CII 23RD NATIONAL AWARD FOR EXCELLENCE IN ENERGY MANAGEMENT 2022

Honeywell Technology Solutions Lab Pvt. Ltd

Bellandur - Doddakannelli Rd,
Adarsh Palm Retreat, Bellandur,
Bengaluru. Karnataka 560 103

23rd, 24th & 25th August 2022

Honeywell

MR. SRIDHAR NATARAJAN
- DIRECTOR GRE

MR. SUBRATA BALIARSINGH
- DIRECTOR IFM

MR. C RAVI KUMAR
- OPERATIONS LEADER

MR. VIJAYAKUMAR SHOLAPUR
- FACILITIES & ENERGY LEAD

HONEYWELL INDIA

8
Decade legacy

$1B
Domestic sales and exports

4
Technology development centers
- Bengaluru
- Madurai
- Hyderabad
- Gurugram

3
Manufacturing centers
- Gurugram
- Dehradun
- Pune

20
Facilities in major cities
- Pune
- Bengaluru
- Gurugram
- Chennai
- Dehradun
- Mumbai
- Kolkata
- Madurai
- Hyderabad
- Jamshedpur
- Vadodara

13000
Employees

3000+
Products, solutions, applications engineered in India

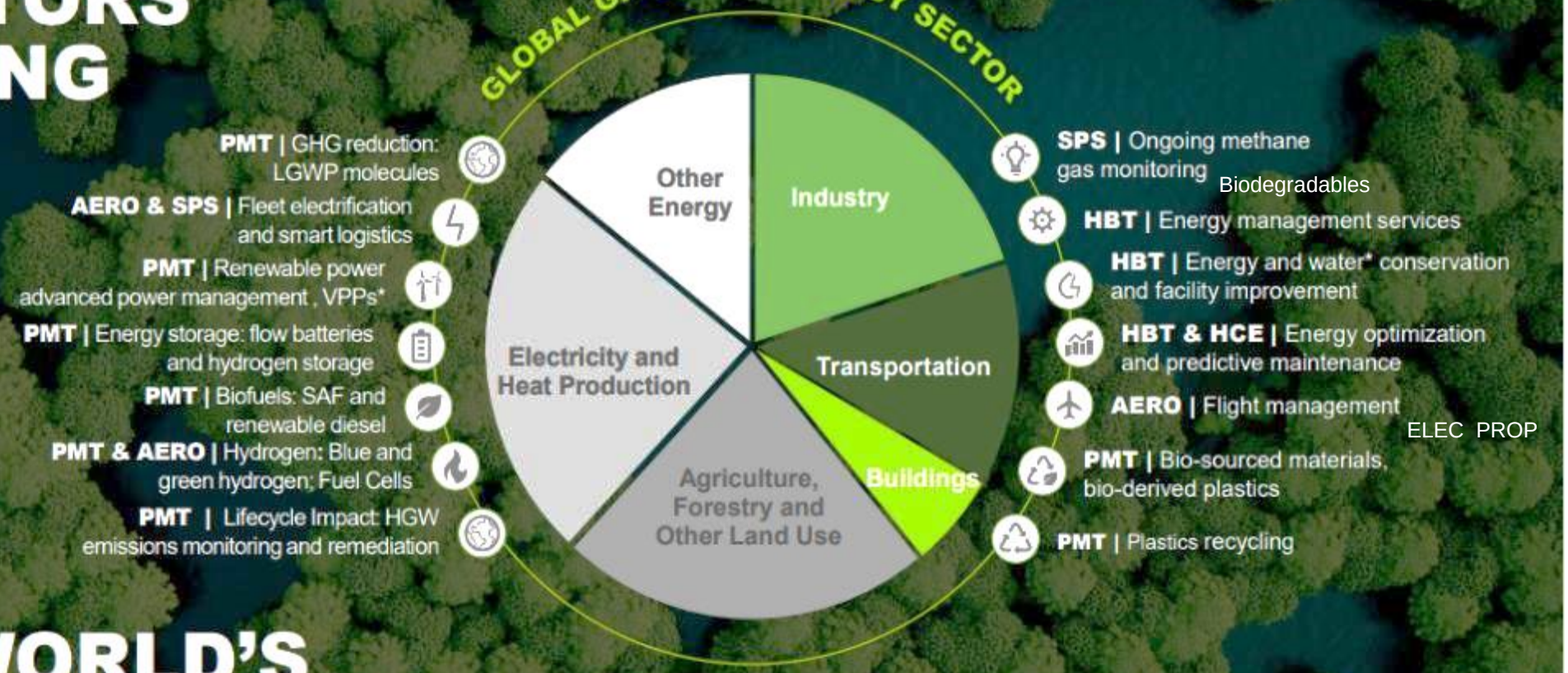
5500
Engineers

HONEYWELL COMMITTED TO BE CARBON NEUTRAL BY 2035

TARGETED SOLUTIONS FOR SECTORS PRODUCING

About 2/3's

OF THE WORLD'S GREENHOUSE GAS EMISSIONS



~ 30% = Agri, Forest, Land use, Others

~70% = Industry, Tpt, Building, Electricity / Heat

SITE INFRA - HTS CAMPUS 01, BANGALORE

- Facility details : SEZ, leased
- Year of operation : 2008
- Built up area : 595,520 sq.ft
- Blocks : Tower 1 and 2
- Seating Capacity : 3,452
- Tower 1 : GF to 7 floors
- Tower 2 : GF to 4 floors
- Incoming Power Supply : 11 kV
- Sanctioned Demand : 2.75 MVA
- Transformer Capacity : 1.5 MVA x 4 nos.
- Diesel Generator Capacity : 6.75 MVA
- UPS Capacity : 2.04 MVA
- Chiller Capacity : 400 TR x 5 nos.

Engineering Labs & DATA Center

Supports Asia pacific

67,500 sq. ft.

operates 24 X 7

Annual energy use is around 9.0 million kWh with the spend of INR 7.8 crores, including diesel cost during FY 2021 - 22

BUILDING SALIENT FEATURES

SUSTAINABILTY CONCEPTS CONSIDERED IN BUILDING

Priority to passive design to reduce energy demands

1. Compact envelope shape
2. Optimized orientation, Solar protection
3. Under roof thermal insulation
4. Optimized air tightness

Include passive

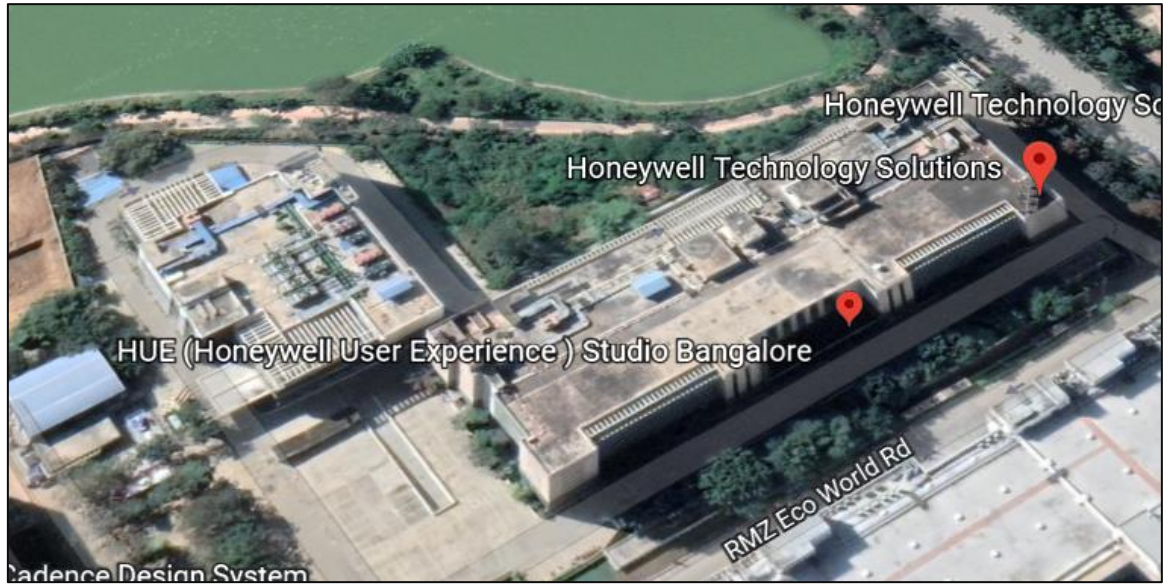
1. UV protected glazing
2. 70 % access to day-light exposure

Occupant comfort and well being

1. Achieving indoor comfort requirements (visual / thermal / acoustic)
2. Maintaining good IAQ (indoor air quality)

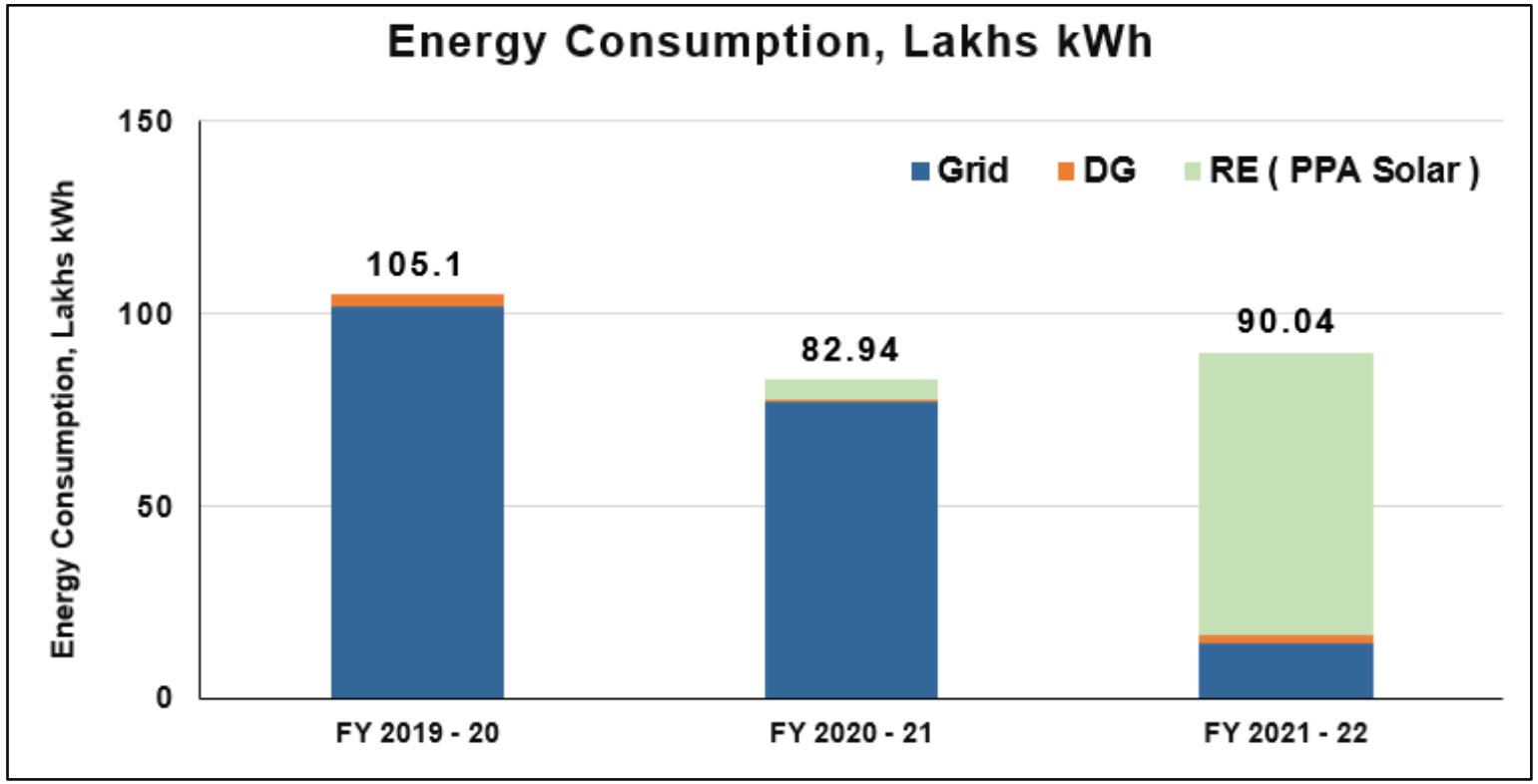
More sustainable elements

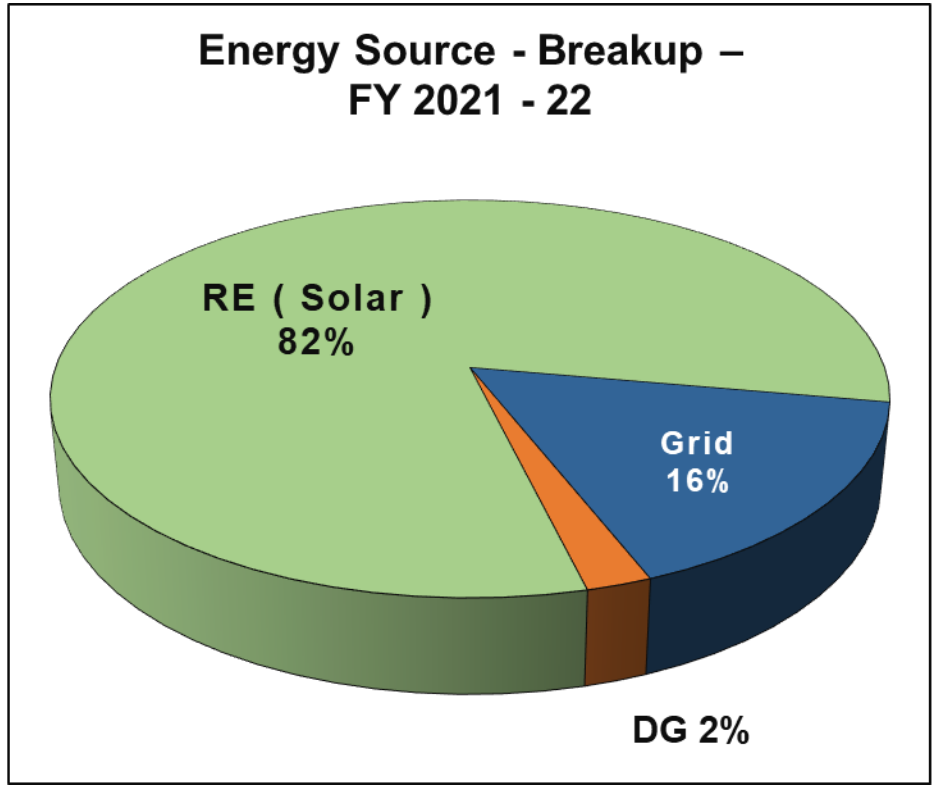
1. Reduced heat island - 1/3rd of the building surrounding area covered with trees and plantation



ENERGY CONSUMPTION OVERVIEW IN 2019 - 2022

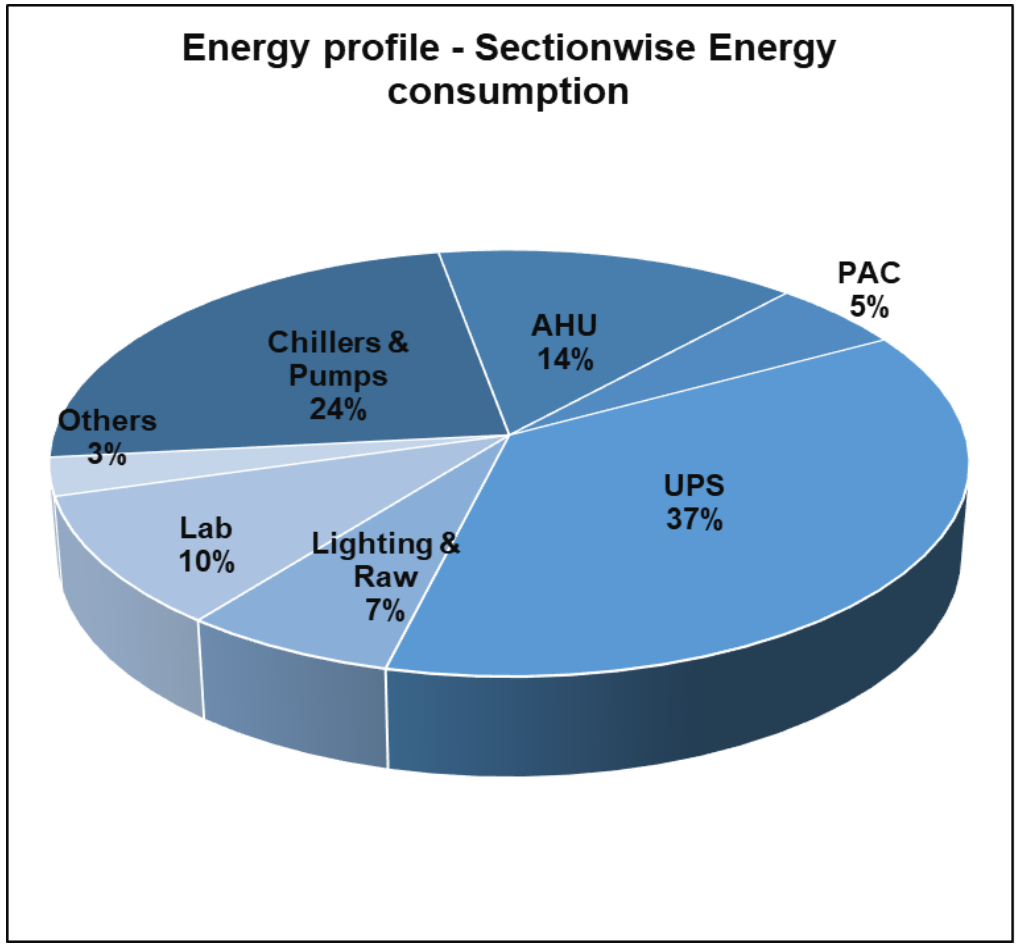
Year	Source of Energy – Energy Consumption, Lakhs kWh			Total Energy Consumption	Energy Cost
	Grid – EB	DG	RE *(PPA - Solar)*	Lakhs kWh	INR
FY 2019 – 20	102.09	3.04	0.00	105.12	9,83,21,126
FY 2020 – 21	77.03	0.91	5.00	82.94	7,78,05,277
FY 2021 - 22	14.56	1.98	73.50	90.04	7,84,95,951





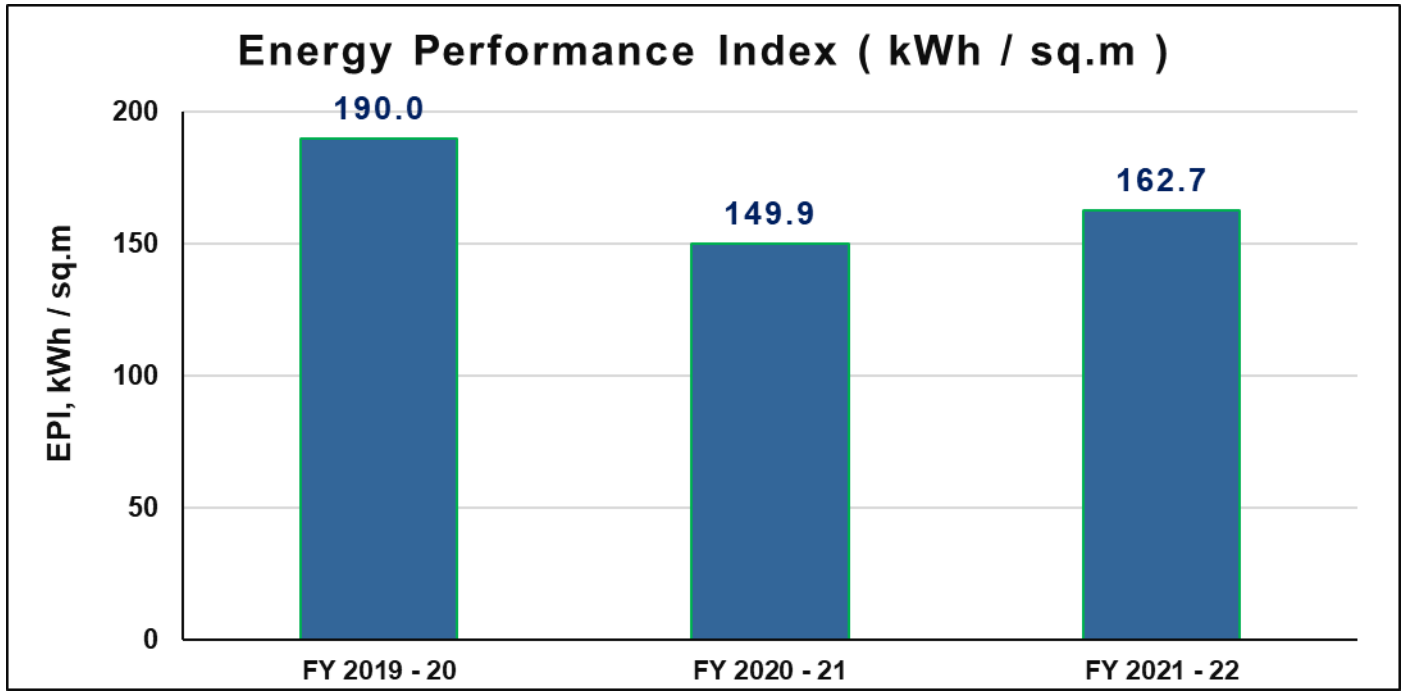
ENERGY CONSUMPTION – UTILITY WISE OVERVIEW

Energy Consumption		
Utility	**Lakhs kWh**	**%**
Chillers & Pumps	21.5	23.9
AHU	13.0	14.4
PAC	4.8	5.3
UPS	33.2	36.8
Lighting & Raw	6.0	6.7
Lab Equipment	9.0	10.0
Others	2.6	2.9
Total	**90.0**	**100.0**



Specific Energy Consumption 2019 - 2022

Year	Total Energy Consumption		Area	Energy Performance Index	Improvement
	kWh	Lakhs kWh	Sq.m	kWh / Sq.m	%
FY 2019 – 20	105,12,370	105.12	55,326	190.0	Base data
FY 2020 – 21	82,93,940	82.93	55,326	149.9	21.2
FY 2021 - 22	90,03,590	90.03	55,326	162.7	- 8.56



Load addition in 2020

60 kW load addition in CNS Lab; which operates for 24 x 7

150 kW of load added in Engine & Demo Lab;

both accounts for 6.19 Lakhs kWh consumption increase following years

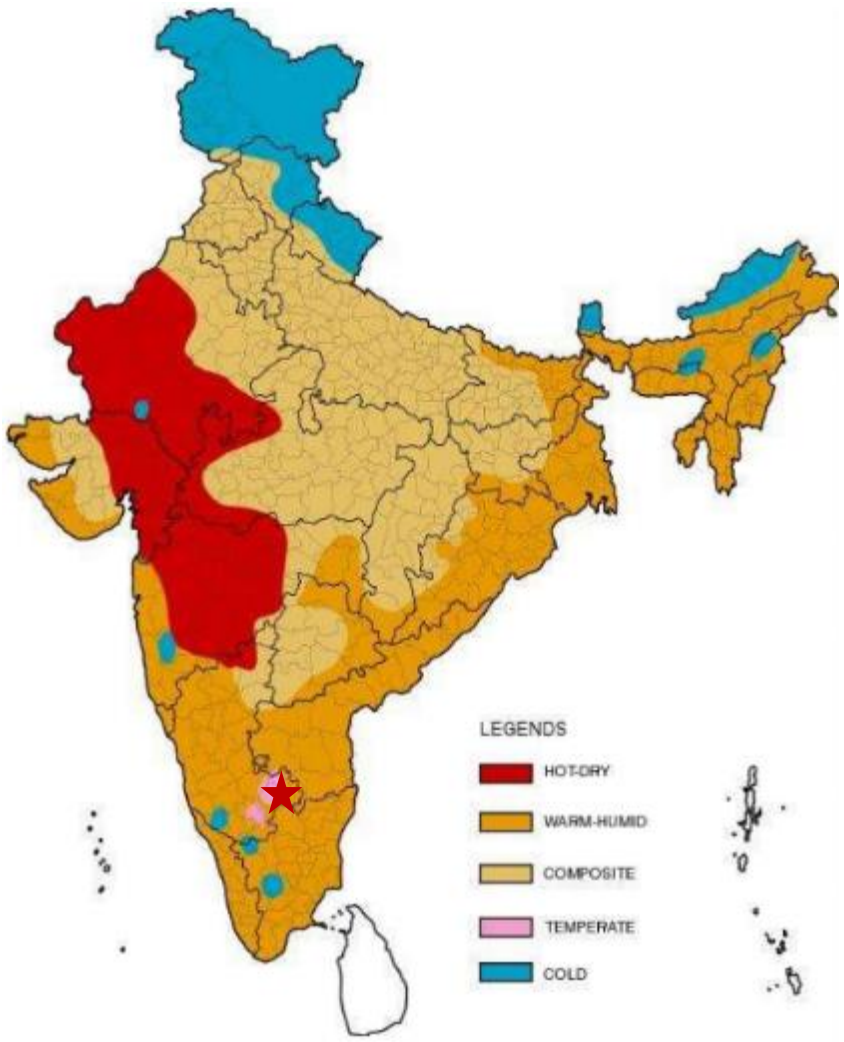
COMPARISON SEC WITH INTERNAL & NATIONAL BENCHMARKING

Internal Benchmarking	Location	Zone	SEC (kWh / m^2 / y)
Honeywell	Campus 01, Bangalore	Composite	162.7
Honeywell	Hyderabad	Composite	169.0

Benchmarking	Reference	SEC (kWh / m^2 / y)		Star Label
		Standard	Actual	
National level	Bureau of Energy Efficiency (BEE)	179	**162.7**	**2 Star**

Climate Zone	AC	
	< 50.0 %	> 50.0 %
EPI (kWh / m^2 / year)		
Composite	86	**179**
Moderate	94	179
Warm & Humid	101	182
Hot & Dry	90	173

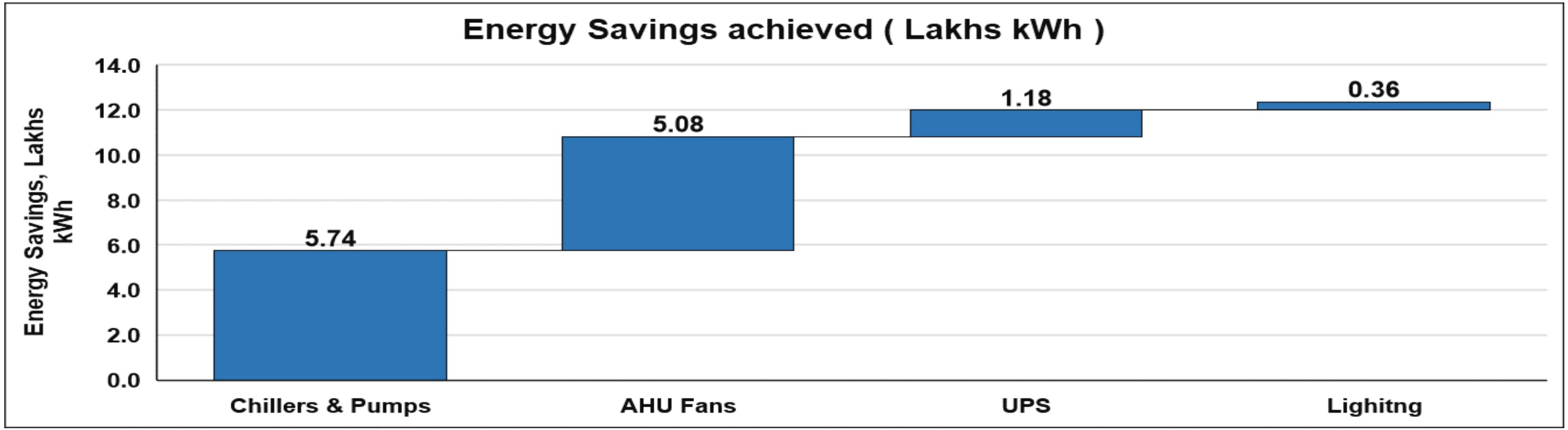
EPI (kWh / m^2 / y)	Star Label
190 – 165	1 star
165 – 140	**2 star**
140 – 115	3 star
115 – 90	4 star
Below 90	5 star



★ *Bangalore*

Energy Saving projects implemented in 2019 - 2022

Year	No. of Energy Saving projects	Investment	Electrical savings	Cost savings	Impact on SEC
		million INR	Lakhs kWh	million INR	%
FY 2019 - 20	02	15.61	5.81	5.33	5.23
FY 2020 – 21	03	4.31	2.57	2.37	3.02
FY 2021 - 22	04	8.94	3.97	3.47	4.23



ENCON PROJECT PLANNED IN FY 2022 - 23

Title of the Project	Annual Electrical savings Million kWh	Annual Cost savings Million INR	Investment Million INR	Status
Replacement of conventional UPS with EE modular UPS (200 kVA x 7 Nos.)	0.259	2.41	8.76	WiP
Replacement of conventional pumps with EE pumps (Primary pumps - 2 no's Condenser pumps – 2 no's.)	0.049	0.46	1.79	Completed

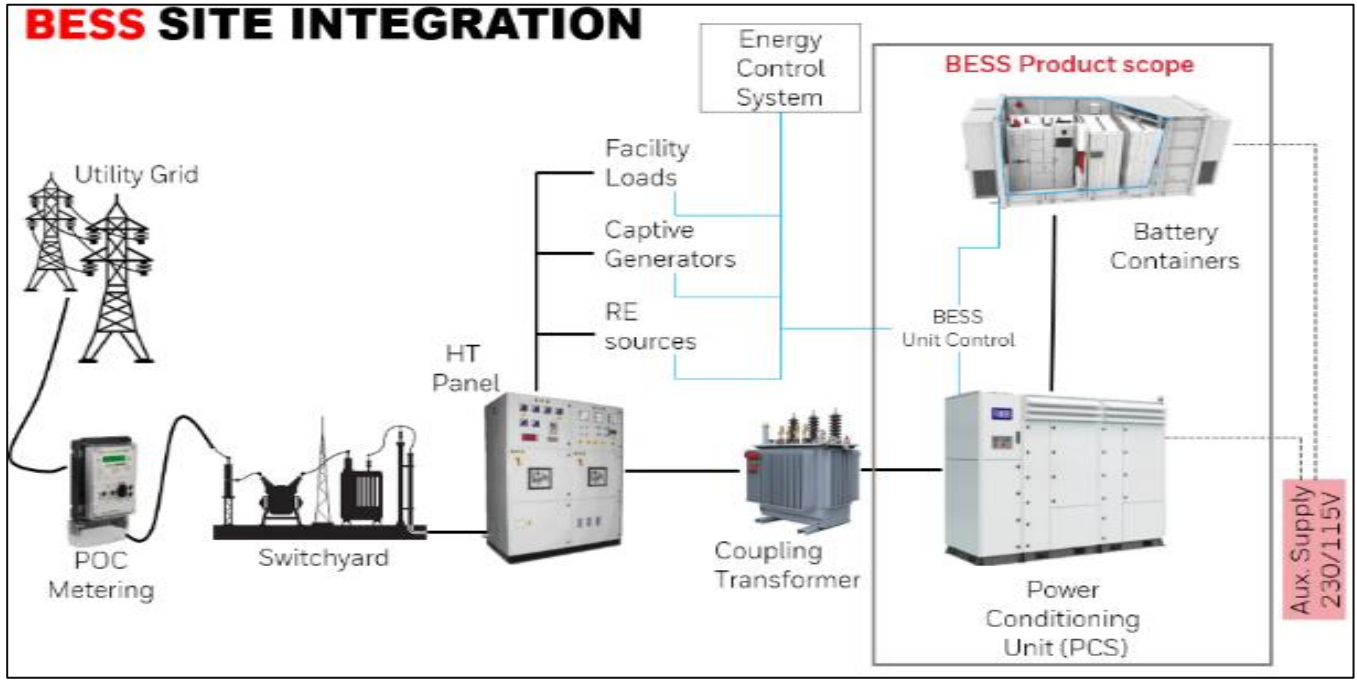
Innovative projects – Battery Energy Storage System

Capacity Installation 600 kW

Technology developed by Honeywell

Energy storage system that uses batteries to store and distribute energy in the form of electricity.

BESS captures energy from different sources, accumulates this energy, and stores it in rechargeable batteries for required demand



Innovative projects – Battery Energy Storage System

BESS solution

- Energy management - **energy arbitrage,** demand management
- Regulates frequency
- Reduce fluctuations & equipment damages due to outages
- Reduce peak hour energy demand costs
- Charging through renewable energy
- Reduce carbon footprint
- Seamless transfer between grid and BESS

Key Notes :

Total 65 % input to BESS primarily through Renewable Energy (Basis PPA tapped to the site)

Anticipated cost savings of INR 18,14,400 /- per annum – basis variable time of Day tariff (TOD) (7 months – Dec to June)

Reduce the need for non-renewable power sources – diesel generators and associated fuel consumption rates, contributing to a smaller carbon footprint.

Innovative projects – Personalized Cooling

Zone based smart cooling

Technology developed by Honeywell

WHAT ARE WE SOLVING?

End User
Person who is in the condition space and requires "Need Based Cooling"

"I am not comfortable with the temperature"
"Air is too cold "
"I feel hot"
"I am uncomfortable"

Contractor
Integrates the product in the HVAC systems

"System takes too long to Balance commissioning, more effort less productive"
"Need to calibrate and balance the airflow"
"Need to give hand over documentation to client"

End users and Facility Managers
Owns the building / Maintains the system

"User calls me every time to adjust the airflow/ temperature"
"Recommissioning it a huge task, requires shut down of some places"-
Energy not optimized

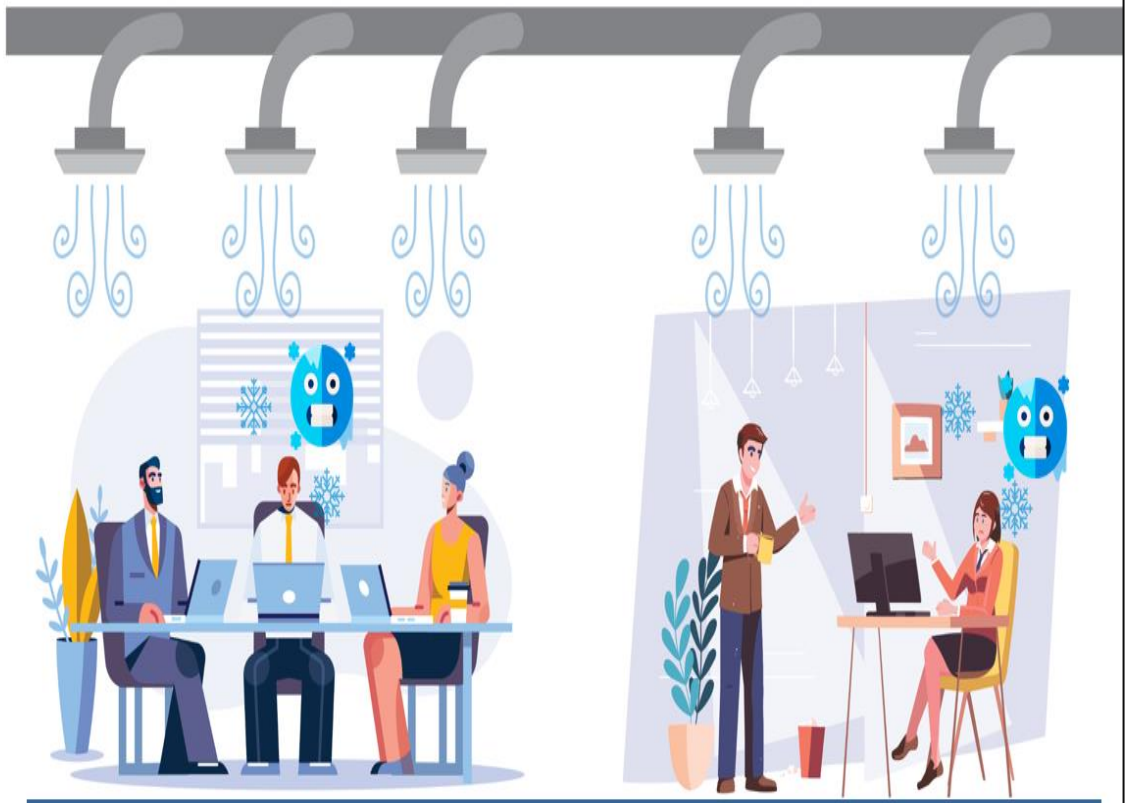
Problem to solve -Energy , Comfort , Productivity

How it works

- Distributed sensors , pick up occupancy & temperature
- Feed details to controller on the "Live" Status
- Based on the Micro Zone requirement, Constant command is given to the Damper Actuator which in-turn control the conditioned air from the Diffuser.
- By this continuous action, expect savings up to 40%** vs traditional constant speed systems

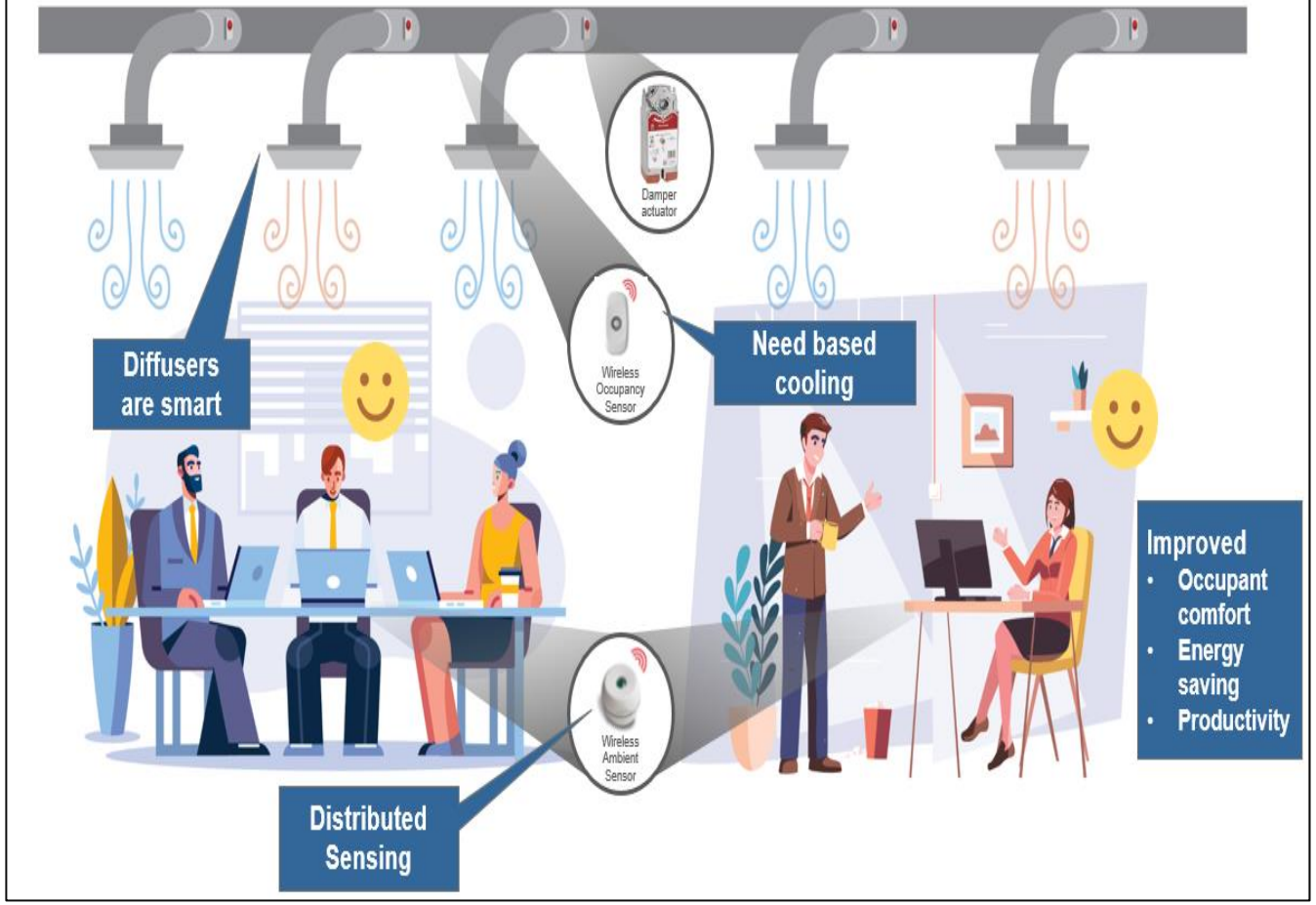
Innovative projects – Personalized Cooling

HOW THE SPACE IS COOLED NOW



Un balanced, Hot and cold spots, un-comfortable – Loss of Energy

ZONE BASED SMART COOLING



Last mile Personal cooling – gives opportunity to set near to user experience.
Energy optimization at diffuser level and balanced system

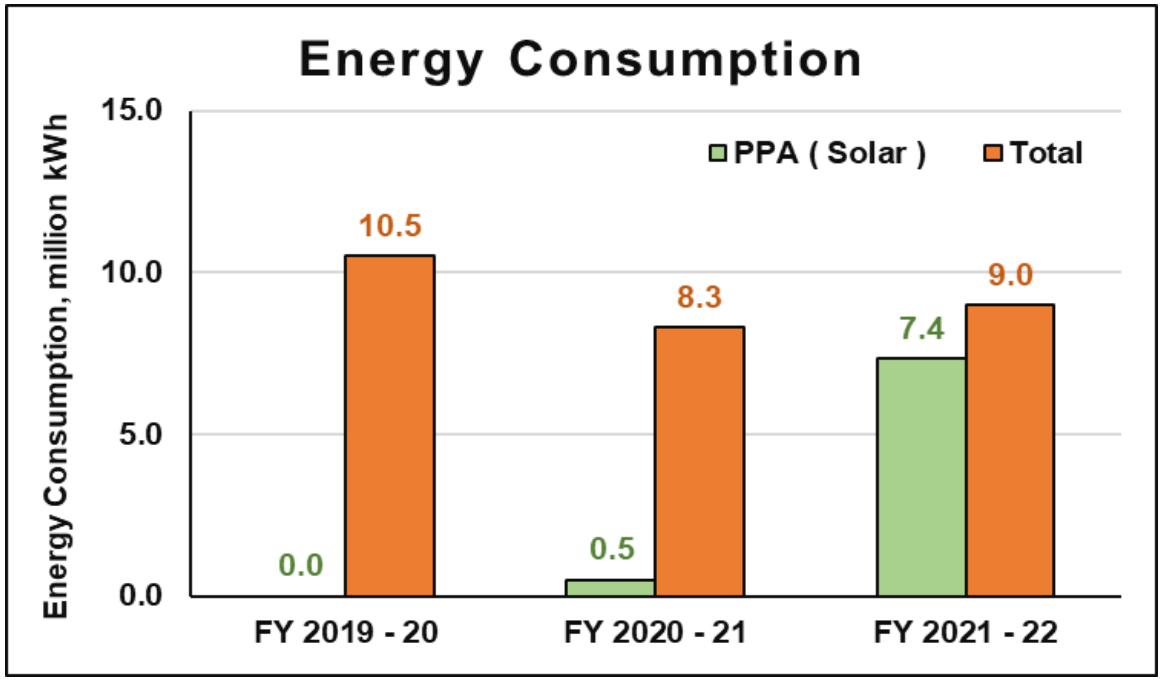
Innovative projects – Personalized Cooling

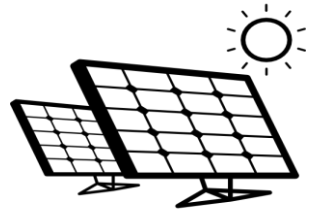
- This system reduced zone sizes & reduces over-cooling and hot spots. Damper & actuator system will fine-tune air delivery to the precise needs of the room
- Improves productivity. The system can be opted for existing & new buildings
- Energy savings can be achieved 12-18% with respect to the VAV system, due to its local controlling mechanism & cooling
- Annual HVAC energy savings typically fall between 15% and 40% with constant speed system. Savings vary hugely from building to building depending on climatic zones, occupancy profiles and design of the system

Load – 100.0 % (Pre installation)					Auto mode (Post Installation)		
Location	**BTU consumption (MWh)**	**Tonnage, TR**	**Fan Power Consumption, kW**		**BTU consumption (MWh)**	**Tonnage, TR**	**Fan Power Consumption, kW**
Fifth floor (AHU 04, 05 & 06)	0.84	238.9	141.9		0.64	181.9	55.6
						Energy Savings, kWh / day	86.3
						Energy Savings on Chiller / day	56.9
						Total savings	143.2
						Total Energy savings / annum	37,800
						Cost savings / annum	3,40,575
						Investment, INR	9,00,000
						ROI, years	2.64

UTILIZATION OF RENEWABLE ENERGY SOURCE

Year	Renewable Energy Source	Renewable Energy Consumption, Lakhs kWh	Total Energy Consumption, Lakhs kWh	% Renewable Energy	CO_2 emission avoided, tons of CO_2
FY 2019 – 20	PPA (Solar)	0.0	105.12	0.0	0.0
FY 2020 – 21	PPA (Solar)	5.0	82.94	6.0	393.5
FY 2021 - 22	PPA (Solar)	73.5	90.04	81.7	5,784.5





82.0 %

6,178.0 Tons of CO_2

WASTE MANAGEMENT

S. No	Type of waste	Quantity	Disposal Method
1	Food Waste	250 kgs / Month	Wastes are processed and converted as organic compost, used for inhouse gardening, packed and given to employees for gardening.
2	E-Waste	175 kgs / Month	Wastes are collected, segregated and stored at our inhouse E-Waste yard. These wastes are disposed to KSPCB Authorized vendors.
3	Non Hazardous Waste	4500 kgs / Month	Wastes (Plastic, Wood, Metal, Carton boxes) are collected, segregated and stored at our inhouse Garbage/scrap Yard. These wastes are disposed to BBMP Authorized vendor.
4	Hazardous Waste	900 Liter / month	Wastes are collected, segregated and stored at our inhouse Hazardous storage area. These wastes are disposed KSPCB approved vendor.
5	Battery Waste	846 Nos of Battery / annum	Wastes are collected, segregated and stored at our inhouse battery storage area. These wastes are disposed KSPCB approved vendor.


OWC


E WASTE STORAGE


HAZARDOUS STORAGE AREA


SCRAP CONTAINER

WATER MANAGEMENT

Dripping irrigation for Landscaping

Implemented year : 2019

- Total water savings in kL : 1,104 kL / annum
- Estimated Cost Savings in INR : 0.138 M
- Total Investment in INR : 0.321 M
- Estimated ROI : 28 months

Installation of water saving aerators in all taps

Implemented year : 2021

- Total Water savings in kL : 2,760 kL / annum
- Estimated Cost Savings in INR : 0.267 M
- Total Investment in INR : 0.128 M
- Estimated ROI : 06 months

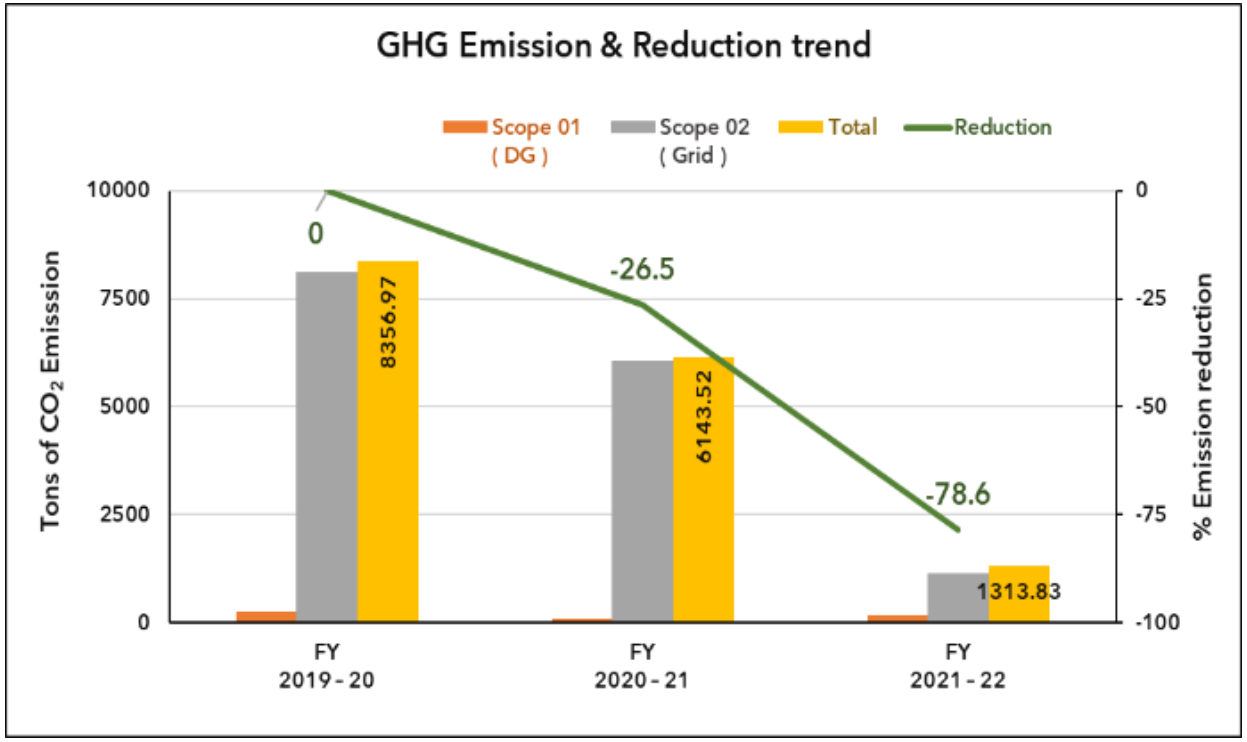
The facility utilize the common STP commissioned in the zone.

The water are treated in STP and reused back for gardening and toilet purpose.

The facility is Zero Liquid discharge facility.

GHG EMISSION TREND

	Scope 01	Emission factor CO_2e / unit = 2.69	Scope 02			Total Emission, CO_2 in tons
CO_2e year	Fuel consumed in liters	Total GHG emission in TCO_2e	Energy consumption in kWh	Emission factor CO_2e / unit	Total GHG emission in TCO_2e	
FY 2019 – 20	94,149	253.2	1,02,08,800	0.794	8,103.7	8,356.9
FY 2020 – 21	31,362	84.4	77,02,990	0.787	6,059.2	6,143.5
FY 2021 – 22	62,705	168.7	14,55,855	0.787	1,145.2	1,313.8



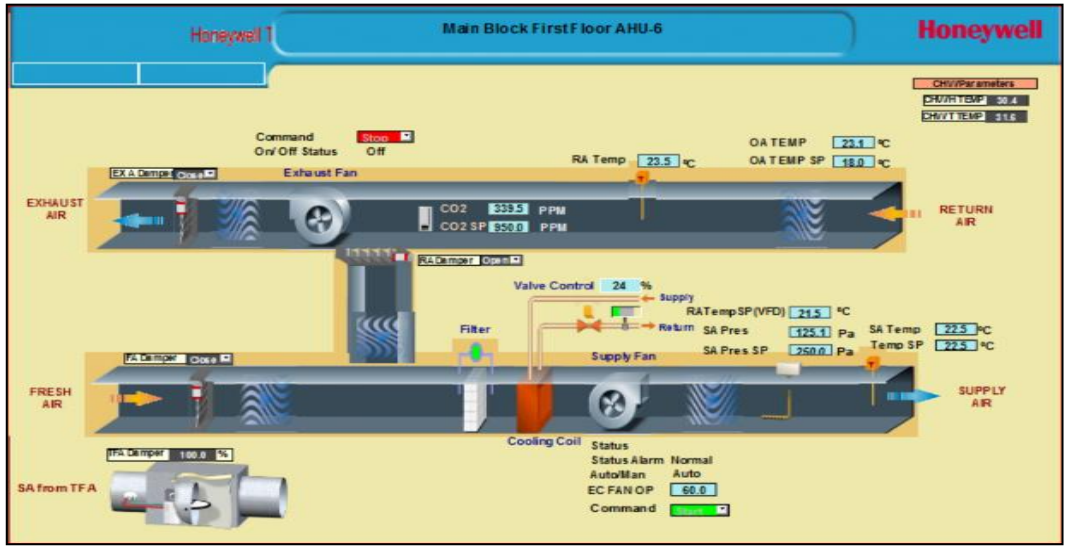
DG set operation

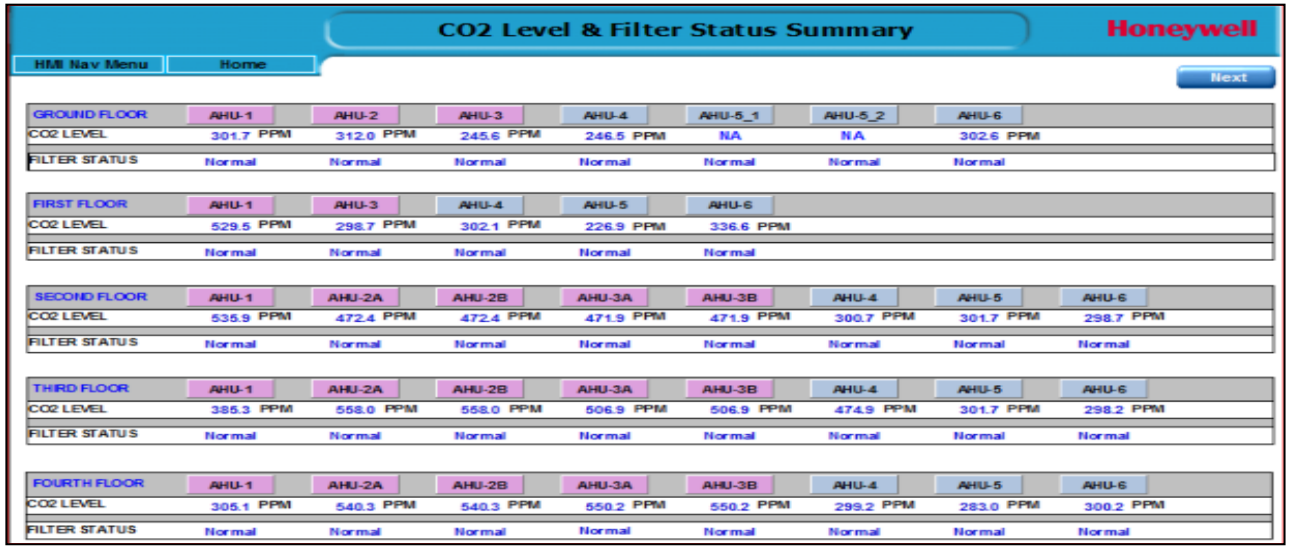
- **Optimization in DG set daily test**
  - *Implemented in 2020*
  - *A check frequency test reduced from daily to weekly once.*
  - *Annually 12.5 kL of Diesel consumption reduced.*
  - *Approx. 33.3 Tons of CO_2 emission reduction*

RE purchase

- **RE purchase – PPA - Solar**
  - *Implemented in 2020*
  - *80.0 % energy consumption drawn from RE*
- **6,178 Tons of CO_2 off-set**

INDOOR AIR QUALITY



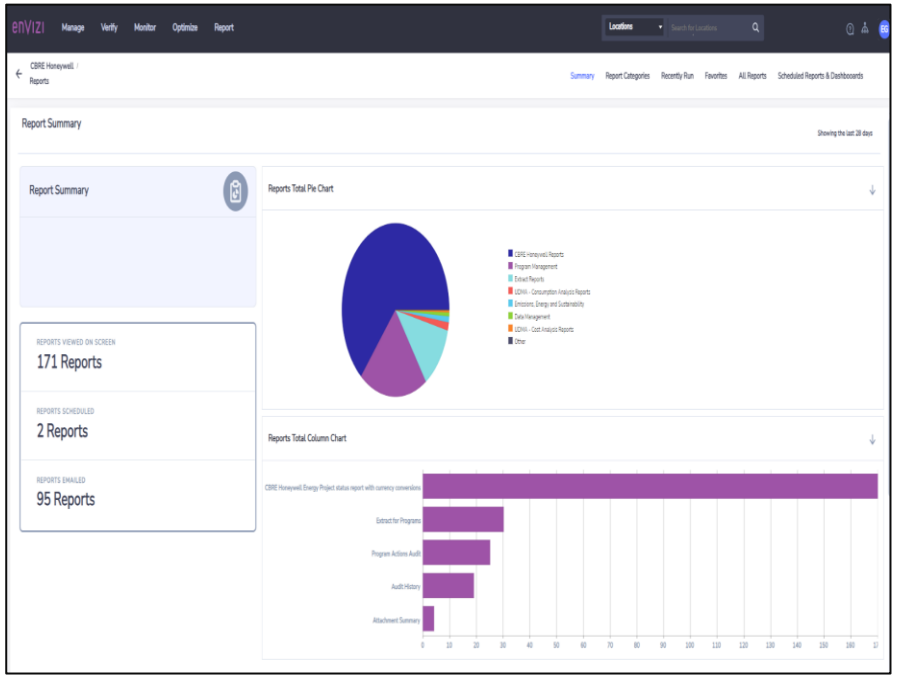


	AHU 01	AHU 02 A	AHU 02 B	AHU 03 A	AHU 03 B	AHU 04	AHU 05	AHU 06
Ground Floor								
CO_2	301.7	312.0	NA	245.6	NA	246.5	NA	302.6
Filter	Normal	Normal		Normal		Normal		Normal
First Floor								
CO_2	529.5	NA	NA	298.7	NA	302.1	226.9	336.6
Filter	Normal			Normal		Normal	Normal	Normal
Second Floor								
CO_2	535.9	472.4	472.4	471.9	471.9	300.7	301.7	298.7
Filter	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal

TEAMWORK, EMPLOYEE INVOLVEMENT & MONITORING

Energy Team

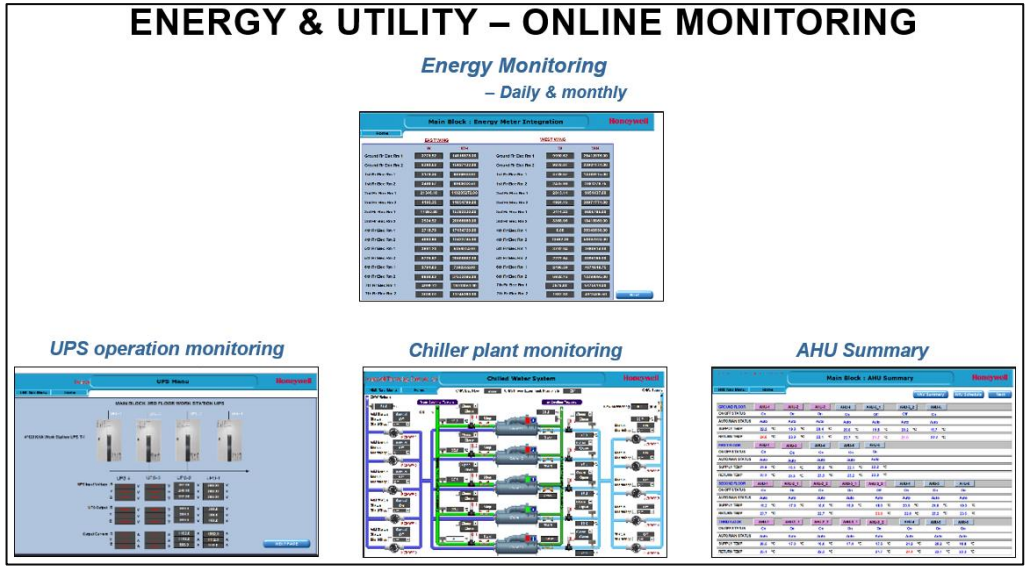
- Certified Energy Managers – 2 Nos.
- Weekly and monthly Energy review
- Energy Dashboard
- Dedicated Energy CAPEX budget
- Periodical Energy Training



BMS Team :

- monitor & control
- scheduling of utilities (Chillers, AHUs)
- monitoring of equipment's

  Viz., Transformer, DG, HVAC, UPS, Energy meters etc.,
- Energy consumption data analysis for critical equipment's
- Indoor air quality monitoring



Kaizens

- Timer optimization in Lighting sensor
- Fixing of Timer controller for Exhaust fans
- MD reduction recommendation
- DG A Check optimization from daily to weekly

IMPLEMENTATION OF ISO 50001 / IGBC RATING

Indian Green Building Council (IGBC)

hereby certifies that

RMZ Ecoworld Plot C2

Bangalore

has achieved pre-certification under the IGBC's LEED India for Core & Shell Rating System. Documentation has been submitted for this project, which demonstrates an intent to design and build a high performance building in accordance with IGBC's LEED India Green Building Rating System

IGBC's LEED 2011 for India Pre-certified Gold

April 2016

C N Raghavendran, Chairman, LEED India
Dr Prem C Jain, Chairman, IGBC
S Raghupathy, Executive Director, CII-Godrej GBC

Bangalore Campus 02

certified by IGBC

HONEYWELL INDIA TECHNOLOGY CENTER

Gurgaon, Haryana

LEED 2009

EXISTING BUILDINGS: OPERATIONS AND MAINTENANCE

PLATINUM

July 2017

Bureau Veritas Certification

HONEYWELL INTERNATIONAL INDIA PVT. LTD.

PLOT NO 2 , PACE CITY SECTOR 36, GURGAON – 122 004, HARYANA, INDIA

Bureau Veritas Certification Holding SAS – UK Branch certifies that the Management System of the above organization has been audited and found to be in accordance with the requirements of the Management System Standard detailed below.

Standard

ISO 50001:2018

Scope of certification

MANUFACTURE OF FIRE DETECTION, CONTROL EQUIPMENT, ALARM SYSTEM COMPONENTS & DAMPER ACTUATOR

Original cycle start date: 21 March 2022
Expiry date of previous cycle: Not Applicable
Certification Audit date: 09 December 2021
Certification cycle start date: 21 March 2022

Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on: 20 March 2025

Certificate No. IND.22.15021/EN/U Version: 1 Revision date: 21 March 2022

Signed on behalf of BVCH SAS UK Branch
Jagdheesh N. MANIAN
Head – CERTIFICATION, South Asia
Commodities, Industry & Facilities Division

Gurgaon Campus certified by

LEED platinum and ISO 50001

LEED
&
WELL
Certification

aimed for

Bangalore
campus 01

by
December
2022

MAJOR ACHIEVEMENTS AWARD

Energy Efficient unit 2017

Energy Efficient unit 2018

EHS Practices award 2015 – 2016 4 Star

"International Safety Award, Merit" "Sector Award" for the year 2017 by British Safety Council

Honeywell Facility Team

Name	Designation	Email ID
Vijayakumar Sholapur	Energy and Projects Head	Vijayakumar.Sholapur@Honeywell.com

THANK YOU

Honeywell

INNOVATIVE PROJECTS – BATTERY ENERGY STORAGE SYSTEM - ROI CALCULATION

BESS OFF PEAK CHARGING BENEFIT ANALYSIS	
DESCRIPTION	VALUE
Load kW	600
Load in kW @ 90%	540
Operating hours	8
Energy Consumption (kWh / day)	4,320
Actual Cost / kWh @ INR 9.1 / kWh per day	39,312
Rebate impact as per TOD	8,640
Total cost (INR)	30,672
Total Savings / annum as per TOD (INR)	18,14,400

TOD TARIFF		
Time Zone	**Name of the Zone**	**Increase / Decrease in Energy Charges over the Normal Tariff applicable**
06:00 HRS to 10:00 HRS	Morning Peak	As per Tariff
10:00 HRS to 18:00 HRS	Normal	As per Tariff
18:00 HRS to 22:00 HRS	On Peak	July to November – Rs. 0/- December to June – Rs. +1 /-
22:00 HRS to 06:00 HRS	Off Peak	July to November – Rs. 0/- December to June – Rs. 1/-