

# CII NATIONAL AWARD FOR EXCELLENCE IN ENERGY MANAGEMENT 2023



## GODREJ IT PARK 02GBD

**PRESENTED BY:**

**ANIKET DESHPANDE | ASS. CHIEF MANAGER  
FACILITY OPERATIONS**

**ABHISHEK PANGE | PROPERTY MANAGER  
BEE EA, CMVP, IGBC AP, GRIHA TRAINER**



Confederation of Indian Industry

# Our Companies



Godrej & Boyce



Godrej Industries



Godrej Consumer Products

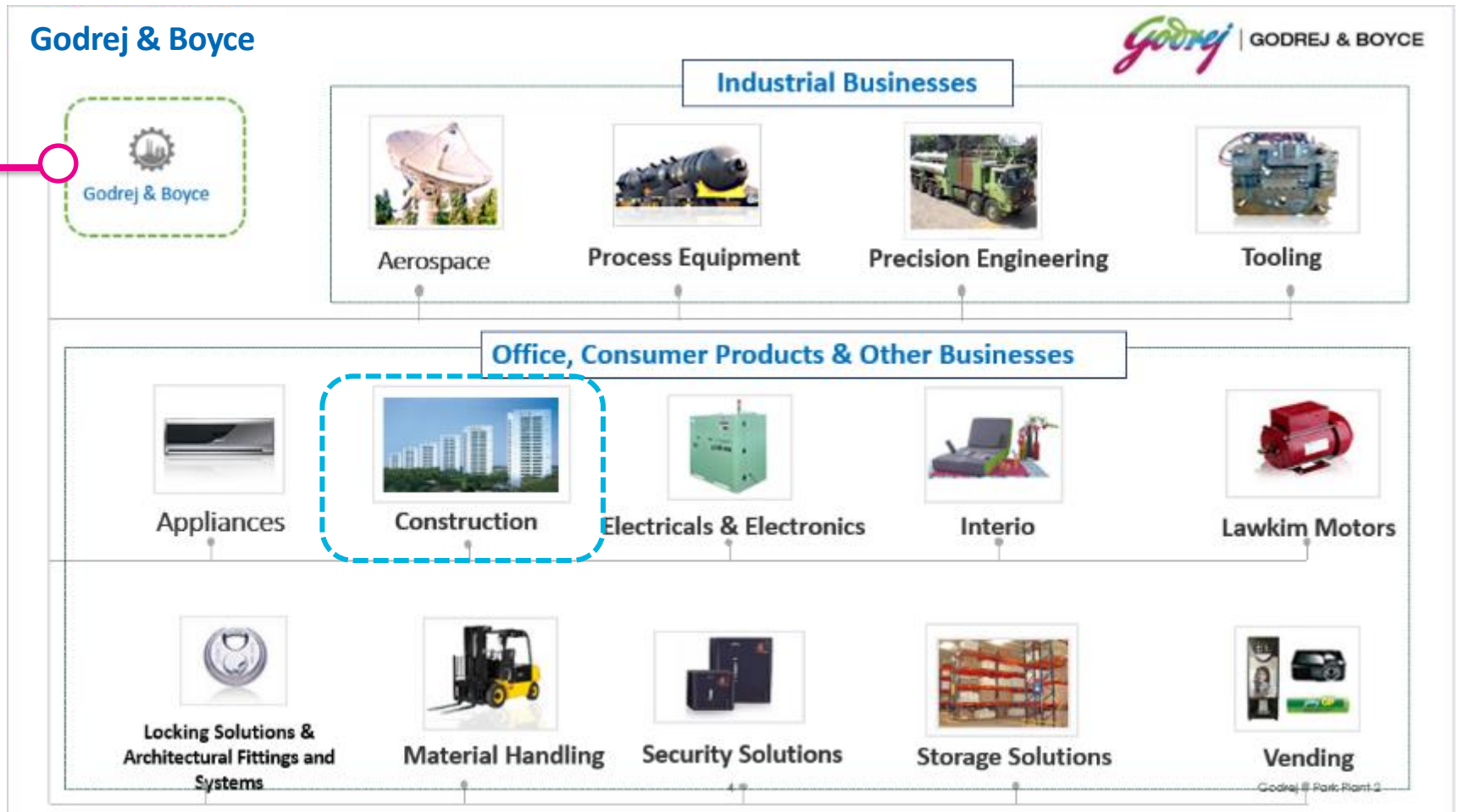


Godrej Agrovet



Godrej Properties

The flagship company  
of Godrej Group





Profit Centre

Cost Centre



Real Estate Leasing (RE-L)



Real Estate Development (RE-D)

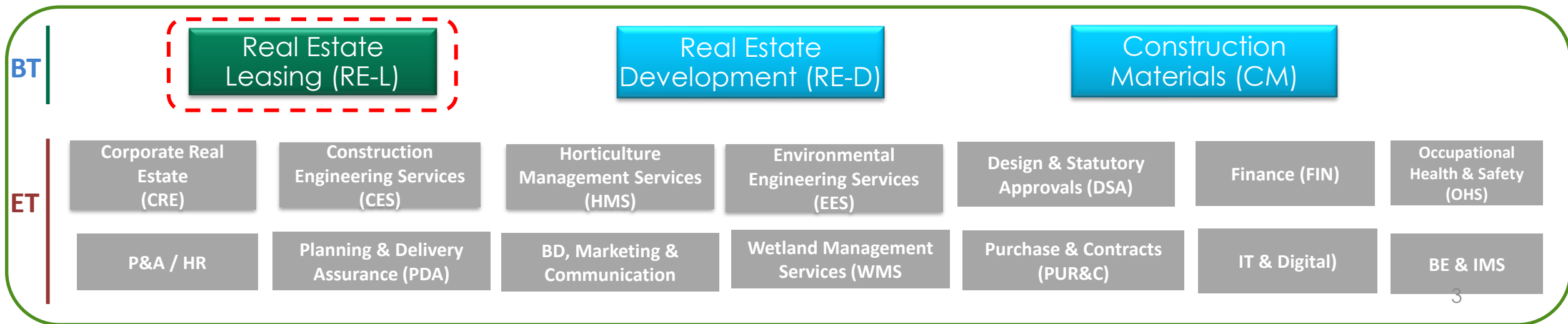


Construction Materials (CM)



Real Estate Services (RE-S)

**3 Business Teams (BT) and 14 Enabling Teams (ET)**

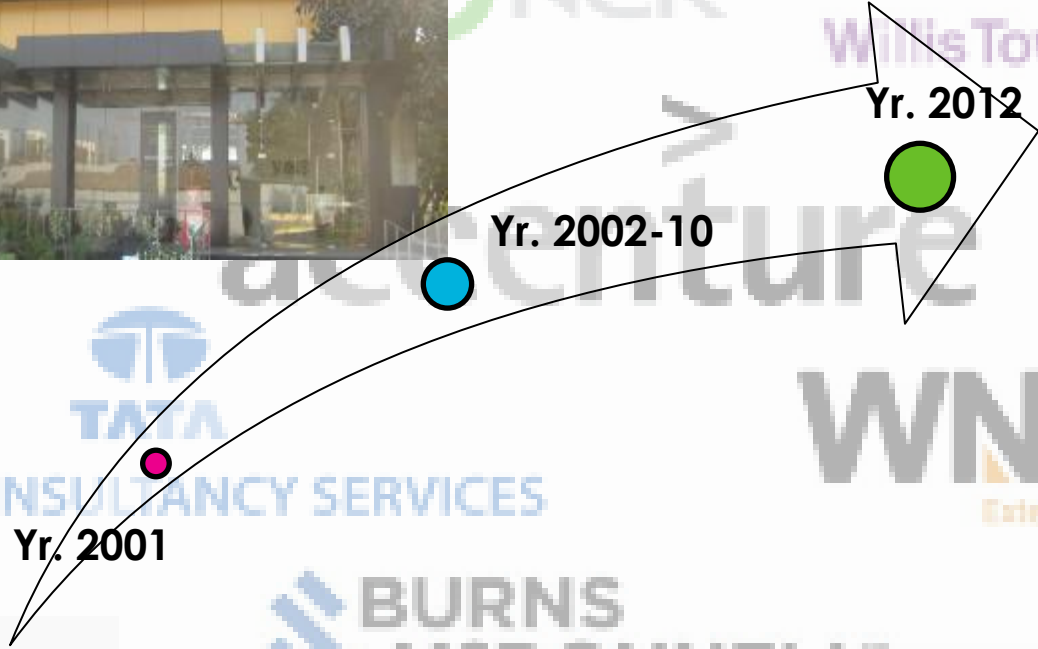


# RE-L: STRATEGIC SHIFT OVER THE PAST YEARS

1.4 Million sq. ft.  
Adaptive Reuse Building



2.2 Million sq. ft.  
Godrej IT Park, 02 GBD



100 sq. ft  
CITIBANK  
ATM



Note: Area shown as Cumulative Net Usable Area since inception (in Sq.ft.)

# GODREJ IT PARK 02GBD - OVERVIEW



**Godrej IT Park O2 GBD**  
Vikhroli, Mumbai



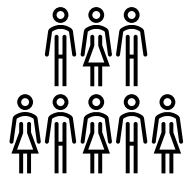
**6.3 MU (FY 22-23)**  
Energy Consumption/Year



**1 Million sq ft**  
Built-up area  
(excluding Parking)



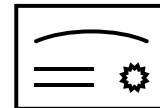
**Multi-Tenant Leased**  
**Building (Core & Shell)**  
09 Clients



**8000 Average**  
Employees Count



**PLATINUM RATED**  
**LEED CS**  
**IGBC HEALTH & WELL BEING**

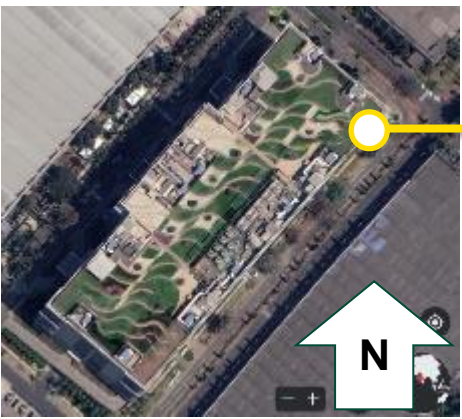


**ISO 9001, ISO 14001,**  
**ISO 45001, ISO 50001**  
Certified



**24 x 7**  
Building Operation

# BUILDING OVERVIEW - PASSIVE DESIGN FEATURES



North – South Orientation

Roof: 3" Polyurethane board + Terrace Garden  
U factor: 0.026 btu/hr.ft<sup>2</sup>°F



ROOF GARDEN

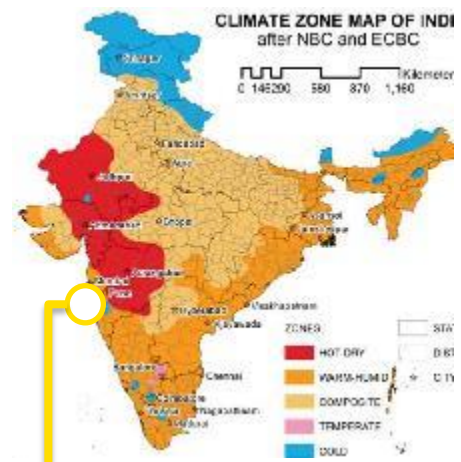


FACADE

Wall Section: 8" AAC Block  
U factor: 0.148 btu/hr.ft<sup>2</sup>°F

Glass Façade  
Window to wall ratio: 12:7 %  
SHGC: 0.23, VLT: 48%

Site located in Mumbai  
Warm & Humid Zone



Due to constraint of industrial plot orientation (North South) Special emphasis was given on “Passive design feature” for optimized energy consumption

# BUILDING OVERVIEW - ENERGY DESIGN FEATURES



Cooling Tower designed with VFD

HRW unit with 75% efficiency wheel to reduce Fresh air load on Chiller



ATRIUM



PLANT ROOM

Building designed for 0.8 W/sq. ft lighting  
100% LED lighting implemented in year 2018 resulting 50% reduction in light load

VFD on AHU Fan system integration with DPT(VAV) resulting in 10% reduction in AHU fan load

Variable secondary pumping system integration with DPT resulting in 25% reduction in pump load

Centrifugal Chiller with designed efficiency of 0.548 kW/TR (ARI condition)

By incorporating Passive and energy efficient design features building is designed 19.5% efficient as compared to ASHRAE Baseline

# RADAR APPROACH FOR ENERGY MANAGEMENT



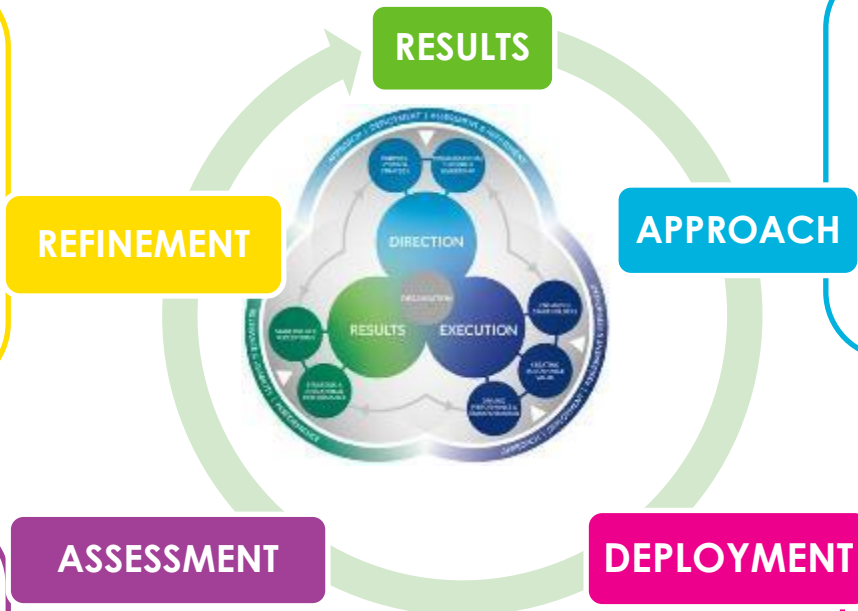
1. 8% Energy saving in Short Term
2. 100% renewable energy for common area
3. 30% Energy saving in Long term (FY 30)
4. 98% Uptime of equipment
5. Purpose Vision Mission - Vision focus on sustainability

- ✓ Track the targets and changes in project of deadlines to meet the target
- ✓ RCA and CAPA for breakdown and changes in SOPs
- ✓ Change in operational SOPs if required to meet the target
- ✓ Identify new project to meet the target

- ✓ 3% of Budget Allocated and planned each year
- ✓ Conduct Life cycle Cost analysis
- ✓ Conduct Energy & Thermography audit
- ✓ Training
- ✓ SOPs of MEP operation for EE operations
- ✓ RCA, CAPA processes
- ✓ Benchmarking of Energy consumption
- ✓ Set Energy baseline

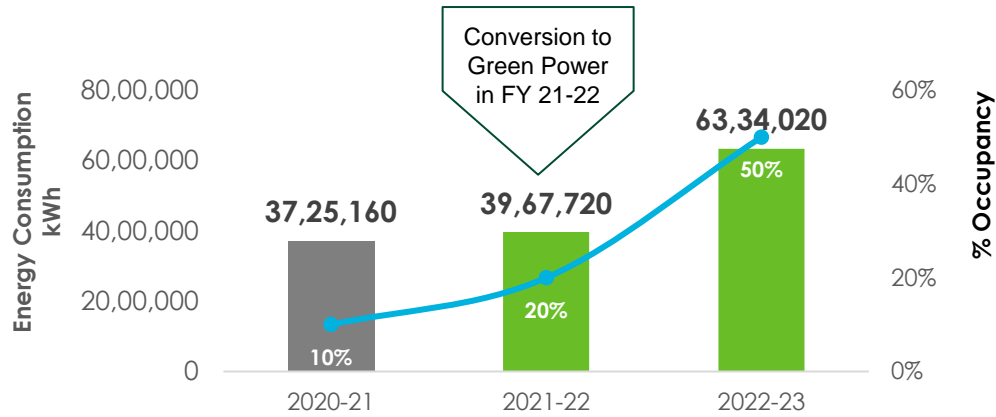
- ✓ Project Review meeting for EE projects
- ✓ Long term project planning
- ✓ Evaluation of ground staff knowledge
- ✓ Commissioning of EE project and establish savings
- ✓ Data analysis of critical EE parameters
- ✓ MEP equipment and complaints analysis
- ✓ Evaluation with benchmark energy data

- ✓ Energy Qualified resource deployment
- ✓ Prepare and execute action plan of audit report
- ✓ Implement preventive actions to reduce repetitive complaints
- ✓ Implement energy saving projects planned in budget
- ✓ Checklist & Monitoring

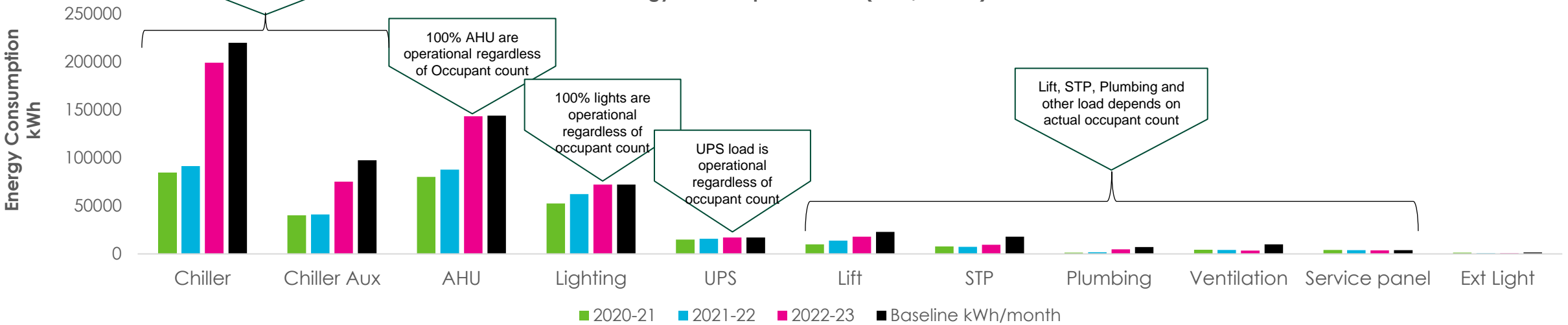




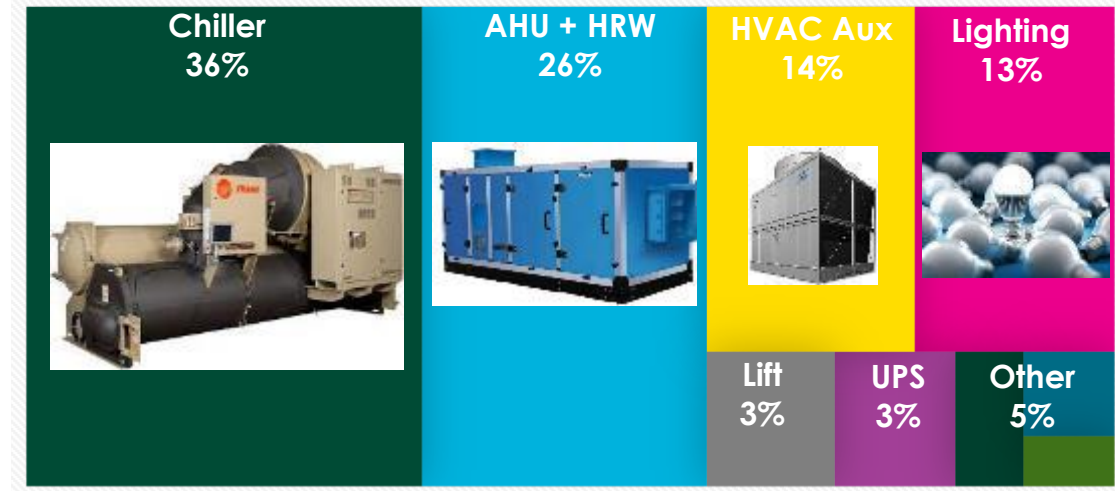
**Building Energy Consumption (kWh/year)**



Chiller and Aux load is determined by AHU operation and Occupancy hence it is slightly less than baseline



**Energy Consumption TreeMap (FY 2022-23)**

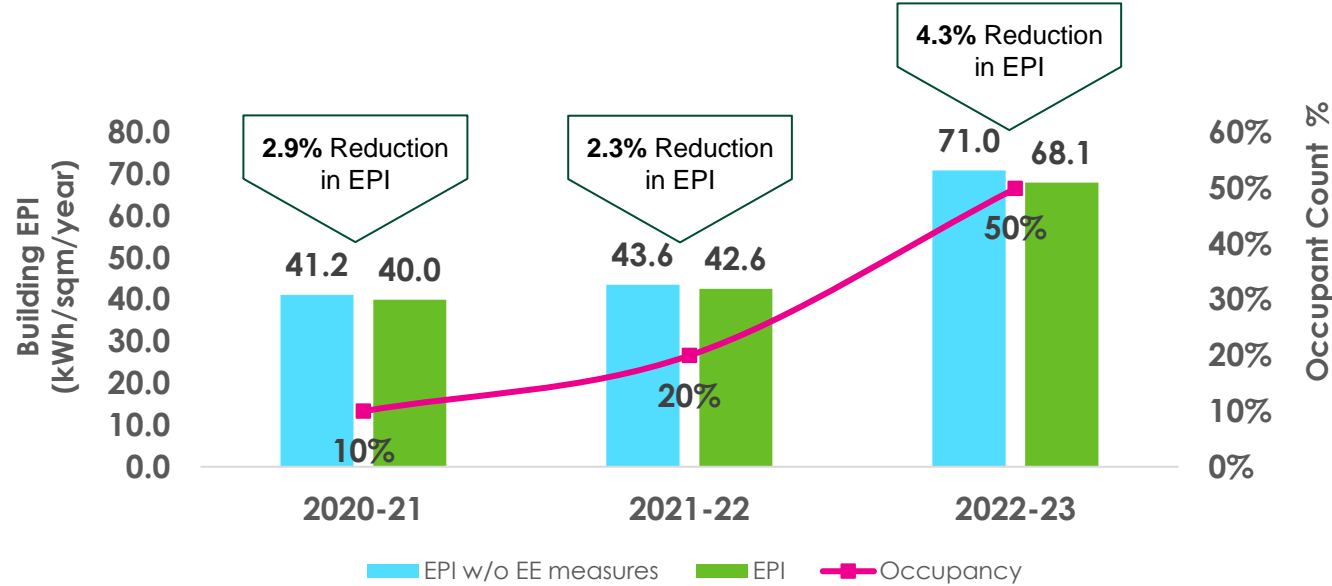


- In 2020-21 and 2021-22 due to lockdown and low operation of building the energy consumption is less
- The energy consumption in 2022-23 increased by 62% due to increased in AHU operation by 62% and increased occupancy

# SPECIFIC ENERGY CONSUMPTION (FY 20-21-FY 22-23)



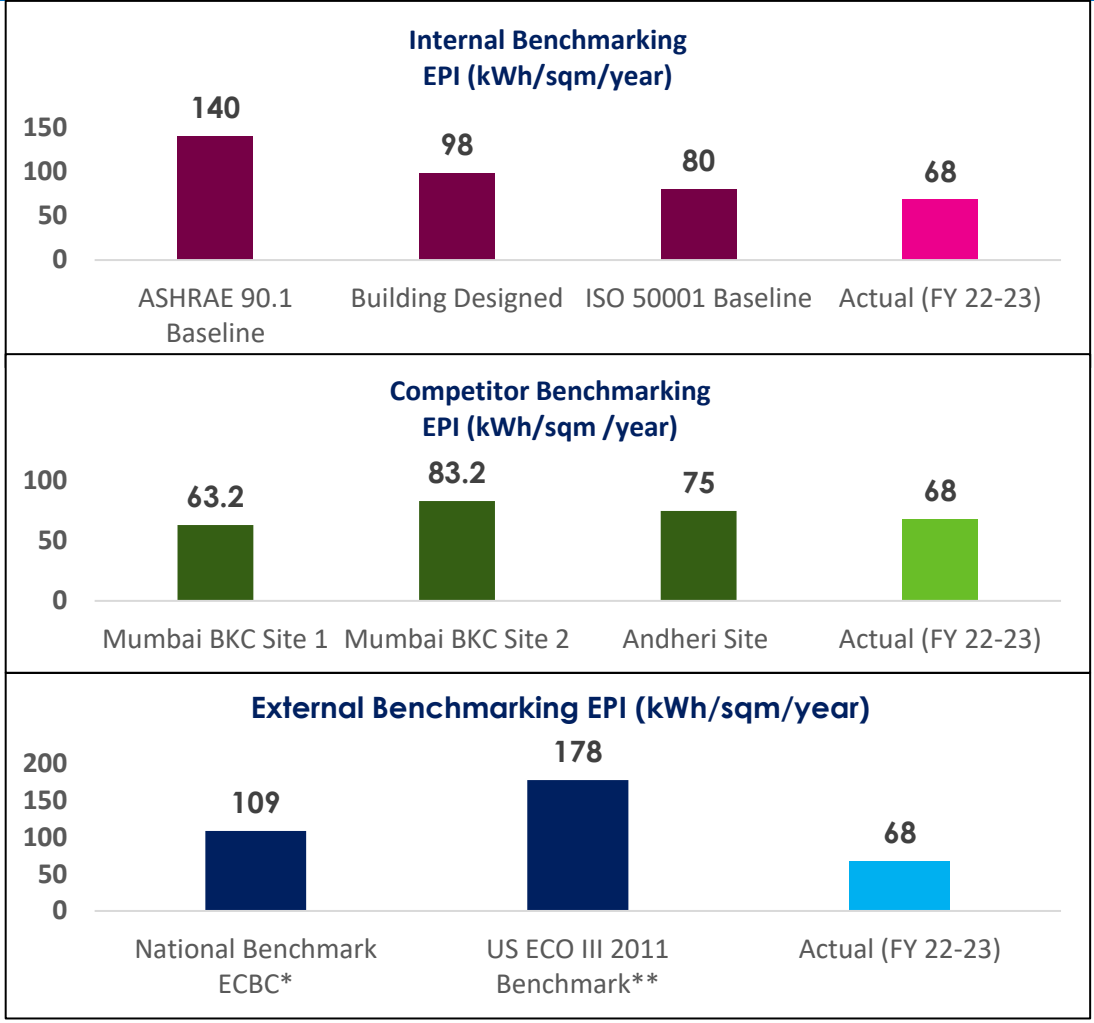
Building EPI Vs Occupancy Graphs (24 hours Building Operation)



- |                  |   |   |
|------------------|---|---|
| <b>2020 - 21</b> | <ul style="list-style-type: none"> <li>STP Diffuser replacement and optimized STP plant operation based on occupancy</li> </ul>   | <ul style="list-style-type: none"> <li>10% reduction in STP blower consumption</li> </ul>   |
| <b>2021 - 22</b> | <ul style="list-style-type: none"> <li>Opted for Green Power tariff from TATA power for entire common area services</li> <li>Secondary pump optimized operation through reduction in pressure setting</li> </ul>  | <ul style="list-style-type: none"> <li>100% Green Power since May 2021</li> <li>4.5% reduction in HVAC aux consumption</li> </ul>   |
| <b>2022 - 23</b> | <ul style="list-style-type: none"> <li>Daylight harvesting for parking lighting</li> <li>Maintaining Chiller approach through chiller descaling and life cycle assessment</li> <li>Occupancy base dimming in Staircase and refugee area lighting</li> </ul> | <ul style="list-style-type: none"> <li>10% reduction in parking light consumption</li> <li>5% reduction in chiller consumption</li> <li>40% reduction in staircase light consumption</li> </ul> |
| <b>Each year</b> | <ul style="list-style-type: none"> <li>Chiller Set point modulation i.e. maintain between 8.5°C to 10.5°C as per ambient</li> </ul>   | <ul style="list-style-type: none"> <li>6% reduction in chiller energy consumption</li> </ul>  |

The EPI in FY 20-21 and FY 21-22 is between 40 to 43 while in FY 22-23 EPI has increased to 68 due to increase in occupant count to 50% and almost 100% AHU and HRW operation as compared to 60% in previous year

# ENERGY BENCHMARKING (CORE & SHELL)



\* Total ECBC = 140 kWh/sqm/year – lighting 9.5 kWh/sqm/year – equipment 21.5 kWh/sqm/year = 109 kWh/sqm/year

\*\* Total US ECO III 2011 = 211 kWh/sqm/year – lighting 10.8 kWh/sqm/year – equipment 21.5 kWh/sqm/year = 178 kWh/sqm/year

## Target to achieve energy efficiency

**Short Term Target**  
FY 23-24  
To  
FY 24-25

- EC Fans for AHU and HRW
  - Energy Efficient HVAC pumps
  - Occupancy sensor based lighting
  - Tri lobe blower in STP
  - Energy Efficient UPS
- Target 8.5%**

**Long Term Target**  
FY 25-26  
To  
FY 28-29

- Energy saving through BMS IoT platform ( FY 25 -26)
  - Replacement of existing chiller with energy efficient chiller (2 nos.) of 0.35 kW/TR ( FY 28-29)
- Target 18.5%**

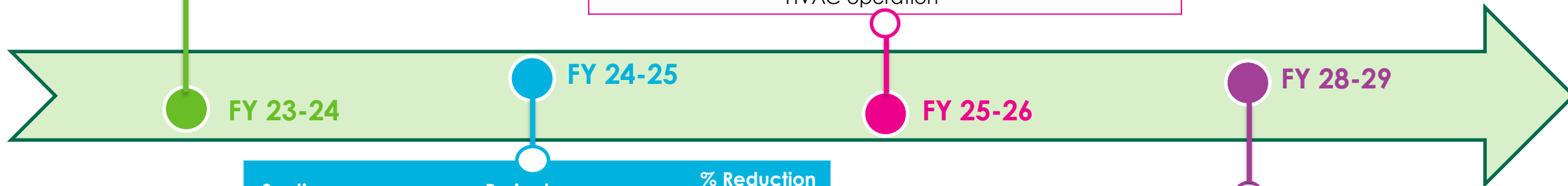
**Godrej & Boyce owns and operate only one leased building hence internal benchmarking is done based on building platinum rating baseline data and baseline committed for ISO 50001**

# ENCON PROJECTS PLANNED

Section	Project	% Reduction in Total
Chiller Auxiliary	15% reduction in HVAC pump consumption with replacement	0.17 %
Lighting	20% reduction with Occupancy sensor based lighting	1%
UPS	5% improved efficiency of UPS with Modular UPS	0.16%
STP	10% reduction in STP blower consumption with Tri lobe blower	0.15%

Section	Project	% Reduction in Total
BMS HVAC	10% reduction in HVAC energy consumption with IoT based HVAC operation	3.5 %

**Target**  
**30.5% Improved**  
**Energy Efficiency**  
**By**  
**2030**



Section	Project	% Reduction in Total
AHU	30% reduction in AHU energy consumption with EC fan retrofit	6 %
HRW	30% reduction HRW fan consumption with EC fan retrofit	1%

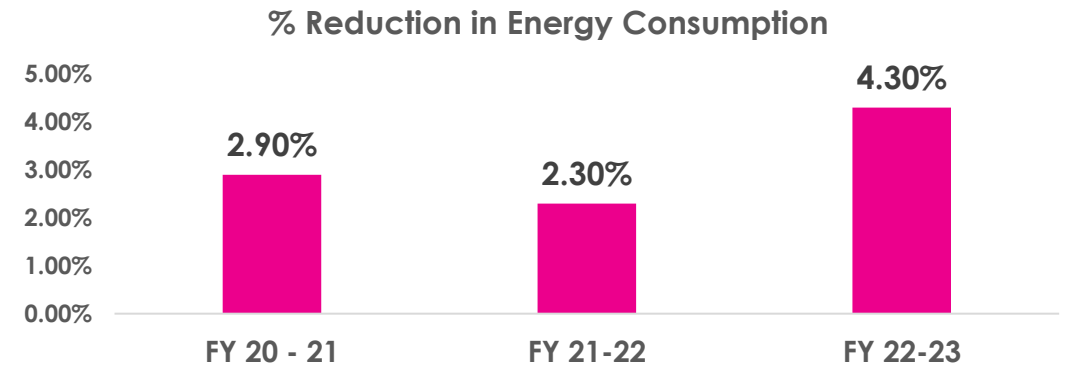
Section	Project	% Reduction in Total
Chiller	40% reduction in Chiller energy consumption with replacement to magnetic Chiller 2 nos.	15 %

**Committed to achieve 3% Energy saving in FY 23-24**

# ENERGY SAVING PROJECT IMPLEMENTED LAST 3 YEARS



Year	No. of Energy Saving Projects	Annual Electrical Saving (Million kWh)	Investment (Rs in Million)	Payback Period (Months)
2020-21	2	0.109	0.267	3
2021-22	2	0.092	0	0
2022-23	4	0.27	0.92	4
<b>Total</b>	<b>8</b>	<b>0.47</b>	<b>1.18</b>	<b>3</b>



Year	Project Title	Annual Electrical Saving (kWh)	Investment (Rs in Million)	Payback period (Months)
2020 - 21	STP Diffuser replacement and optimized STP plant operation	45144	0.267	7
2021 - 22	Secondary pump optimized operation through reduction in pressure setting	22474	0	0
2022 - 23	Daylight harvesting for parking lighting	11274	0.1	12
	Maintaining Chiller approach	115228	0.7	7.5
	Occupancy based dimming	13875	0.12	11
Each years	Chiller Set point modulation	263005	0	0
<b>TOTAL</b>		<b>4,71,000</b>	<b>1.18</b>	<b>3</b>

**Average energy saving of 3.2% per year achieved over last 3 years**

Sr. No.	Title of Project	Annual Electrical Saving (Million kWh)	Investment (Rs in Million)	Project Highlights	Payback Month
1	Daylight harvesting	11274	0.1	<ul style="list-style-type: none"> <li>The periphery of elevated parking level (P1 , P2 level) are sufficiently daylight</li> <li>The lighting circuit of daylight was segregated and made OFF during day</li> </ul>	12
2	Maintaining Chiller approach	115228	0.7	<ul style="list-style-type: none"> <li>Life Cycle assessment of Chiller and blocking of worn out tubes</li> <li>Descaling of condenser when approach reaches 3°C</li> </ul>	7.5
3	Occupancy base dimming LED	13875	0.12	<ul style="list-style-type: none"> <li>Staircase and Refugee area are not always Occupied</li> <li>As per Norm they should always be lit</li> <li>Occupancy sensor based LED dimming fixture installed</li> </ul>	11
4	Chiller Set point modulation	129623	0	<ul style="list-style-type: none"> <li>The chiller set point is varied based on season and ambient condition</li> <li>10°C in winter and 8.5°C in summer</li> <li>With maintained return air temp + Rh within comfort zone</li> </ul>	0
	<b>Total</b>	<b>270000</b>	<b>0.92</b>		<b>4</b>

**Although we have converted entire IT park lighting to LED in 2018 which has resulted in saving of 10% energy consumption, still we achieved 4% energy saving in FY 22-23**

## Energy Management in FY 2020-21

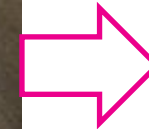
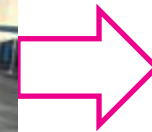


- The STP plant designed for 800KLD
- Input to STP reduced drastically during Lockdown
- Further the aeration diffuser system is old and in efficient
- Leading to increased in energy for aeration

- STP designed as 2 x 400 KLD sperate blower system
- During Lockdown one tank was made empty
- Aeration system diffuser were replaced
- The energy saving of **45144 kWh/year** achieved
- With investment of **Rs. 2.5 Lakh** for diffuser

Replaced old aeration system With new diffuser

Additionally optimize blower operation

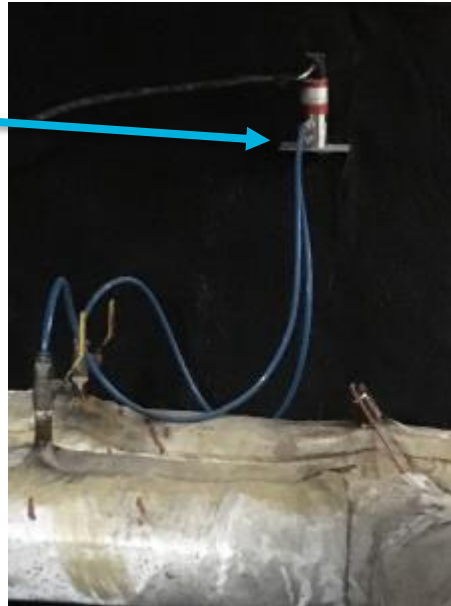


## Energy Management in FY 2021-22



- The secondary pump were operating in auto mode on set pressure setting of 13 PSI
- Actual required pressure at the AHU inlet for rated flow to be maintained was analyzed as per AHU designed

DPT sensor installed at extreme AHU i.e. on 5th floor was calibrated for accuracy



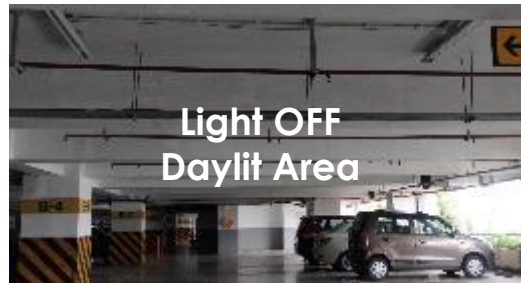
Reduction in pressure setting of secondary pump to 12 PSI

- Programming in VFD with set pressure was reduced from 13 PSI to 12 PSI for all pumps combination
- Energy saving of **22474 kWh/year** was achieved
- With zero investment





## Energy Management in FY 2022-23

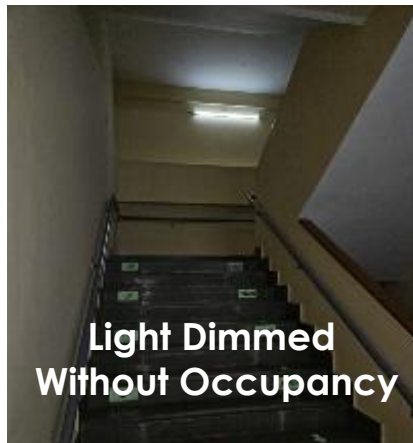


### Daylight Integration in Parking

- The Parking lighting consist of 2 x 18 LED lighting fixtures installed in driveways
- The parking are located on podium 1 and podium 2 level, periphery of parking is adequately daylit
- As lighting circuit distribution were not designed considering fact of daylight harvesting hence all lights remain "ON"
- Lighting fixtures installed in daylit areas were identified and separated for non-daylit areas lighting fixtures
- The energy saving achieved in 2022-23 with day light harvesting is **11274 kWh/year**
- With investment of **Rs. 0.75 Lakh**

### Occupancy Sensor based LED dimming

- The staircase and refugee areas are only intended for use only in case of emergency evacuation
- But as per norm the lighting in this areas should always be ON
- Resulting in wastage of energy even when occupancy is not present
- The existing light fixtures were replaced with occupancy sensor based dimming lighting fixtures
- This during no occupancy light will dim to 50%
- The energy saving with occupancy sensor based lighting fixture is **13875 kWh/year**
- With investment of **Rs. 1.2 Lakh**



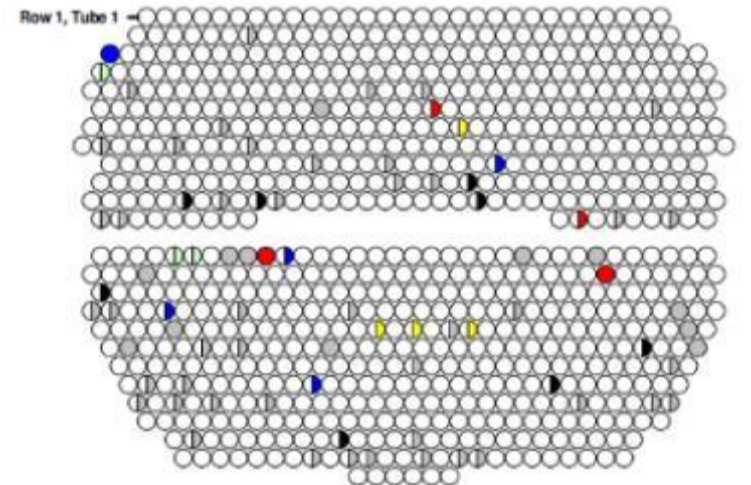
## Energy Management in FY 2022-23



- The Chiller accounts for 40% of building energy consumption
- Chiller condenser approach and Chilled water set points largely affect the energy consumption
- Descaling is done if condenser approach exceeds 2°C @ 90% load
- For life cycle assessment of chiller condenser eddy current test is done every 5 year

- Maintaining chiller approach below 2°C @ 90% load
- Eddy current test ensures blocking of affected tubes to avoid breakdown during running condition
- Life cycle assessment helps for decision in long term for equipment replacement (CAPEX planning)
- Energy saving of **115228 kWh/year**
- Investment of **Rs. 7 Lakhs**

**Improved Chiller Condenser Approach from 2°C to 1°C**



## Energy Management In Each Year



- The Chillers are design to operate to deliver 7°C chilled water
- The energy consumption of Chiller depends on chilled water temperature delivered
- Many MNC tenants demands 7°C water at AHU inlet

- The Set point of Chiller was elevated based on season and time of day
- Set point: 8.5 °C in summer to 10.5°C in winter
- Ensure all AHU %Rh and temperature is maintained within comfort zone
- Energy consumption of chiller is reduced by approx. 6% i.e. **1,30,000 kWh/annum**
- No Investment

Chiller Set Point Modulation as per Ambient and Heat load



# Innovative project: Solar 3D Printed bus stop

## 3D Printed Solar Bus stop with Roof top Solar Panel



### Project Details

- Promotes commute through shared transport system
- 3DP bus stop using recycled aggregate, less use of water, less wastage of material, low transportation
- Self sustainable bus stop with 1.65 kWp integrated flexible Solar power panel with battery system
- The lighting of bus stop was totally supplied from solar power hence making it total sustainable solution

1. 2400 kWh/annum energy generation through Solar Panel
2. 3D printed bus-stop with attractive design promotes shared transport usage

1.65 kWp Flexible integrated solar Panel installed on Bus stop



Self sustainable 3D printed Bus stop with solar integrated panel to encourage usage of shared transport

## Dimming of LED light in Staircases based on Occupancy



1. Replaced existing LED light with Occupancy based dimming LED light in all Staircases
2. 13875 kWh/annum Energy saving

### Why?

- The building has 11 nos. of emergency staircases and 7 nos. refuge areas distributed throughout building
- The staircase and refuge areas are only intended for use only in case of emergency evacuation
- But as per norm the lighting in this areas should always be ON
- Resulting in wastage of energy even when occupancy is not present

### Solution

- The existing light fixtures were replaced with occupancy sensor based dimming lighting fixtures
- Thus during no occupancy light will dim to 50% and thus it will not be dark even when no occupancy is there
- The energy saving with occupancy sensor based lighting fixture is **13875 kWh/year**
- With investment of Rs. 1.2 Lakh

Energy saving in lean occupied area along with compliance with required safety norms

# Innovative project: Maintain Green Roof

## Implementation and maintenance of Green Roof

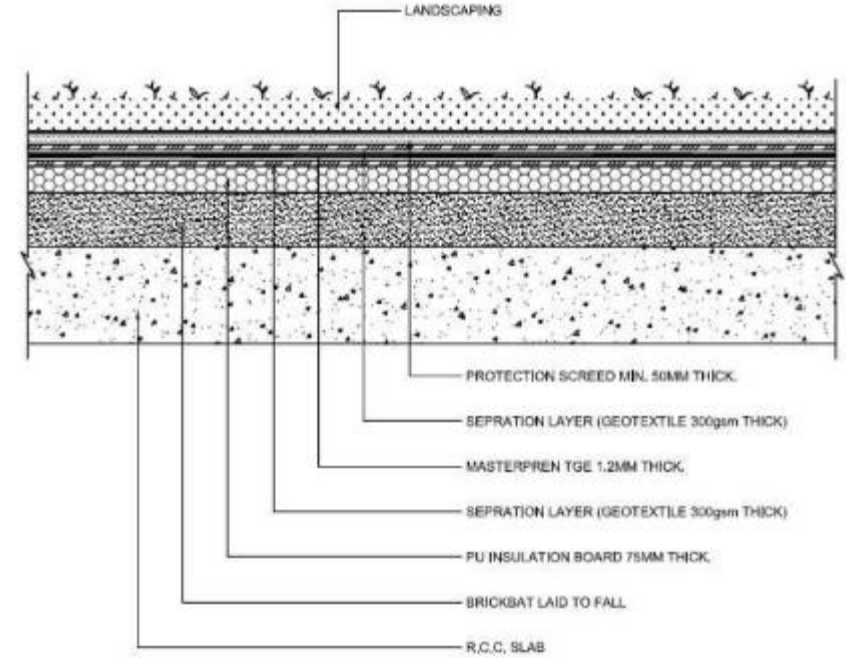


75 mm PU Insulation board

The Green roof of 1 lakh sq.ft was implemented on terrace to provide over-deck insulation as a part of green building requirement

### Advantages of Green Roof

- Reduction in heat island affect
- Improved Biodiversity
- Reduced HVAC consumption



### Basis of Saving Calculation

1. Conventional Roof U factor: **0.068 btu/hr.ft<sup>2</sup>°F**
2. Green Roof U factor: **0.026 btu/hr.ft<sup>2</sup>°F**
3. Terrace area: **1 lakh sqft**
4. Sun light hours: **12 hours**
5. Chiller iKW: **0.65**

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Operating Days /month	31	28	31	30	31	30	31	31	30	31	30	31
Average Ambient Temp during working hours (7am - 7pm) in DEGC	26.0	27.1	29.1	30.4	31.3	30.1	28.3	27.9	28.6	30.2	29.5	27.5
Tonnage reduction (TR)	0.61	0.91	1.53	1.92	2.18	1.82	1.28	1.16	1.37	1.86	1.66	1.05
Energy Saving kWh/month	268	363	671	818.2	960	773.8	561.2	509.6	582.6	817.3	707	460
<b>Energy Saving Per year</b>	<b>7492</b>											

**Maintained Green roof for last 10 years with reduction in HVAC consumption and reduce heat island effect and improve biodiversity**

## PATH TOWARDS RENEWABLE ENERGY

With focus on achieving net zero building, We at Godrej IT park explored renewable energy options for common area electricity

The options explored were:

### On -site rooftop solar 750 kWp on adjacent industrial roof

- Would generate 20% of total energy consumption of Godrej IT Park
- ✗ • The 750 kWp power plant output proposed to be connected to common area LT panel
- The idea was not implemented due to MERC compliance limitation for power transfer from adjacent premises



### Open Access 1.25 MWp Solar power plant

- Open access solar power plant option was explored and plant size of cumulative for Godrej Vikhroli campus as 7.5 MWp was finalized with TATA Power
- ✗ • Out of 7.5 MWp, 1.25 MWp was apportioned for Godrej IT Park
- Under this scheme Godrej would have invested 10% of total plant cost with unit rate of Rs. 7.5/kWh for solar power
- The idea was not executed due to plant size viability constraint from TATA power

### 1.25 MWp Solar Open Access



✓ Hence to meet the Renewable energy target Management decided to avail Green Power tariff option as per MERC with Rs. 0.66/kWh additional charges

# UTILIZATION OF RENEWABLE ENERGY SOURCES

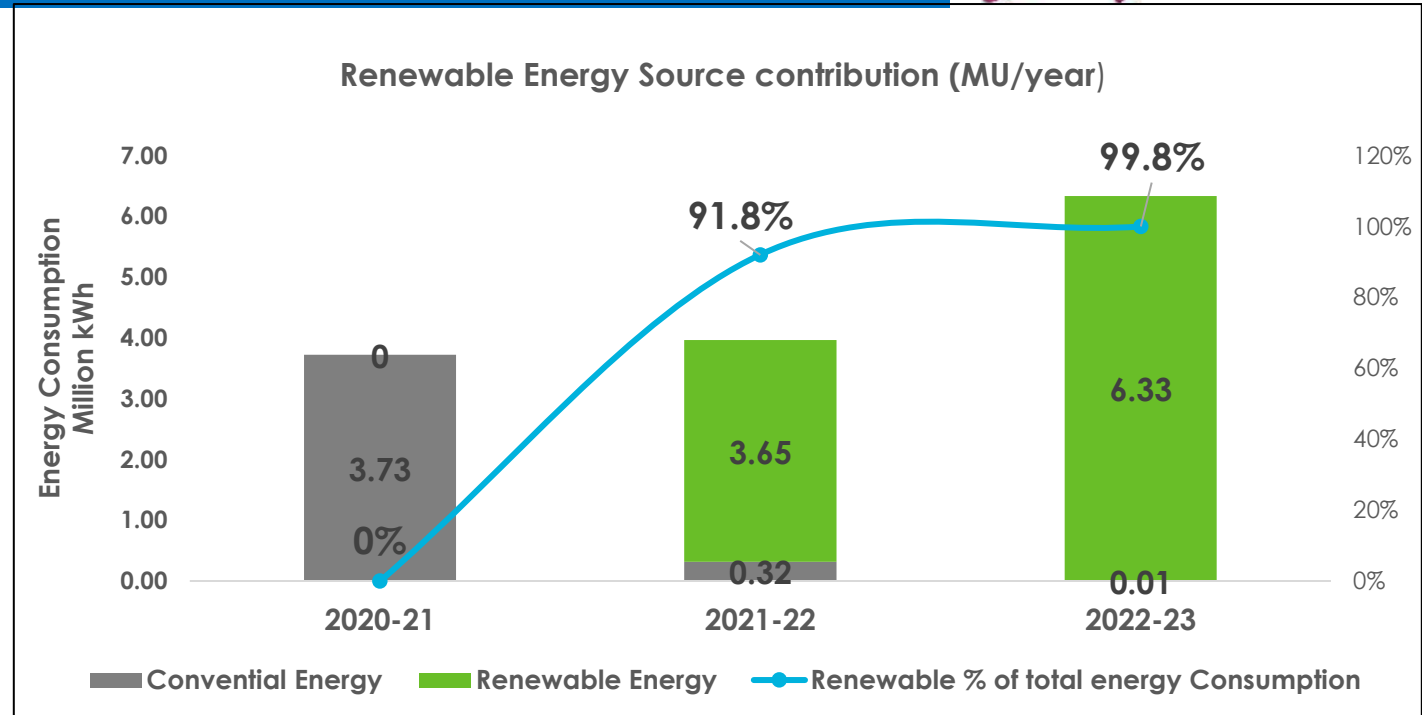
## GREEN POWER



MAY 2021



MARCH 2023




	2020-21	2021-22	2022-23
Conventional Energy + DG (MU/annum)	3.74	0.32	0.01
<b>Renewable Energy (MU/annum)</b>	<b>0</b>	<b>3.65</b>	<b>6.33</b>
Renewable Investment (Million Rs./year)	0	2.59	4.49
<b>Total Investment (Million Rs.)</b>		<b>7.08</b>	


**In Last Three years around 72% of total energy consumption is through Green Power source with Rs. 7 million investment (Borne by G & B)**







**SCOPE 1**  
Emission from DG operation



**SCOPE 2**  
Emission from Energy consumption



**SCOPE 3**  
All other emissions associated with a company's activities

Category	Tonnes CO2 Emission		
	2020-21	2021-22	2022-23
Scope 1	18.9	16.3	18.5
Scope 2	3166.4	268.3	0.0
<b>Total</b>	<b>3185.3</b>	<b>284.6</b>	<b>18.5</b>
<b>% Reduction</b>		<b>91%</b>	<b>99%</b>

To offset SCOPE 1  
**Proposed to Install 25 KWp renewable off site**

Out of 15 nos. categories 4 nos. are relevant to Godrej IT Park

**1. Purchased Goods & Services:**  
**Supplier Assessment In progress (Target 80% Vendor shall be Green-Co certified)**

**5. Waste generated in operations:**

**7. Employee Commuting:**  
**Collation of data in progress**

**13. Down stream leased assets:**  
**40% of client are Green Power**

## Waste Management



Colour Coding for Waste Bins



### Project Details

- Compliance to "Solid Waste Management Rules, 2016"
- Implementation of de-centralised total waste management system to reduce load on corporation infrastructure.
- Supplement and strengthen the MSW system of B.M.C Wards (N&S)
- Garbage Recycling Facility of MSW 11 TPD capacity
- Monthly Garbage Quantity : 293 MT

### Benefits

- All wet waste converted to compost, which is used by Gardening team.
- All dry waste recycled for alternate use.
- Upscaling of coconut waste to cocopeat & coir.
- Upscaling of garden waste to vermicompost.
- Briquettes made from Cardboard & Tissue paper. Can be used as alternative fuel.
- Creating employment opportunity and better work conditions for BPL Group (ragpickers / scavengers from Deonar dumping ground area).

SOLID WASTE SEGREGATION ACTIVITY



UPSCALING OF GARDEN WASTE TO VERMICOMPOST



UPSCALING OF BIODEGRADABLE WASTE



# IMPLEMENTATION OF ISO 50001



**ISO 50001  
TARGET  
1%  
ENERGY  
SAVING  
FY 23-24**

**CONSIDERED  
AS SEU FOR  
KWH MORE  
THAN 10%**

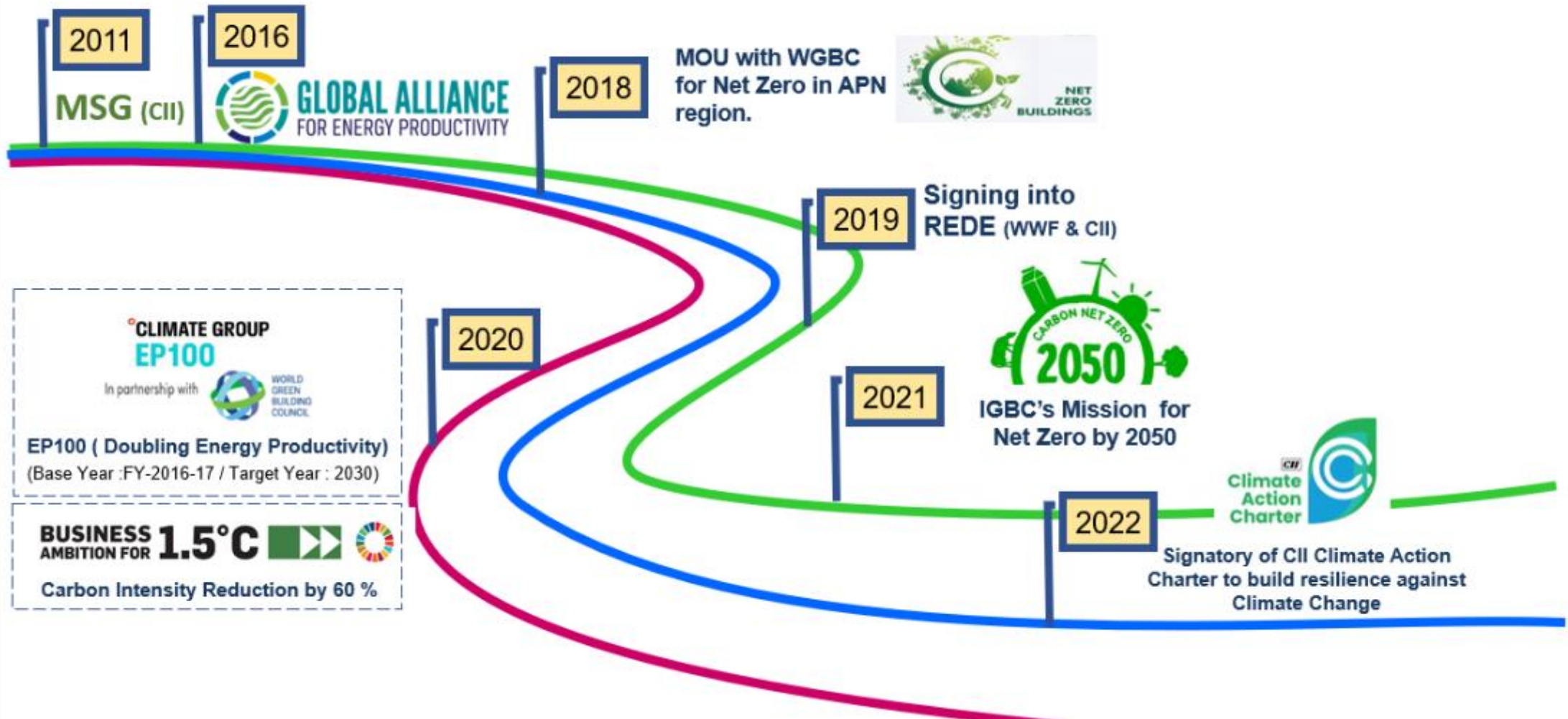
	ISO 50001 Baseline Yearly Avg (Kwh /month)	Actual Avg Consumption till June 23
Chiller	219556.00	230671.30
Chiller Aux	87468.00	82285.30
AHU	113847.00	103453.50
HRW	43374.00	50362.15
Lighting	72161.00	65576.62
UPS	17017.00	18281.86
Lift	23005.00	21855.51
Ventilation	5459.00	5757.57
Service panel	3866.00	4638.45
STP	18048.00	14360.26
Plumbing	7056.00	4743.80
Losses	15035.00	23463.69
<b>Total</b>	<b>625892.00</b>	<b>625450</b>
<b>Reduction wrt to Baseline</b>		0.07%

Sr. No.	Area	Implemented in FY 23-24	Electrical Savings kWh / annum	Status	% Energy Saving of Total	Total % saving of Total
1	HVAC	Optimum operation of Chiller through set point modulation	60000	Implemented	0.79%	<b>0.94%</b>
2	STP	To Replace Present twin Lobe blower with Tri lobe to achieve Energy Efficiency and reduced noise level	11000	Implemented	0.15%	

Planned Energy Project FY 23-24	
Chiller Auxiliary	Replacement of 2 nos. Condenser and 2 nos. Secondary pump with energy efficient pumps
UPS	Replace existing UPS with energy efficient 60 KVA modular UPS



## Godrej's Climate Journey so far



With 100% Renewable Energy through Green Power procurement Godrej IT Park is already Net Zero Energy for Scope 1  
Godrej & Boyce has Committed to Achieve NET Zero Building by 2030

# MAJOR ACHEIVEMENTS



**CII Business Excellence Award**



**NSC Safety Award Silver Trophy**



**First Green Power Leasing Consumer in Mumbai**



**EV CHARGING FACILITY**



**THANK YOU**

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