CII 24th NATIONAL AWARD FOR EXCELLENCE IN ENERGY MANAGEMENT 2023

Honeywell International India Pvt Ltd

Pace City II, Sector 36, Village Mohammedpur Jharsa,
Gurgaon – 122004, Haryana – India.

SUBRATA BALIARSINGH
- DIRECTOR IFM - INDIA

RASHI KAUSHIK,
VINOD VATSA,
MUKESH BHADA,
- OPERATIONS LEADER

VIJAYAKUMAR SHOLAPUR
- FACILITIES & ENERGY LEAD - INDIA

Date : 13th, 14th and 15th August 2023

Honeywell

HONEYWELL INDIA

8
Decade legacy

$1B
Domestic sales and exports

13500
Employees

3000+
Products, solutions, applications engineered in India

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
- Vadodara

NET ZERO COMMITMENT- HONEYWELL SUSTAINABILITY POLICY

Honeywell

Sustainable Opportunity Policy
Honeywell's Commitment to Health, Safety and the Environment

By integrating health, safety and environmental considerations into all aspects of our business, we protect our employees and contractors, our communities and the environment, achieve sustainable growth and accelerated productivity, drive compliance with all applicable regulations and develop technologies that expand the sustainable capacity of our world. Our health, safety and environmental management systems reflect our values and help us meet our business objectives.

- We protect the safety and health of our employees and contractors, and minimize the environmental footprint of our operations through efforts to prevent illness, injury and pollution.
- We actively promote and develop opportunities for expanding sustainable capacity by increasing energy and water efficiency, improving security and safety, and reducing emissions of harmful pollutants.
- We are committed to compliance with all of our health, safety, environmental and legal requirements everywhere we operate.
- Our commitment to health, safety and the environment is an integral aspect of our design of products, processes and services, and of the lifecycle management of our products.
- Our management systems apply a global standard that provides protection of both human health and the environment during normal and emergency situations.
- We identify, control and endeavor to reduce hazards and associated risk (to employees and contractors), emissions, waste and inefficient use of resources, including energy and water.
- We are open with stakeholders and work within our communities to advance laws, regulation and practices that safeguard the public.
- We abide by the company's own strict standards in cases where local laws are less stringent.
- Our senior leadership and individual employees are engaged in aspects of health, safety and the environment and are accountable for their role in meeting our commitments.
- We measure and periodically review our progress and strive for continuous improvement.

These are our commitments to health, safety, and the environment, and to creating Sustainable Opportunity everywhere we operate.

Vimal Kapur
CEO

Revised: 16 June 2023
Version: 8
Document Number: 3-1101-X10

CORPORATE ENERGY & SUSTAINABILITY TEAM

Executive Sponsorship
Anne Madden – Senior V.P., General Counsel and Corporate Secretary

Senior Leadership Support
Evan van Hook – Chief Sustainability Officer and Nate Johnson – V.P. Global Real Estate

Program Management
HSEPS - Cathy Gallagher

Corporate Energy & Sustainability Team

Core Members

Corporate		SBG Energy Leads		CBRE Facility Partner	
HSEPS Cathy Gallagher Dinesh Kumar	GRE IFM Eddie Massie Brian Norris Stephen Greenway	Aero Paul Clevenger	HBT Adriana Miranda Cari Field	Americas Dan Lindsey Tony Siddle Susan Fusaro	EMEA Steph Temme Mohammed Ahmad Patrycja Nowacka
HCE / HBT Timm Olson	Procurement Jay Shawver Genna Loeser Angel Ciopec	PMT Barry Martin Mo Hoda	SPS Lauri Mesaeh Sean Quarry	APAC Kevin Guo	India Vijay Sholapur (HON) Elayaperumal G

Support

Corp Finance Mary Holt Bobby Barrow	GR Larry Kast	Aero Sebastien Chague (Fin)	HBT Dean Ford Jon Speary Jenci Philip (Fin)	PMT Carine Baerlocher (Fin)	SPS Mahesh Vidyasagar Zachee Gouett Oliveira (Fin)

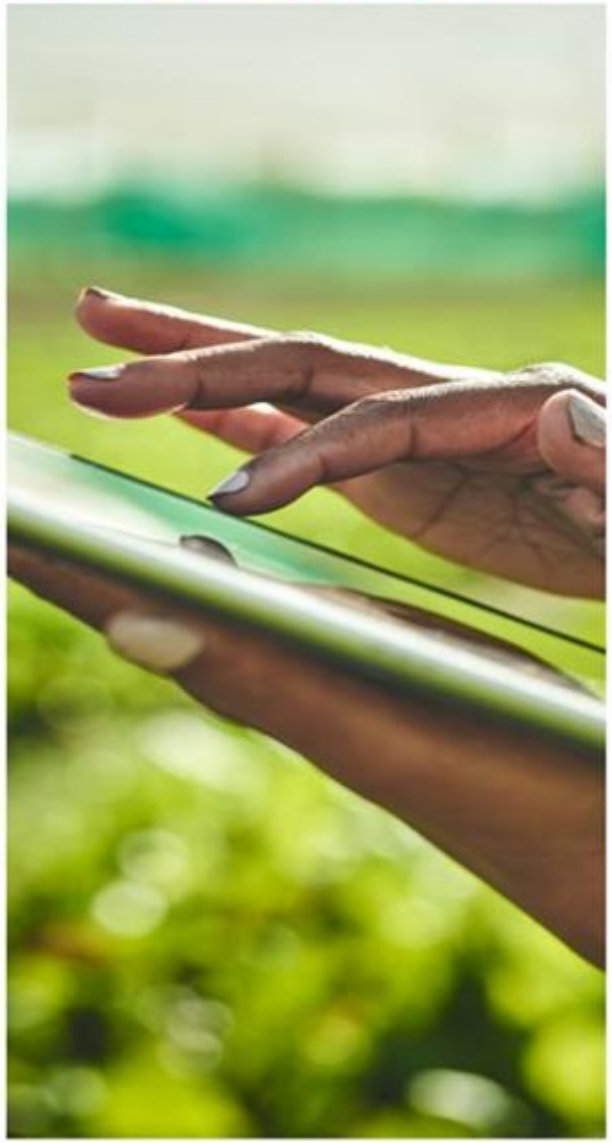
Driving Performance & Continuous Improvement

SCIENCE BASED TARGETS
DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

- **Reduce Scope 01 and Scope 02 GHG emissions 50 % by 2037 from 2019 base year.**
- **Reduce Scope 03 emissions 23 % within the same timeframe.**

- **Investment in Energy savings projects**
- **Improve** Energy Efficiency by 10 %
- **Conversion to renewable energy sources**

THE ENVIRONMENT



Our commitment to being environmentally responsible is reflected in the extensive work we do to reduce greenhouse gas (GHG) emissions, increase energy efficiency, conserve water, minimize waste, and drive efficiency throughout our operations. Honeywell also champions responsible remediation projects and efforts to make our products safer and more sustainable.

OUR ENVIRONMENTAL GOALS

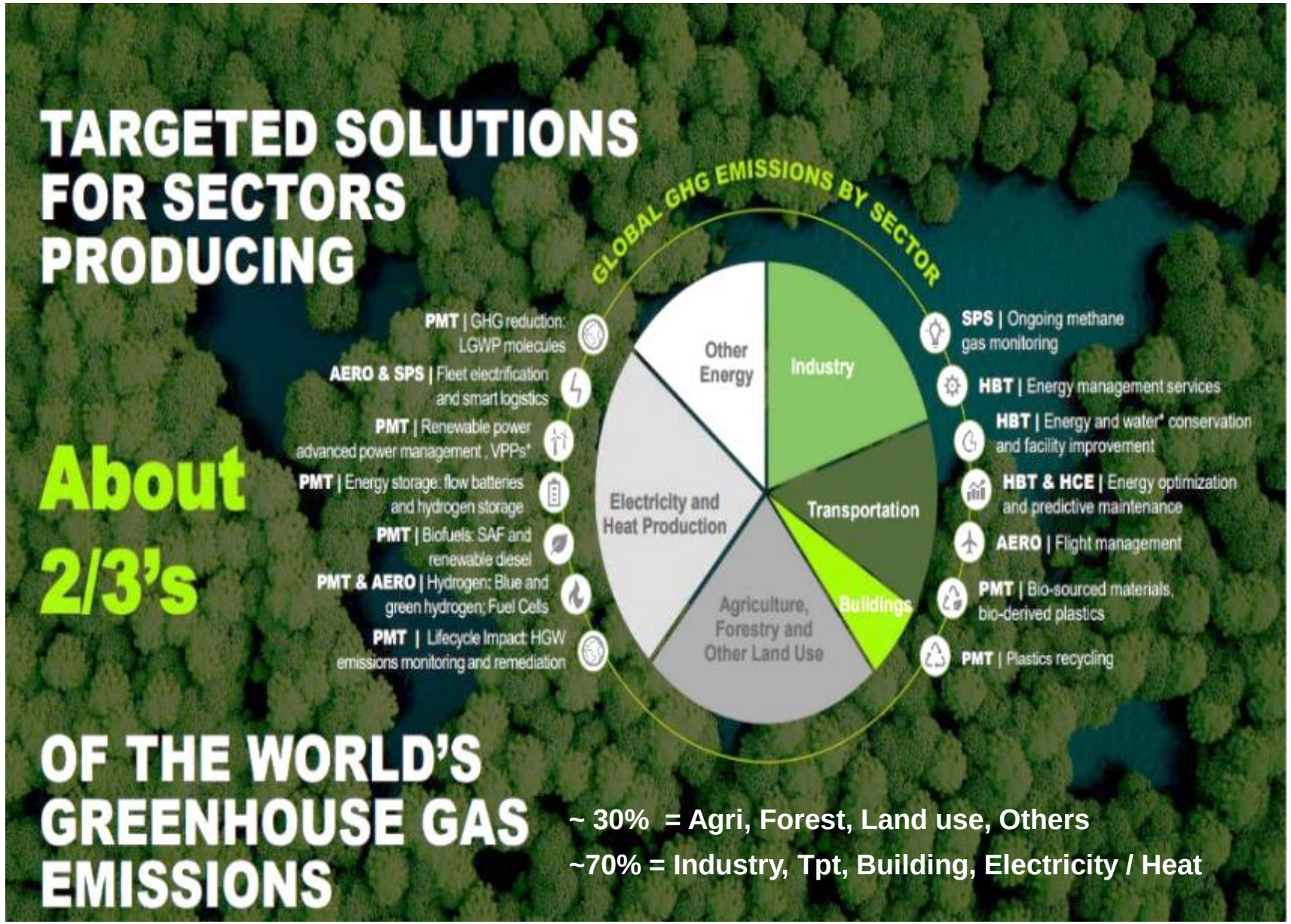
We are proud of the environmental improvements we have achieved to date and continue in our commitment to make our businesses more sustainable.

- **Pledge to be carbon neutral in our facilities and operations[1] by 2035**
- **Commitment to set a science-based target aligned with the Science Based Targets initiative (SBTi)**
- **Five-year "10-10-10" target to, by 2024:**
  - Reduce global Scope 1 and Scope 2 GHG emissions intensity by an additional 10% from 2018 levels
  - Deploy at least 10 renewable energy opportunities
  - Achieve certification to ISO's 50001 Energy Management Standard at 10 facilities

GOAL	TIMEFRAME	STATUS
30% GHG reduction[1]	2007 – 2011 (2004 baseline)	**Exceeded**
20% Energy efficiency improvement	2007 – 2011 (2004 baseline)	**Exceeded**
15% GHG intensity reduction[1]	2012 – 2016 (2011 baseline)	**Achieved 3 years early**
10% GHG intensity reduction[1]	2014 – 2018 (2013 baseline)	**Exceeded**
10% GHG intensity reduction[1]	2019 – 2023 (2018 baseline)	**On track**
10 Renewable energy opportunities		**On track**
10 Certified ISO 50001 sites		**Exceeding**

[1]Scope 1 and Scope 2

HONEYWELL COMMITTED TO BE CARBON NEUTRAL BY 2035



01 facility certified
01 facility in progress

01 facility certified

02 facilities certified

Scope 1 Abatement plan

- Existing DG' conversion to dual-fuel system.
- Leveraging Battery Energy Storage System
- Leveraging Induction based cooking system
- Vehicle fleet engagement model

Scope 2 Abatement

- Offsite and onsite –Green power through PPA
- In-house solar power plant.

SITE INFRA - HTSL GURUGRAM

Facility details

- Owner : Owned
- Year of operation : 2008
- Built up area : 206,925 sq.ft
- Building : 02
- Seating Capacity : 480
- Incoming Power Supply : 11 kV
- Sanctioned Demand : 3.60 MVA
- Transformer Capacity : 1.50 MVA x 3 nos. ;
  : 0.80 MVA x 1 no.
- Diesel Generator Capacity : 4.735 MVA
- UPS Capacity : 2.70 MVA
- Chiller Capacity : 1,621 TR cumulative.

Labs & Plants
40,000 sq. ft.
&

Manufacturing
46,000sq.ft.
&
operates
24 X 7

Annual energy use is around 6.76 million kWh with the spend of INR 5.76 crores, including diesel cost during FY 2022 - 23

BUILDING SALIENT FEATURES

SUSTAINABILTY CONCEPTS CONSIDERED IN BUILDING

Priority to passive design to reduce energy demands

1. Compact envelope shape
2. Solar protection
3. Under roof thermal insulation
4. Air tightness

Include passive

1. UV protected glazing
2. 50 % 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)

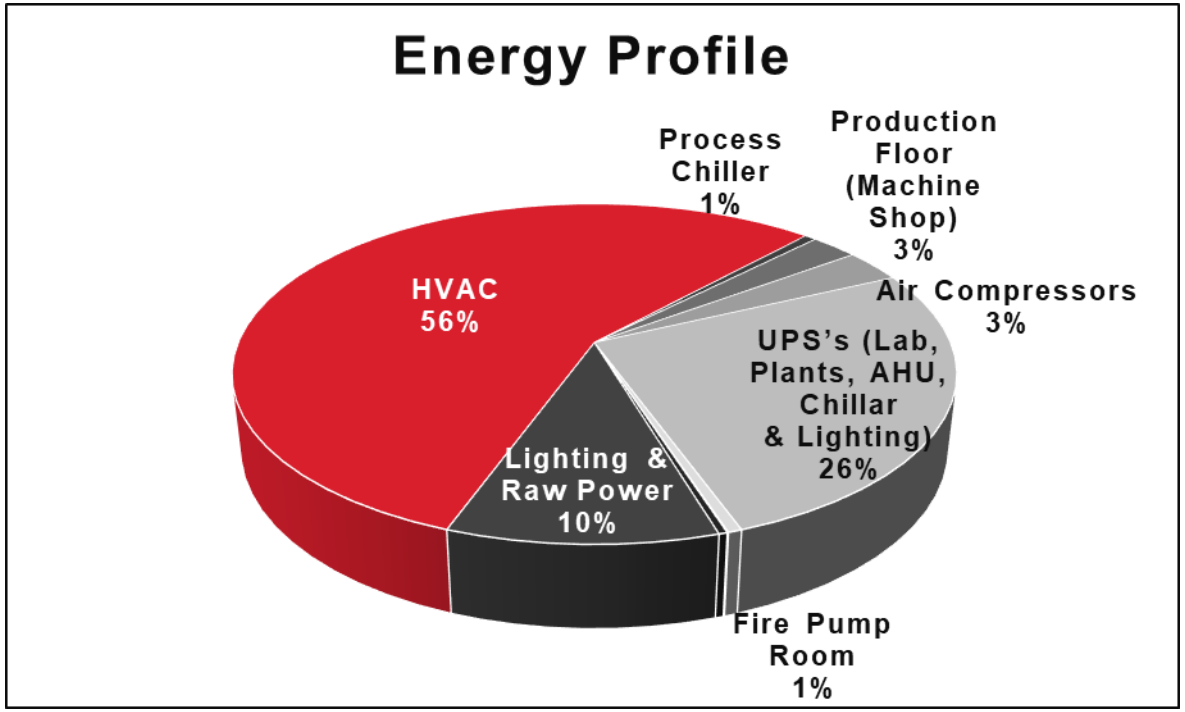
More sustainable elements

1. Reduced heat island more than- 2/3rd of the building surrounding area covered with trees and plantation.
2. Solar Power plant of 345 kWp installed and operational
3. Zero liquid discharge

certified

ENERGY PROFILE – UTILITY WISE OVERVIEW

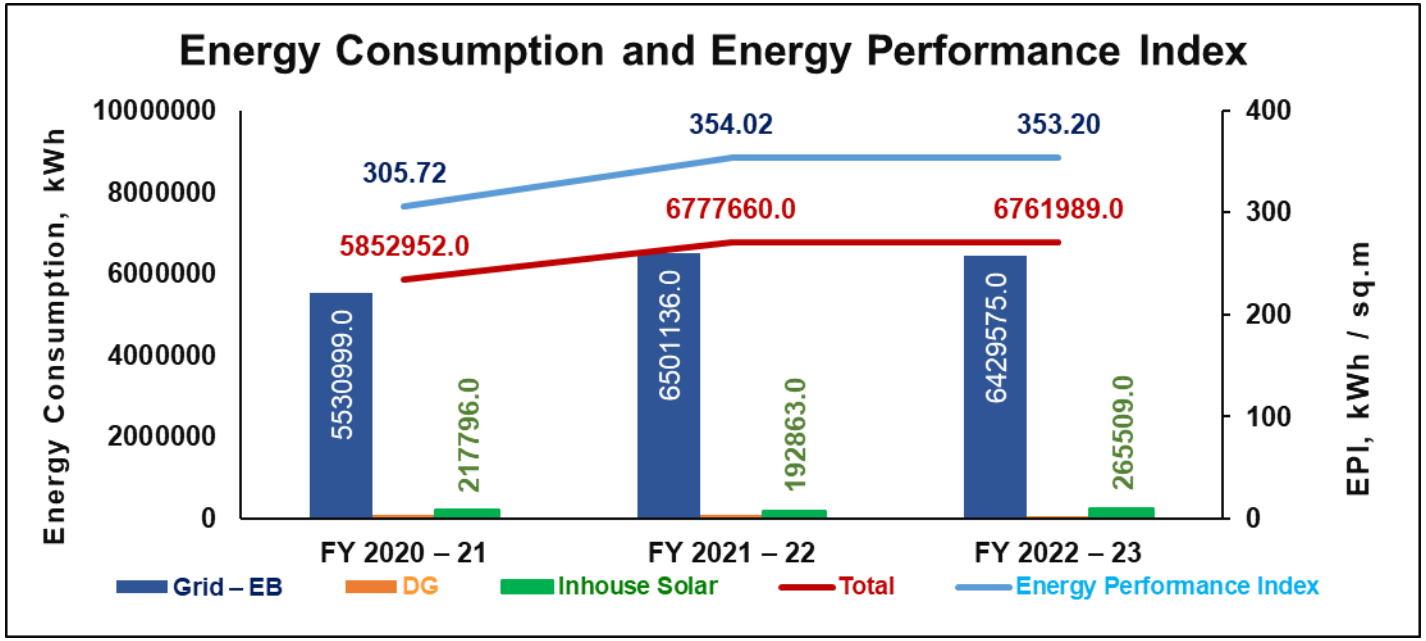
S No	Utility	Energy Consumption, kWh	Energy Share %
1	HVAC	4,000,997	56.2%
2	Process Chiller	43,685	0.6%
3	Production Floor - Machine Shop	178,246	2.5%
4	Air Compressors	221,038	3.1%
5	UPS's - Lab, Plants, AHU, Chiller, WS & Lighting	1,882,864	26.5%
6	Fire Pump Room	37,423	0.5%
7	ETP & STP	26,220	0.4%
8	Lighting & Raw Power	725,873	10.2%
Total		**7,116,345**	**100.0**

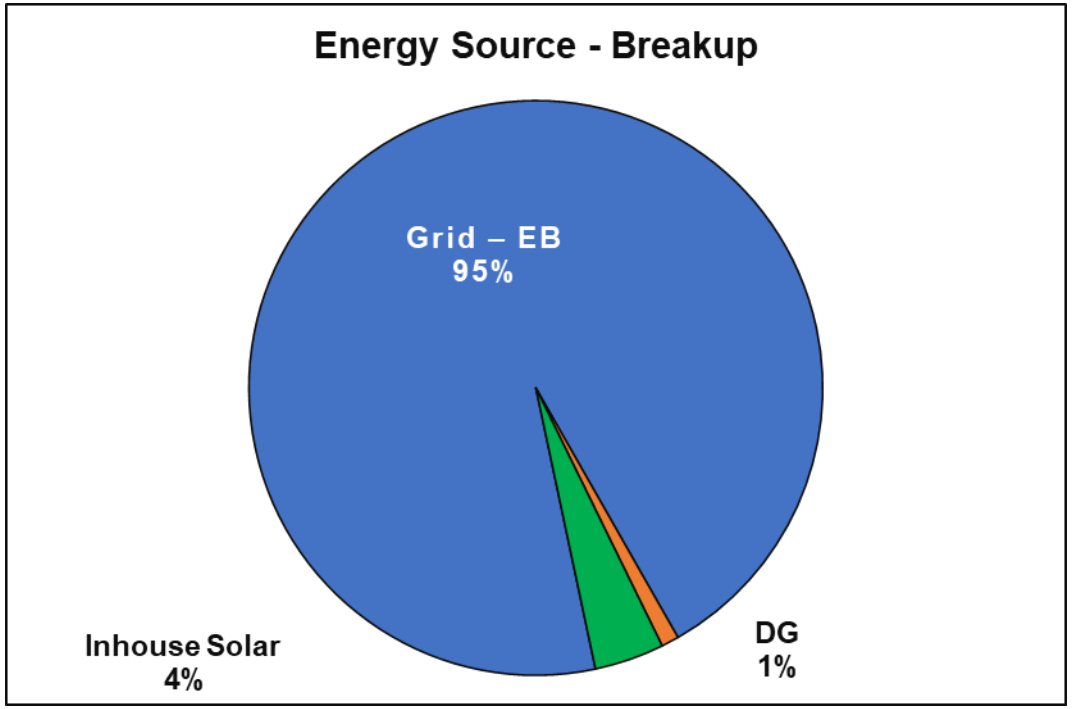


- The R&D section has once through Air conditioning system, which uses 100 % fresh air.
- The facility practices 20 ACPH for pilot plant area and 12 ACPH for lab area.
- Lab load contributes for significant Energy consumption, nearly 35.0 % (including HVAC load as well)

ENERGY CONSUMPTION & ENERGY PERFORMANCE INDEX 2020 - 2023

Year	Source of Energy – Energy Consumption, kWh			Total Energy Consumption	Energy Cost	Area	Energy Performance Index
	Grid – EB	DG	*Inhouse Solar*	Lakhs kWh	INR	Sq.m	kWh / Sq.m
FY 2020 – 21	5,530,999	104,157	217,796	58.53	58,653,516.02	19,145	305.72
FY 2021 – 22	6,501,136	83,661	192,863	67.78	57,458,620.54	19,145	354.02
FY 2022 – 23	6,429,575	66,905	265,509	67.62	57,636,863.65	19,145	353.20





Note :

- **The year 2019 – 20 the consumption 7,874,148 units and EPI was at 413.45 and has been reduced significantly in the following years.**
- **Couple of Energy savings initiatives implemented through operational control measures.**

COMPARISON SEC WITH INTERNAL & NATIONAL BENCHMARKING

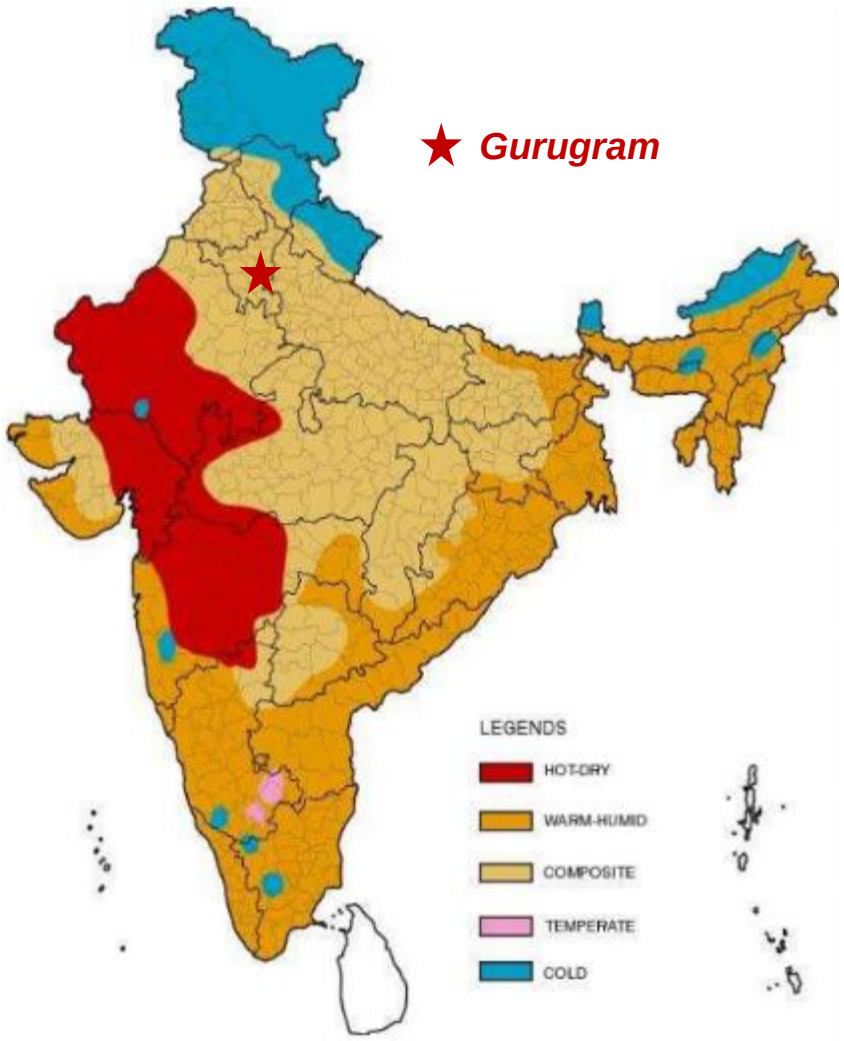
Internal Benchmarking	Location	Zone	SEC (kWh / m^2 / y)
Honeywell	Gurugram	Composite	353.2
Honeywell	Campus 02, Bangalore	Composite	251.1

Benchmarking	Reference	SEC (kWh / m^2 / y)	
		Standard	Actual
National level	Bureau of Energy Efficiency (BEE)	179	**353.2**

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

Key factors for high Energy consumption

- **The R&D section has once through Air conditioning system, which uses 100 % fresh air.**
- **The facility practices 20 ACPH for pilot plant area and 12 ACPH for lab area.**
- **Lab equipment's operates 24 x 7, which contributes for 35.0 % Energy consumption**



Energy Saving projects implemented in 2020 - 2023

Year	No. of Energy Saving projects	Investment	Electrical Savings	Cost Savings	Impact of SEC
		million INR	kWh	million INR	%
FY 2020 – 21	04	5.12	332,000	3.33	5.37
FY 2021 – 22	02	2.4	117,900	0.972	1.71
FY 2022 – 23	01	8.64	214,357	1.79	3.07

ENCON PROJECT PLANNED IN FY 2023 - 24

Title of the Project	Electrical Savings, kWh pa	Cost Savings, INR pa	Investment, INR	Status
EC Fans for AHU Systems – 24 nos. AHUs	148,300	1,258,180	5,965,507	Completed
Retrofit of existing AHU Cooling Coils and its fans – 3 Nos.	24,000	196,800	3,000,000	W I P

INNOVATIVE PROJECT
CONDENSATE WATER FOR PRECOOLING AMBIENT AIR

Background to Implement Project:

- Site has 236000 CFM capacity of AHUs for serving to Pilot plants & Lab areas operating at 20 APH.
- These units operates for 24 x 7 through out the year.
- Annually Condensate water recovered from AHUs is about 3,600 kL.
- Ambient air is pumped into the system during the cycle change, this brings hot air sometimes putting additional load on the Chillers.
- Thereby it is thought to pre-cool the incoming ambient air with the condensate water before reaching the Cooling coils of AHUs.
- Accordingly, the condensate water was circulated into the coil, thereby reducing the ambient air temperature.
- This reduces the load on Chillers.

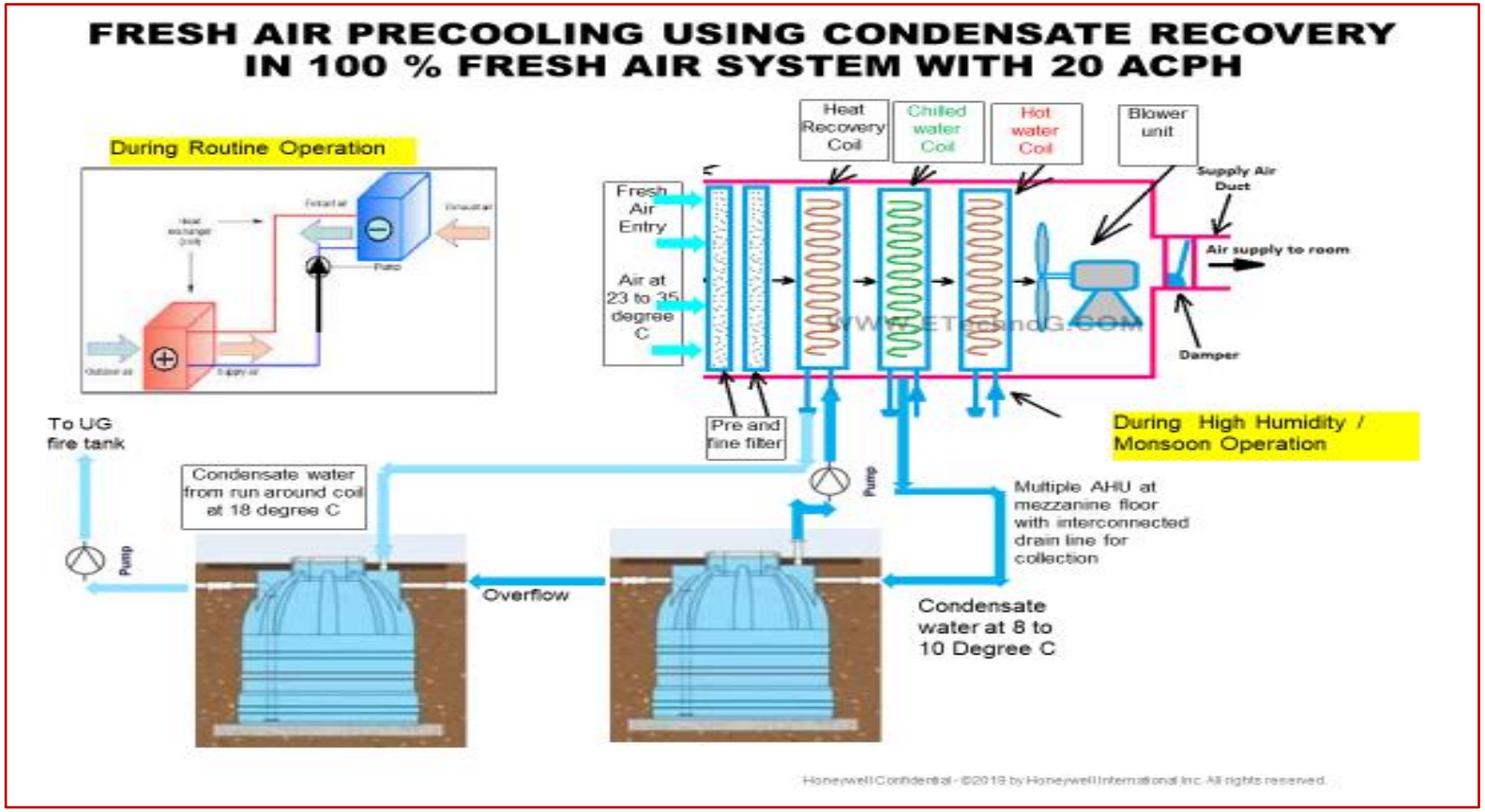
Advantages :

1) Reduction on Chiller Load due to precooling of fresh air.

2) Cost avoidance
(Purchase of water tankers reduced by 40%)

AHU Connected = Pilot Plant 2 area

- Project Cost = INR 9 Lakhs
- Energy Savings = 165,000 kWh pa
- Cost Savings = INR 14 Lakhs pa



ENERGY CAPEX – RUN AROUND COIL

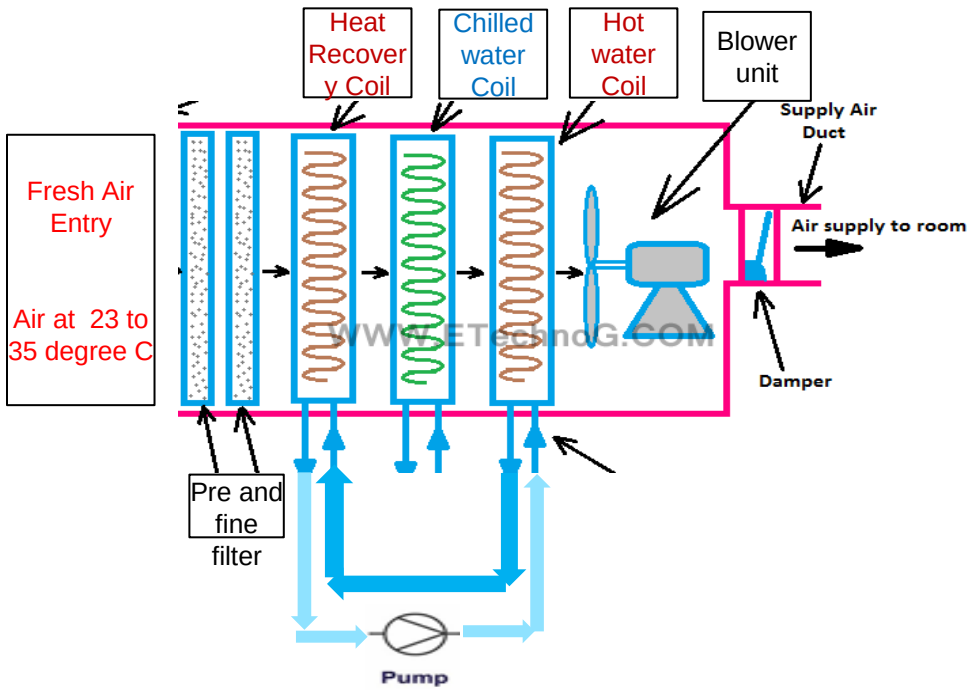
Background to Implement Project:

- During High Humidity seasons to manage Relative Humidity in Lab and plant areas we have to cool the incoming fresh air to reach dew points and than reheat the same for maintaining required temperatures in the supply area.
- We have a combination of heating options including oil heaters, hot water generators and heat pumps available which consume considerable energy.

What has been done:

- Normally we are using water between 40 to 45 degree centigrade from heating source to reheat air passing from hot water coil to maintain room temperature.
- If we interconnect hot water coil with run around coil and isolate connection with exhaust unit , we can make use of incoming air temperature for increasing water temperature in hot water coil and the same is also helping to bring down incoming air temperature while passing from run around coil by using a pump for water circulation.

Schematic



AHU Connected - Pilot Plant 1 , Lab 1 to 10 excluding 7

Project Cost - INR 800000

Power Savings – 99.52 kW

Energy Savings – 1.07 Lakhs kWh pa

Cost Savings - INR 9.13 Lakhs pa

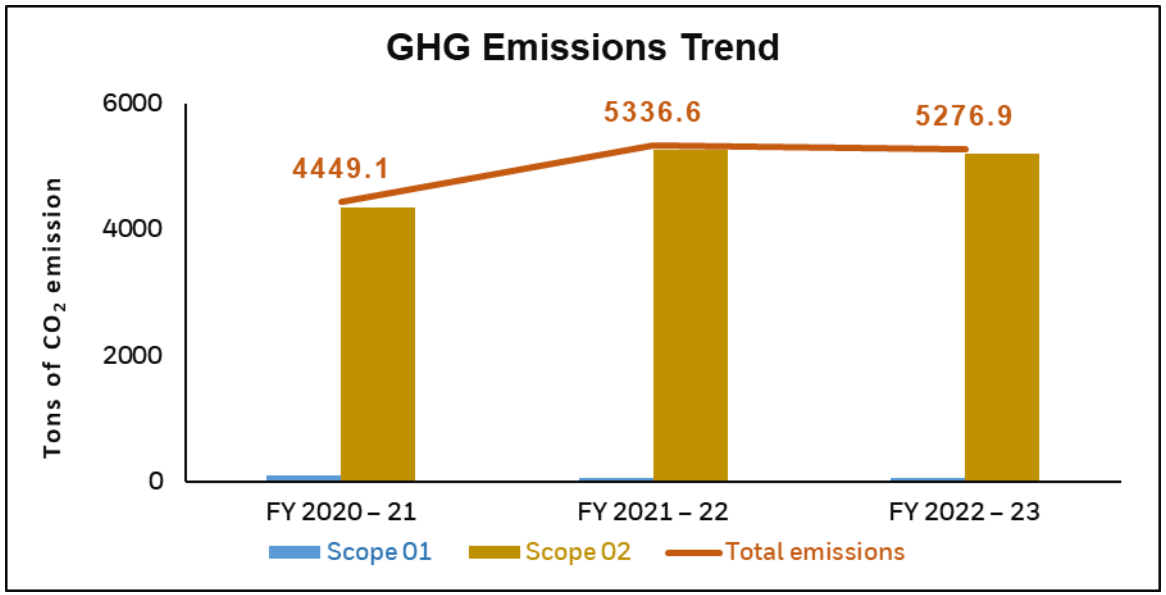
UTILIZATION OF RENEWABLE ENERGY SOURCE

Year	Renewable Energy Source	Renewable Energy Consumption, kWh	Total Energy Consumption, kWh	% Renewable Energy	CO_2 emission offset, tons of CO_2
FY 2020 – 21	Inhouse - Solar	217,796	5,852,952	3.72	171.19
FY 2021 – 22	Inhouse - Solar	192,863	6,777,660	2.85	156.22
FY 2022 – 23	Inhouse - Solar	265,509	6,761,989	3.93	215.06

Plant	Capacity	Year
Old Plant	165 kW	2014
New Plant	180 kW	2022

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 2020 – 21	37,820	101.7	5,530,999	0.786	4,347.4	4,449.1
FY 2021 – 22	26,296	70.7	6,501,136	0.810	5,265.9	5,336.7
FY 2022 – 23	25,631	68.9	6,429,575	0.810	5,208.0	5,276.9



Scope 01 – Mitigation plan

- Replacement of existing DG set with PNG based Generator.
- Also, few DG generators will be implemented with Dual fuel system.

DG set operation

- **Optimization in DG set daily test**
  - *Implemented in 2020*
  - *"A check" test frequency revised from daily to weekly once.*

Inhouse Solar

- **Inhouse Solar**
  - *Installed capacity of 345 kWp.*
  - *Energy Generation of nearly 2.5 lakhs per annum*

INDOOR AIR QUALITY

TEST REPORT

Workzone Air Quality Monitoring

Test Report No. : EKO/E-556/080623 — Issue Date : 17/06/2023

Issued To : UOP INDIA PVT. LTD. (HONEYWELL)
Sector - 36
Pace City- II
Gurugram (Haryana) - 122002

Sample Description	: Workzone Air
Sample Drawn on	: 06/06/2023
Sample Drawn by	: EPEPL (Mr. Shakir)
Sample Received on	: 08/06/2023
Sampling Location	: UOP Office Area-2
Sampling Plan & Procedure	: SOP-AAQ/15
Analysis Duration	: 08/06/2023 To 12/06/2023
Sampling Time	: 08 Hrs.
Ambient Temperature (°C)	: 27.0
Average Flow Rate of SPM (m^3/min)	: 1.8
Average Flow Rate of Gases (lpm)	: 1.8
Weather Condition	: Clear
Remark (if any)	: NA

RESULTS

S. No.	Parameters	Test Methods	Results	Units	Permissible Limits
1	RSPM	IS: 5182 (P-23)	1.38	mg/m^3	5.0 as per OSHA
2	SPM	IS: 5182 (P-4)	3.72	mg/m^3	15.0 as per OSHA
3	Sulphur Dioxide (as SO_2)	IS: 5182 (P-2)	< 5.0	mg/m^3	5.0 as per Factories Act, 1948
4	Nitrogen Dioxide (as NO_2)	IS: 5182 (P-6)	< 5.0	mg/m^3	6.0 as per Factories Act, 1948
5	Carbon Monoxide (as CO)	IS: 5182 (P-10)	< 0.5	mg/m^3	55.0 as per Factories Act, 1948
6	Total Volatile Organic Compounds	IS: 5182 (P-11)	< 0.1	mg/m^3	–

Notes :
1. The results given above are related to the tested sample, as received & mentioned parameters. The customer asked for the above tests only.
2. This test report will not be generated again, either wholly or in part, without prior written permission of the Laboratory.
3. The test report will not be used for any publicity/legal purpose.
4. The test samples will be disposed off after 15 days from the date of issue of test report, unless until specified by the customer. Sample received for biological tests will be destroyed after 7 days from the date of issue of test report.
5. Responsibility of the Laboratory is limited to the invoiced amount only.

****End of Report****

For EKO PRO ENGINEERS PVT. LTD.
PURNIMA CHAUHAN
TECHNICAL MANAGER
(Authorised Signatory)

Page 1 of 1

IAQ is being monitored in the office area:
The meter display the Carbon dioxide (CO_2) level in the office area.

UV lights are installed in the air handling units (AHU's), to improve the air quality by killing the bacteria's and fresh air dampers are also installed to improve the air quality of the office area.

Also, IAQ test being carried out for entire building through 3rd party vendor annually once.

Carbon dioxide (CO2)

Rating	Index	CO2 ppm
Excellent	1	0 - 400
Fine	2	400 - 1000
Moderate	3	1000 - 1500
Poor	4	1500 - 2000

TEAMWORK, EMPLOYEE INVOLVEMENT & MONITORING

Kaizens

- MD reduction
- Optimization of exhaust fans in Lab 07.
- Optimized the UPS operations based on Load Conditions
- BMS - Scheduling incorporated to optimize temperature requirement and OFF hours operation in alignment with the business, (which was previously done manually)

BMS Team :

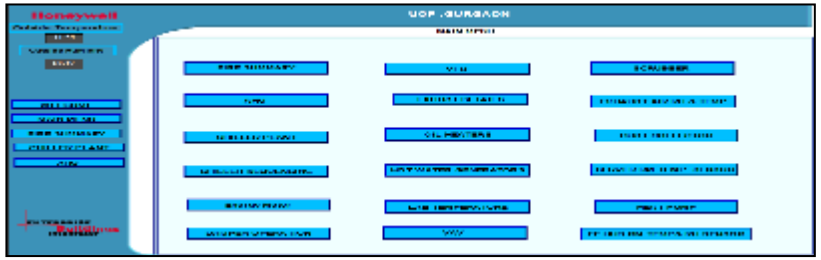
- monitor & control
- scheduling of utilities (Chillers, AHUs)
- monitoring of equipment's

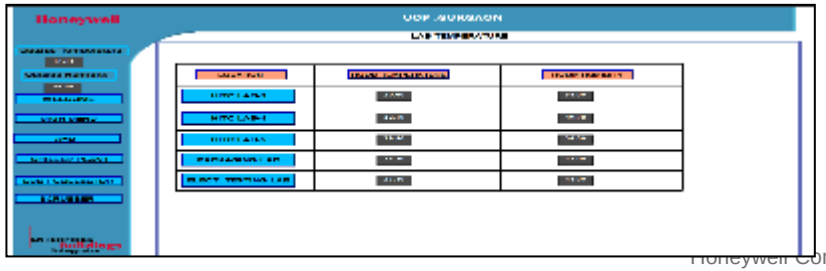
Viz., Transformer, DG, HVAC, UPS, Energy meters etc.,

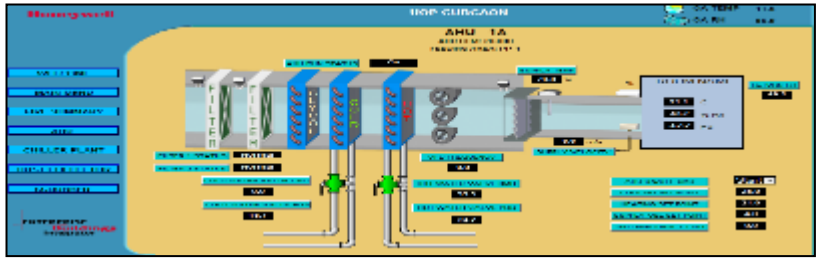
- Energy consumption data analysis for critical equipment's
- Indoor air quality monitoring

Energy Team

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







CERTIFICATIONS

MAJOR ACHIEVEMENTS AWARD

Golder Peacock Award 2023

E2J Technology

Ethanol to Jet process aims to produce sustainable aviation fuel having lower carbon intensity via cellulosic feedstock.

THANK YOU

Honeywell

BACK UP SLIDES

INNOVATIVE PROJECT - CONDENSATE WATER FOR PRECOOLING AMBIENT AIR

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AHU 2A & 2B (170000+17000)

= 34000 CFM or 16.04 m3/s

$h_s = c_p \rho q dt$ **(1)**

where h_s ***= sensible heat (kW)***

c_p ***= specific heat of air (1.006 kJ/kg °C)***

ρ ***= density of air (1.202 kg/m³)***

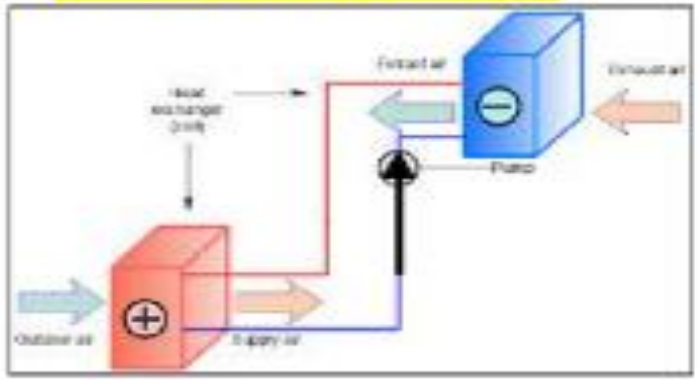
q = air volume flow (m³/s)

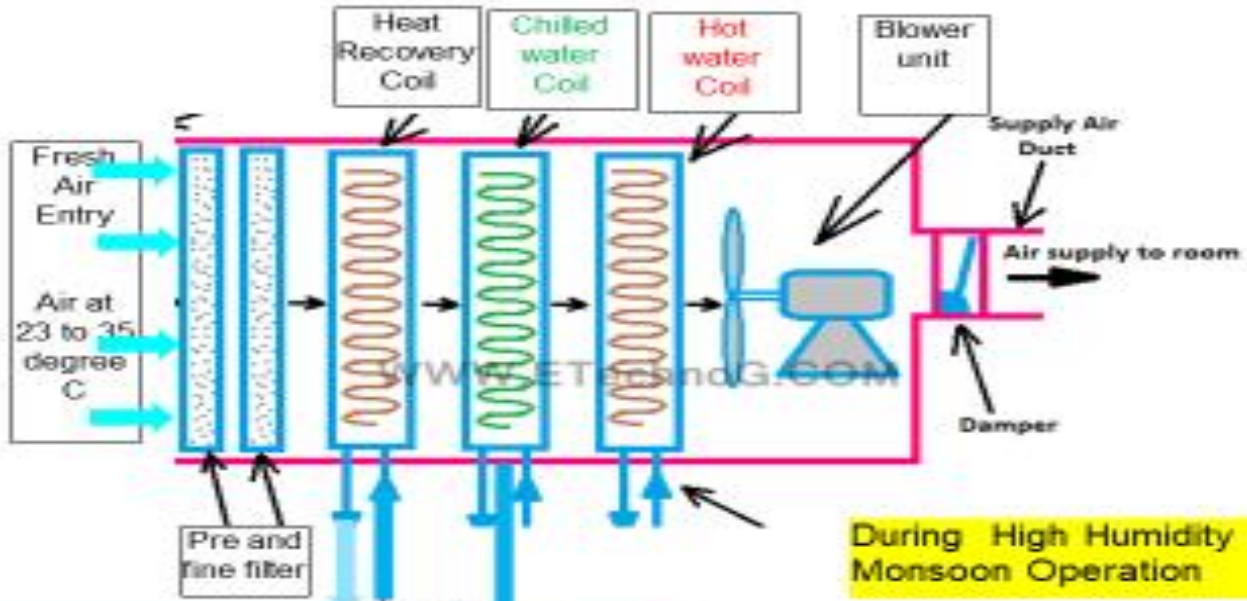
dt = temperature difference (°C)

h_s ***= (1.006 kJ/kg °C) (1.202 kg/m³) (16.04 m³/s) ((16 °C) - (12 °C))***
= 77.61 (kW) x24 x 90 =167,644 kWh

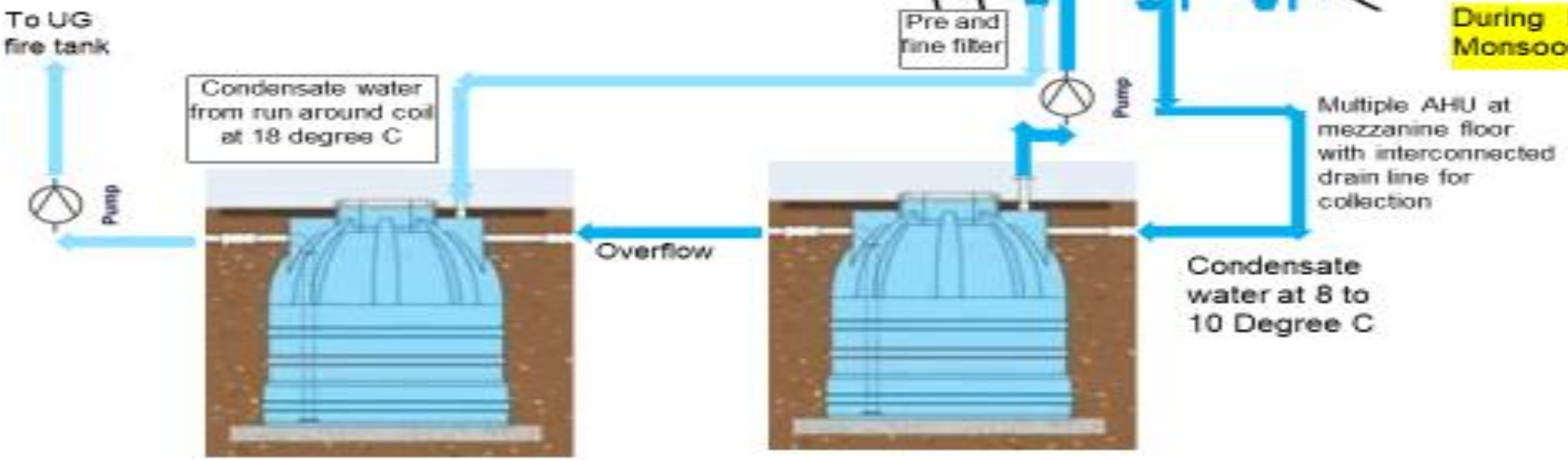
FRESH AIR PRECOOLING USING CONDENSATE RECOVERY IN 100 % FRESH AIR SYSTEM WITH 20 ACPH

During Routine Operation





During High Humidity / Monsoon Operation



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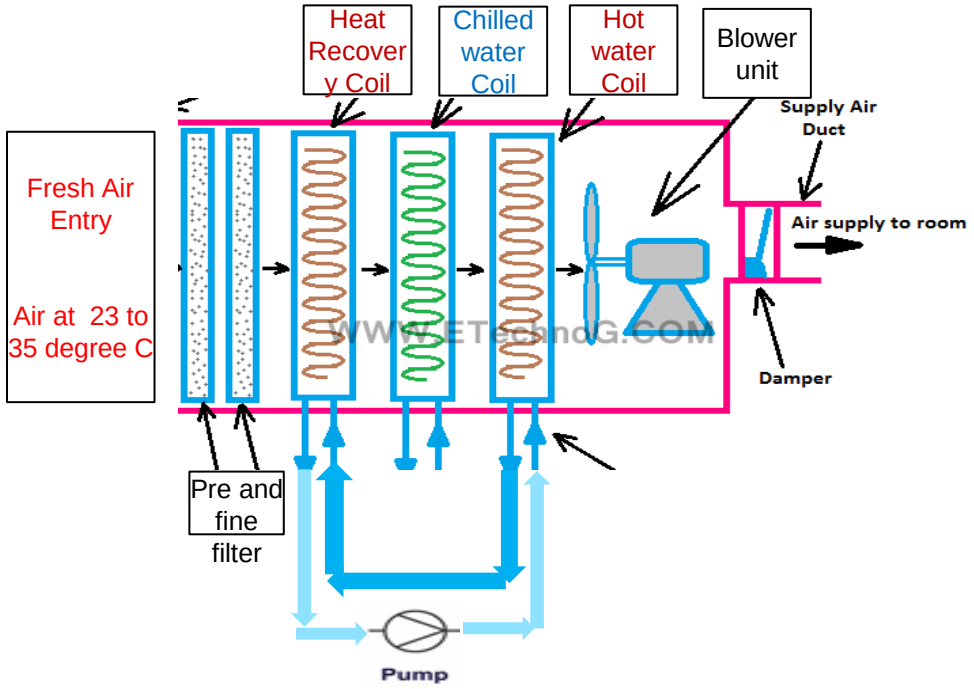
- If we interconnect hot water coil with run around coil and isolate connection with exhaust unit , we can make use of incoming air temperature for increasing water temperature in hot water coil and the same is also helping to bring down incoming air temperature while passing from run around coil by using a pump for water circulation.

Schematic



AHU Connected - Pilot Plant 1 , Lab 1 to 10 excluding 7

Project Cost - INR 800000

Power Savings – 99.52 kW

Energy Savings – 1.07 Lakhs kWh pa

Cost Savings - INR 9.13 Lakhs pa

AHU 3A, 3B, 1A, 1B

(21000+11300+11300)

= 43600 CFM or 20.57 m3/s

$h_s = c_p \rho q \, dt$ **(1)**

where h_s = sensible heat (kW)

c_p = specific heat of air (1.006 kJ/kg ^oC)

ρ = density of air (1.202 kg/m^3)

q = air volume flow (m^3/s)

dt = temperature difference (^oC)

h_s = (1.006 kJ/kg ^oC) (1.202 kg/m^3) (20.57 m^3/s) ((16 ^oC) - (12 ^oC))
= 99.52 (kW)