Confederation of Indian Industry

CANDOR TechSpace

24th National Award for Excellence in Energy Management'2023

SEAVIEW DEVELOPERS PRIVATE LIMITED
[Candor TechSpace, IT/ITES SEZ, Sector-135, Noida]

Energy & Sustainability Warriors

Mr. Baljit Singh
(Executive Vice President, India-operations)

Mr. Mukund K. Kumar
(Sr. General Manager, ESG & Operations)

Mr. Srijit Mukherjee
(General Manager, Energy & Sustainability)

Mr. Prabhakar Saxena
(Manager, Energy & Sustainability)

Mr. Raghav Singhal
(Manager, Energy & Sustainability)

Mr. Loveneesh Khurana
(Manager, Energy)

Brookfield Properties India

At Brookfield Properties, We’re reimagining real estate through sustainable solutions, and we believe in creating spaces that makes a difference.

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

50+ MSF
Grade A
Business campuses

0.5 million
working professional
impacted

2040
net zero goal advanced
by 10 years

250+
TENANTS

SEAVIEW DEVELOPERS (P) LIMITED, AT A GLANCE..!!

SEAVIEW DEVELOPERS (P) LIMITED, AT A GLANCE..!!

Legal Entity	SEAVIEW DEVELOPERS PVT LTD
Land Area	29.7 Acres
Project Highlights	Sustainable features that include • Energy efficient chillers with ATCS • Rooftop Solar system • CTI certified cooling towers • AHUs with EC Fans & ES Filter • 100% LED lights • Water-efficient landscaping • Zero water discharge campus achieved through Sewage treatment plant (STP) with ultra-filtration • High-performance glazing system to allow minimal heat gain while maximizing pleasant daylight ingress • Electric vehicle charging stations • Zero Wet Waste Discharge campus achieved through Organic waste composter • Micro-Climate Water Body
Amenities	• Gym • Restaurant & Food Court • Daycare • Tennis, Football, Badminton, Basketball grounds

Architectural Design Features

Climate Zone: Composite

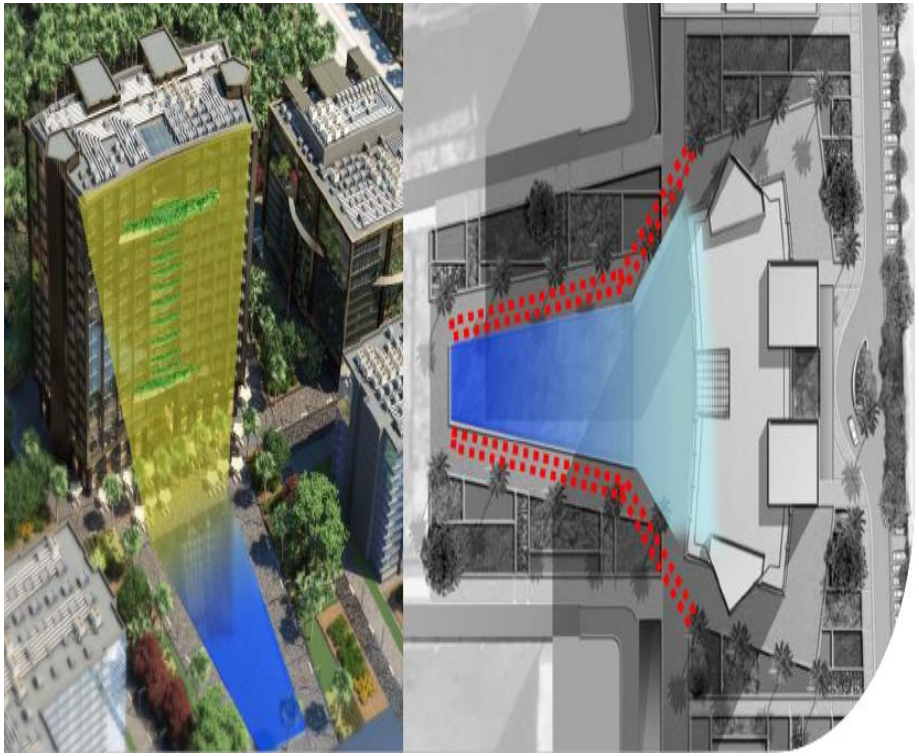
North-east facing façade reduces heat gain

South and west protected by cores to avoid direct solar radiation to offices

The high-performance glazing system allows for minimal heat gain while maximizing pleasant daylight ingress.

Dark colored glass, with a VLT - 42%|SHGC – 0.3| U-Value – 1.6, allowing penetration of daylight that is available almost throughout the year.

For glare control, overhangs and fins have been added to the South and West façade.



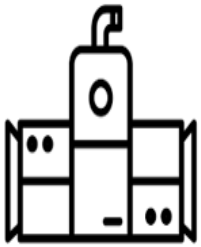
1521 Sq. M of a Landscape Water body

Microclimate Generation

Evaporative Cooling

Creating a sustainable environment through the generation of a cooler Micro-climate

Energy and Sustainability Initiatives

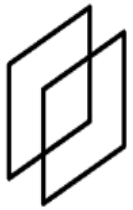


CENTRIFUGAL CHILLERS TARGETED COP OF 6.3

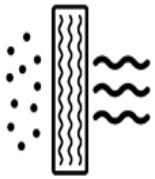
CTI CERTIFIED COOLING TOWERS

LED LIGHTING

DEMAND CONTROLLED VENTILATION



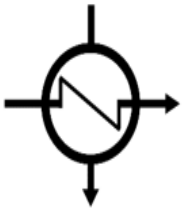
DOUBLE GLAZING



MERV 13 FILTERS

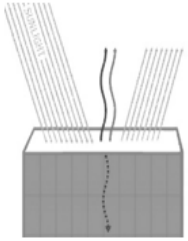
95% SPACES RECEIVE DAYLIGHT >110 LUX

VFD IN PUMPS

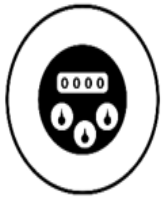


HEAT RECOVERY WHEEL

ROOF-TOP SOLAR



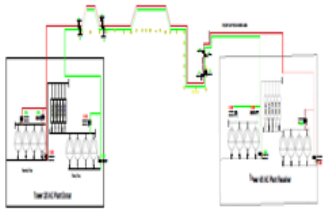
HIGH SRI ROOF



METERING AT BUILDING LEVEL

BUILDING MANAGEMENT SYSTEM

IAQ System

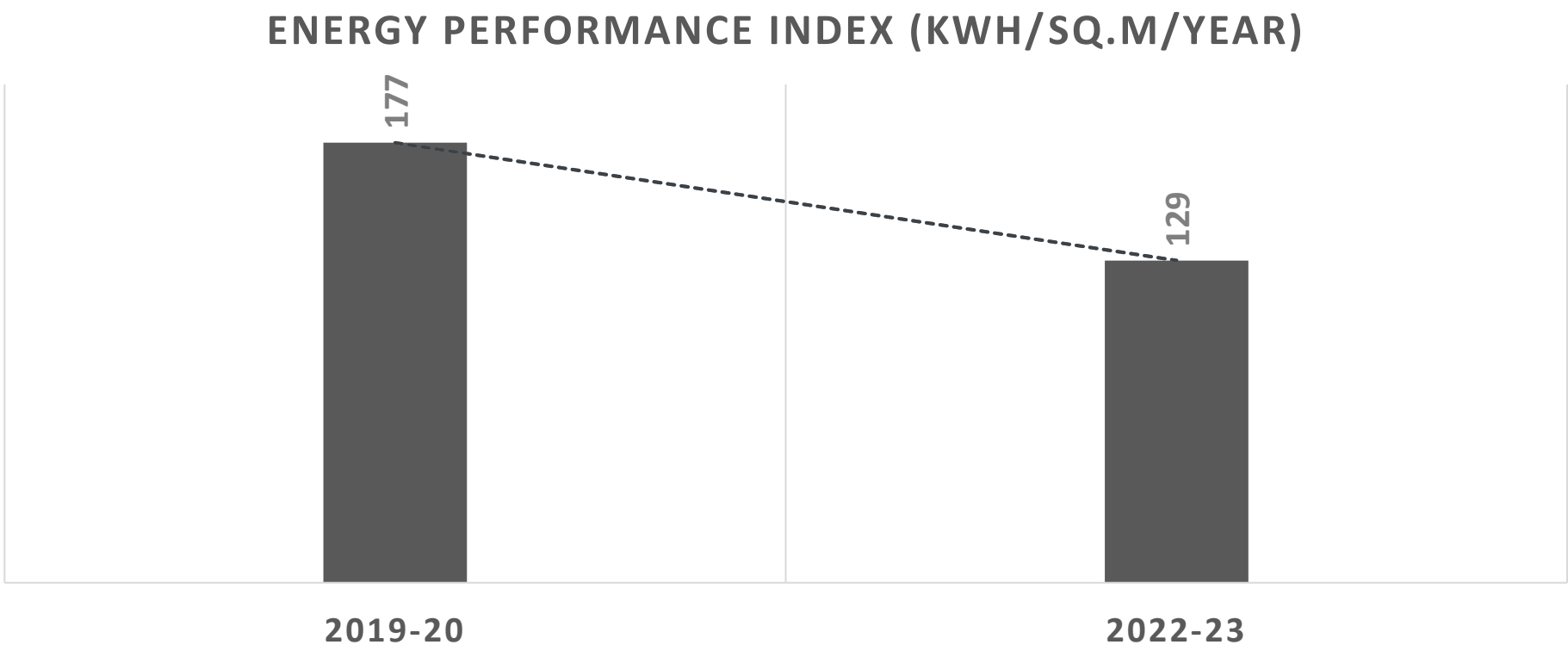


Chiller-Ring Main Line

Energy Consumption Pattern

Parameter	Units	2020-21	2021-22	2022-23
Energy Consumption				
Grid	MWh	25718	23245	33769
DG Sets	MWh	399	378	1282
Total Annual Energy, (Grid + DG)	**MWh**	**26117**	**23623**	**35051**
Energy Cost				
Grid	Million Rs.	288	254	331
DG Sets	Million Rs.	3.6	5.6	34.5
Total Annual Energy Cost, (Grid + DG)	**Million Rs.**	**291**	**260**	**366**

Energy Performance Index

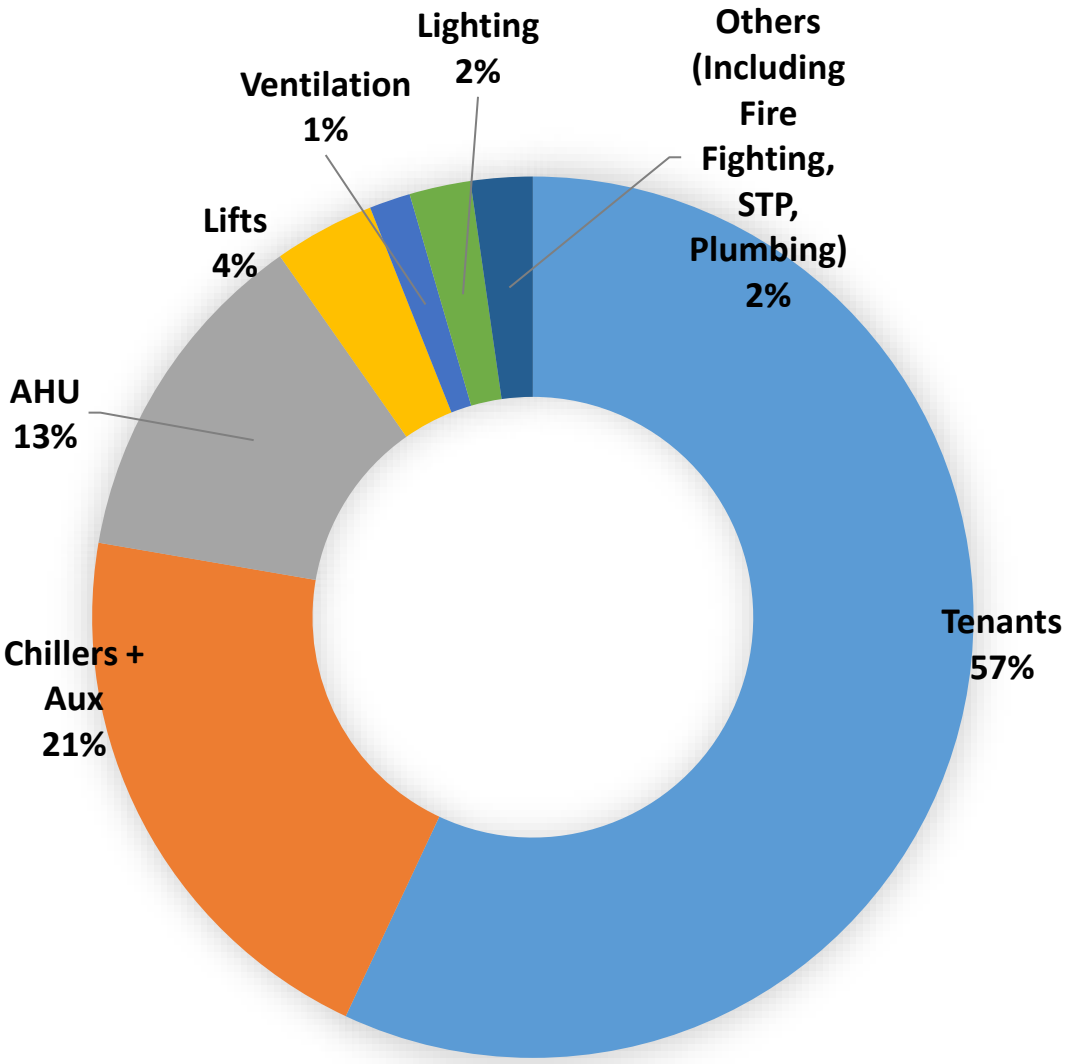


- **27% reduction in EPI achieved wrt the FY19-20 (Baseline Year)**
- **Campus occupancy 83.6% (24 Hr./Day) and 16.4% (12 Hr./day)**
- **Consumption reductions in FY2021 & FY2022 are attributable to lower physical occupancy, on account of restrictions due to covid, however the occupancy is increasing gradually, ~70% of the Baseline occupancy achieved during FY 22-23.**

Energy Mapping

Energy Share of Major Utilities

Section	Share of Energy (%age)
Tenant	**57%**
Common Area Consumption	
Chillers & Aux	**21%**
AHUs	**13%**
Lightings	2%
Lifts	4%
Ventilation	1%
Others (Including Fire fighting, Plumbing, STP)	2%
Total	**100%**



Energy Share (Tenant & Utilities break up)

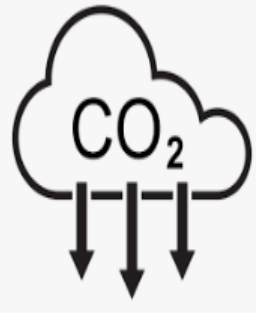
List of Major Encon Project Planned in FY [2023-24]

S. No.	Encon Project Planned	Energy Saving, Lacs kWh	Cost Saving, Lacs Rs.	Investment , Lacs Rs.	Payback, Months
1	Implementation of chemical free water treatment Technology in Cooling Towers	4.82	48.75	113.75	28
2	Installation of Ring Main line for HVAC Plant Room-4 to HVAC Plant Room-5	2.82	28.53	42.8	18
3	Automation of Ring Main line actuators for HVAC Plant Room-1 to 2 and 3 to 4 wrt. to the cooling demand load of the buildings	1.07	10.80	19.8	22
4	Replacement of De-rated equipment's with Energy efficient equipment's	3.62	36.63	58	19

Major Energy Saving Projects Implemented in Last Three Years

S. No.	Financial Year	Major ECM Project Implemented	Energy Saving kWh	Cost Saving INR	Payback Months
1	FY(2020-21)	3	4,44,532	45,99,960	14
2	FY(2021-22)	7	8,07,248	88,63,697	26
3	FY(2022-23)	3	3,83,906	43,41,406	15

Project Impact



S. No.	Financial Year	GHG Emission Reduction, Tonne
1	FY(2020-21)	365
2	FY(2021-22)	662
3	FY(2022-23)	315

Energy Saving Projects Implemented in Last 3 Years

RETROFITTING OF EC FANS WITH ES FILTERS IN AHU'S

- EC motors installed in AHU's to achieve higher energy savings.
- Improvement in quality of air inside the workplace
- Higher life of electrostatic filters as compared to normal filters.
- Energy savings to the tune of ~30-40% achieved in AHUs

SECONDARY CHILLED WATER PUMP AUTOMATION

- Automation of secondary pump for energy efficiency in HVAC system.
- VFD controlled HVAC pumps with auto changeover as per load demand.
- Avoid running of extra pumps by utilizing in better efficiency manner.
- Manual dependency of speed regulation for secondary pump is completely avoided.

Energy Saving Projects Implemented in Last 3 Years…..Contd.

COOLING TOWER UPGRADATION

- Upgradation of existing cooling towers by changing of fills, louvers etc to match with the heat load of operational chillers.
- VFD installation on CT fans
- Lower specific energy consumption of the operating chillers.

CENTRALIZED BUILDING MANAGEMENT SYSTEM

- 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.

Energy Saving Projects Implemented in Last 3 Years…..Contd.

CHILLED WATER RING MAIN LINE (INTERCONNECTION OF TWO HVAC SYSTEM)

- Individual plant rooms inter-connected so that single plant room can supply chilled water to two or more buildings.
- Higher energy savings due to optimal loading of chillers during low load period.
- Run hour, O & M and spares consumption reduced for the receiving plant.
- Enhanced redundancy

AUTOMATION OF AHU FRESH AIR DAMPER WRT. IAQ PARAMETERS

- Flow of fresh air based on air quality monitored inside and outside the building
- Higher energy savings due to optimal opening of fresh air dampers.
- Higher productivity of occupants because of proper maintaining of IAQ level.

Energy Saving Projects Implemented in Last 3 Years…..Contd.

LED LIGHTS INSTALLATION

- All existing conventional lights in campus are converted with LED lights
- Installed high efficiency with > 115 lumens/watt.
- Installed 3 metres from ground level for better illumination.
- Installed digital timers for exterior lighting

AUTOMATIC TUBE CLEANING SYSTEM AND COOLING WATER TREATMENT FOR CHILLERS

- Automatic condenser tube cleaning system and cooling water treatment system installed for Chillers
- Helps to reduce specific energy consumption by lowering condenser fouling and keeping the approach within the limits.

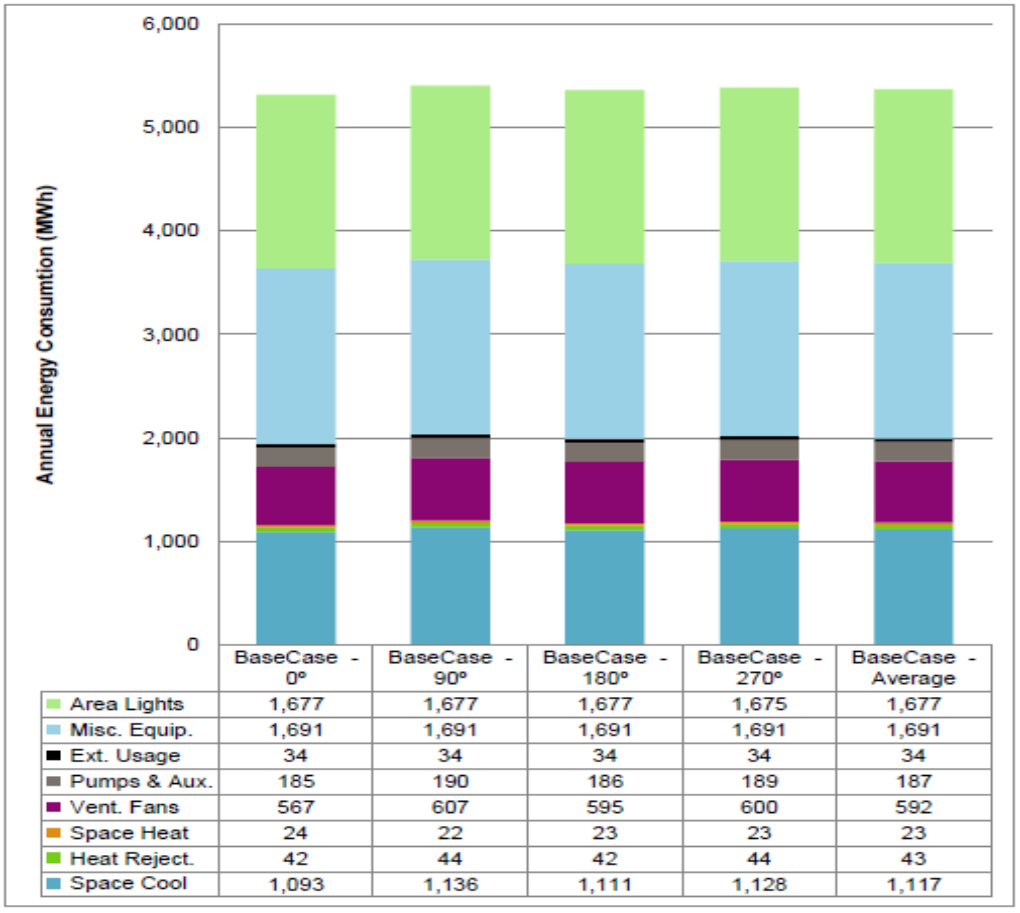
Energy Saving Projects Implemented in Last 3 Years…..Contd.

IN-EFFICIENT EQUIPMENT'S REPLACEMENT WITH ENERGY EFFICIENT EQUIPMENT'S

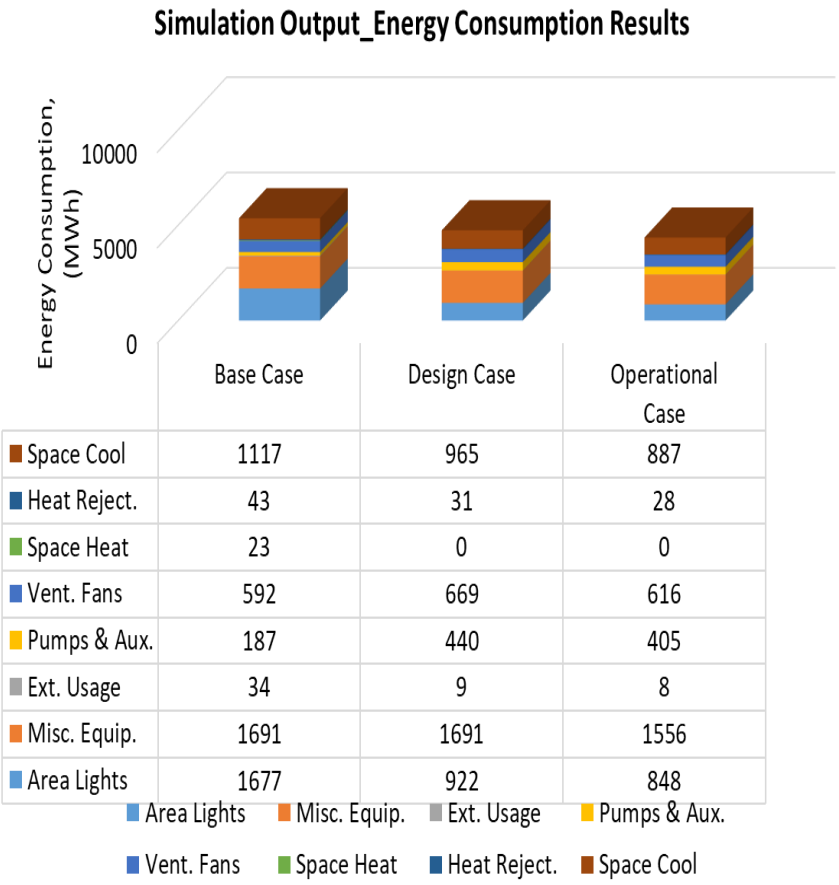
- In-efficient cooling towers, chilled water pumps etc. replacement with new technology based energy efficient product
- Higher energy savings
- Reduction in running hours as well as O & M activities

Innovative Project-1

ENERGY SAVING IN DESIGN STAGE- NEW DEVELOPMENT PROJECT TOWER-11/11A



	BaseCase - 0°	BaseCase - 90°	BaseCase - 180°	BaseCase - 270°	BaseCase - Average
Area Lights	1,677	1,677	1,677	1,675	1,677
Misc. Equip.	1,691	1,691	1,691	1,691	1,691
Ext. Usage	34	34	34	34	34
Pumps & Aux.	185	190	186	189	187
Vent. Fans	567	607	595	600	592
Space Heat	24	22	23	23	23
Heat Reject.	42	44	42	44	43
Space Cool	1,093	1,136	1,111	1,128	1,117

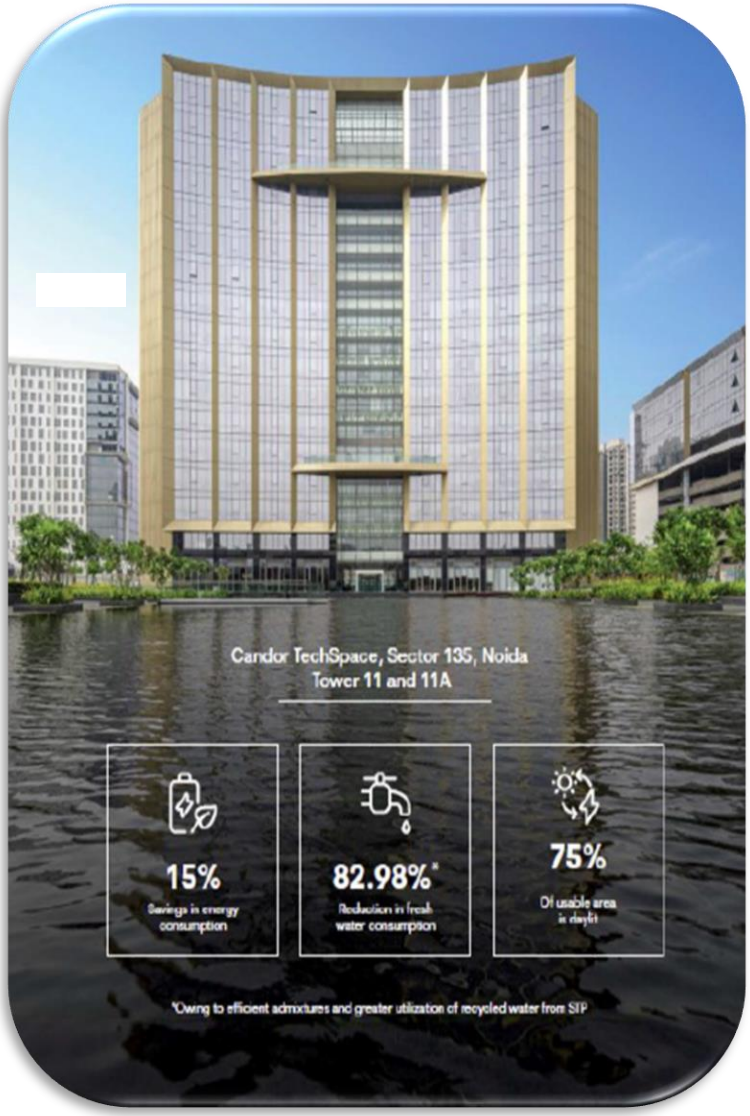


	Base Case	Design Case	Operational Case
Space Cool	1117	965	887
Heat Reject.	43	31	28
Space Heat	23	0	0
Vent. Fans	592	669	616
Pumps & Aux.	187	440	405
Ext. Usage	34	9	8
Misc. Equip.	1691	1691	1556
Area Lights	1677	922	848

- Energy simulation study was carried during the building design phase.
- The Bae case Energy consumption was averaged out by changing the building orientation by 90°, 180°, 270°.
- The Baseline annual energy consumption is 5364275 kWh and Design case annual energy consumption is 4726769 kWh.
- Design case energy consumption is 12% better than the Base case energy consumption.
- Net Energy saving 14.8% after installation of roof top solar plant as compared to base case.
- 19% savings achieved during operational phase wrt the Base case energy consumption.

Innovative Project-1…..Contd.

ENERGY SAVING IN DESIGN STAGE- NEW DEVELOPMENT PROJECT TOWER-11/11A



- IGBC Platinum Campus Level (Certified) & Building Design (Pre-certified)
- High SRI Roof Top to mitigate Urban Heat Island Effect
- 100% LED Lighting
- Efficient chillers
- Rainwater Harvesting System
- Organic Waste Composting
- EC Fans for best Indoor Air Quality
- Demand Control Ventilation
- Water Efficient Low-Flow Fixtures
- EV Charging Stations
- Energy Efficient Design
- CFC Free Refrigerant

Innovative Project-2

AHU RETROFITTING WITH EC FANS & ELECTROSTATIC FILTERS

Cost Benefit Analysis (1 Tower):

Total investment
= Rs.58.95 Lacs

Annual electrical energy savings
= 2,69,116 kWh

Annual savings
= Rs.27.21 Lacs

Payback
= 2.16 Years

Background

- Individual towers & floors AHUs has conventional fans and Filters.

Challenges

- Pressure drop in the existing filters, normally increases resulting in high energy consumption as well as lower air changes.
- To Improve upon the Indoor Air Quality is vital

Proposed System

All the AHUs to be fitted with Electrostatic Filters with MERV 14+ ratings.

All AHUs fitted with conventional fans replaced with highly efficient EC Fans to reduce the energy consumption.

Advantages of the new system

- Lower energy consumption because of lesser pressure drop across the filters.
- Enhancing the quality of air inside the conditioned space by 95%.for PM 2.5 level.
- Energy savings to the tune of ~30-40% achieved in AHUs due to EC fans installation.
- Life of ES filters is 10 years; thus, waste footprint gets reduced for the property.

Innovative Project-3

INSTALLATION OF PREMIUM ENERGY EFFICIENT CHILLER WITH ATCS SYSTEM

Output Type	Full Load (I-P)	Part Load (I-P)	Part Load (I-P)	Part Load (I-P)
Percent Load	100.00	75.00	50.00	25.00
Chiller Capacity	750.0 tonR	562.5 tonR	375.0 tonR	187.5 tonR
Chiller Input kW	402.1 kW	223.4 kW	104.8 kW	67.10 kW
Chiller Efficiency	0.5361 kW/tonR	0.3971 kW/tonR	0.2795 kW/tonR	0.3581 kW/tonR
Chiller COPR	6.560 kW/kW	8.856 kW/kW	12.58 kW/kW	9.821 kW/kW
NPLV.IP	0.3310 kW/tonR	N/A	N/A	N/A

Cost Benefit Analysis (1 Tower):

Total investment
= Rs.3.94 Cr.

Annual electrical energy savings
= 7.5 Lacs kWh

Annual savings
= 75.82 Lacs Rs.

Payback
= 5.19 Years

Background

The site has a number of towers, and the HVAC plants are placed in clusters to meet the cooling demand.

Challenges

High Energy consumption in chillers and frequently condenser tube failures resulted in down time and increased operational cost.

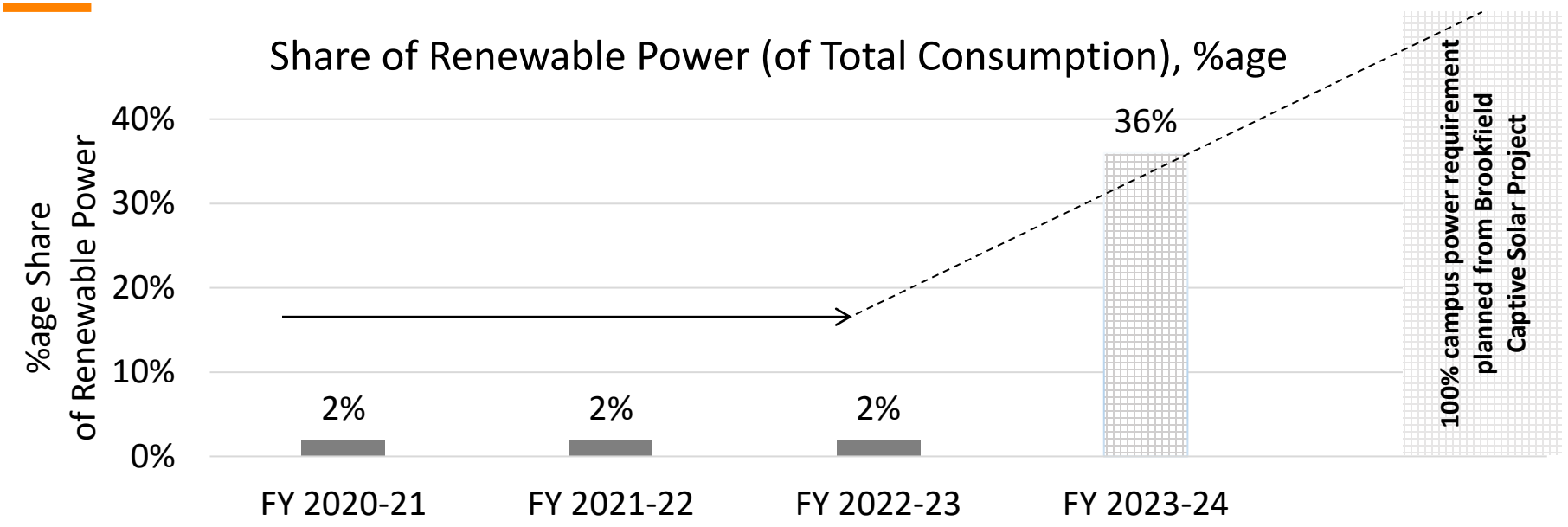
Proposed System

It was proposed to install highly energy efficient chillers having ikW/TR of 0.5361 (100% Load) with Automatic condenser Tube Cleaning System (ATCS).

Advantages of the new system

- Resulted in 25% energy savings in HVAC
- Carbon Emissions & Electrical Energy Savings
- Improved Condenser Tube Life
- Avoids costly Shutdown and Downtime
- Eliminates offline cleaning
- Avoids harmful chemicals that are used for descaling
- Reduces Carbon Footprint

Utilization of Renewable Energy Resources



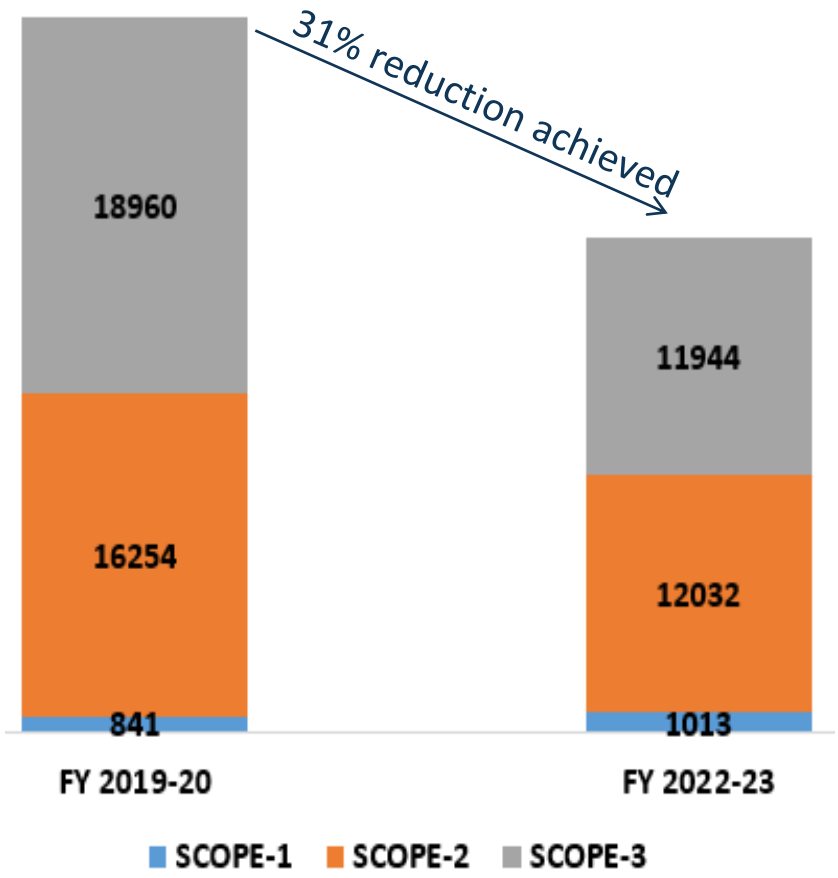
Year	Technology (Solar/Wind/ Biomass)	Installed Capacity (MW)	Consumption (million kWh)	% of Overall Electrical Energy Consumption
FY 2020-21	Rooftop Solar	0.31	0.45	2%
FY 2021-22	Rooftop Solar	0.31	0.45	2%
FY 2022-23	Rooftop Solar	0.51*	0.65	2%
FY 2023-24	Rooftop Solar + IEX/ Open Access	0.51+	12.85	36%**

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

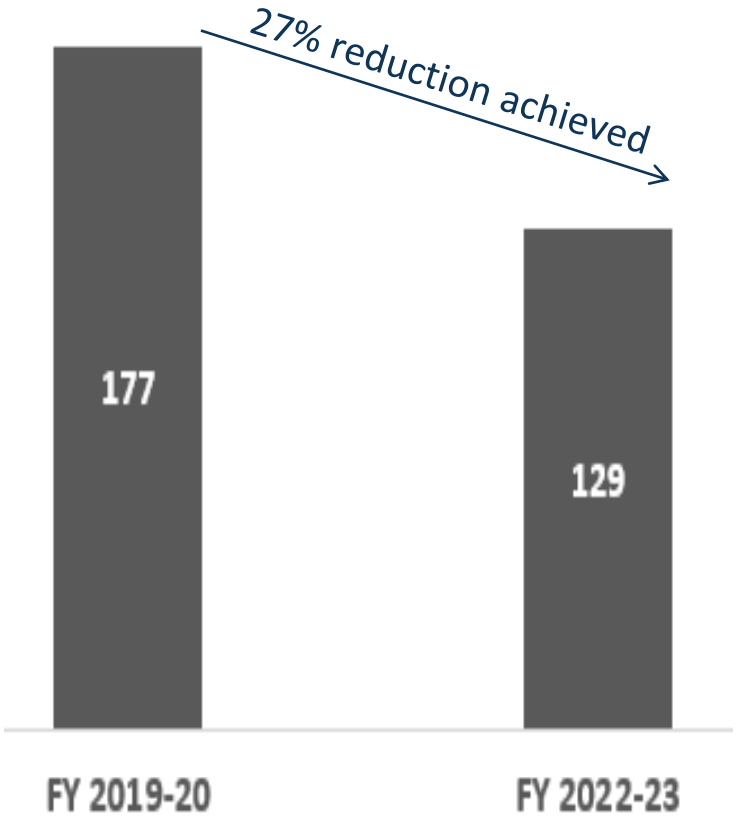
*** 1st April'24 onwards, 36% of Total energy requirement being met through open access renewable power.*

GHG Emission

GREENHOUSE GAS EMISSIONS (mtCO2e)



ENERGY CONSUMPTION INTENSITY (KWH/SQM)



Indoor Air Quality- Breathing Better Air, Indoors and Outdoors

>95%

Efficiency of filtering of PM10 and PM2.5 entrapment

The Candor TechSpace is equipped with air quality purifiers that provide higher AQI index within workspaces. This ensures:

- 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.**
- **Energy savings in AHU's observed because of low pressure drop-in filter section.**
- **Long life of filters.**
- **Automation of AHU Fresh Air Damper wrt. IAQ Parameters**
- **Lesser concentration of PM2.5/10 during winter season.**

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"), 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.

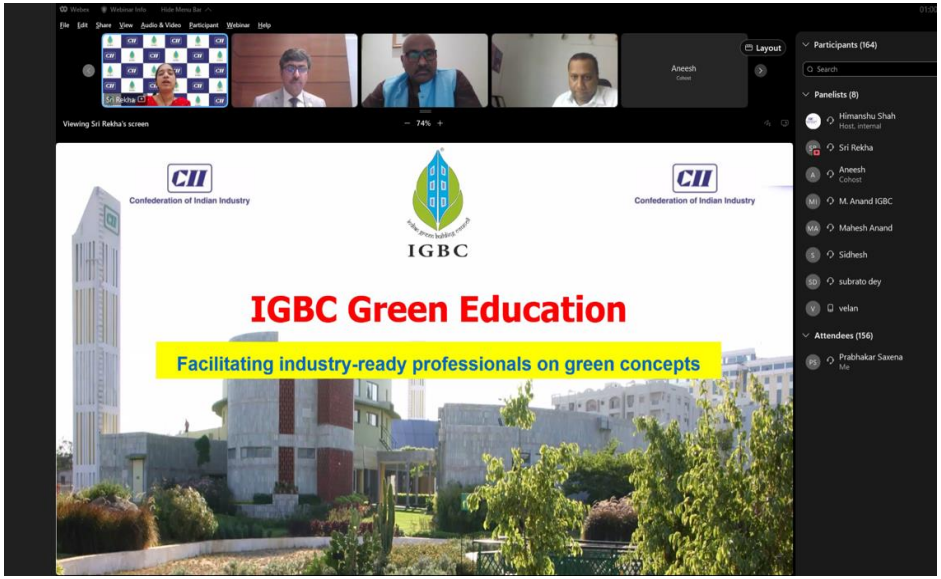
This policy will be reviewed once a year, or more frequently if necessary, to ensure relevance to Brookfield Properties' business operations and objectives.

DATE: 01st Apr 2023
ISSUE: Rev 3.0

Baljit Singh
(Executive Vice President - Operations)

Energy Management System
ISO 50001:2018 Certified Campus

Training, Team Work, Employee Involvement & Monitoring



- Daily Energy and Water Monitoring System
- Review Meeting chaired by Head operation
- Separate budget for Energy Conservation
- Energy Efficiency/Awareness training Programs
- Rewards and Recognition on monthly/Quarterly basis

Central Energy Team & Innovation Club/Ideathon

- Central Energy Team having qualified BEE Certified Energy Auditor (& Manager) led by Accredited Energy Auditor to carry out frequent performance audits at campuses.
- Site has dedicated Engineers to continuously record & monitor the energy consumption and the same is being verified by Central Energy Team on weekly basis.
- Latest calibrated Instruments to check (analyze) all the possible parameters & Equipment's performance

- INNOVATION CLUB/ IDEATHON to present ideas on Energy saving, Operational best practices, optimization being done every 6 months.
- Participants ranging from operator level to the senior management participates and presents their ideas.
- The implementable idea is immediately taken up at sites and the presenter is suitably rewarded.

Awards and Certifications

5 Star Rating

5 Star Rating By Bureau of Energy Efficiency (BEE)

ISO 50001:2018 Certification by TUV SUD

CII Kaizen Award Winner'2022 First Runner-up

By Institute of Directors

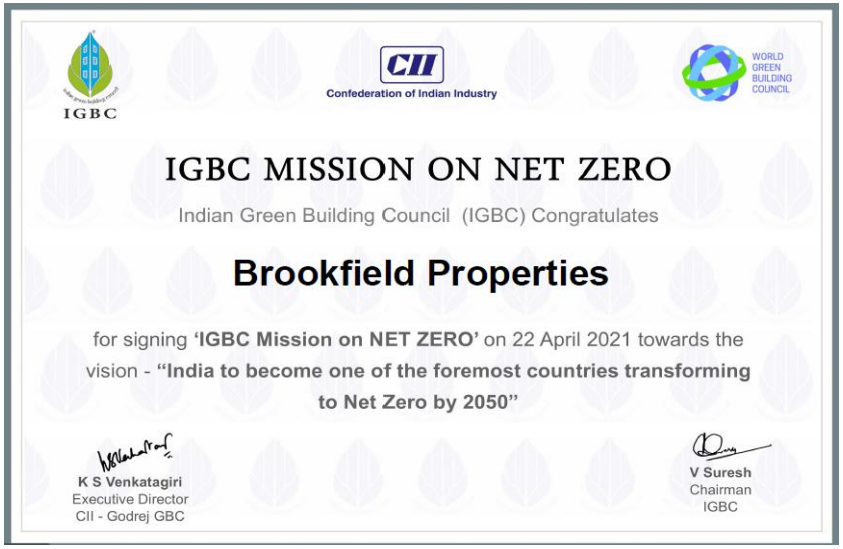
IGBC Existing Building Rating, Platinum Rated

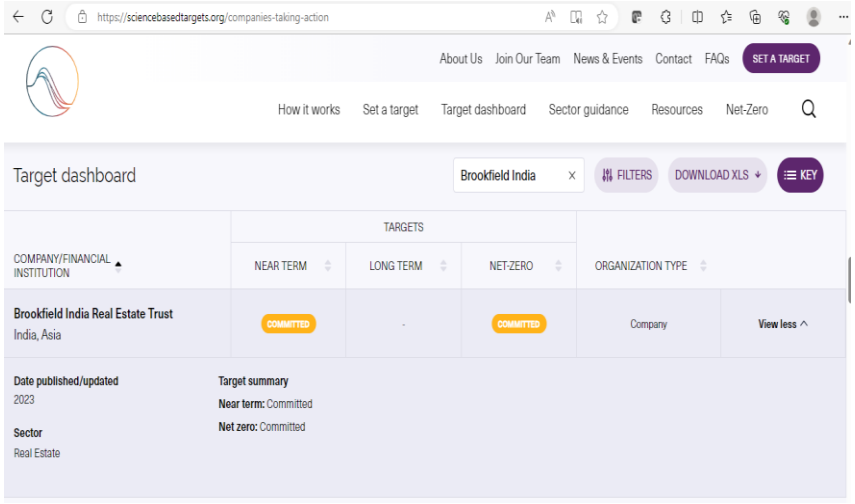
ISO 9001, 14001, 45001 Certification by TUV SUD

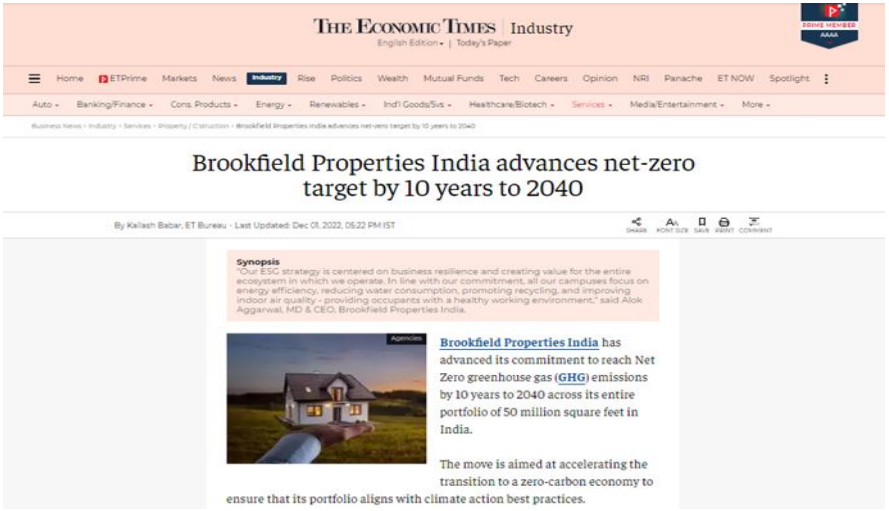
CII 5S Excellence Award'2022 Diamond Rating

Our Commitment to Net Zero

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







We have accelerated our Net Zero Commitment by 10 years to 2040 in FY23 as part of our overall ESG Goal.

Thank You

Mukund Kumar
Seaview Developers Private Limited
Plot No 20, 21, Noida-Greater Noida Expy,
Sector 135, Noida, Uttar Pradesh 201304

Email: mukundkrishnan.kumar@brookfieldproperties.com