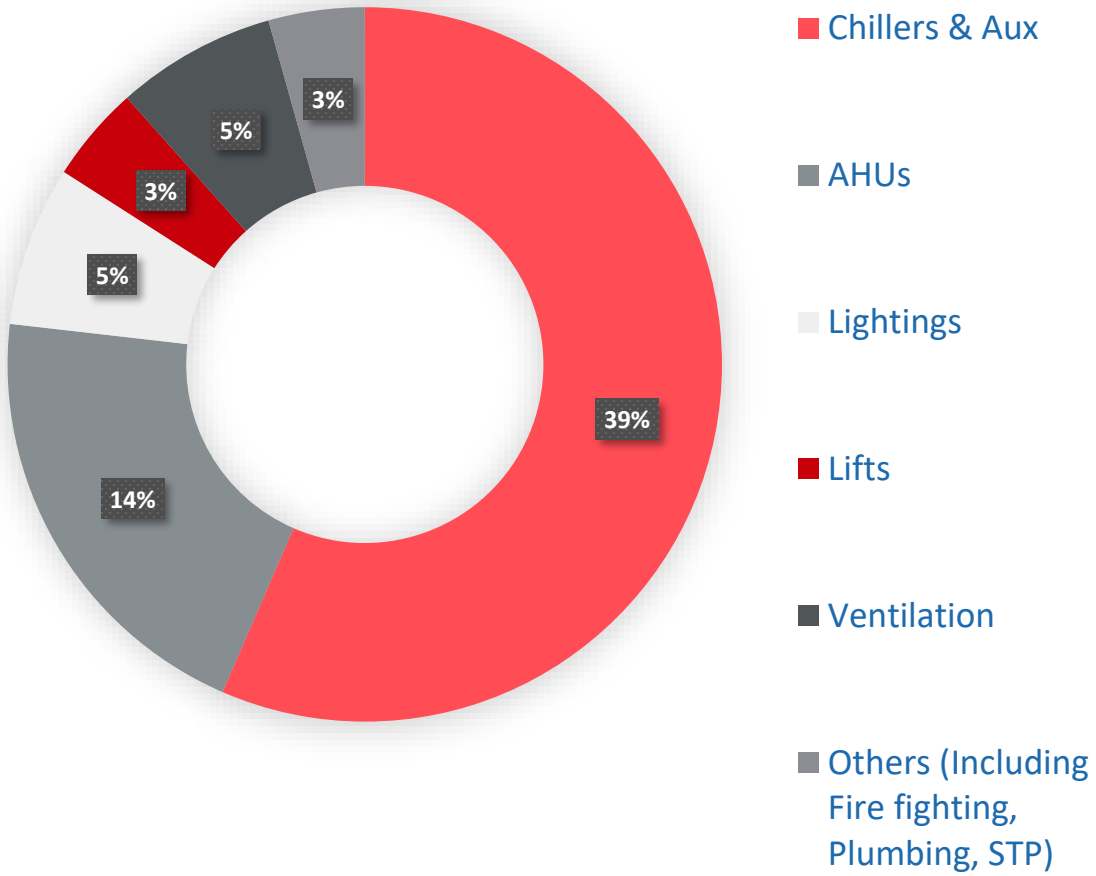
CTI Certified Cooling Tower

CO sensors

ENERGY MAPPING/ SECTION WISE ENERGY CONSUMPTION

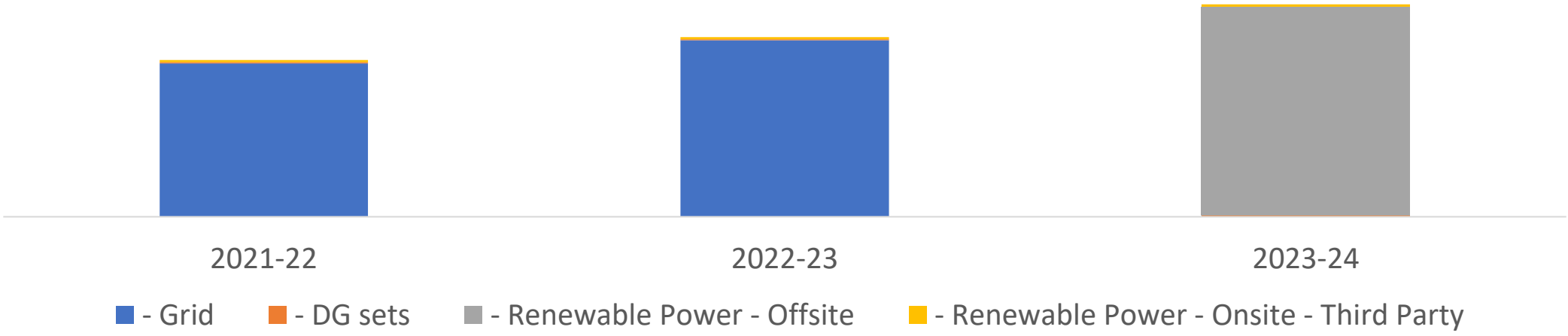
Section	Share of Energy (%age)
Tenant	**31%**
Common Area Consumption	**HVAC accounts for ~75% of total common area energy consumption**
Chillers & Aux	**39%**
AHUs	**14%**
Lightings	5%
Lifts	3%
Ventilation	5%
Others (Including Fire fighting, Plumbing, STP)	3%
Common Area Consumption	**69%**
Total	**100%**

Share of Major Utilities Energy Consumption

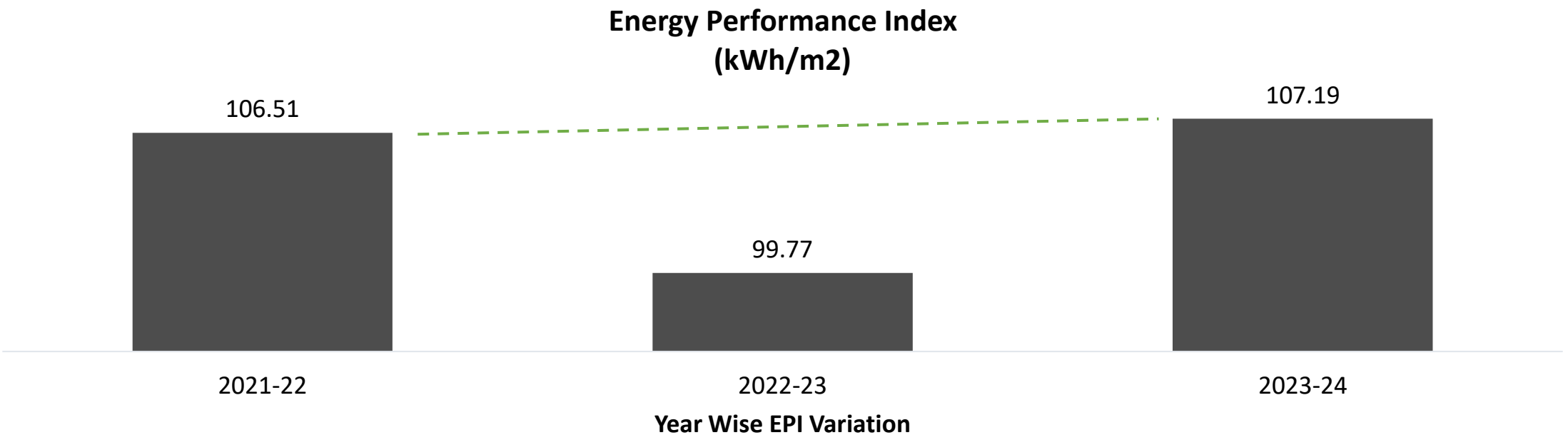


YEAR WISE ENERGY CONSUMPTION PATTERN

	Parameters	2021-22	2022-23	2023-24
	Energy (MWh)			
1.	Grid	21,682	24,924	-
2.	DG sets	143	144	221
3.	Renewable Power - Offsite	-	-	29,468
4.	Renewable Power - Onsite - Third Party	309	319	312
	Total Energy	**22,134**	**25,387**	**30,002**

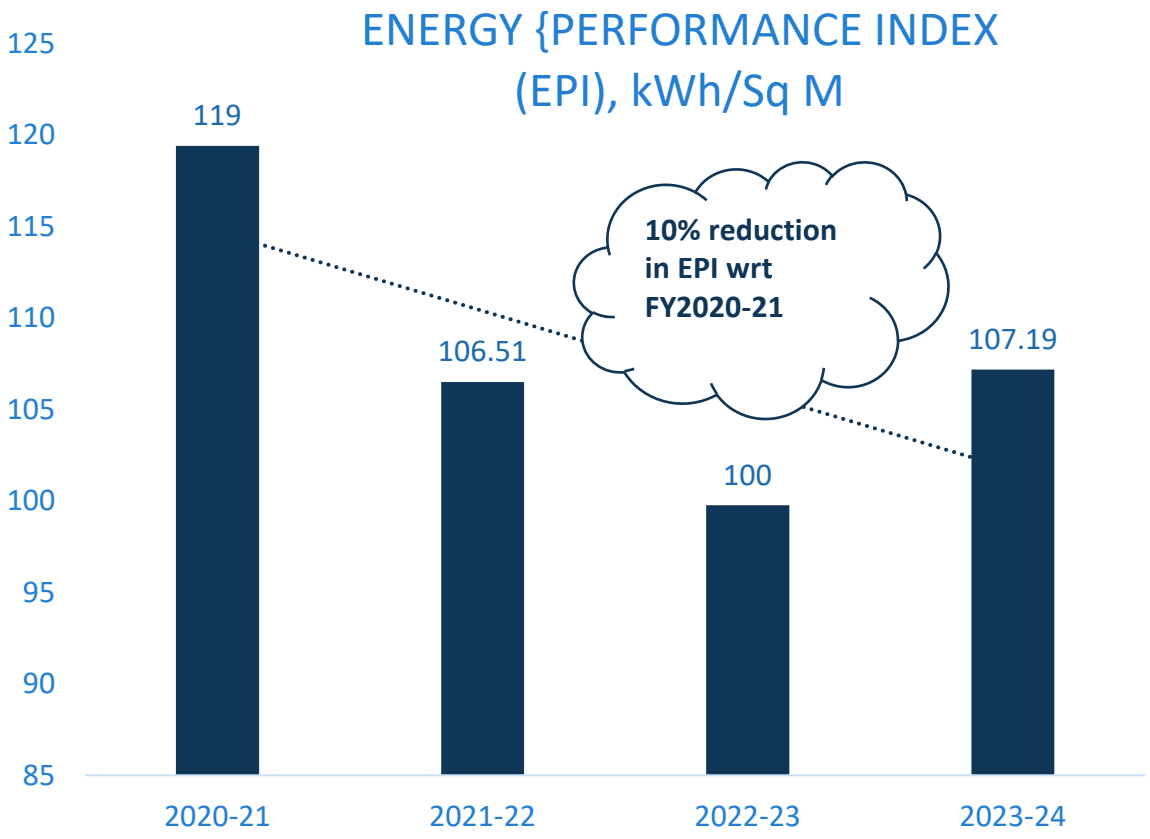


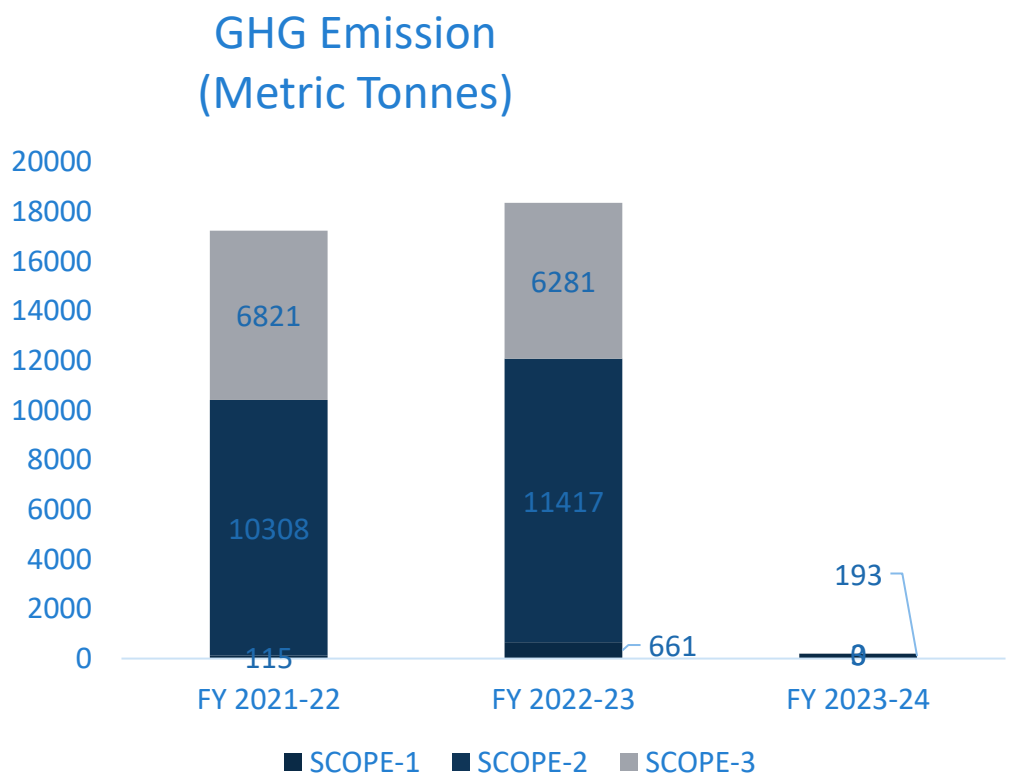
SPECIFIC ENERGY CONSUMPTION IN LAST YEARS (FY 21-22 TO FY 23-24)



Parameter	2021-22	2022-23	2023-24
Total Energy Consumption, MWh	22,134	25,387	30,002
EPI (kWh/m2)	106.51	99.77	107.19
% Change	**-**	**-6%**	**7%**

ENERGY PERFORMANCE & GHG PERFORMANCE

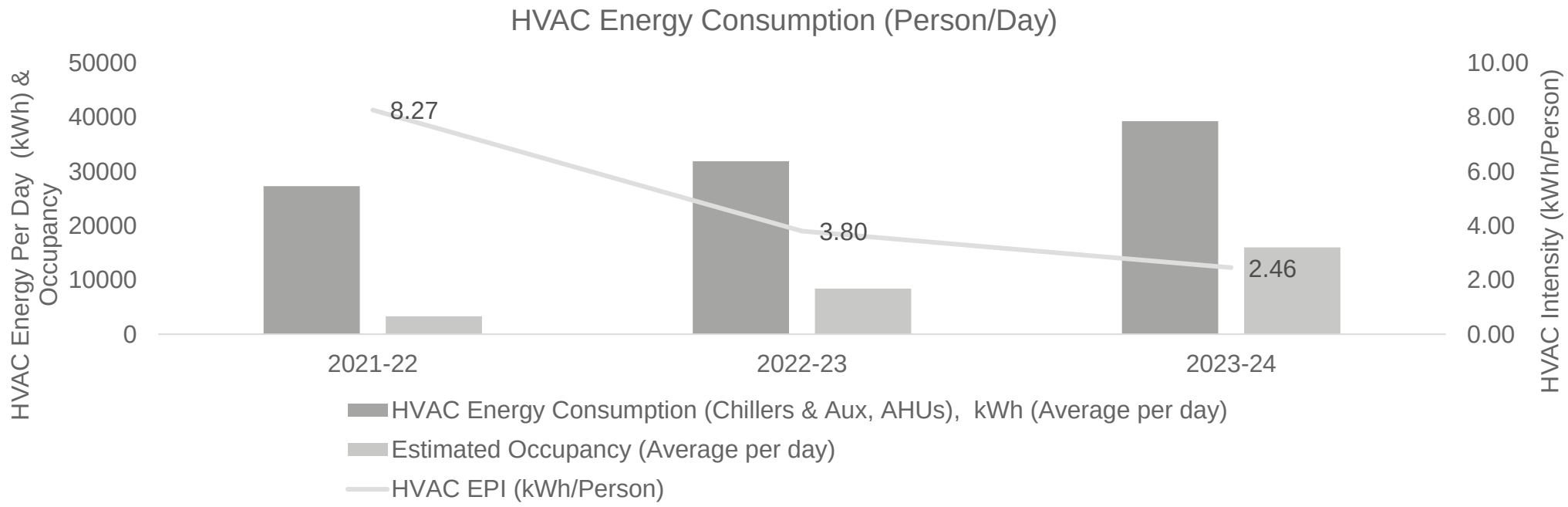




Factors attributable to EPI variation

- **Change in Footfall/ Occupancy**, on account of restrictions due to covid, however the occupancy is increasing gradually, ~70% of the Baseline occupancy achieved in FY'24.
- **Change in CAM Model,** Increase in 24X7 operation.
- **Rapid change in climatic condition**, Increase in heat intensity.

HVAC PERFORMANCE/ OCCUPANCY VARIATION



Parameter	2021-22	2022-23	2023-24
HVAC Energy Consumption (Chillers & Aux, AHUs), kWh (Average per day)	27277	31911	39283
Estimated Occupancy (Average per day)	3300	8400	16000
HVAC EPI (kWh/Person/Day)	**8.27**	**3.80**	**2.46**

HVAC Intensity reduced substantially as the occupancy rose many folds post COVID restrictions during last 3 Financial Years

IMPACT OF ENCON PROJECTS IN LAST YEARS

Year	Major EM Project Implemented	Investment (INR Million)	Energy Saving (Million kWh)	Cost Savings (INR Million)	Impact on SEC
FY 2021-22	7	7.95	1.05	9.58	Optimization of Common Area Energy Consumption
FY 2022-23	3	10.6	0.92	9.12	
FY 2023-24	3	3.4	0.31	3.08	

FY 21-22

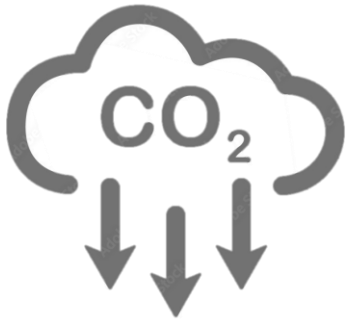
- Retrofitting AHUs with EC Fan
- Replacement of Inefficient Pump with Efficient pump
- Automation and Energy Meter Integration.
- Basement Lighting Optimization

FY 22-23

- AHUs Automation/ Pumps Automation.
- Integration of Energy Meters with BMS.
- AHU Condensate Recovery
- BMS upgradation and Utilities Integration

FY 23-24

- IAQ Monitoring and Fresh Air Control
- AHU Condensate Recovery
- Electrostatic Filters in AHUs
- Cooling Tower Upgradation



Year	GHG Reduction, Tonne
FY 2021-22	746
FY 2022-23	653
FY 2023-24	220

ENERGY SAVING PROJECTS IMPLEMENTED

RETROFITTING OF EC FANS WITH ES FILTERS IN AHU'S

SECONDARY CHILLED WATER PUMP AUTOMATION

COOLING TOWER UPGRADATION

CENTRALIZED BUILDING MANAGEMENT SYSTEM

CHILLED WATER RING MAIN LINE INTERCONNECTION

AUTOMATION OF AHU FRESH AIR DAMPER WRT. IAQ PARAMETERS

100% LED LIGHTS INSTALLATION

BASEMENT EXHAUST INTERGRATION WITH CO SENSOR

INNOVATIVE PROJECTS IMPLEMENTED_1

AHU Condensate Drain Recovery

Background: AHUs at every floor is feeding to cooling load requirement, 24X7.

Challenges:

Kolkata being hot and humid, substantial quantity of Condensate through drain is being waste resulting in loss of chilled water, energy & water cost.

Proposed System:

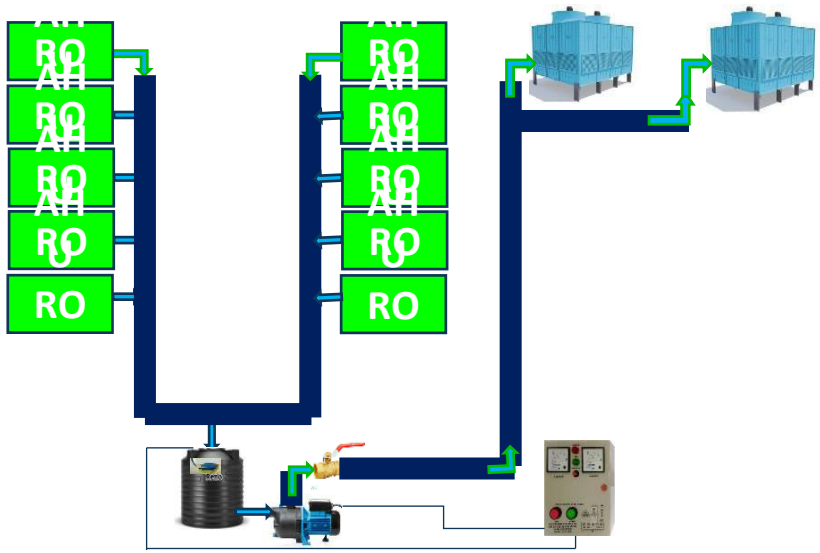
All the drains of the AHU condensate in pumped to the cooling tower through booster pump

Advantages:

1. Improving the Cooling Tower Performance
2. Improvement in Chiller performance, lesser O&M Cost.
3. Water Saving/Water Pumping Saving

Cost Benefit Analysis:

Total investment	=	Rs. 15 Lacs
Annual electrical energy savings	=	2.2 Lacs kWh
Annual savings	=	Rs.18 Lacs
Payback	=	10 months



INNOVATIVE PROJECTS IMPLEMENTED_2

AHUs retrofitted with EC Fans with dual feedback control/ VAV

Background: AHUs meeting Cooling load requirements 24X7 at all floors across the campus

Challenges:

- Energy Consumption optimization in the HVAC low Side was needed to improve the overall system efficiency.

Proposed System:

- 25 poor performing AHUs were selected for upgradation with EC fans. CFM delivery modulated based on feedback from return air temperature and VAV pressure feedback for optimized operation.

Advantages of the new system:

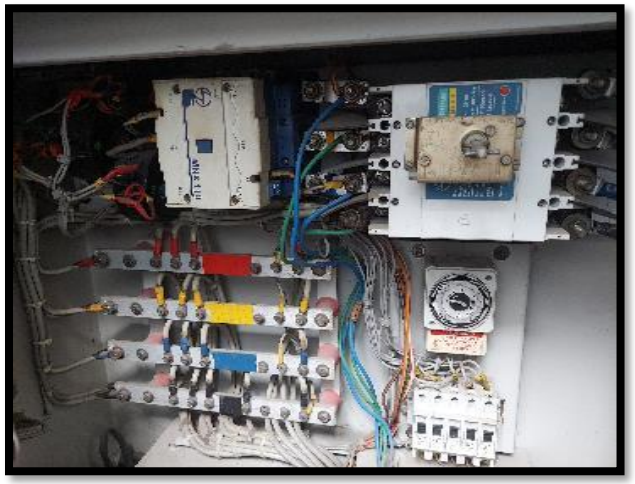
- Optimal loading of AHUs, resulting in higher energy saving
- Run hour, O & M and spares consumption reduced for the receiving plant.
- Enhanced redundancy and improved system performance.
- Reduced load on AHUs and Chillers.

Cost Benefit Analysis

Total investment	= Rs.125.00 Lacs
Annual electrical energy savings	= 21.75 Lacs kWh
Annual savings	= Rs.184.88 Lacs
Payback	= 9 months

INNOVATIVE PROJECTS IMPLEMENTED_3

Automation with CO sensor & Timer relay installation



Background

- Basement Fresh Air & Exhaust fans are operated manually and requires more attention.
- External pole lights are operated manually in evening & morning at site
- Toilet exhaust & Terrace Fresh air are operated manually.

Proposed System

- CO sensor installed with integration of Fresh air fans in Basements
- Timer relay installation on External pole lights, Terrace FA fans & Toilet exhaust

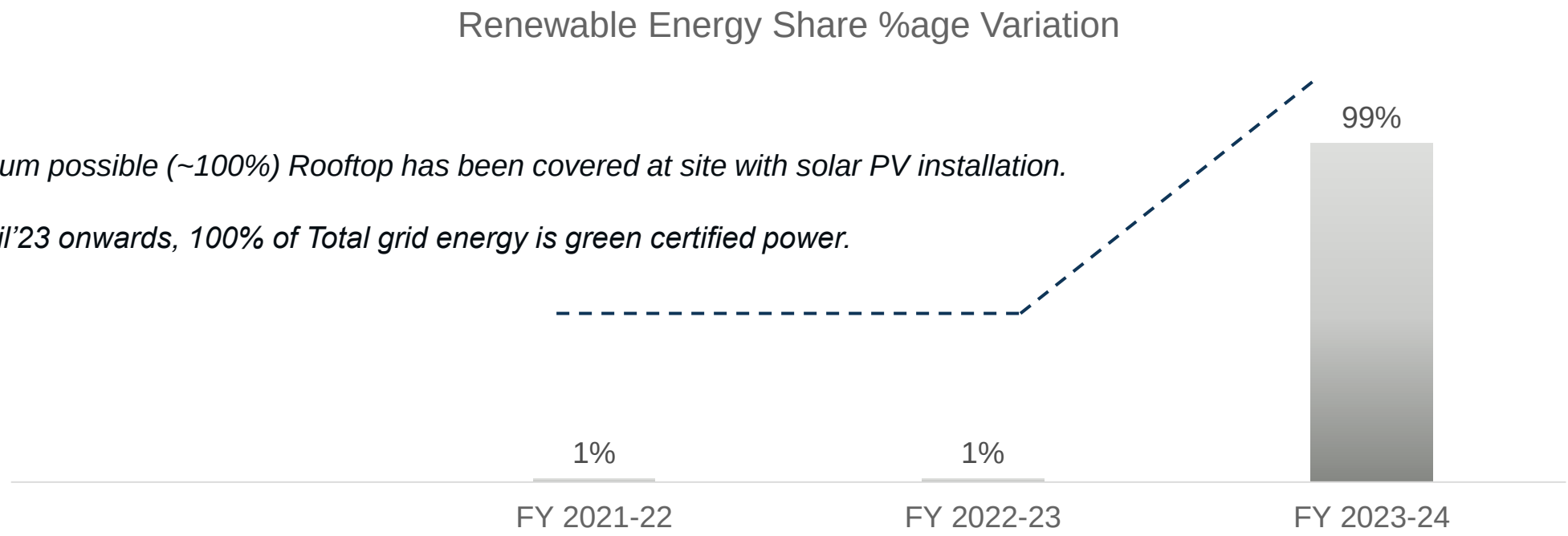
Advantages

- Manual operation reduced
- Optimization can be done easily as per operation requirement
- CO sensor helps in preventing unnecessary running of Fresh air fans
- Running time reduced that helps in increase of product life cycle and saving energy

Cost Benefit Analysis

Total investment	= Rs. 27 Lacs
Annual electrical energy savings	= 6.28 Lacs kWh
Annual savings	= Rs. 44 Lacs
Payback	= 8 months

UTILIZATION OF GREEN ENERGY RESOURCES



Maximum possible (~100%) Rooftop has been covered at site with solar PV installation.

1st April'23 onwards, 100% of Total grid energy is green certified power.

Year	Technology (Solar/Wind/ Biomass)	Consumption (million kWh)
FY 2021-22	Rooftop Solar	1%
FY 2022-23	Rooftop Solar	1%
FY 2023-24	Rooftop Solar + Green Energy from Grid	99%

HEALTH & WELL BEING

INDOOR AIR QUALITY- BREATHING BETTER AIR, INDOORS AND OUTDOORS

>95%

Efficiency of filtering of PM10 and PM2.5 entrapment

- Higher employee efficiency rates.
- Enhanced and healthy environment.
- Reduction of loading on HVAC systems, hence more cost efficient.

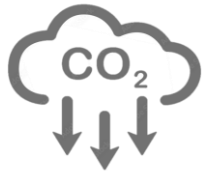
Electrostatic Filter with EC fans

- **MERV 14+ filter removes all airborne particles of Smoke, Dust, Pollen, Dander etc.**
- **Long life of filters.**
- **Lesser concentration of PM2.5/10 during winter season.**

PERFORMANCE HIGHLIGHTS

ENERGY IMPACT

	FY2021-22		FY 2023-24
Renewable Energy Share	1.4%	↑	99.3%
Renewable Energy	3,09,428 kWh	↑	2,97,80,285 kWh
GHG Emission	17,241 mtCO2e	↓	191 mtCO2e



~17049 tones of GHG

Emission reduction from 2021-22 to 2023-24

=

Equivalent to carbon sequestered by

~5,28,519 Nos.

Fully grown trees in a year

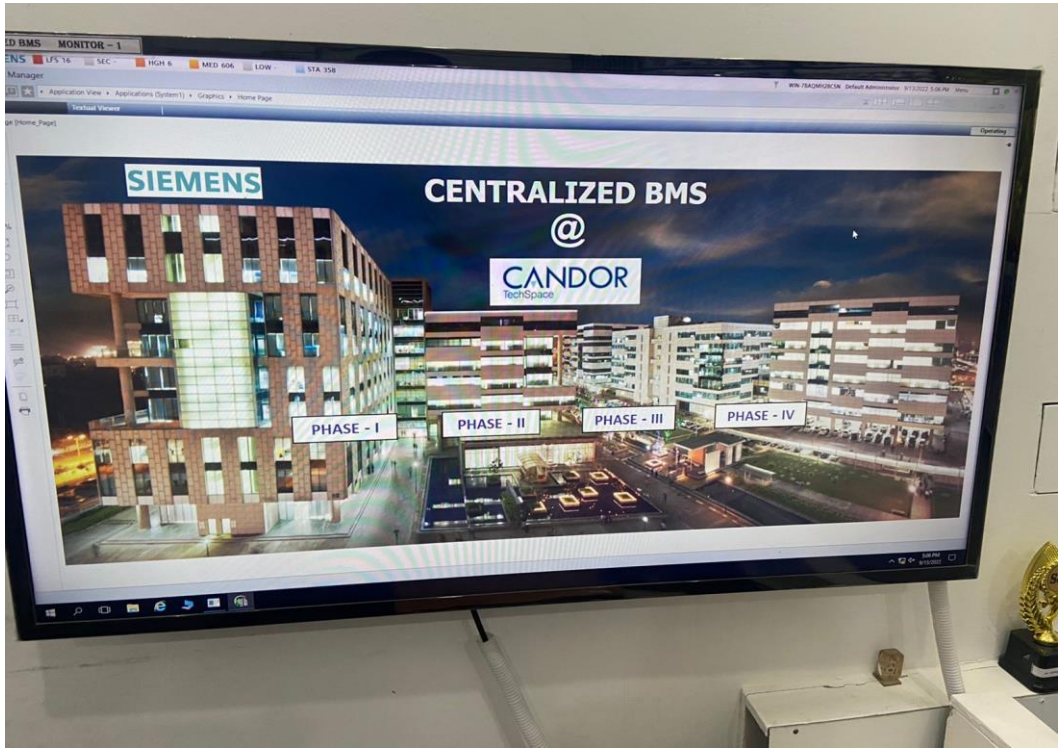
10%

reduction in energy intensity from 2020-21 to 2023-24

~99%

reduction in GHG emission from 2019 to 2023

CENTRAL BUILDING MANAGEMENT SYSTEM AND ISO 50001 CERTIFICATION



- BMS system from all towers are brought under a single platform.
- All utility equipment's integrated with BMS for better operation controls and monitoring.
- Monitoring energy consumption trend to identify gaps.
- Monitoring and operation control of Chillers, pumps and AHUs.

Brookfield
Properties

ENERGY POLICY

Brookfield Properties ("the company 1"), is committed implementing sustainable energy policies that minimize our environmental impact, reduce our carbon footprint, and promote energy efficiency across all of our properties. Also, for continually improving our Energy Performance through the process of introspection, conservation, customization, communication, and control by adhering to the following:

1. Comply with applicable legal requirements and other requirements related to its energy use, consumption and efficiency, codes of accepted industry practices and appropriate standards through periodic internal & external inspection regime
2. Adopt the best available technology to enhance energy efficiency and reduction in carbon footprint to mitigate impacts of climate change
3. Nurture green building concept adoption in design, construction and management of facilities and energy efficiency as a way of life.
4. Ensure the responsible use of energy throughout our business, including conserving energy, improving energy efficiency, and giving preference to renewable over non-renewable energy sources when feasible.
5. Develop and implement Energy objectives and targets to ensure a continual improvement in our energy performance and support the purchase of energy-efficient products and services.
6. Develop a strong sense of energy awareness amongst all employees by incorporating environmental priorities within work programs and business plans, and ensuring appropriate energy and environmental information is included in general training and inductions.
7. Ensuring that this policy is communicated to all stakeholders to make them aware of our energy management system commitments.

This policy will be reviewed once a year, or more frequently if necessary, to ensure relevance to Brookfield Properties' business operations and objectives.

DATE: 01st Apr 2023
ISSUE: Rev 3.0

Baljit Singh
(Executive Vice President - Operations)

Energy Management System
ISO 50001:2018 Certified Campus

AWARDS AND CERTIFICATIONS

IGBC Existing Building Rating, Gold Rated

5 Star Rating

5 Star Rating By Bureau of Energy Efficiency (BEE)

Bureau Veritas Safeguard Certified

By Institute of Directors

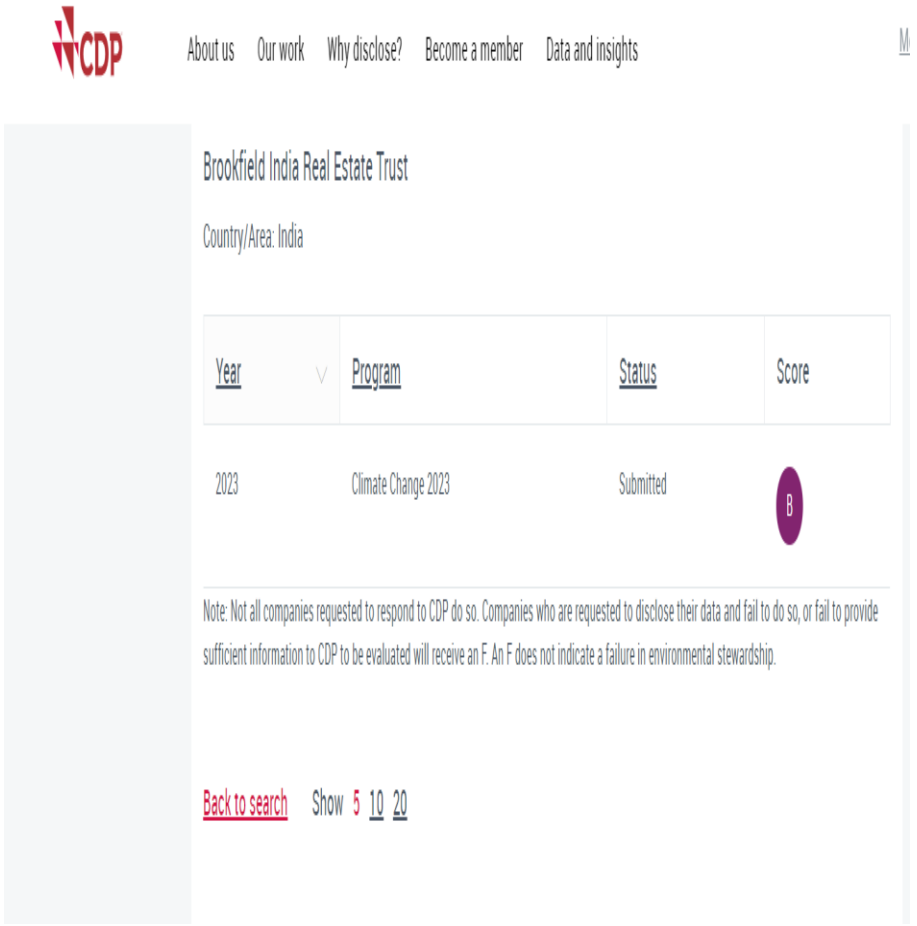
ISO 50001:2018 Certification by TUV SUD

ISO 9001, 14001, 45001 Certification by TUV SUD

British Safety Council Sword of Honor

COMMITMENT TO NET ZERO

Public Disclosure & Voluntary Initiatives



CDP

SBTi

OUR COMMITMENT TO NET ZERO

Committed to industry-leading sustainable development to deliver long-term value to our business, partners and communities

Nifty 19,310.15 ↓-55.10 Canara Robeco Equity T... ↑14.2 % INVEST NOW

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Brookfield Properties India advances net-zero target by 10 years to 2040

By Kailash Babar, ET Bureau • Last Updated: Dec 01, 2022, 05:22 PM IST

SHARE FONT SIZE SAVE PRINT COMMENT

IGBC

Confederation of Indian Industry

WORLD GREEN BUILDING COUNCIL

IGBC MISSION ON NET ZERO

Indian Green Building Council (IGBC) Congratulates

Brookfield Properties

for signing **'IGBC Mission on NET ZERO'** on 22 April 2021 towards the vision - **"India to become one of the foremost countries transforming to Net Zero by 2050"**

K S Venkatagiri
Executive Director
CII - Godrej GBC

V Suresh
Chairman
IGBC

2019

Establish baselines

2024

Net Zero plans for all buildings

2025

50% of portfolio on decarbonization pathway

2030

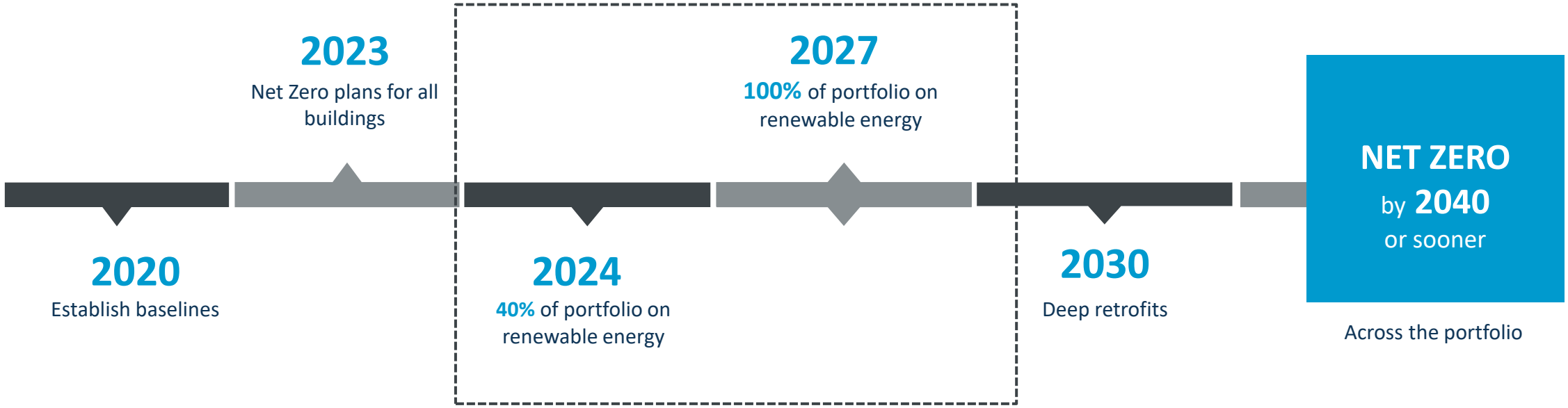
Accelerate decarbonization across assets

2040 NET ZERO (Or Sooner)

Across the Brookfield portfolio

OUR COMMITMENT TO NET ZERO

Committed to industry-leading sustainable development to deliver long-term value to our business, partners and communities



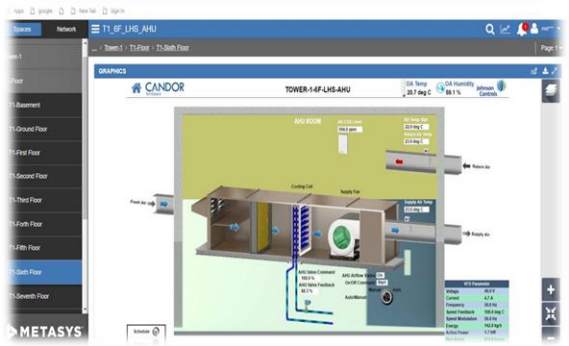
OUR DECARBONIZATION STRATEGY	Reductions in energy demand and consumption at every asset	Renewable energy sourcing across assets	Judicious use of offsets for remaining emissions

Following **science-based targets** methodology in business operations.

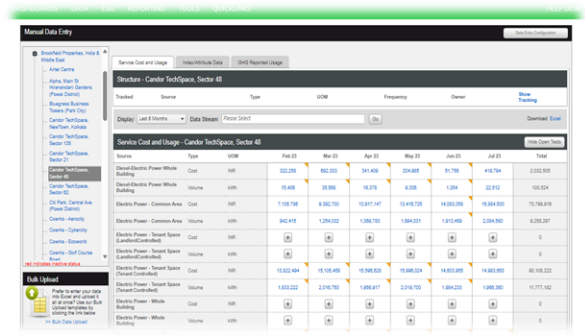
Committed to setting **science-based targets** by
- 2024 for the REIT portfolio
- 2025 for rest of the portfolio

TEAMWORK, EMPLOYEE INVOLVEMENT AND MONITORING

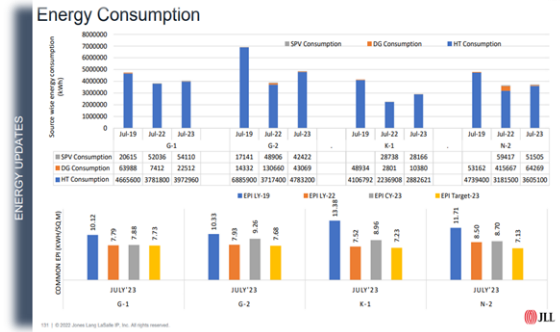
BMS System to monitor energy consumption



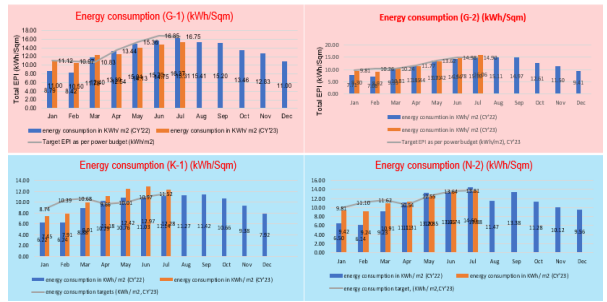
Resource Advisor Portal to update Energy, water, waste and GHG emission data



Monthly Review of Energy Performance



ESG Performance – Energy Consumption Profile (kWh/Sqm)



MICROCLIMATE CREATION THROUGH PONDS AND INCREASE IN GREEN COVER & IMPROVING BIODIVERSITY

BIO-DIVERSITY SNAPSHOT

Green cover increased to 38% of total covered area.

Ponds creation across the Campus to improve the natural cooling through microclimate creation.

Resulted in reduced HVAC load

6,000+ trees and 13 waterbodies, creating a biodiverse microclimate

Total 1,27,442 Kg of Carbon Sequestered by 3,715 trees.

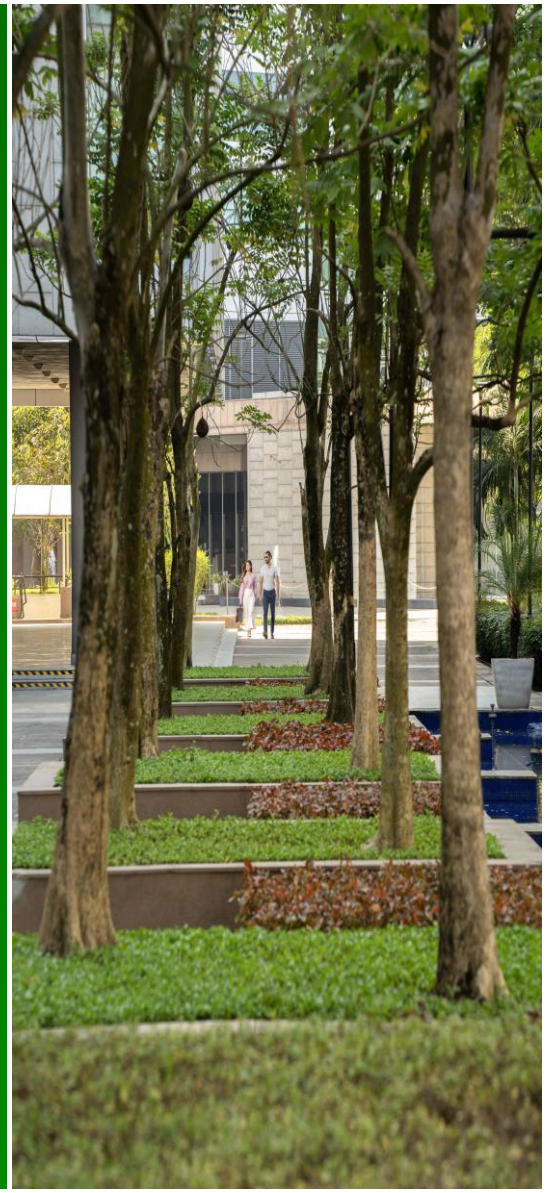
Habitat comprising of 164 floral species.

49% floral species are native to India.

Habitat supporting 36 faunal species.

Simpson's Biodiversity Index (SBI) value for trees, shrubs herbs and climbers was found to be 0.89, 0.89, 0.81 and 0.63 respectively.

More than 1% of invasive species were noted.

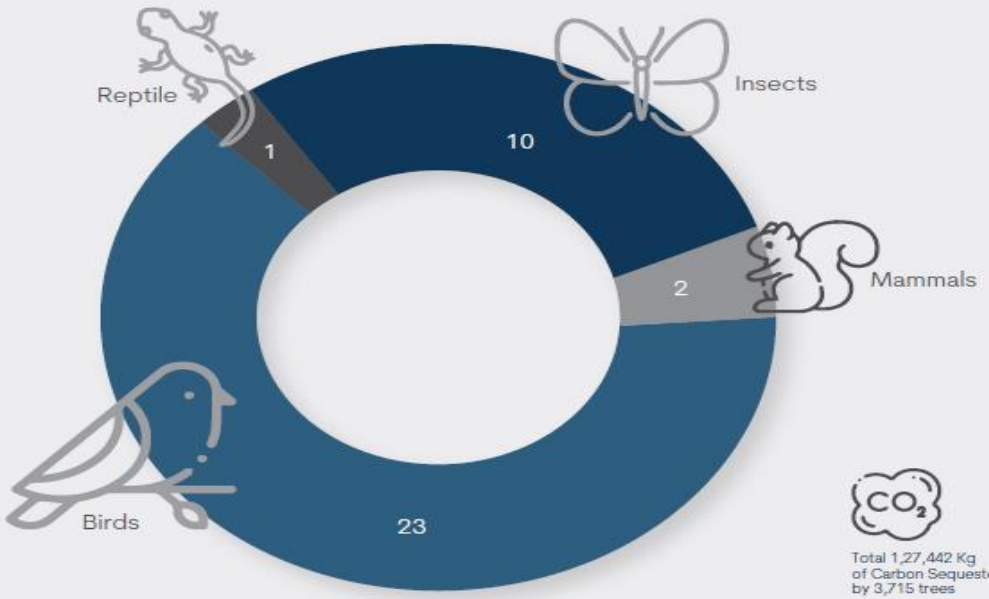


BIO DIVERSITY PROFILE

Candor TechSpace, Newtown, Kolkata

Existing biodiversity profile

- Total 38% green cover with 100% ecological connectivity.
- Habitat comprising of 164 floral species.
- 49% floral species are native to India.
- Habitat supporting 36 faunal species.
- Simpson's Biodiversity Index (SBI) value for trees, shrubs, herbs, and climbers was found to be 0.89, 0.89, 0.81 and 0.63 respectively.
- More than 1% of invasive species were noted.
- Sita Ashok (Saraca asoca) categorised as vulnerable under IUCN Red list of Threatened species is planted at the campus.
- Indian Grey Mongoose (Herpestes edwards) is listed under Schedule I of the Wildlife Protection Act (WPA), Amendment, 2022 was observed at the campus.



Total 1,27,442 Kg of Carbon Sequestered by 3,715 trees

- Green cover value > 40% of the land area (ground and built structures) is considered as good and 95% ecological connectivity is considered suitable for the faunal species.
- The faunal species value is based on a single visit survey and the diversity and abundance may vary.
- Simpson's Biodiversity Index value ranges between 0 to 1, a value close to 1 indicates higher diversity and evenness.
- The given Carbon Sequestration values are calculated for trees only and do not include other green patches comprising of shrubs, herbs and grass. Also, the Carbon Sequestration value is influenced by factors like the type of species, its girth and height.
- Currently Urban Heat Island (UHI) value has been represented on the right-side, increasing the green cover percentage can help in reducing the UHI effect.

64 Tree species

27 Shrub species

63 Herb species

10 Climber species

WATER, WASTE & SUSTAINABILITY INITIATIVES

Rainwater Harvesting System

Water efficient low flow fixtures

Drought tolerant species

Water efficient irrigation system

High SRI Roof Top to mitigate Urban Heat Island Effect

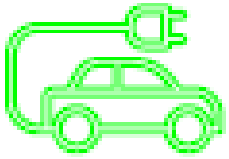
Waste Segregation

Water Recycling

Metering at Building Levels

100% Onsite Organic Waste Composting

Roof Top Solar



EV Charging Stations

MERV 13+ Filters

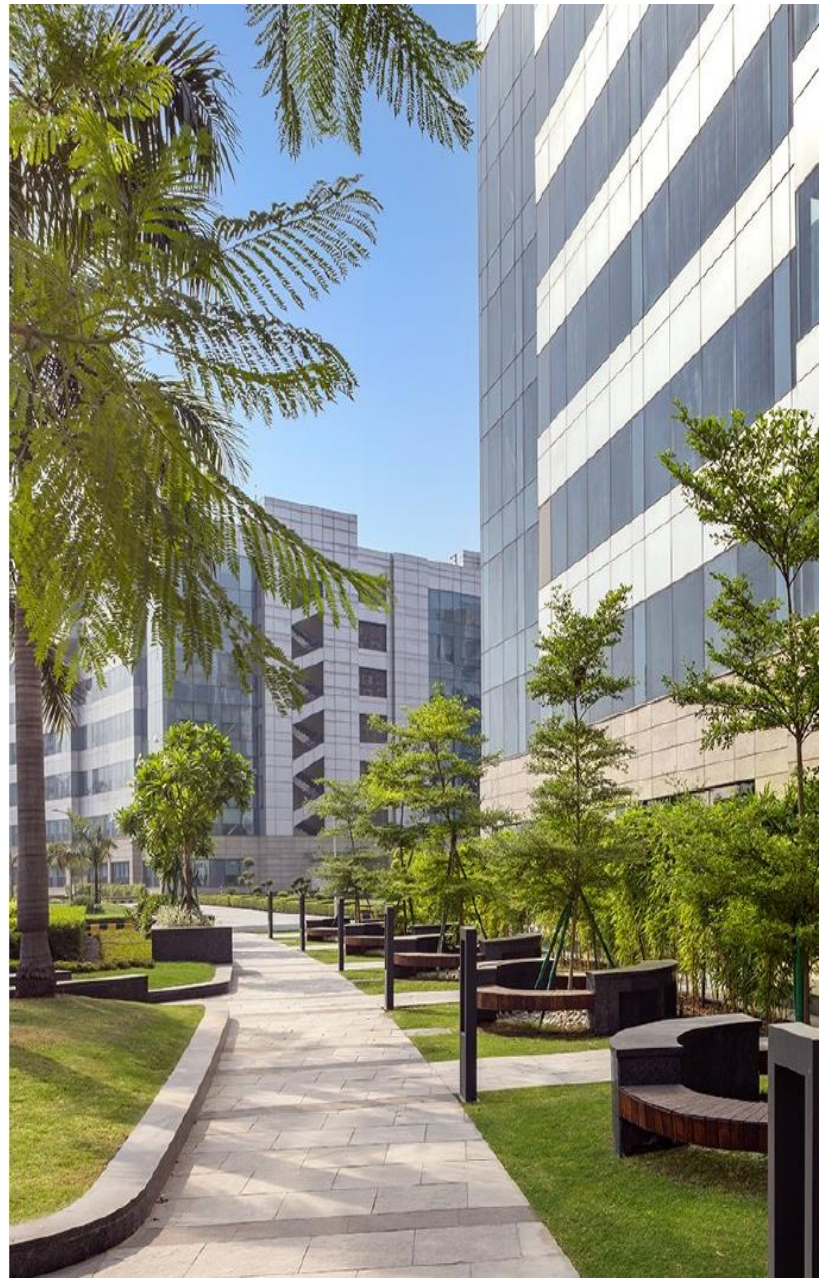
CFC Free Refrigerant

Low Emitting Material

CFC Free Refrigerant

LEARNING FROM CII

- **Build up towards the nomination process has helped us to**
  - **recognize and identify projects** which has helped our company's excellence in the reduction of energy consumption and innovation.
- **Our mission towards use of clean energy and reduction of carbon footprints**
  - Is helping us scout for new avenues and techniques to resource conservation.
- **We appreciate CII for providing this platform to share our experience**,
  - implementations and concepts, we believe that our efforts to mitigate climate change and prioritizing a circular economy will ensure our sustained growth in the future.



WAY FORWARD

- **Sustainability First….Always!**
  - ~50+ mn. Sq.ft., Largest player in the office Segment in less than a decade
  - Sector Leader for Sustainable Office Development in Asia by GRESB, Outperformed global average across all criteria

- Renewable Energy Programme.
- Installation of Fan less Cooling Towers.
- Chemical less water treatment for Cooling Towers.
- Integration of actuators installed in HVAC ring main system with BMS.
- Demand ventilation control based on AQI parameters.
- Chiller’s Parameter integration with BMS
- Installation of centralized BMS & EMS software with AI capable to integrate all other property wise centralized BMS

Thank You

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