FORTIS HOSPITAL MOHALI, A MULTY SPECILITY HOSPITAL

CII 25th National Award for Excellence in Energy Management-2024

Presented By: - Mr Neeraj Tandon
Chief Engineer

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Organization Accredited by Joint Commission International

Fortis Care. For good.

BUILDING DETAILS

Total Plot Area	8.22acre
Built-up area	50336sqm
No of Beds	493
Operation Theatres	17
Incoming Electrical	2 Sources 11KVA
Generators	1250KVA *3nos
Transformer	2000KVA*2nos
Chiller Plant	433TR*3nos
UPS	200KVA *3nos(UPS are in parallel load with ATS), 120KVA *3Nos.
Fuel	PNG from AGL, HSD

- *Fortis Hospital Mohali Establishes in 2001*, Approx 2000 sqf/cardiac ICU bed instead of the normal 800-900 sqf/in Indian healthcare
- *Hospital set on sprawling 8.22 acres, with built up area of 50336 square meters.*
- *FHM is a 493 bedded (Census+Non-Census), JCI and NABH certified multi specialty tertiary care hospital,*
- *Fortis Hospital, Mohali has won several awards, including; Best Design Award from American Institute of Architects,1999.*

Number of Buildings: 4

- IPD Block (A block)
- OPD Block (B block)
- Rehabilitation Centre
- Fortis Cancer Institute

NATURAL ENERGY USAGE FOR LIGHTING

Fortis Hospital Mohali

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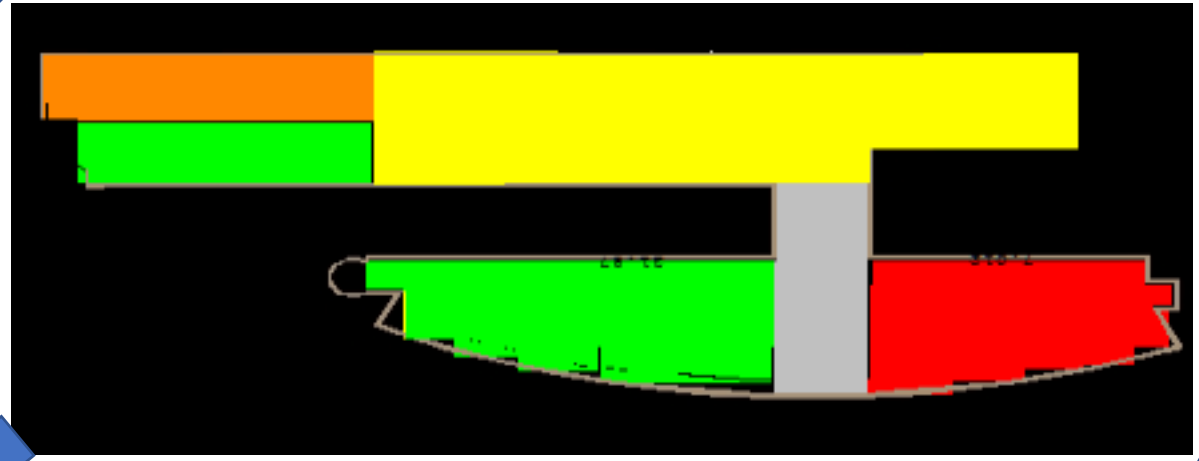

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Glass type	Direction
Double Glaze Unit	NW
Low-U Double Glaze Unit	SW

Parameter	Baseline Glass specs as per AHRAE 90.1	Normal DGU Glass (North-east)	Low e Glass (South-west)
U Value (Btu/hr-sqft *F)	1.2	0.49	0.35
SHGC	0.25	0.35	0.23

Energy Efficiency Summary

Description	2019-20	2020-21	2021-22	2022-23	2023-24	% Change 2019-20 vs 2023-24
Specific Electrical Energy Consumption (kWh/Sqm)	111	102	107	107	110	-0.90%
kWh/Occupied Bed/Year	14141	13219	12876	12310	12278	-13.17%
Energy Consumption kWh in Lakhs	55.72	51.56	53.69	54.04	55.13	-1.05%

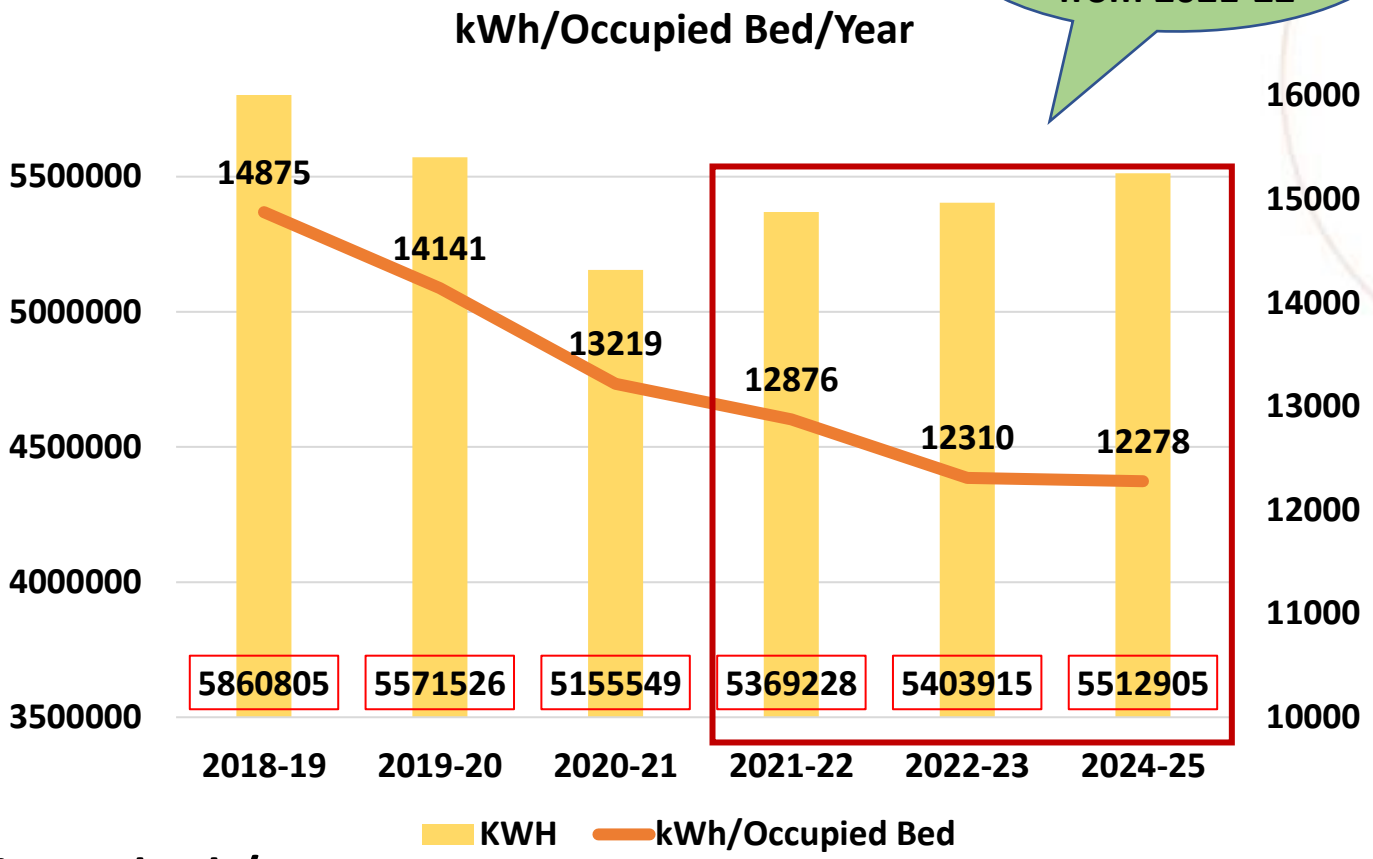
What changed during 2019-20 to 2023-24?

In spite of increased patient Occupancy/Foot fall/ Equipment load by approx. 13.96 %,
Specific Energy consumption (SEC) saved 0.90% and kWh/Bed Saved is 13.17% from FY 2019-20

The nearest Competitor SEC (Specific Energy Consumption) of Hospital buildings stands at 124 Kwh / Sqm

FORTIS MOHALI ENERGY PERFORMANCE VS GLOBAL, NATIONAL & COMPETITION BENCHMARK

Fortis Mohali Kwh/sq.mtr	Competition Benchmark	BEE National Benchmark	Global Benchmark
110	124	200	205



BEE National benchmark is defined for Hospitals is 200 kWh/m2

Specific Energy consumption of Fortis Mohali is 110 kwh/m2

Global benchmarking defined by Serbia, UK and Germany (CIBSE TM 46), (EnEv) 205kWh/m2

13.17% kWh/Occupied bed reduction compared to 2019-20

Specific Energy consumption of Fortis Mohali stands at 110 kwh/m2 which is 45 % below the global bench mark and 46.34% below the National Benchmark

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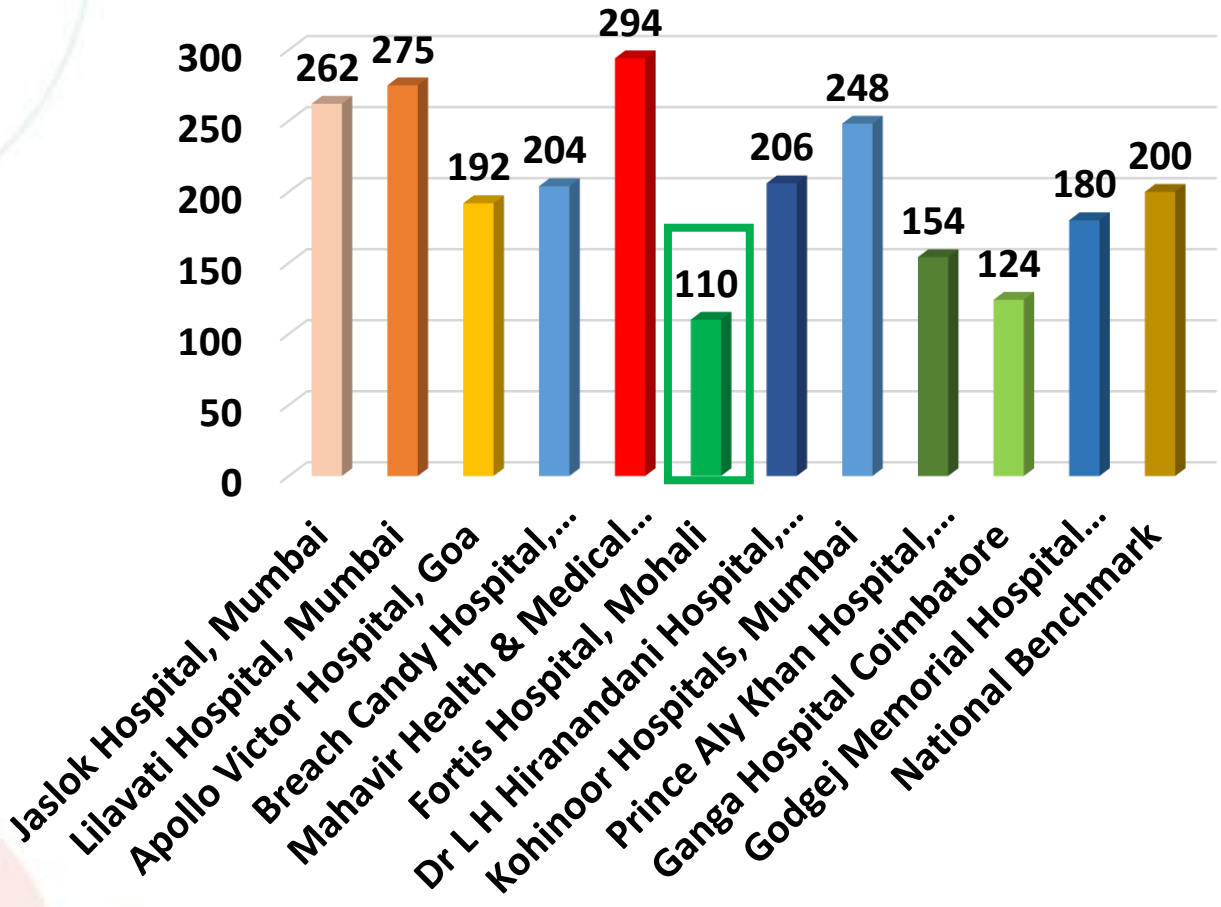
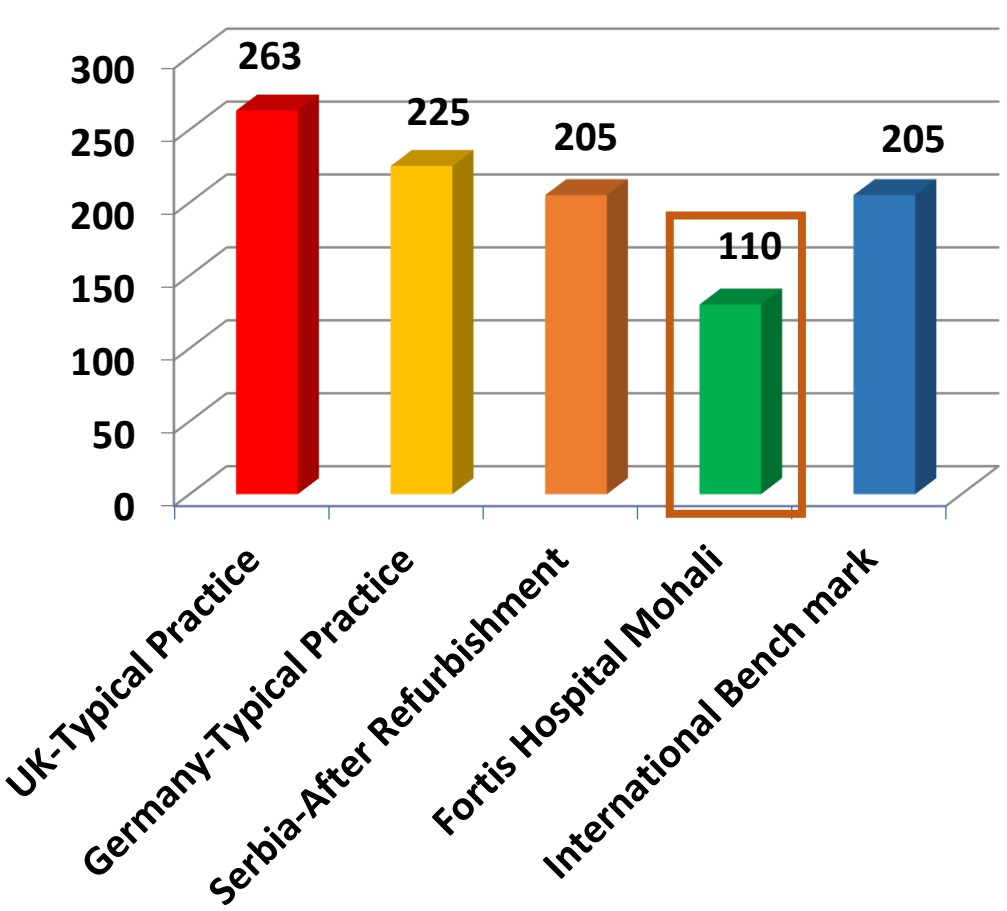
BENCH MARKING (KWH/SQM)

NATIONAL BENCH MARKING (KWH/SQM)



International Benchmarking

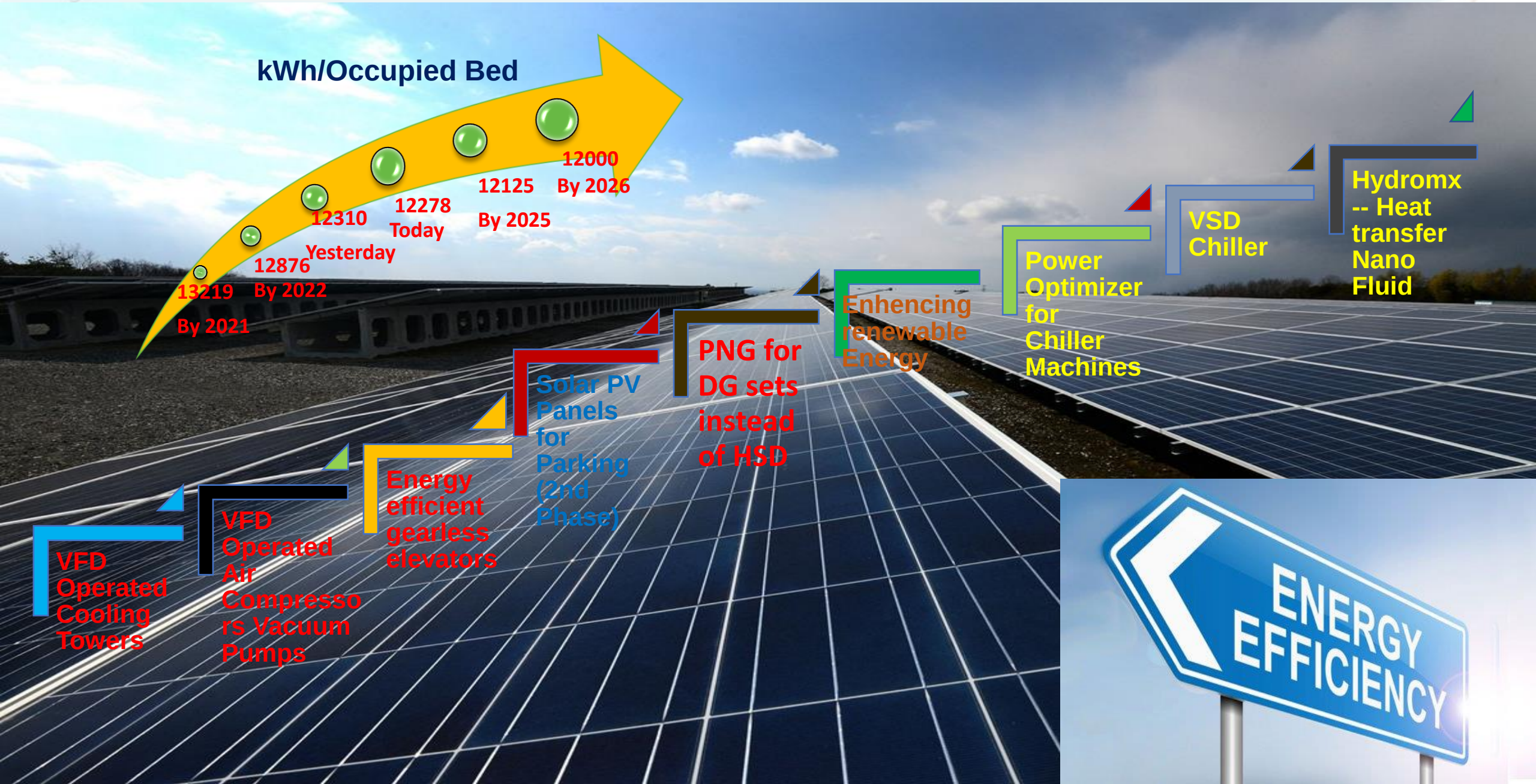


Reference A report on Energy efficient hospitals survey by *CII*,
BEE National benchmark is defined for Hospitals is 200 kWh/m2

Comparison of building energy benchmarks in Serbia, UK and Germany (CIBSE TM 46), (EnEv)----- KWH/M2

Fortis Care. For good.

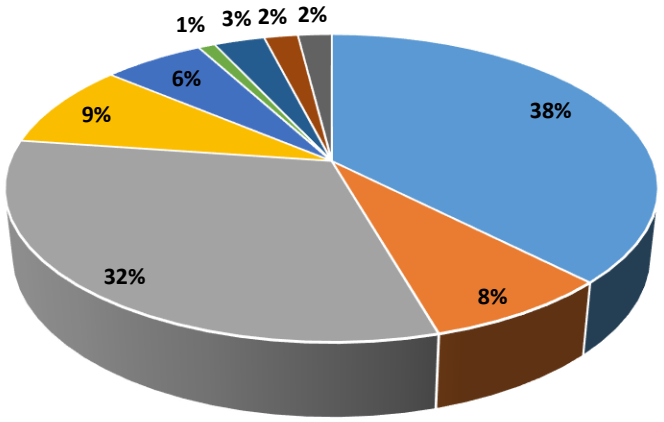
Roadmap for being Global Leader in Energy Efficiency….



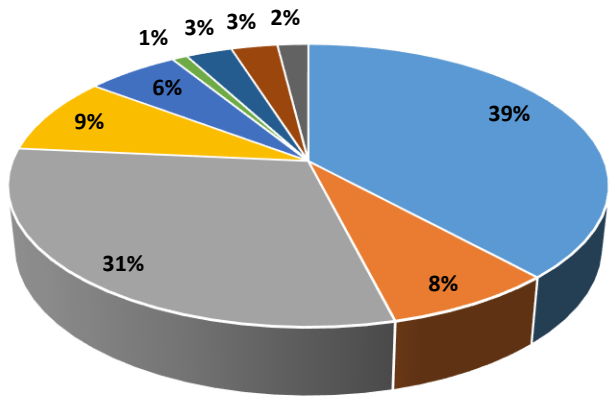
BENCHMARKING – ENERGY USAGE- OUR CHALLENGES

- Current – Consumption patterns ,Perpetual growth in facilities, diagnostic equipment's, additional beds thus increased Energy.
- Consumption patterns aren't fixed, they vary depending on the number of occupied beds, the footfalls & the local weather conditions. Increasing energy & Maintenance costs.
- Hospital are energy guzzlers. They not only adds to the operational costs but also to emissions that contribute to the anthropogenic green house gases

2023-24



2022-23



Equipment	Avg. Consumption 2023-24	Avg. Consumption 2022-23
HVAC (heating, ventilation, & air conditioning)	38%	39%
Lighting	8%	8%
Medical Equipment	32%	31%
Boilers	9%	9%
Water Systems	6%	6%
DG Sets (Diesel generator)	1%	1%
Laundry	3%	3%
Medical Gases	2%	3%
STP (sewage treatment plant)	2%	2%

Our Encon Journey

1999

Best Design Award from American Institute of Architects

2020-22

11. . Energy efficient gearless elevators

2. 5 no's VFD Operated AHU's

3. Solar PV Panels for Parking (2nd Phase)

4. Ahu replaced with EC fans

5. LED for new areas as well

2021-23

Cooling Towers Approach based Automated operations

2.Condenser Pumps with VFD

3.Synchronized Elevators Operations

4.RO Reject Water Reuse

5.VFD operated Energy Efficient OT AHU's

6.Conversion of old CPU's with Laptops and thin power saving CPU

2022-23

1. VSD Chiller

2. AHU with VFD

3. BMS Operations

4. HVAC Primary Pump Stopage

5. Energy efficient gearless elevators

6. LED Lights

7. Disconnection of 2x80 KVA & 2X20 kVa UPS & given supply through main central UPS

8. Emergency lights on UPS to remain switched off , only to be on during power outage

2019-20 EPI 111

2020-21 EPI 102

2021-22 EPI 107

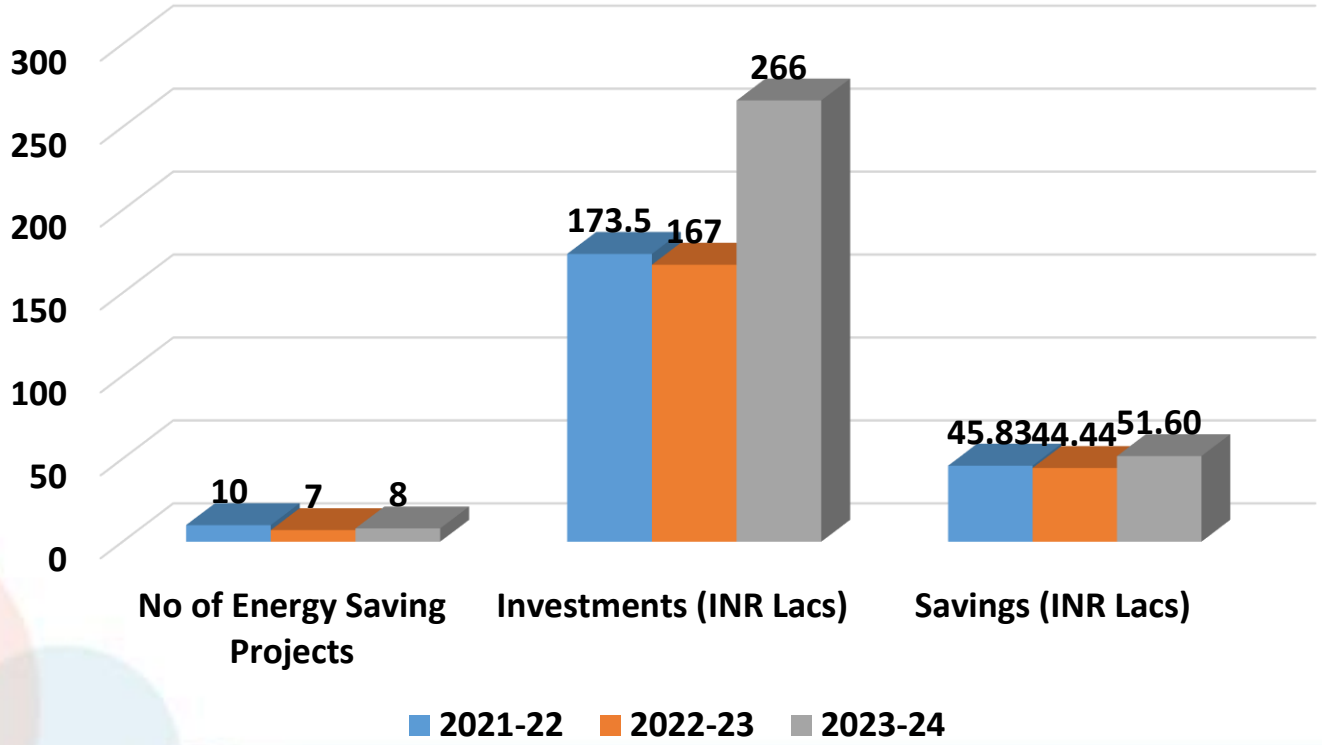
2022-23 EPI 107

2019-20 EPI 110

BEE National Benchmark 200

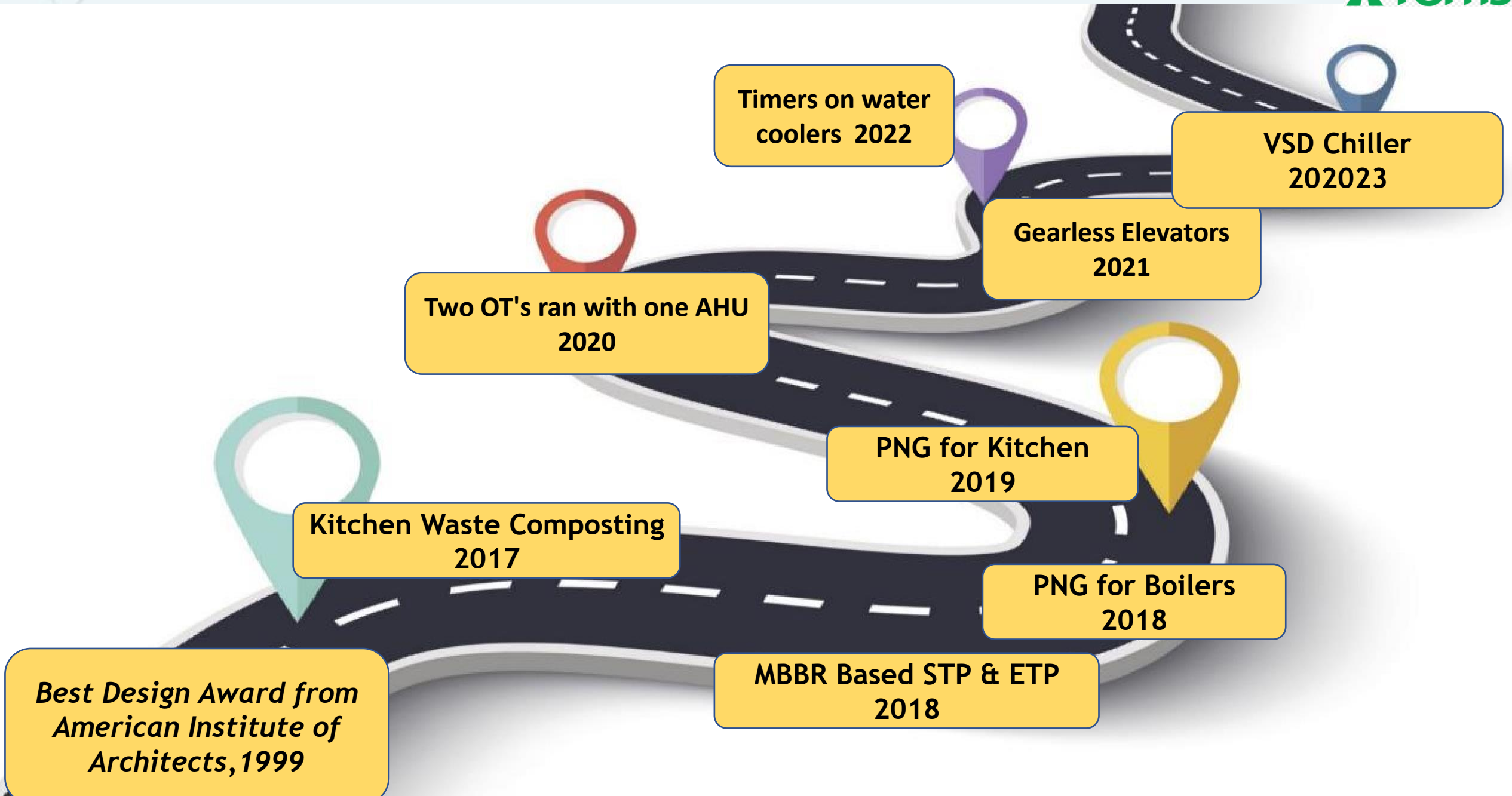
SUMMARY OF PROJECT IMPLEMENTED IN LAST THREE YEARS

Year	No of Energy Saving Projects	Investments (INR Lacs)	Savings (INR Lacs)
2021-22	10	173.5	45.83
2022-23	7	167	44.44
2023-24	8	266	51.60

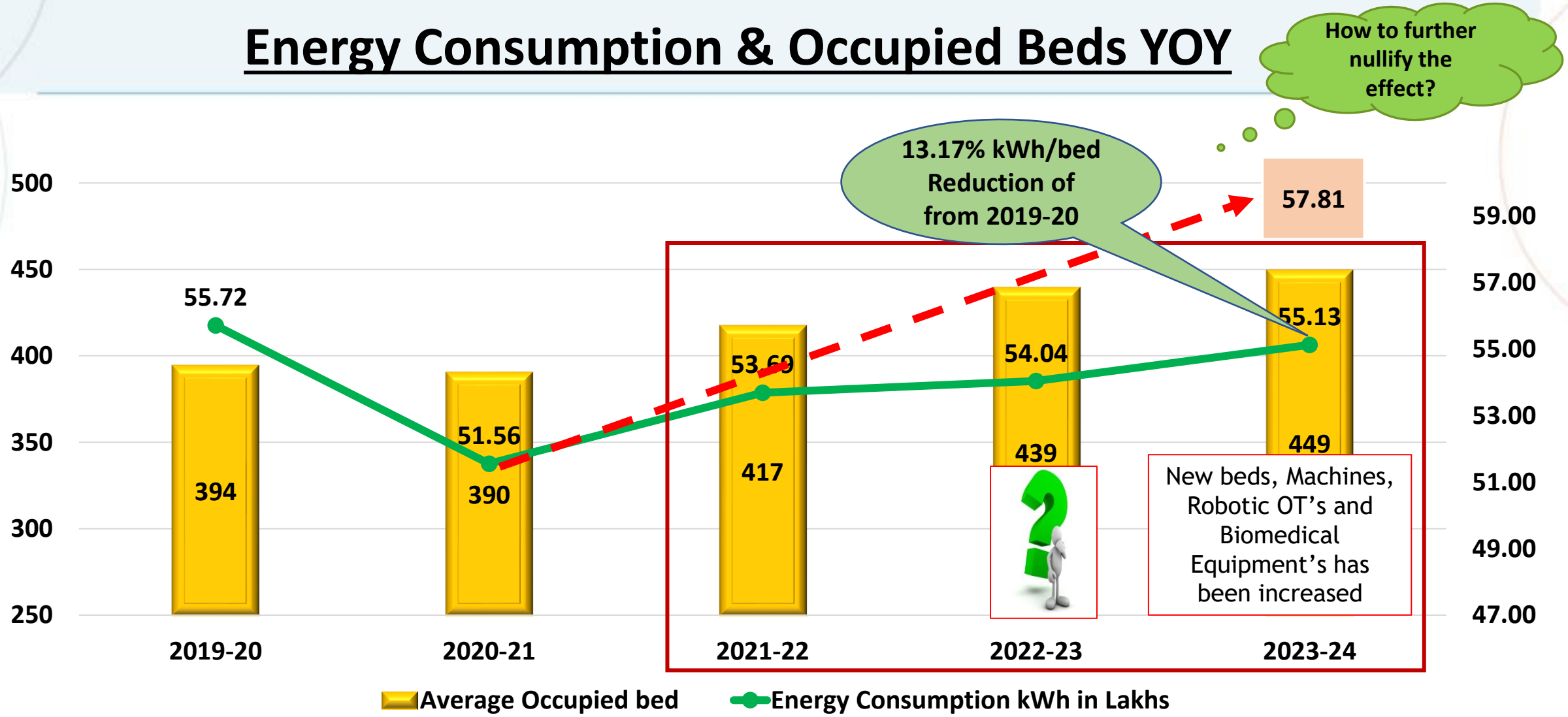


- Each year dedicated budget gets allocated towards Energy Conservation Projects
- Apart from technology up gradation, special focus is also given to operational optimization, to reduce energy wastage.
- Dedicated Energy Management cell looks after all Energy conservation projects and keep track of all regular energy saving activities.

FIRST OF ITS KIND PROJECTS IN HOSPITAL



Energy Consumption & Occupied Beds YOY



What changed during the last year?

4.64% kWh/Occupied bed reduction compared to 2020-21

Specific Energy consumption of Fortis Mohali is 110 kwh/m2 which is 45 % below the global bench marking and 46.34% below the National Benchmark

Going Forward Targets

ENCON PROJECTS PLANNED IN FY 2024-26	
Year	**Description**
2024-25	Hydromx-Heat trnsfer Nano Fluid
2024-25	Geothermal for chilled ground water
2024-25	Open Access power Source
2024-25	VFD for all the AHU's
2024-25	VFD Operated Cooling Towers
2024-25	Secondry Pumps with inbuilt VFD
2024-25	Cooling towers fan replacement with FRP fans
2025-26	OT AHU's replacement
2025-26	VSD Chiller
2025-26	Enhancing Renewable Energy
2025-26	PNG for DG sets instead of HSD
2025-26	Energy efficient elevators/cooling towers (2nd Phase)
2025-26	Heat Pump for Hot Water
2025-26	Power Optimizer for Chiller Machines

Benchmarks 17762kWh/bed (By Bureau of Energy Efficiency, Govt. of India ECO-III Project)

Innovative Project (1)

Disconnection of 2x80 KVA & 2X20 KVA UPS & given supply through main central UPS

Statement: The design in FCI block was with two source of power with a facility to changeover to alternate source of power through ATS i.e. Automatic Transfer switch in case of power outage to all ICU's and OT's in new block. Thus power was fed through 2x80 kVA & LIGHTING WITH 2X20kVA UPS. Since main hospital building taking care of entire OT's set ups with central parallel operated 2x200 kVA UPS , Hence decided to put the 2X80kVA & 2X20kVA UPS load on central UPS thereby sparing 2x80 kVA & 2X20 kVA UPS from the system resulted in huge energy savings. This was indeed innovative.

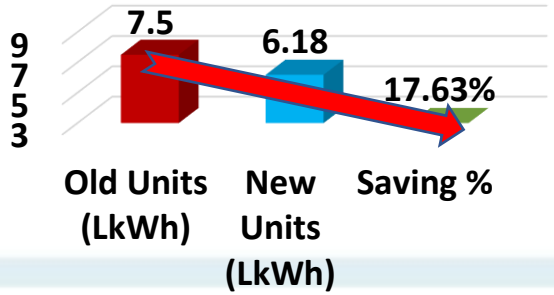
Trigger for implementing the project Energy conservation is paramount not because to save money but to save wasteful energy and reduce the loss by innovating through kaizens and experience. Running of inductive motors besides whole lot of UPS in big tertiary care hospital consumes a lot of energy besides giving losses in the system both on load as well as on no load hence optimum utilization is the need of the hour. Thus triggered to save on energy triggered to do this innovative project for good.

why innovative: With Disconnection of 2x80 KVA & 2X20 KVA UPS & given supply through main central UPS ------ Few UPS were in use for ICU supply through ATS IN NEW BLOCK , Since load on these UPS were only 20% , HENCE DECIDED TO SHUT THEM BY SHIFTING THE LOAD ON Central UPS making it an innovative project.

Cost Benefit Analysis

Energy Savings	132250kWh
Cost Savings	INR 10.91Lakhs
Investment	Nil
Payback	Immediately

Power Consumption Analysis



Replication Potential :- Yes

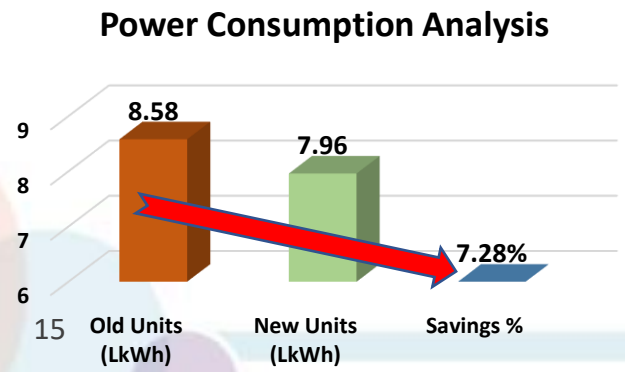
Innovative Project (2)

Primary pumps stoppage

Statement: Primary pump was delivering extra flow because it runs in series with Secondary pumps and Bypass line is fully closed. The design of HVAC pumping system was such that both Primary and Secondary pumps were put in use while Chillers were in use. But it was observed that when One Chiller remained in operation the required GPM were available even without running Primary pumps that is Secondary pumps were sufficient to make up the pressure. Hence stopped the Primary pump operation when Single chiller was in use. Whenever all 5 secondary pumps run they extract higher water through the system as they are fixed in line pumps.

Trigger for implementing the project This Innovation came up while evaluating the efficiency of chiller functioning during that time the Energy team made this observation and immediately the trigger was put across to OEM for confirmation and stopped the [Primary Pump of 7.5 Kw motor which resulted in huge Energy savings.

Why innovative: HVAC primary pump stoppage :Wasteful operation of primary pump stopped making it innovative . It was observed that Primary pump is delivering extra flow because it is running in series with the secondary pumps return line. Whenever all 5 secondary pumps run they extract higher water through the system as they are fixed inline pumps. and hence the required pressure was attained without running the primary pump required to feed chiller requirement.



Cost Benefit Analysis

Energy Savings	62500kWh
Cost Savings	INR 5.50Lakhs
Investment	Nil
Payback	Immediately

Replication Potential :- Yes

Energy Savings Project Implemented in 2023-24

BMS Operations

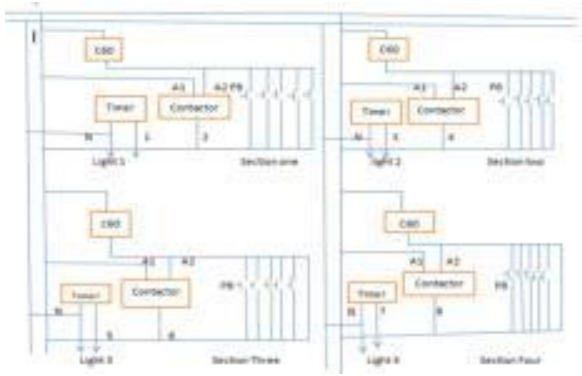
LED Lights

VSD Chiller

HVAC Primary Pump Stoppage

Energy efficient gearless elevators

Disconnection of 2x80KVA & 2X20 KVA UPS's



Emergency lights on UPS to remain switched off , only to be on during power outage

AHU with VFD

All Projects have Replication Potential

Savings of 5.82LkWh Power Units & 415MT CO2e

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LIST OF ENERGY CONSERVATION PROJECTS IN 2023-24

Projects	Annual Electrical Saving (KWH)	Electrical Savings (kW)	Annual Electrical Cost Saving (Rs million)	Total Annual Savings (Rs million)	Investment Made (Rs million)	Payback (Months)	CO2e Reduction (MT)
VSD Chiller	98725	25	0.9	0.9	14	186.67	80.95
AHU with VFD	92500	16	0.82	0.82	5	73.17	75.85
BMS Operations	42500	18	0.38	0.38	0	0	34.85
LED Lights	65840	20	0.58	0.58	0.6	12.41	53.99
HVAC Primary Pump Stoppage	62500	50	0.55	0.55	0	0	51.25
Emergency lights on UPS to remain switched off , only to be on during power outage	20000	10	0.18	0.18	0	0	16.40
Disconnection of 2x80 KVA & 2X20 KVA UPS & given supply through main central UPS	132250	40	1.16	1.16	0	0	108.45
Energy efficient gearless elevators	67880	6	0.59	0.59	7	142.37	55.66
	582195	**185**	**5.16**	**5.16**	**26.6**	**414.62**	**477.40**

These projects have been replicated in other units

LIST OF ENERGY CONSERVATION PROJECTS IN 2021-2023

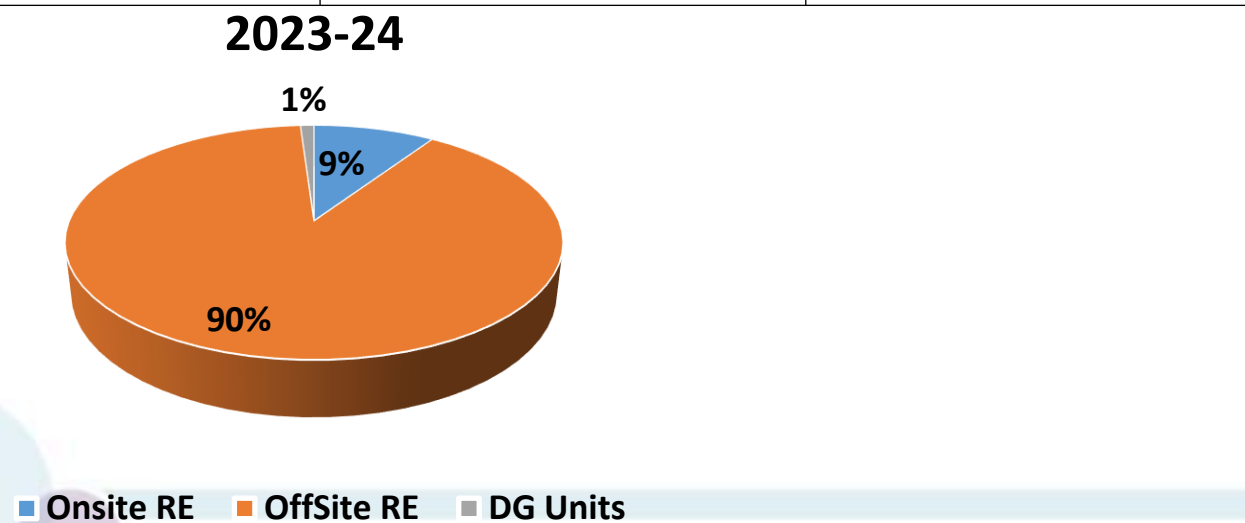
Sr. No	Title of Project	Year	Investment Made (Rs million)	Annual Savings (Rs million)	Payback (Months)	CO2e Reduction (MT)
1	Cooling Towers Approach based Automated operations	2022-23	1.025	0.624	17.20	62
2	Condenser Pumps with VFD	2022-23	1.05	0.25	88.80	25
3	Synchronized Elevators Operations	2022-23	7.25	1.153	75.26	112
4	RO Reject Water Reusage	2022-23	0	1.254	0.00	15
5	VFD operated Energy Efficient OT AHU's	2022-23	2.00	0.916	26.23	91
6	Conversion of old CPU's with Laptops and thin power saving CPU	2022-23	3.5	0.161	260.87	16
7	Timers for water coolers	2022-23	0.05	0.086	6.98	8
8	Energy efficient gearless elevators	2021-22	6.5	0.56	145	56
9	Disconnection of 2x80 KVA & 2X20 Kva UPS & given supply through main central UPS	2021-22	0	1.09	0	108
10	Trauma & Vascular OTs chilled water supplies routed through main pump	2021-22	0.15	0.33	11	33
11	Harnessed fresh air usage in winters for ICU, OT's and Patient rooms thereby chiller running was reduced	2021-22	0.1	0.99	1	99
12	5 no's VFD Operated AHU's	2021-22	3	0.45	55	44
13	Solar PV Panels for Parking (2nd Phase)	2021-22	5	0.74	81	74
14	Ahu replaced with EC fans 1 no's for power savings	2021-22	1.5	0.16	44	16
15	Optimized electrical supply by switching off alternate lights /emergency lights, motion sensors in office areas, washrooms	2021-22	0.1	0.08	15	8
16	LED for new areas as well	2021-22	0.3	0.17	3	17
17	Mercury free hospital	2021-22	0.7	0	0	0

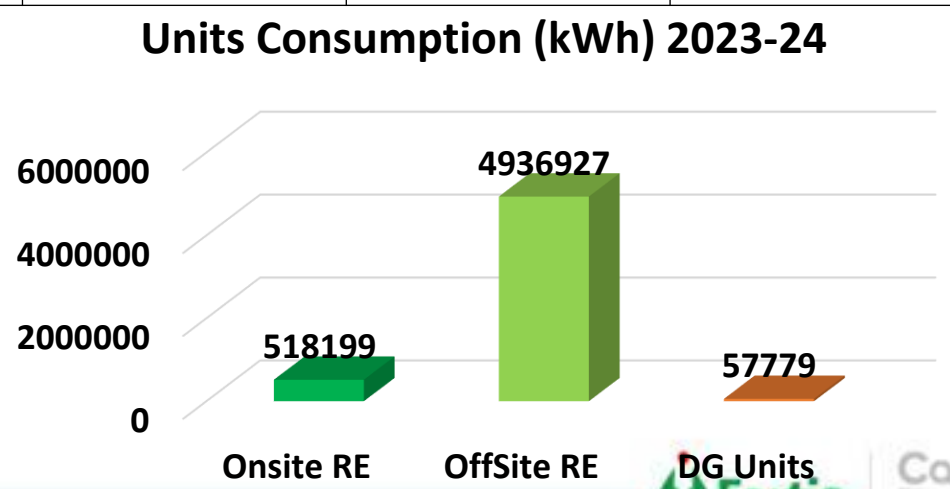
These projects have been replicated in other units

UTILISATION OF RENEWABLE ENERGY SOURCES

Technology (Electrical)	Type of Energy	Onsite Solar PV Panels Installed Capacity (Kw)	Onsite Generation (LkWh)	Offsite Energy (RE) Purchased	Total Renewal Energy (LkWh)	% of Overall electrical Energy	Technology (Electrical)
2021-22	Renewal Energy	480kW	5.99	0	5.99	11.04%	2021-22
2022-23	Renewal Energy	480kW	5.92	27.26	33.18	61.40%	2022-23
2023-24	Renewal Energy	480kW	5.18	49.37	54.55	98.95%	2023-24

Technology (Thermal)	Type of Energy	Onsite/Offsite	Installed Capacity (kCal)	Usage (LCal)	% of Hot Water Usage
2021-22	Solar Water Heater	Onsite	8000	22.18	75%
2022-23	Solar Water Heater	Onsite	8000	22.76	76%
2020-21	Solar Water Heater	Onsite	8000	22.21	75%



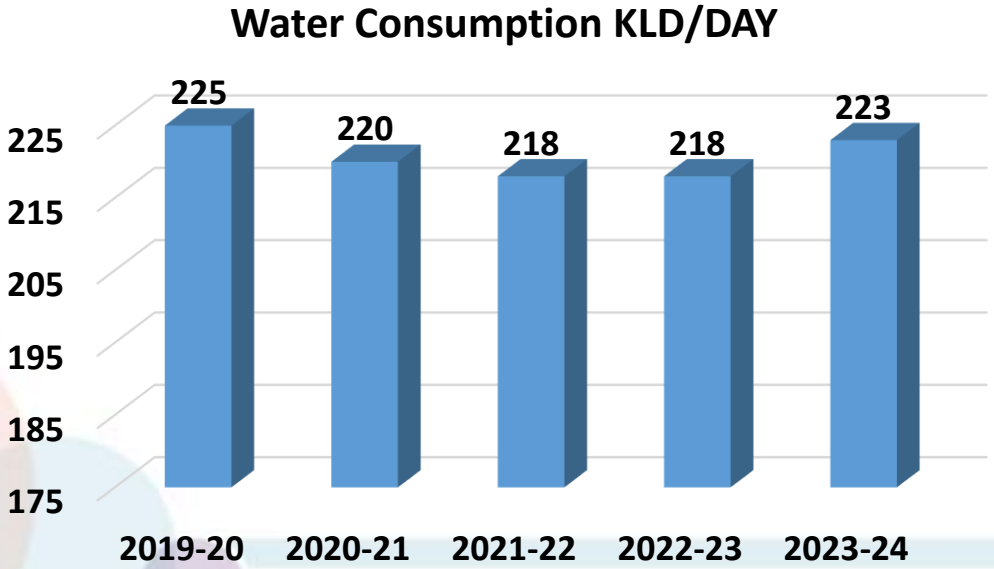


Water Management

- Apply fresh water use reduction measures at FHM
- Improve water use performance
- Implement/manage water efficient landscaping systems
- Improve cooling tower water management performance
- Implement innovative water technologies for water efficiency improvement.

Water use reduction by efficient fixtures

550KLD Sewage treatment plant



System level Water Metering facility

Rain Water Harvesting Pits

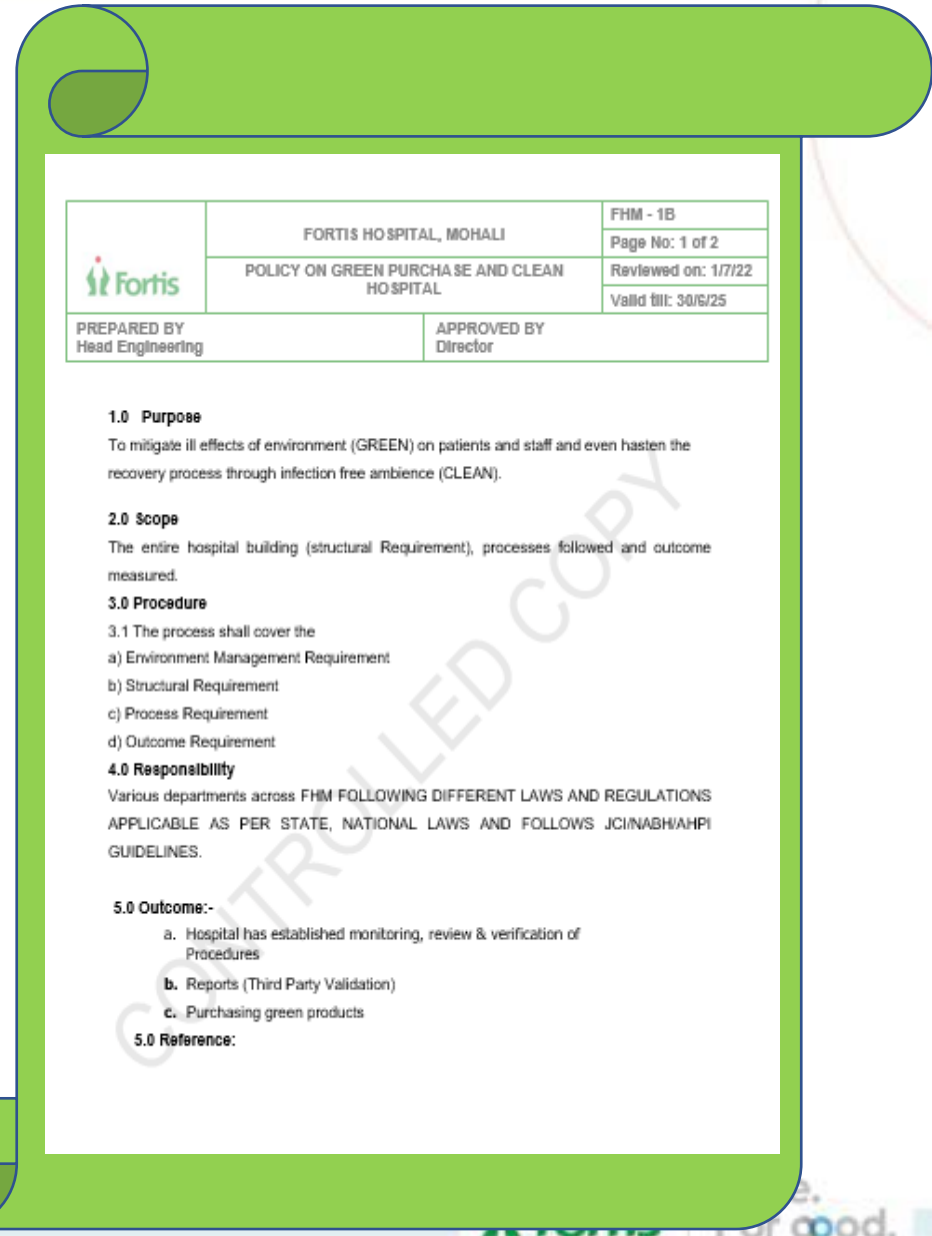
GHG Inventorisation

Fortis Mohali is committed to GHG reduction not only by reduction of its own facilities but also creating Benchmarks for Indian Buildings as Smart Building.

Fortis Mohali Every year allocates Budget for Energy Efficiency program as a corporate initiative and allocate the budget based on Global competition, any project below 5years of pay back qualifies for it, This year Fortis Mohall has allocated approx. 26.6 Million INR for this program Globally.

2023-24 Project was part of the same corporate budgeting program.

Reduction of 2214tCO2e tons from 2019 till 2024.



Fortis	FORTIS HOSPITAL, MOHALI	FHM - 1B
		Page No: 1 of 2
	POLICY ON GREEN PURCHASE AND CLEAN HOSPITAL	Reviewed on: 1/7/22
		Valid till: 30/6/25
PREPARED BY Head Engineering		APPROVED BY Director

1.0 Purpose

To mitigate ill effects of environment (GREEN) on patients and staff and even hasten the recovery process through infection free ambience (CLEAN).

2.0 Scope

The entire hospital building (structural Requirement), processes followed and outcome measured.

3.0 Procedure

3.1 The process shall cover the

a) Environment Management Requirement

b) Structural Requirement

c) Process Requirement

d) Outcome Requirement

4.0 Responsibility

Various departments across FHM FOLLOWING DIFFERENT LAWS AND REGULATIONS APPLICABLE AS PER STATE, NATIONAL LAWS AND FOLLOWS JCI/NABH/AHPI GUIDELINES.

5.0 Outcome:-

a. Hospital has established monitoring, review & verification of Procedures

b. Reports (Third Party Validation)

c. Purchasing green products

5.0 Reference:

CONTROLLED COPY

Sources of Emission at FHM

Direct Emission

Scope 1

- Fuel emission from Boilers
- Fuel emission from DG set
- Fuel emission from Fire drill
- Emission from Fire extinguishers
- Emission from Air conditioners & refrigerators

Energy Indirect Emission

Scope 2

- Emission from Electricity usage
- Emission from RE (as per ACI guideline)

Other Indirect Emission

Scope 3

- Fuel emission from Patients and their attendants vehicles.
- Emission from employee daily commute
- Emission from employee business travel
- Electricity emission by concessionaires

Green Supply Chain

a. Information on Projects implemented- **Our Housekeeping cleaning Agents & Card Board and Wooden Packing Boxes are purchased from identified vendor who manufactures with Recycled material.**

b. Information on Evaluation done- **Different vendors were evaluated and manufacturing processes and materials used were certified by FHM as per FHM standard before giving clearance for the Boxes.**

c. Information on Benefits achieved- **50% reduction in cost and contribution to green initiative by the company.**

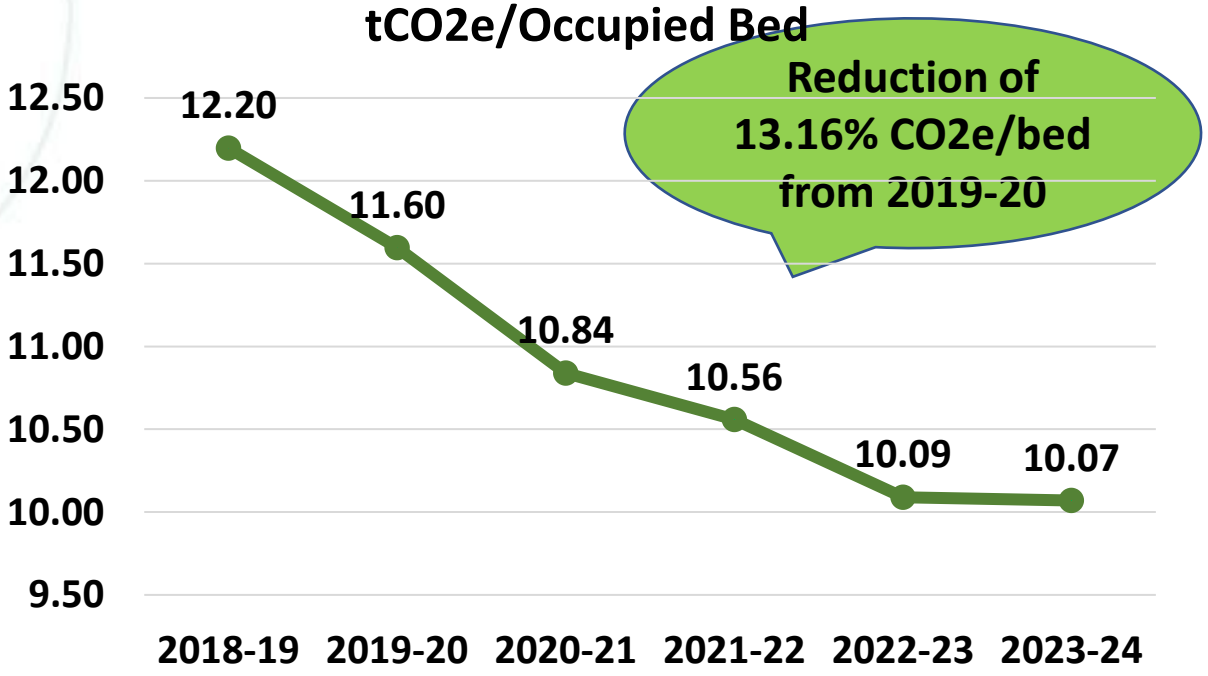
Use of 100% LED lights in entire complex

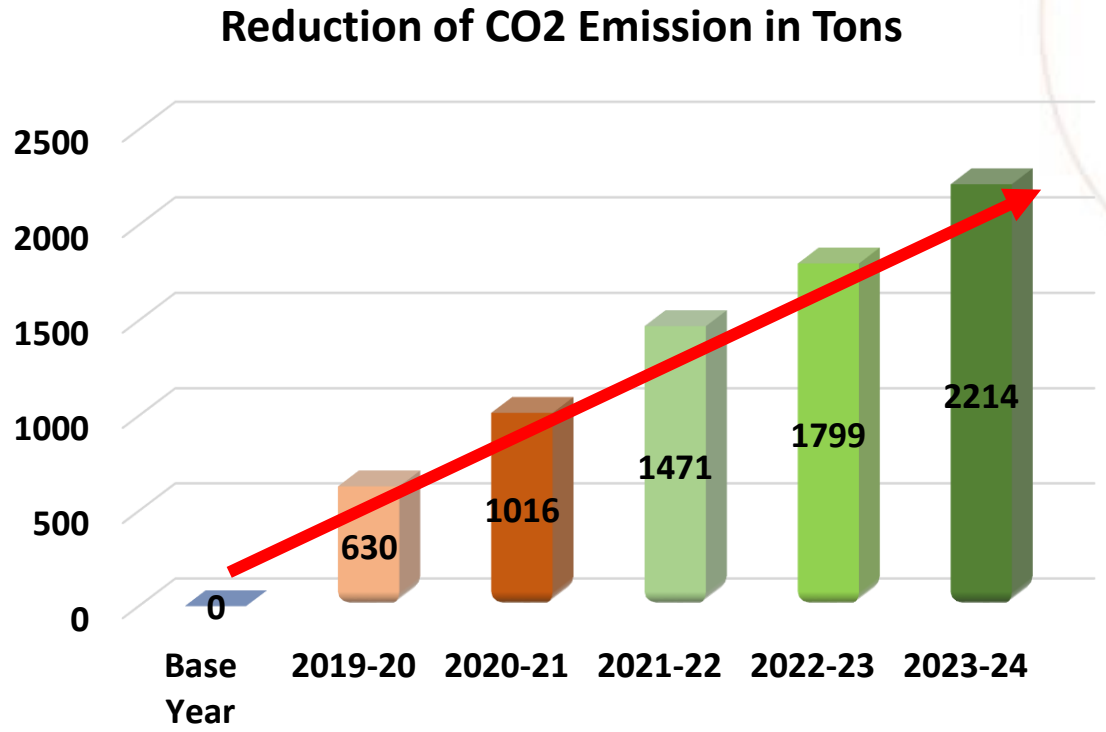
Minimize exposure of building occupants and cleaning personnel to potentially hazardous chemical, biological and particulate contaminants

Our Green chillers provide air conditioning comfort with lowest electrical energy

Segregation of dry and wet garbage at kitchen
Wet garbage 100% recycling through AGA for piggery

Carbon Footprint Reduction





What changed in 3 years ?

Reduction of 13.16% CO2e/bed from 2019-20	Reduction of 2214 tCO2e from 2019-20

Reference IFHE : International Federation of Hospital Engineering 2013

CO2e Calculation for EB units from Central Electricity Authority of India (0.82kg/unit)

CO2e Calculation for PNG from www.epa.Gov/energy/greenhouses (1.95mtCO2/SCM)

CO2e Calculation for HSD from ecoscore.be (2.64kg/litre)

Towards Carbon Positive Hospital

Renewable Energy Harnessing

- Solar Energy
- Solar Water Heater
- Rain Water Harvesting
- STP water for Gardening

Awareness and Training

- Energy Cell
- Daily monitoring
- Trainings
- Energy Audits
- Suggestions and implementations

Technical Intervention

- Efficient Water Cooler Chillers
- Energy efficient Pump and Motors
- LED Lightings

Efficiency Improvement

- Benchmarking
- Auditing
- Monitoring
- Analyzing
- Improving

Environmental Monitoring

FHM strives to maintain healthy indoor air Quality.

- **3rd party air quality check** is done at regular intervals.
- Co2 sensors installed in return ducts of all AHUs & automatic fresh air intake when value crosses set parameters.
- Portable Co2 meters used to check Co2 level in all offices & crowdy areas multiple times in a day
- In FY2023-24, **UV lamps being installed in all AHUs** to upgrade the quality of indoor air.

Sr. no.	Parameters	Results	Standard	Test Method
1	Suspended Particulate Meter(PM)	6.8µg/m³	_____	IS:5182(P-23):2006 Reaff. 2017
2	Respirable Suspended Particular Meter (PM10)	71.2	100.0µg/m³	IS:5182(P-23):2006 Reaff. 2017
3	Sulphur Dioxide (SO2)	6.3	80.0µg/m³	IS:5182(P-2):1999 Reaff. 2001
4	Nitrogen dioxide (NO2)	20.4	80.0µg/m³	IS:5182(P-6):2006 Reaff. 2017
5	Fine Particulate matter (PM2.5)	37.3	60.0µg/m³	SOP (ETL/SOP/02-Section-4):2015
6	CO	ND	2.0µg/m³	IS:5182 (P-10)
7	Lead (pb)	ND	1.0µg/m³	Lab. SOP (BY AAS)
8	Ozone (O3)	ND	100.0µg/m³	CPCB Guideline

Rich landscape of Greenery is maintained, which further upgrades the air quality & gives a feel- good attitude to all stakeholder

Update on Net Zero Hospital Plan

Energy Conservation & Efficiency	Continuous focus on conservation & efficiency through System based approach, Life cycle cost approach
Develop Green Infrastructures	FHM has developed green building policy and framework
Use of renewable energy	FHM working on various initiatives for use of 100% renewal energy
Operational Excellence	Regularly monitoring Patients and their attendants occupancy Time
Hospital Programs	FHM is now working on PNG for DG sets instead of HSD
GHG Management & ACA	Working on various initiatives related to decarbonization

Achieve "net zero carbon emission Hospital" by 2030

Net Zero Carbon Emission Hospital by 2030

- **Energy Conservation & Efficiency**
- **Develop Green Infrastructures**
- **Use of renewable energy**
- **Operational Excellence**
- **Healthcare Programs**
- **Low Carbon foot prints**
- **Reduce Bio-medical waste**
- **GHG Management & ACA**

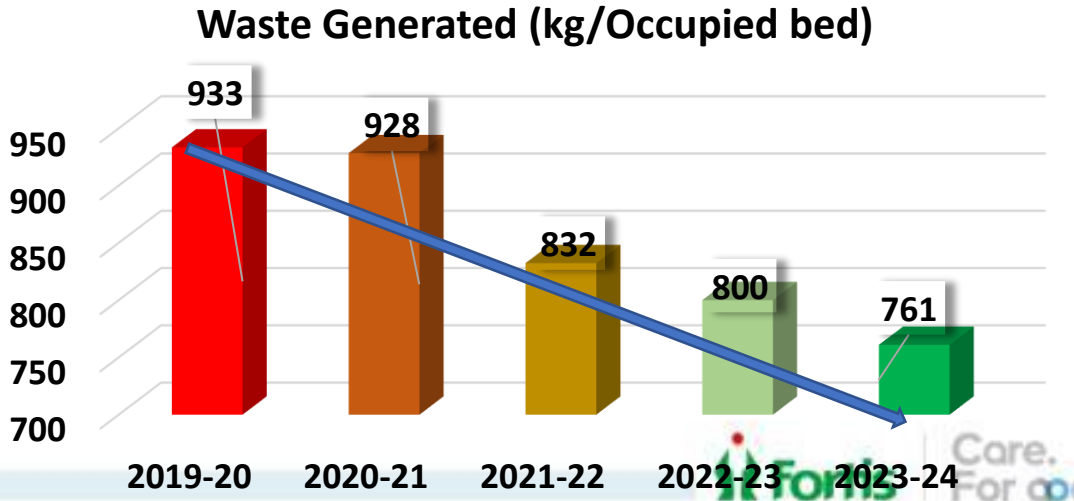
Waste Utilization and Management

- **We believe in "waste to wealth" and we adapted the system of segregation and recycling since beginning.**
- Paper & Carton boxes, Oils & Food/canteen waste is handled by FHM Facility Management Services and sold to scrap dealers.
- Horticulture waste is composted by us onsite.
- Electronic waste, Metal waste & some paper waste is sell to the authorized vendors.
- Old PCs, UPS, Converters, chairs, etc are given to desirous employees/sell to the PPCB authorized vendors.
- FHM is Zero Discharge Building. Storm water goes to RWH.
- Waste water is treated using MBR technology and 100% of the treated water is used for irrigation, flushing and AC cooling tower top-up.

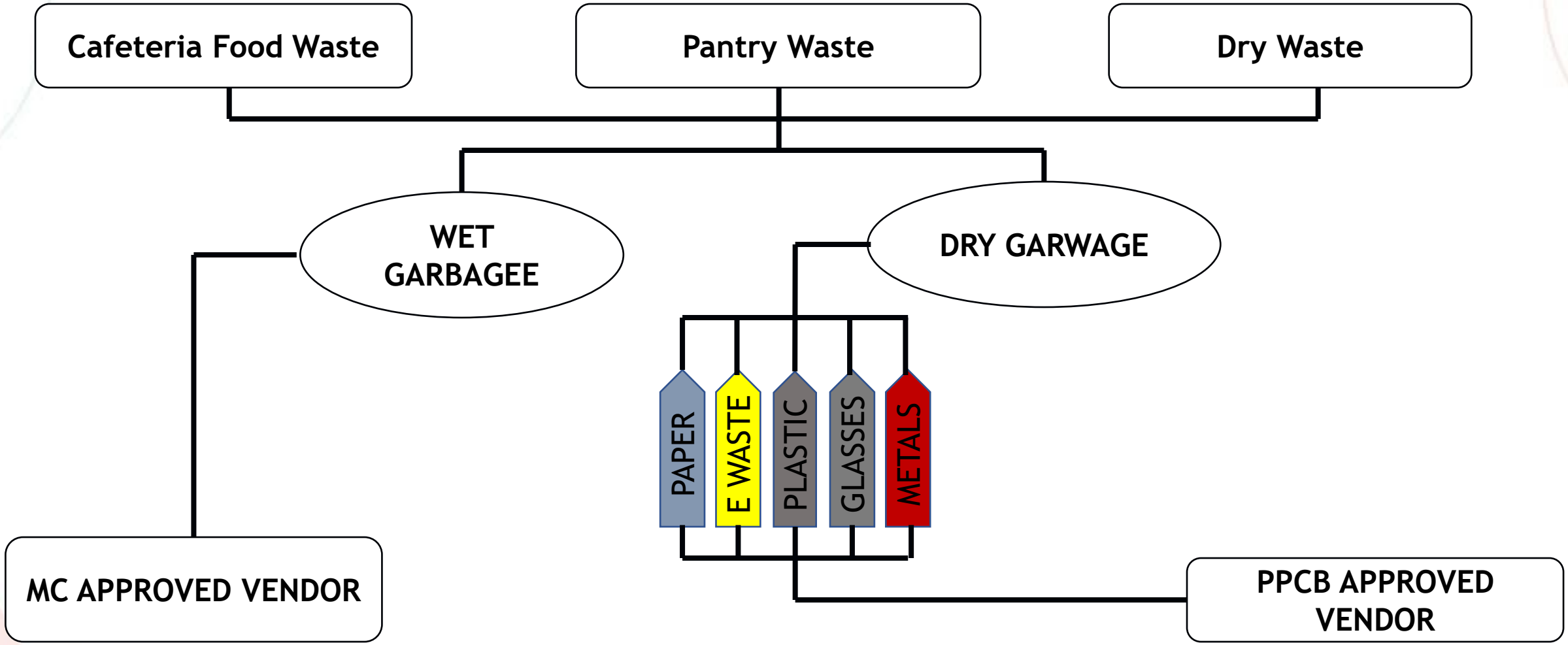
STP/ETP PLANT

DRY AND WET GARBAGE FROM KITCHEN

BMW collection buckets



Education imparted to Patients, Attendants, vendors & associates segregation of waste to minimize land pollution



Why is ESG relevant for healthcare?

If the health sector were a country, it would be **the fifth-largest emitter** on the planet!

- **Healthcare's climate footprint is equivalent to 4.4% of global net emissions (2 gigatons of carbon dioxide equivalent).**
- **Fossil fuel consumption is at the heart of healthcare's emissions**. Emissions emanating directly from health care facilities & owned vehicles **(Scope 1) make up 17%** of the sector's worldwide footprint. Indirect emissions from purchased energy sources **(Scope 2) comprise another 12%.**

ENERGY MANAGEMENT

- Hospitals are highly energy-intensive, **using 2.5 times more energy per square foot than an office building.**
- A **30% cut** in health care electricity's carbon pollution by 2030 would reduce Green house gas emissions– **preventing** an estimated **4,130 premature deaths, 85,000 asthma attacks, 4 million respiratory symptom events, 3,750 hospital visit** incidents

WASTE AND BIO-HAZARDOUS WASTE MANAGEMENT

- Globally, hospitals produce an average of **13.6 kg of waste per patient per day.**

Fortis Care. For good.

Energy excellence frame work-FHM

Energy management structure

+

Total Employee Involvement

+

Monitoring and review systems

+

Energy Audits

+

Bench Marking

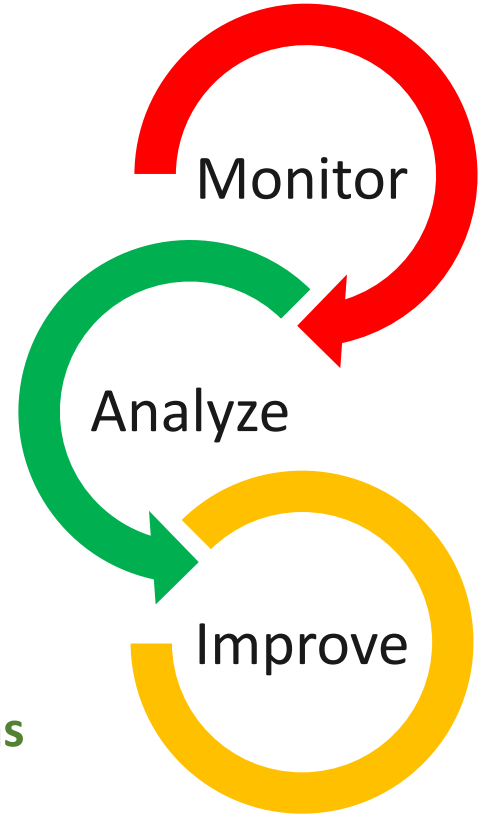
+

Energy management planning

+

Energy Efficient Equipment's

Energy excellence

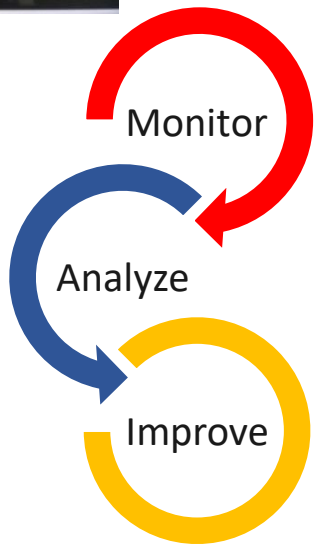


ESG: FHM has been given specially budget under ESG and Rs 37 Lakhs has been allocated for Energy Conservation FY 24

Energy Measurement, Monitoring & Reporting

- Dedicated energy Meters for all the panels
- Separate energy meters for lighting, HVAC
- All the Tenants have separate energy meter.

- All the energy meters are linked to BMS for energy monitoring.
- Record of daily energy meter recording
- Annual calibration of all energy meters.
- Carry out variance analysis of energy.



- Monthly review of energy balancing by energy Management Cell

Energy Performance Review

Continuous Monitoring → Daily Report Generation → Weekly Review by Chief Engineer → Monthly Review By GM-Operations → Quarterly Review by Zonal Director

ENCON – O&M BEST PRACTICES

- Set point of chillers are manually controlled based on ambient condition.
- Automatic Scheduling for AHUs and Ventilation fans.
- De-scaling of Water Cooled condenser tube and cleaning of Air Cooled condensers.
- Chemical Treatment for make up water
- Cleaning of Air Filters in AHUs and FCUs.
- Timers & Motion sensors for external & Corridors Lighting
- Reporting of carbon emission to CDP
- Mapping & reduction of carbon emission as per ACA
- Use of automated building Management System
- Use of renewal energy for day to day operations

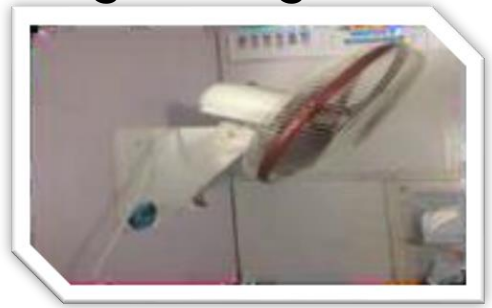
Kaizen Initiatives by in-house Technicians & Supervisors Team

Timer Controller for peripheral lighting

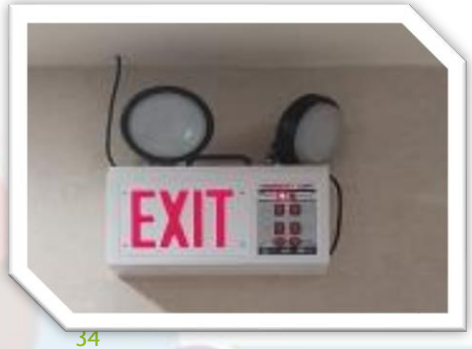
Motion Sensor for corridors

Limit Switch for Air curtains and Fire shaft Door

Damaged pedestal fan converted into wall mounted fan in engineering Area



Battery Operated Emergency lights in Corridors/stairs

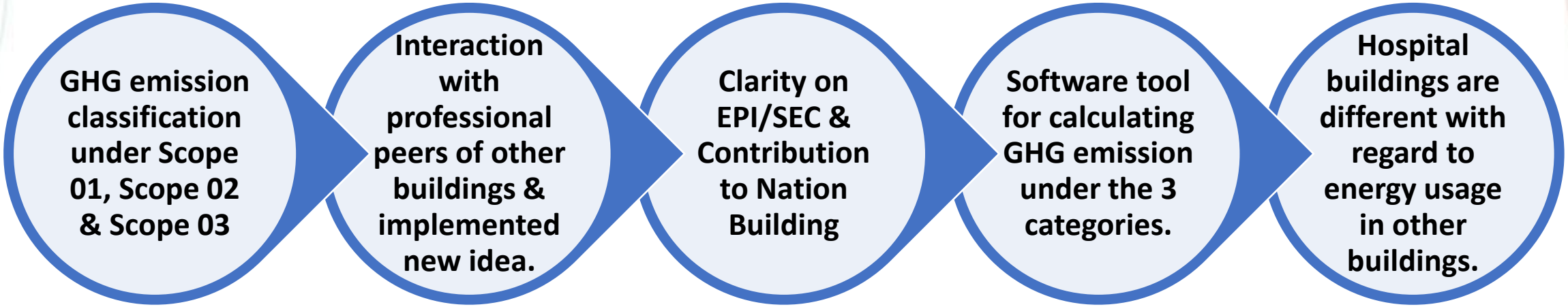


Auto Operation of DG Fresh Air/Exhaust fans

Conventional lights replacement with LED

Modification in ducts for Two OT's ran with one AHU

Learning from CII Energy Award programs



Implementation of ISO 50001

ISO 50001 Implementation WIP

0.05% investment of energy saving projects on total turnover of the company

COMMUNITY & NEIGHBORHOOD BENEFIT PROGRAMS

- School Buddies Program (Trainings for fire safety & Electrical safety)
- Taken park adjacent to hospital and maintaining with STP treated water
- Safety Trainings to staff on protocols with creation of negative pressure OT's
- Trainings given to staff on Electrical safety, fire safety & Hand Hygiene
- Maintaining round about with STP treated water.
- FHM Top management committee involved in planting of trees in Hospital premises on world environment day
- Sharing of best practices among the industries
- Implementation of R&R scheme for energy & water conservation project.
- Training /awareness for contract labour/Office staff on energy conservation.

Long Term Vision On Energy Efficiency

- We aim at bringing down our SEC of 111 to double digit figure in the future.
- Zero CFC gas emissions from any system at the facility.
- Maximum clean Energy use at the facility through renewables
- 100% recycling of paper and plastic waste.
- Accreditation from IGBC/ISO50001, BEE, AHPI etc.

SUPPORT NEEDED:

Technical:

Further hiring the right consultants for other Energy conservation activities at the facility in any form (Building construction, resource conservation etc.).

Financial support:

The investment, Par of the monetary Energy saving is given to FHM that is further used for sustainable activities at the hospital

Supplier Engagement:

Need consultant for IGBC/ISO50001 certification

Energy managers and technical support available for FHM

ENCON EFFORTS: Key Impact

Area	Key Impact
Energy Efficiency	• 4.64 % KWh/occupied bed reduction achieved in last 3 years
Water Conservation	• 4.70 % reduction/occupied bed in last 3 years
GHG Reduction	• 4.64% Reduction in GHG Emission since last 3 years
Waste Management	• 100% Kitchen waste being used to make manure
Green Supply Chain	• Environment friendly HK/Cleaning agents & Chem.
Others	• Started use of Eco friendly HK chemical and paint

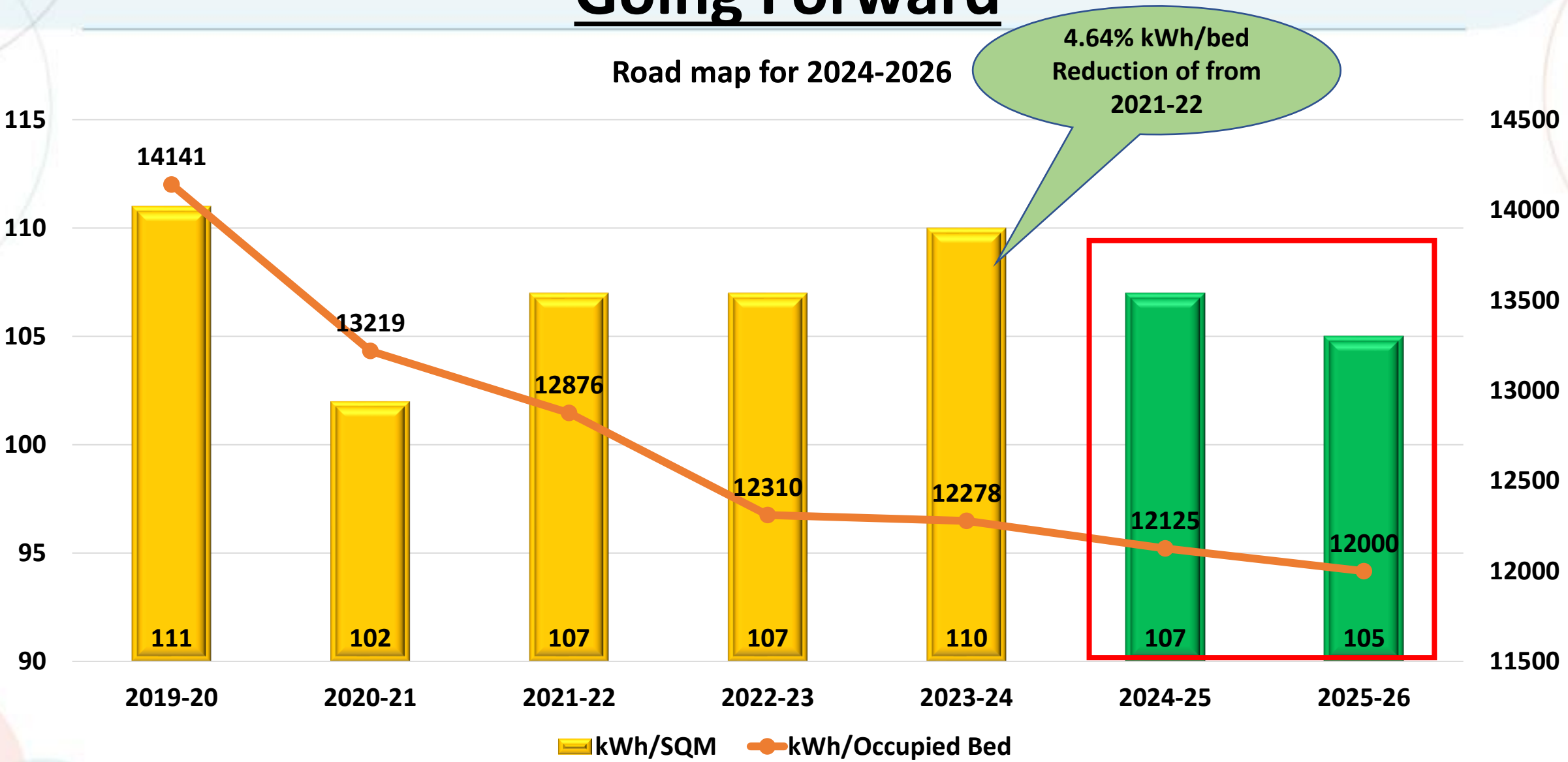
Special Focus on Reduction of “Energy” and “Water” Consumption

Globally Green: Healthcare

BEST PRACTICES FOLLOWED

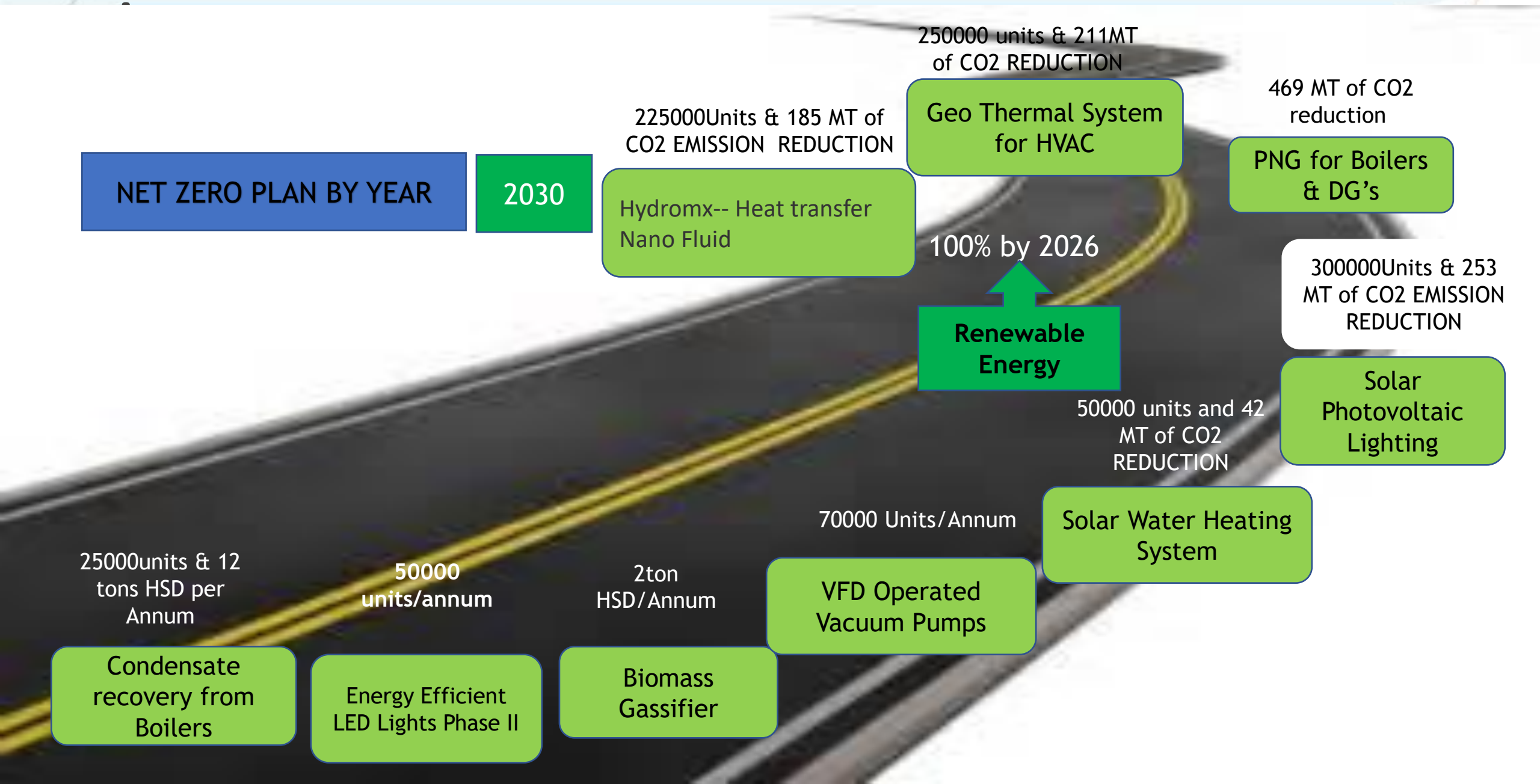
- ❑ Natural lighting in patient areas
- ❑ Green house keeping
- ❑ Better Indoor Air Quality
- ❑ Sound Reduction
- ❑ Mercury free hospital
- ❑ 5-10% Energy savings
- ❑ 5-10% water savings
- ❑ Good day lighting
- ❑ No sick building syndrome
- ❑ Faster patient recovery

Going Forward



Benchmarks 17762kWh/bed (By Bureau of Energy Efficiency, Govt. of India ECO-III Project)

ENCON Roadmap – Sustaining continual



FHM Awards & Recognition

AHPI Award for Quality Beyond Accreditation - 2019,2020, 2022, 2023

BEE NATIONAL ENERGY CONSERVATION AWARD 2015

State Energy Conservation Award PEDA- 2019, 2020

AHPI Award for Best Green Hospital- 2017,2019

AHPI Award for Nursing Excellence - 2019

Doc n Doc Gammex Saviour - Best Multispecialty Hospital - 2014

NABH Nursing Excellence- 2016,2020

Asia Pacific Hand Hygiene Excellence Award- 2015

Best Sustainable Hospital Project Award by HBII-MEDGATE - 2014

CII National award for Excellence in Energy Management- 2016, 2017,2019,2020,2022,2023

No. 1 Private Multispecialty Hospital in Chandigarh – The Week – Nielsen Best Hospitals Survey -2015

Pan Fortis Innovation Award - 2014

Indian Health & Wellness Awards 2016

Fortis Hospital, Mohali, wins CAHOtalks Video Competition on COVID-19 Management

Intel Embedded Challenge Award for Innovation in Industry (Catheter reprocessing) 2014