FORTIS HOSPITAL MOHALI, A MULTI SPECILITY HOSPITAL

CII 24th National Award for Excellence in Energy Management-2023

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BUILDING DETAILS

Total Plot Area	8.22acre
Built-up area	50336sqm
No of Beds	472
Operation Theatres	16
Incoming Electrical	2 Sources 11KVA
Generators	1250KVA *3nos
Transformer	2000KVA*2nos
Chiller Plant	433TR*4nos
UPS	200KVA *3nos(UPS are in parallel load with ATS), 120KVA *3Nos.
Fuel	PNG from AGL, HSD

- *Fortis Hospital Mohali Established 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 384(472) bedded, 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

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NATURAL ENERGY USAGE FOR LIGHTING

Fortis Hospital Mohali

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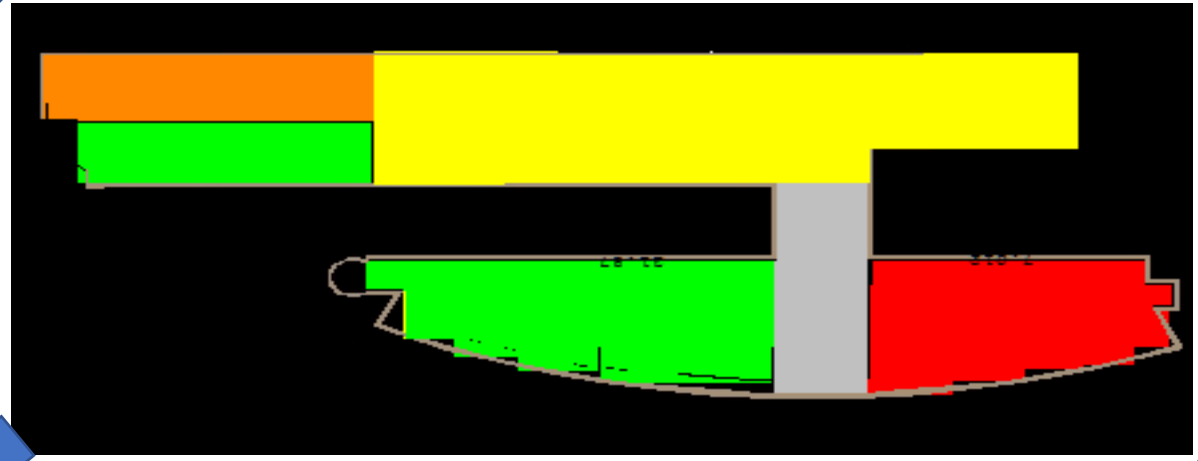


N

W

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

ARCHITECTURAL DETAILS OF FORTIS MOHALI WITH RESPECT TO ENERGY EFFICIENCY

Low window to wall ratio (WWR).It reduces the building cooling load.
As per ECBC 2007,WWR should not exceed 60% and preferred in between 40% to 60%.A building with higher WWR will transfer more heat than a building with lesser WWR

65% area have day-lighting. It reduces the artificial lighting requirement. It reduces 5% of energy consumption

Green Central court yard to reduce heat load of building. It reduces the energy consumption as well as feel good for patients

Solar PV panel installed on roof-top. It reduce cooling load. It reduces 0.5% to 0.75% energy consumption

Thermal Resistance glazing to reduces heat load of building. It reduce 2.5% to 3.5% of energy consumption.

Energy Efficiency Summary

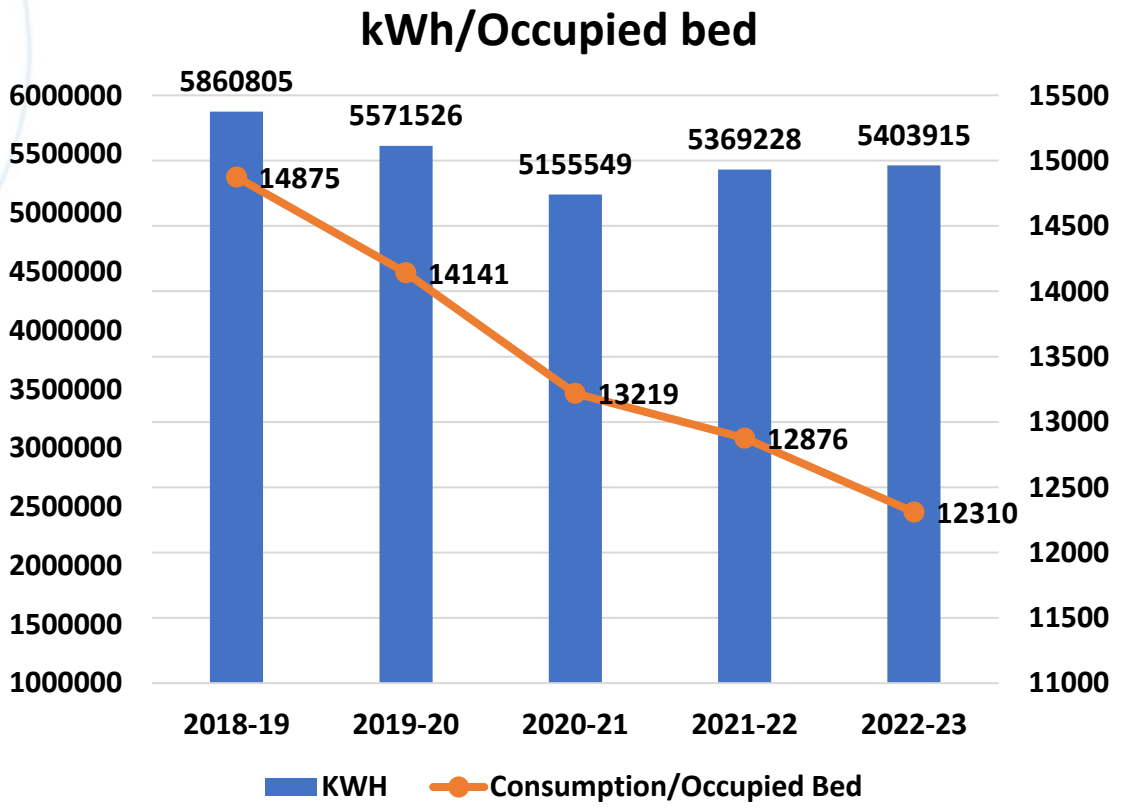
Description	2018-19	2019-20	2020-21	2021-22	2022-23	% Change 2018-19 vs 2022-23
Specific Electrical Energy Consumption (kWh/Sqm)	116	111	102	107	107	-7.76%
Average Occupancy	88%	88%	87%	93%	93%	5.68%
Bed capacity	448	448	448	448	472	5.36%
kWh/Occupied Bed	14875	14141	13219	12876	12310	-17.24%
Energy Consumption kWh in Lakhs	58.61	55.72	51.56	53.69	54.04	-7.79%
Energy Cost kWh in Lakhs	473.20	462.90	440.80	453.30	448.5	
Energy Saving Cost in Lakhs	31.3	10.30	22.10	-12.50	4.80	
Per unit cost in INR	8.07	8.31	8.55	8.44	8.30	

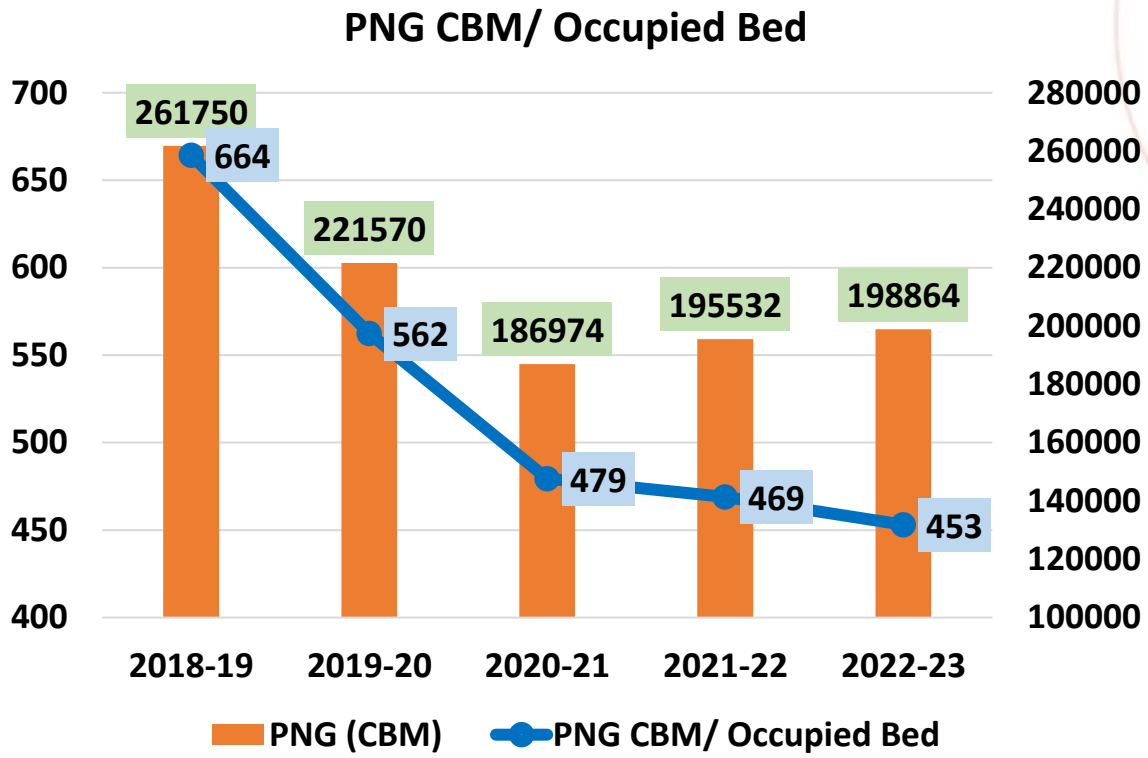
What changed during the last year?

In spite of patient Occupancy/Foot fall/ Equipment load increased by approx. 5.68 %, SEC reduces by 7.76%

The nearest Competitor SEC (Specific Energy Consumption) of Hospital buildings stands at 143 Kwh / Sqm

Sp. Energy Consumption (Electricity & Fuel)





What changed during the last year?

17.25% kWh/Occupied bed reduction compared to 2018-19

31.81% Fuel /occupied bed reduction compared to 2018-19

✓**Specific energy consumption (kWh/M2) has increased due to increased footfall/Equipment load, additional Dr. Chambers & increased OT numbers.**

FORTIS MOHALI ENERGY PERFORMANCE VS GLOBAL, NATIONAL & COMPETITION BENCHMARK

Fortis Mohali Kwh/sq.mtr	Competition Benchmark	BEE National Benchmark	Global Benchmark
107	113	200	205

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

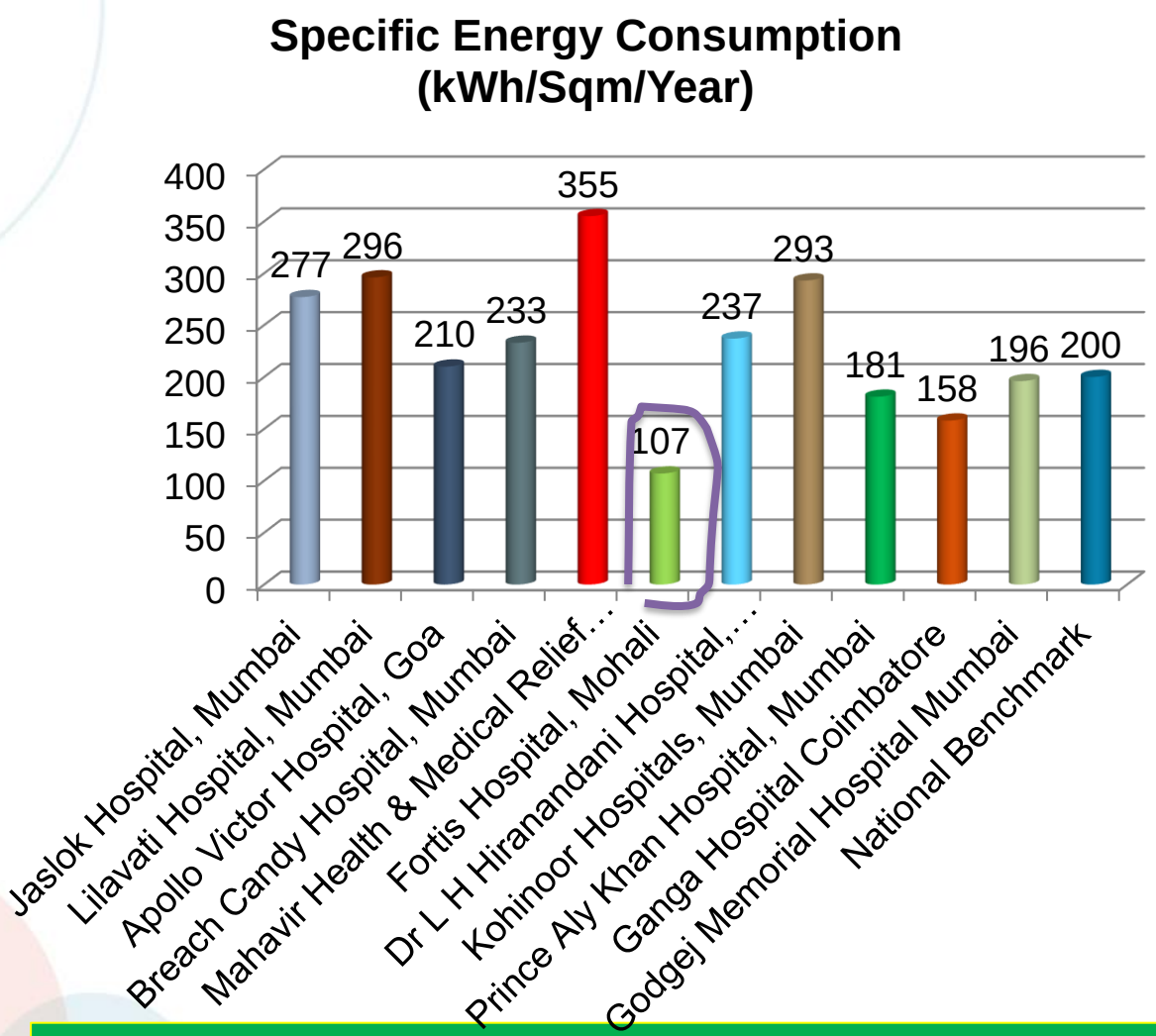
Specific Energy consumption of Fortis Mohali is 107 kwh/m2

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

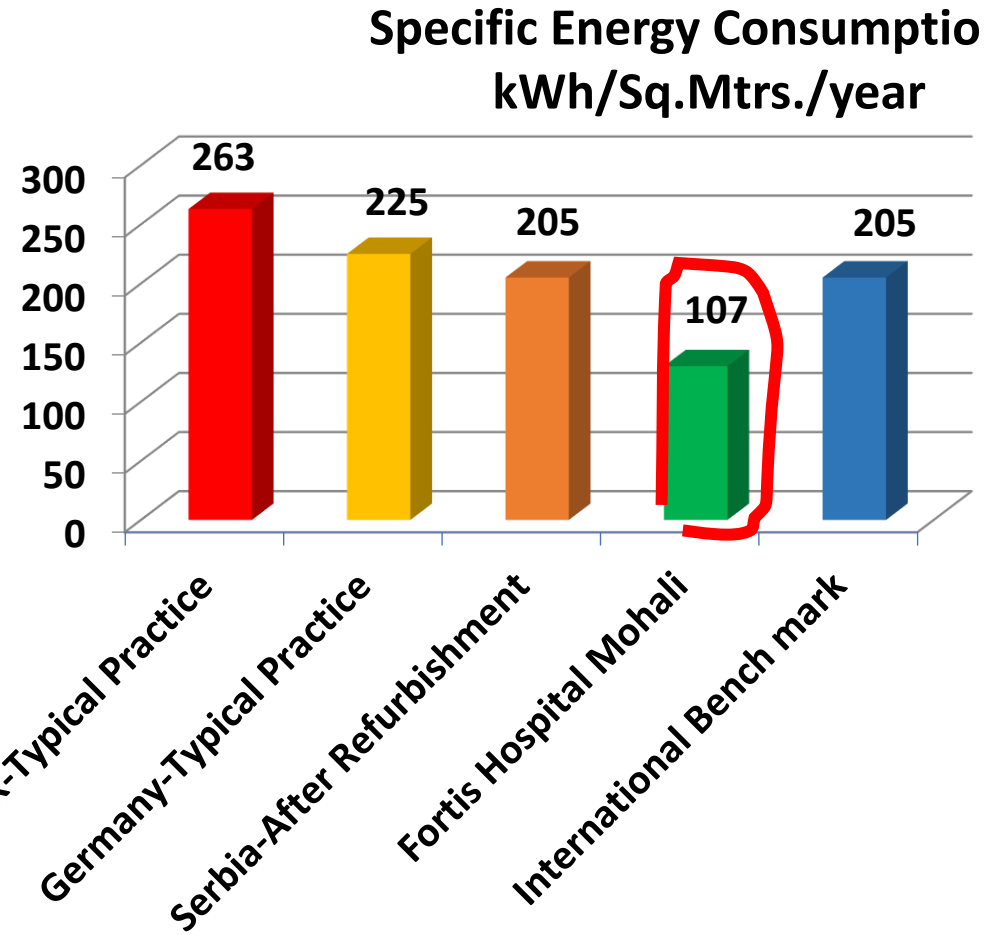
Specific Energy consumption of Fortis Mohali is 107 kwh/m2 which is 47.80 % below the global bench marking and 46.5% below the National Benchmark

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

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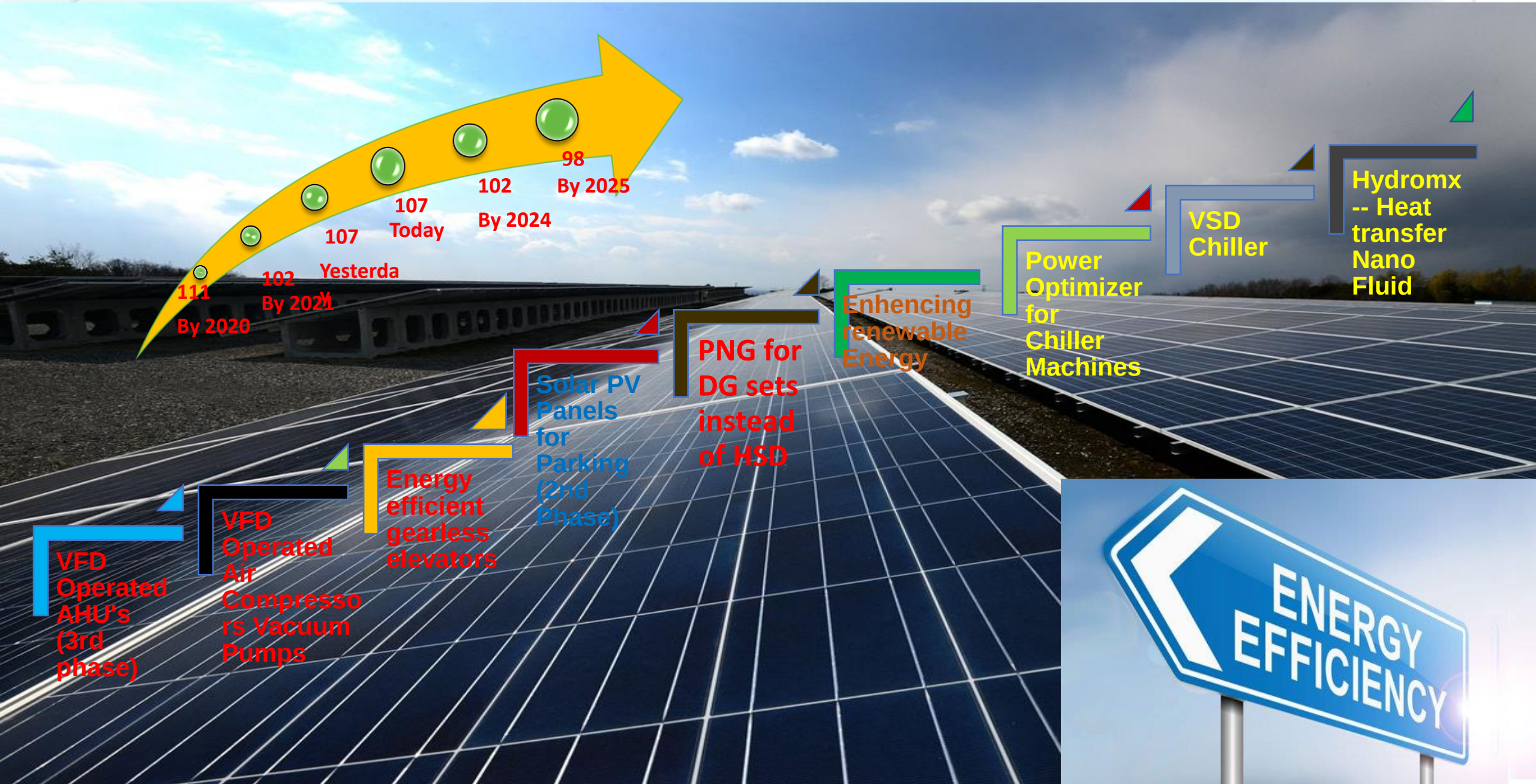
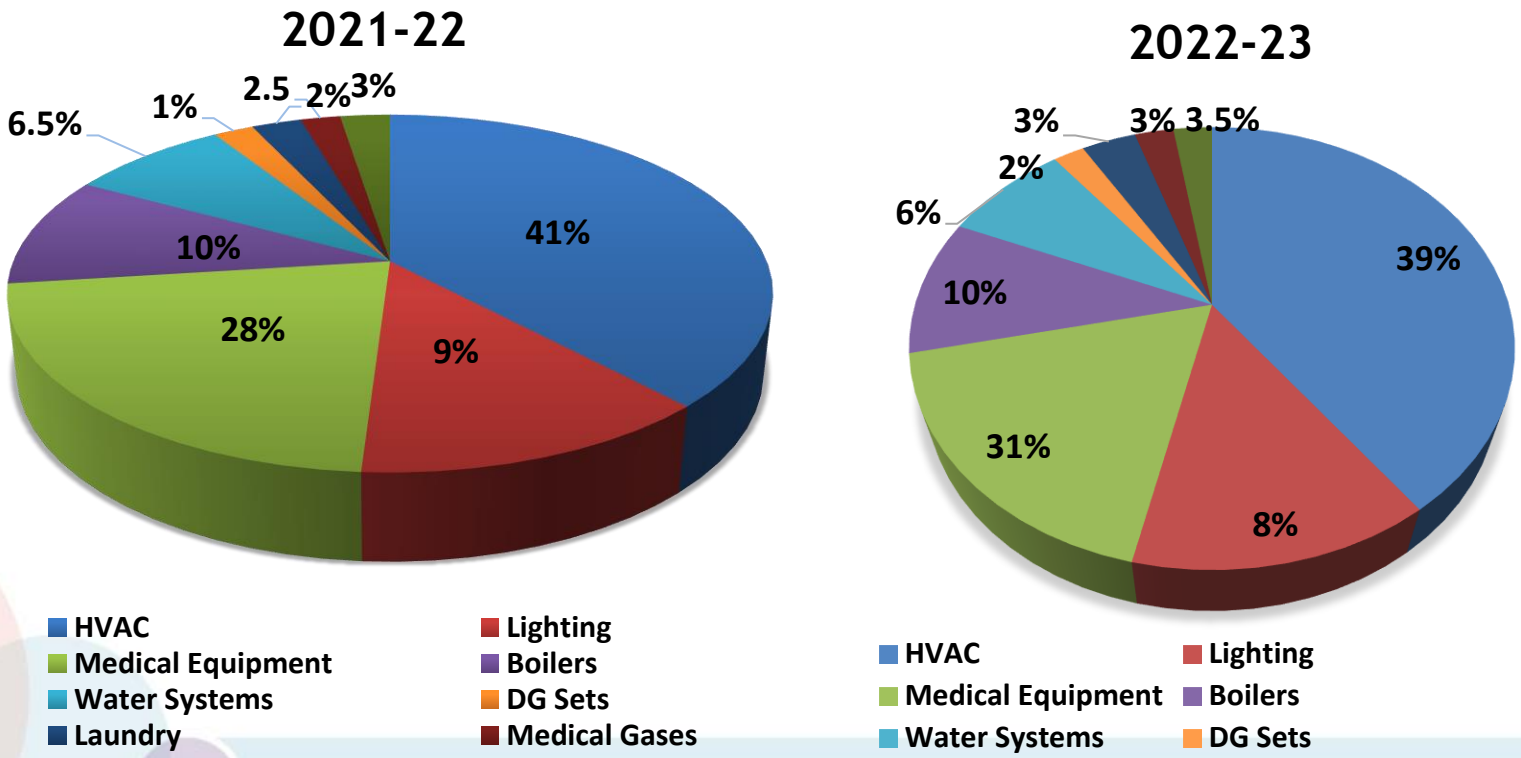
Roadmap for being Global Leader in Energy Efficiency….



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



Equipment	Avg. Consumption 2021-22	Avg. Consumption 2022-23
HVAC (heating, ventilation, & air conditioning)	41%	39%
Lighting	9%	8%
Medical Equipment	28%	31%
Boilers	9%	9%
Water Systems	6.5%	6%
DG Sets (Diesel generator)	1%	1%
Laundry	2.5%	3%
Medical Gases	2%	3%
STP (sewage treatment plant)	2%	2%

Our Encon Journey

1999

Best Design Award from American Institute of Architects

2020-21

1. Double skin AHU with VFD
2. Split AC's replaced with FCU's
3. Humidity controls in OT's
4. Creation of negative pressure OT/ICU's
5. Ensured 24X7 Operation of boilers on PNG instead of HSD
6. PC's will go to s… automatically

2021-22

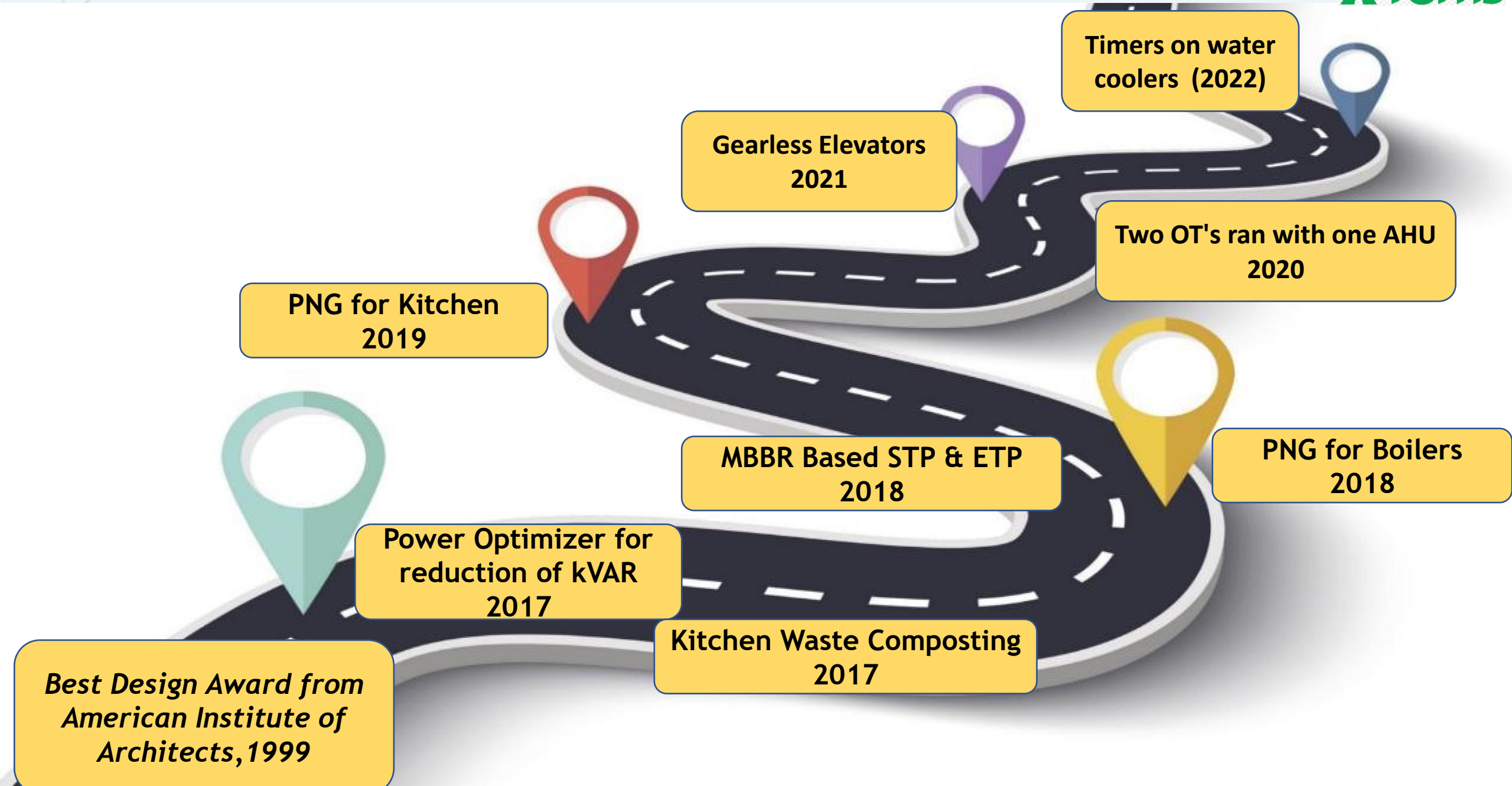
1. . Energy efficient gearless elevators
2. 5 no's VFD Operated AHU's
3. Solar PV Panels for Parking (2nd Phase)
4. Ahu replaced with EC fans
5. LED for new areas as well
6. Disconnection of 2x80 KVA & 2X20 KVA UPS

2022-23

1. Cooling Towers Approach based Automated operations
2. Condenser Pumps with VFD
3. Synchronized Elevators Operations
4. RO Reject Water Reusage
5. VFD operated Energy Efficient OT AHU's
6. Conversion of old CPU's with Laptops and thin power saving CPU
7. Timmers for water coolers

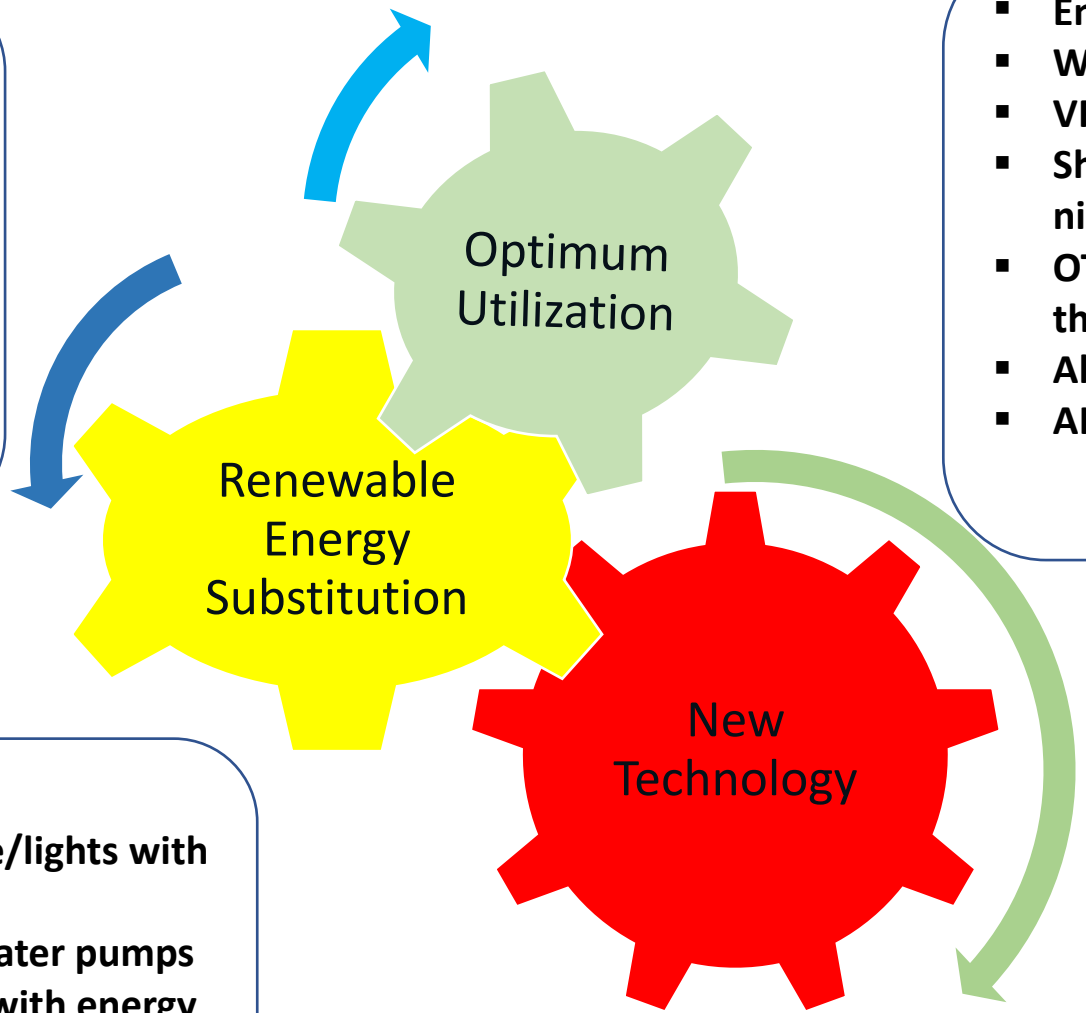
2019-20 EPI 111 → 2020-21 EPI 102 → 2021-22 EPI 107 → 2022-23 EPI 107 → BEE National Benchmark 200

FIRST OF ITS KIND PROJECTS IN HOSPITAL



ENERGY CONSERVATION PROJECTS

- Solar Photovoltaic Lighting
- PNG for Boilers
- Hot Water generation through Solar water heater system
- Water conservation
- STP Modification with UV/UF
- LED for new areas as well
- PNG for Kitchen

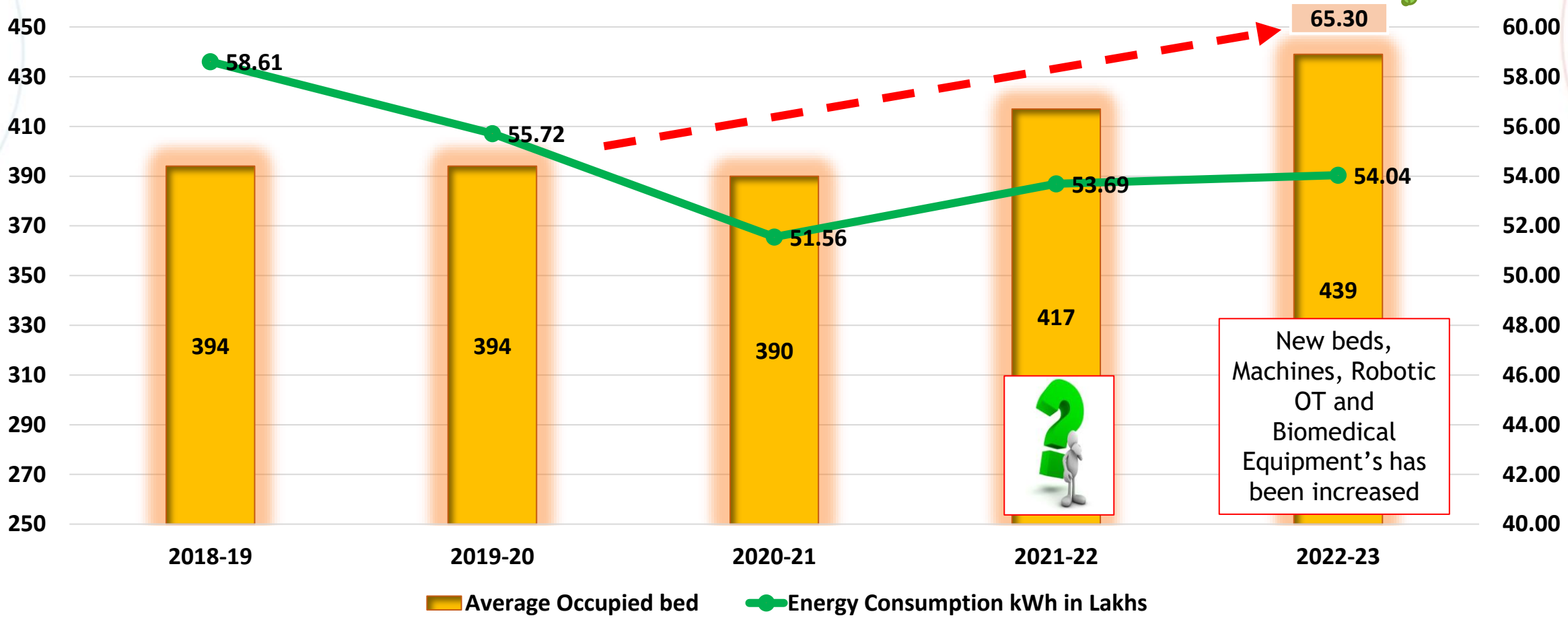


- Energy efficient gearless elevators
- Waste Heat Recovery
- VFD on Identified AHU's
- Sharing one AHU for two OT's during night hours
- OTs chilled water supplies routed through main pump
- Ahu replaced with EC fans
- AHU's with 100% Fresh Air in OT

- Mercury free hospital
- Replacement of Fluorescent tube/lights with LED Lights
- Installation of VFD drives with water pumps
- Replacement of vacuum pumps with energy efficient VFD operated vacuum pumps
- Humidity & Temperature in LINAC

Energy Consumption & Occupied Beds YOY

How to further nullify the effect?



What changed during the last year?

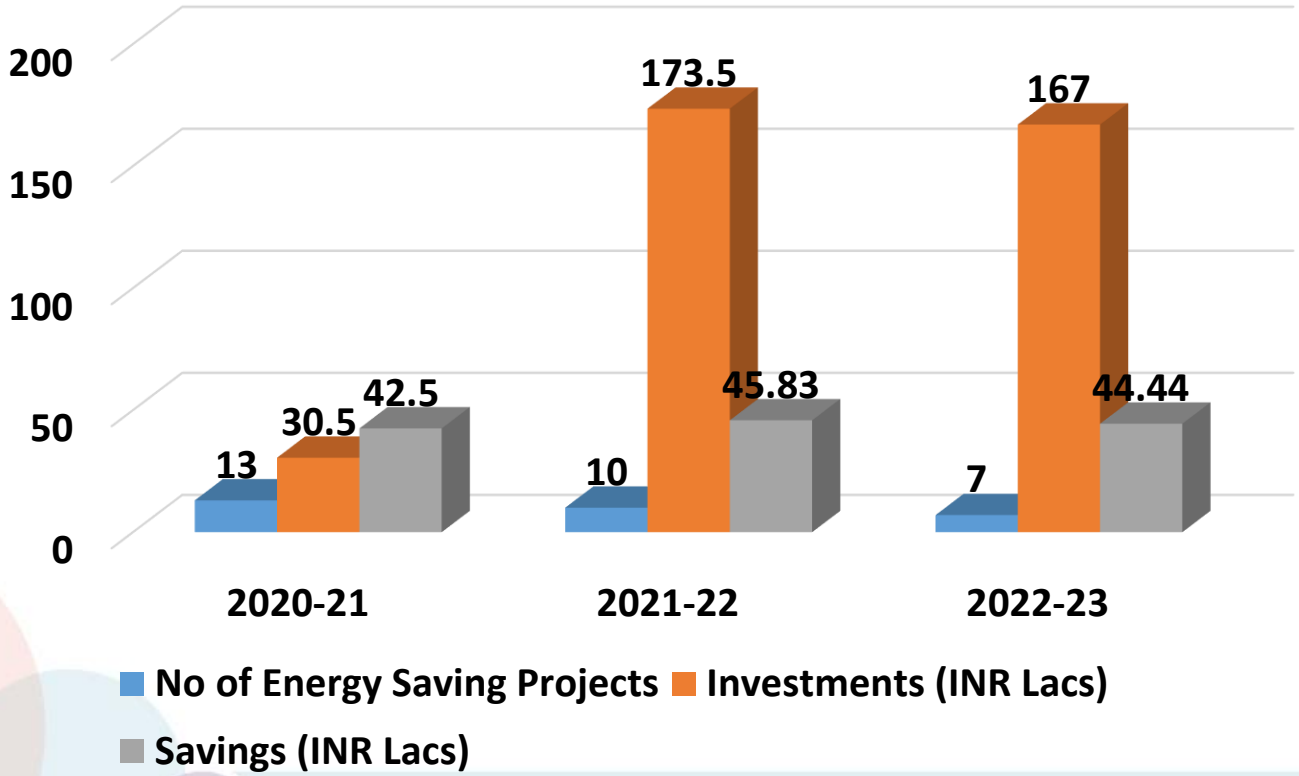
17.24% kWh/Occupied bed reduction compared to 2018-19

31.81% Fuel /occupied bed reduction compared to 2018-19

✓ Specific energy consumption (kWh/M2) has increased as patients occupancy / foot falls, Additional renovation of Dr. Chambers & OT numbers remained High as compared to 2021-22

SUMMARY OF PROJECT IMPLEMENTED IN LAST THREE YEARS

Year	No of Energy Saving Projects	Investments (INR Lacs)	Savings (INR Lacs)
2020-21	13	30.5	42.5
2021-22	10	173.5	45.83
2022-23	7	167	44.44



- 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.

LIST OF ENERGY CONSERVATION PROJECTS IN 2022-23

Sr. No	Title of Project	Annual Electrical Saving (kWh)	Annual Thermal Saving (Ton/Year)	Total Annual Savings (Rs million)	Investment Made (Rs million)	CO2e Reduction (MT)
1	Cooling Towers Approach based Automated operations	75250	0	0.624	1.025	61.71
2	Condenser Pumps with VFD	30180	0	0.25	1.05	24.75
3	Synchronized Elevators Operations	136250	0	1.153	7.25	111.73
4	RO Reject Water Reusage	18750	219	1.254	0	15.38
5	VFD operated Energy Efficient OT AHU's	110450	0	0.916	2.00	90.57
6	Conversion of old CPU's with Laptops and thin power saving CPU	18970	0	0.161	3.5	15.56
7	Timers for water coolers	10120	0	0.086	0.05	8.30
	Total	399970	219	4.444	16.7	327.98

These projects have replica potential for other units

Innovative Project (1)

Cooling Towers Approach based Automated operations

Statement:

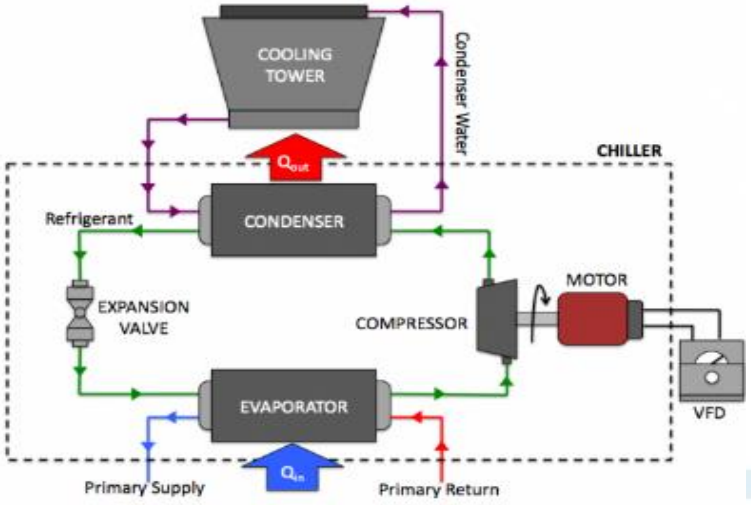
Cooling Towers operations works on the basis of ambient wet bulb and tries to cool the condenser water nearest to wet bulb. Consumption of Our CT fans below optimum approach remained very high.

Trigger for implementing the project

Cooling towers remained in use for nearly 24x7 & were required for smooth Chiller operations & for that Maintenance of cooling towers is not enough but Optimum operations are needed for Efficient Energy Conservation

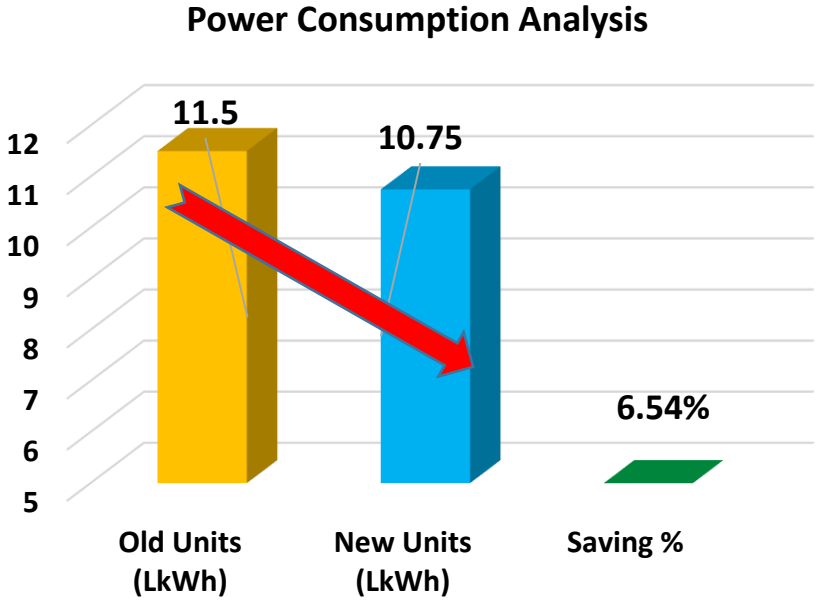
Why innovative:

24x7 Running at constant Cooling fans speed was reduced with VFD & hence saved energy



Cost Benefit Analysis

Energy Savings	75250kWh
Cost Savings	6.27Lakh INR
Investment	10.25Lakh INR
Payback	17.23Months



Replication Potential :- Yes

Innovative Project (2)

Synchronized Elevators Operations

Statement:

New elevators got approved to phase out end of life elevators hence efficient elevators were decided to replace the conventional elevators

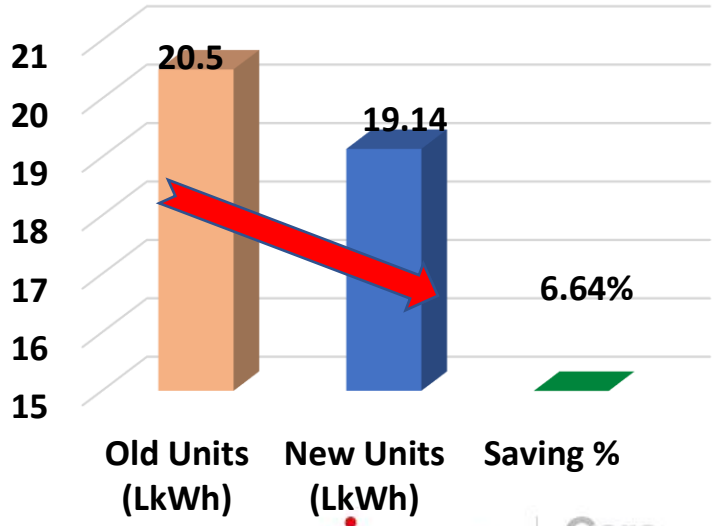
Trigger for implementing the project

Increased foot falls warranted efficient operations

why innovative:

Efficient Synchronized operations of two elevators were ensured for Elevators running 24x7 at patient area with single master panel thus resulted in huge savings.

Power Consumption Analysis



Cost Benefit Analysis

Energy Savings	136250kWh
Cost Savings	11.56Lakh INR
Investment	72.50Lakh INR
Payback	75.26Months

Replication Potential :- Yes

Innovative Project (3)

RO Reject Water Reusage

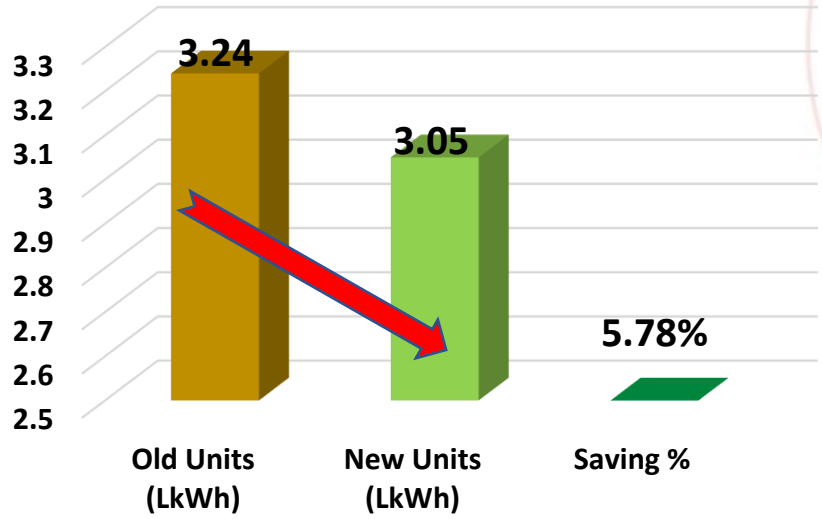
Statement:

60- 70 KLD RO water gets wasted in a day to manage OT/Dialysis operations

Trigger for implementing the project

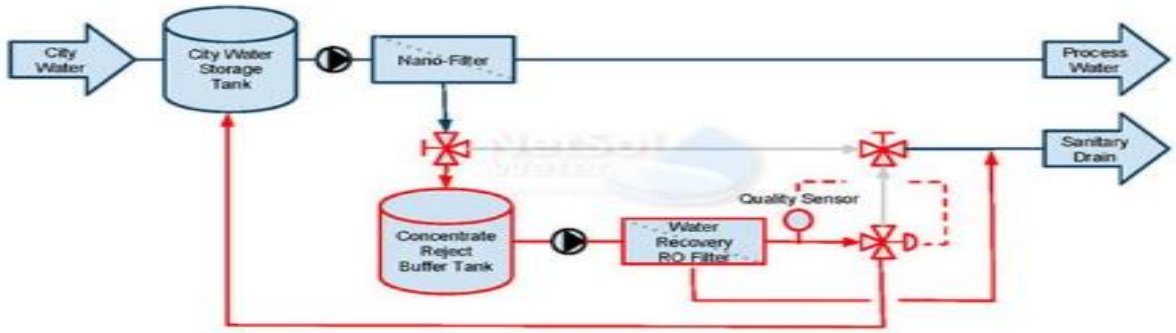
Since inception huge quanity of RO reject water getting wasted

Power Consumption Analysis



Why innovative:

By doing a slight modification started utilizing RO reject water in public washrooms etc resulted in huge saving besides maintaining water table



Recycling the wastewater from RO system

Cost Benefit Analysis

Energy Savings	18750kWh
Cost Savings	12.54Lakh INR
Investment	Nil
Payback	Immediate

Replication Potential :- Yes

Encon Project- Condenser Pumps with VFD

Statement:

Condenser water pumps are integral part of chiller operations to reject heat to atmosphere. As the HVAC plant room equipment's were designed for Peak Load but we observed that peak load requirements were limited to 15-20% of the time when two chillers were operating.

Trigger for implementing the project

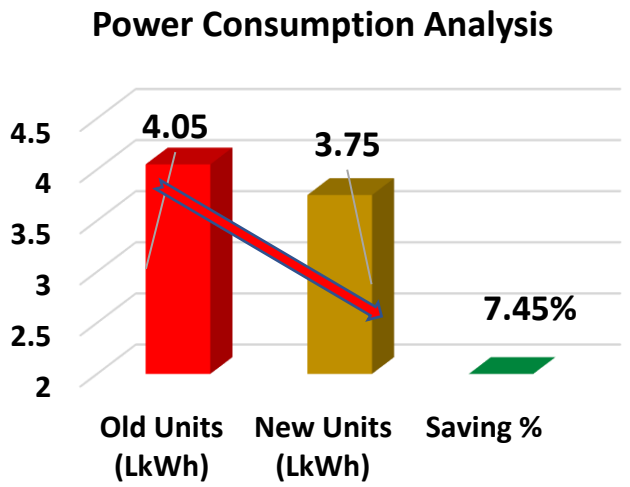
Since we observed that the operating head was higher and was designed to meet the future expansion as per business plan

why innovative:

To get the best efficient operation wasteful energy was saved by placing VFD.

Cost Benefit Analysis

Energy Savings	30180kWh
Cost Savings	2.50Lahk INR
Investment	18.50Lakh INR
Payback	88.8 Months



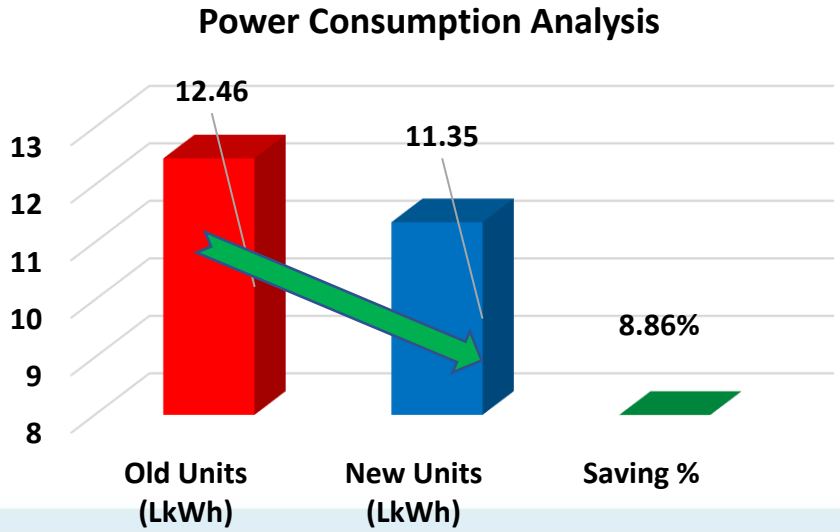
Replication Potential :- Yes

Encon Project- VFD operated Energy Efficient OT AHU's

Statement:

Temperature and humidity plays an important part in OT's for patient surgery & to prevent infection,
So decided to add new AHU's against Conventional old AHU's were not efficient due to ageing hence decided to replace them with VFD operated AHU's which resulted in not only giving comfort to the operating teams & also resulted in huge energy savings.

The AHU's were carefully designed as per the operational requirements based on the specialities specific in minds



Cost Benefit Analysis

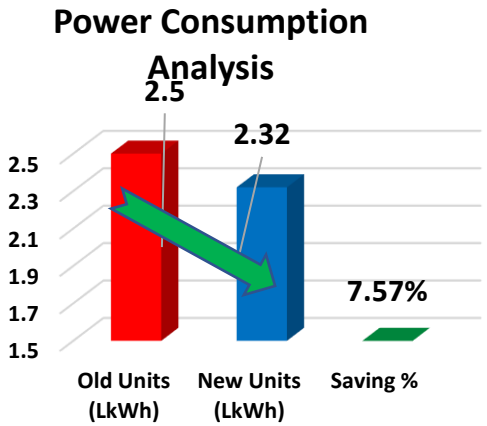
Energy Savings	110450kWh
Cost Savings	9.16Lakh INR
Investment	20 Lakh INR
Payback	26.23Months

Replication Potential :- Yes

Encon Project-Conversion of old CPU's with Laptops and thin power saving CPU

Statement:

The conventional CPU's) 50 Nos) were replaced with Laptops, resulted in energy savings. The CPU's are very old and energy consumption higher than new thin CPU's, so decided to replaced with new one



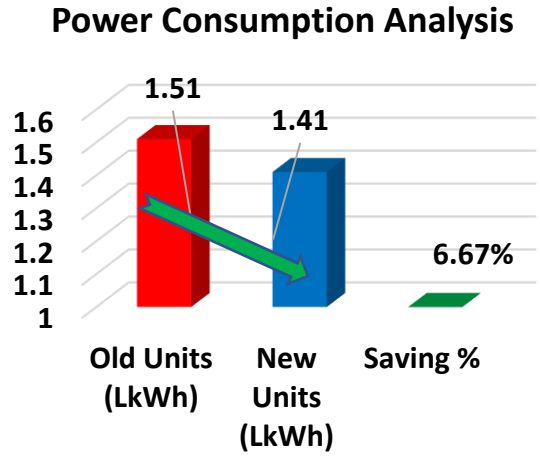
Cost Benefit Analysis

Energy Savings	18970kWh
Cost Savings	1.61Lakh INR
Investment	3.50Lakh INR
Payback	261 Months

Encon Project-Timers for water coolers

Statement:

The water coolers running 24X7, so its decided to switch off through timers in night hours & when not required

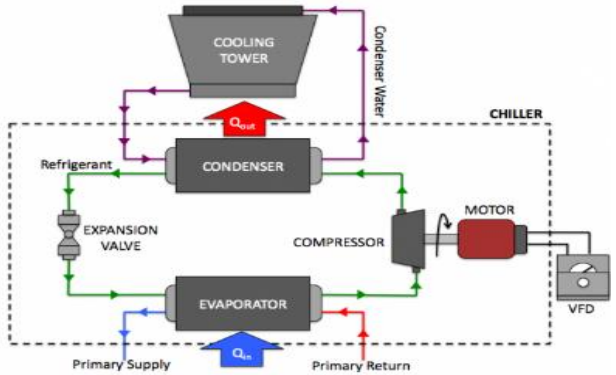


Cost Benefit Analysis

Energy Savings	10120kWh
Cost Savings	0.86Lakh INR
Investment	0.5Lakh INR
Payback	7 Months

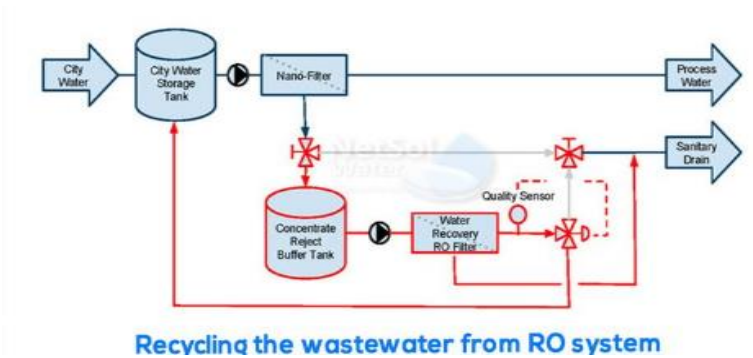
Replication Potential :- Yes

Energy Savings Project Implemented in 2022-23



VFD's on CT fans

Condenser Pumps with VFD



RO Reject Water Reusage

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

VFD operated AHU's

Synchronized Elevators Operations

Timers for water coolers

All Projects have Replication Potential

Savings of 4.0LkWh Power Units & 328MT CO2e

Energy Savings Project Implemented in 2021-22

Energy efficient gearless elevators

Disconnection of 2x80 KVA & 2X20 kVa UPS

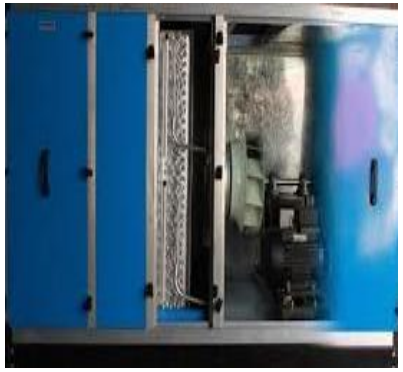
OTs chilled water supplies routed through main pump

Fresh air usage in winters for ICU, OT's

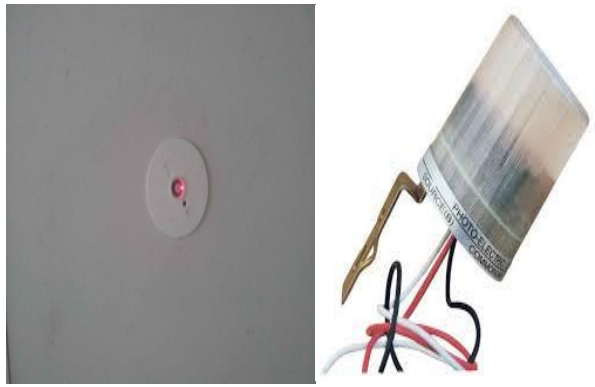
VFD Operated AHU's

Solar PV Panels

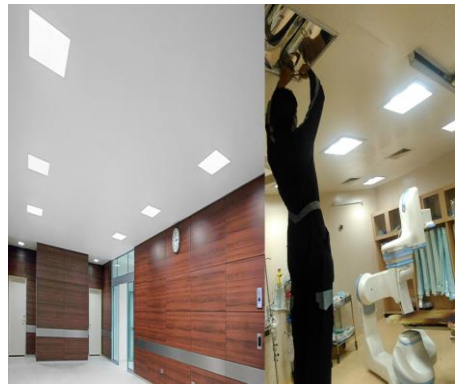
Ahu with EC fans



motion sensors



LED for new areas



Year	No of Energy Saving Projects	Investments (INR Lacs)	Savings (INR Lacs)
2021-22	10	173.5	45.83

All Projects have Replication Potential

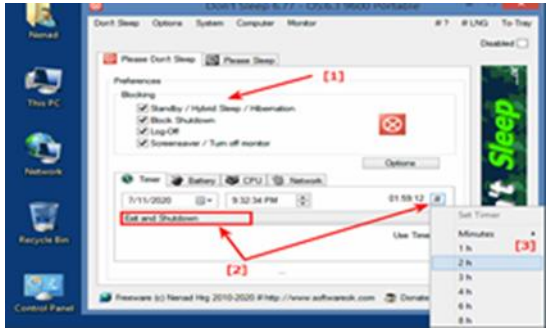
Savings of 5.55LkWh Power Units & 455MT CO2e

Energy Savings Project Implemented in 2020-21

Optimized usage of primary pumps in HVAC chiller system

Two OT's ran with one AHU

PC's will go to sleep mode automatically



Vintage old inefficient AHU's replacement

Rational n optimum use of elevators

Split AC's replaced with FCU's

Chiller running optimization done by increase in Temperature set point

Humidity controls in OT's

Year	No of Energy Saving Projects	Investments (INR Lacs)	Savings (INR Lacs)
2020-21	13	30.5	42.5

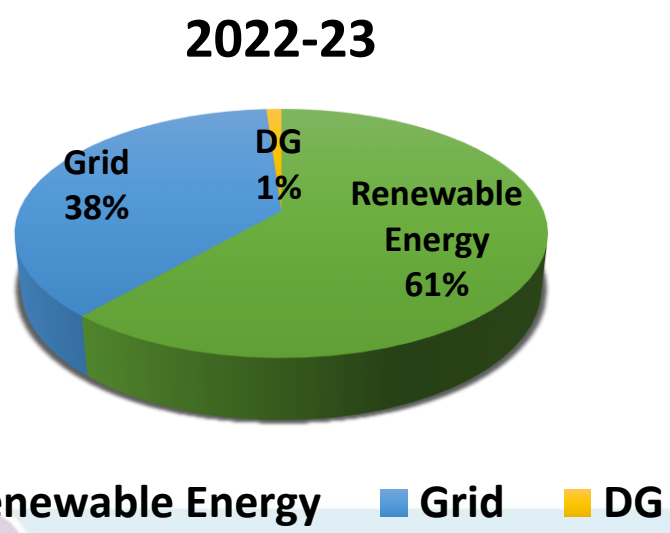
All Projects have Replication Potential

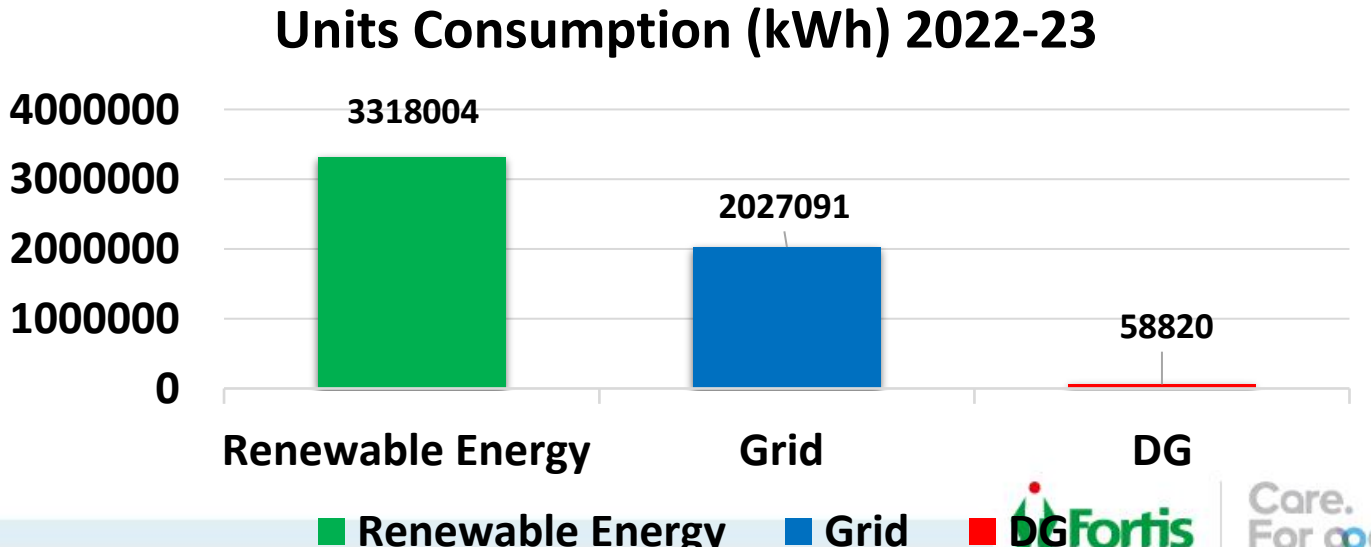
Savings of 4.22LkWh Power Units & 386MT CO2e

UTILISATION OF RENEWABLE ENERGY SOURCES

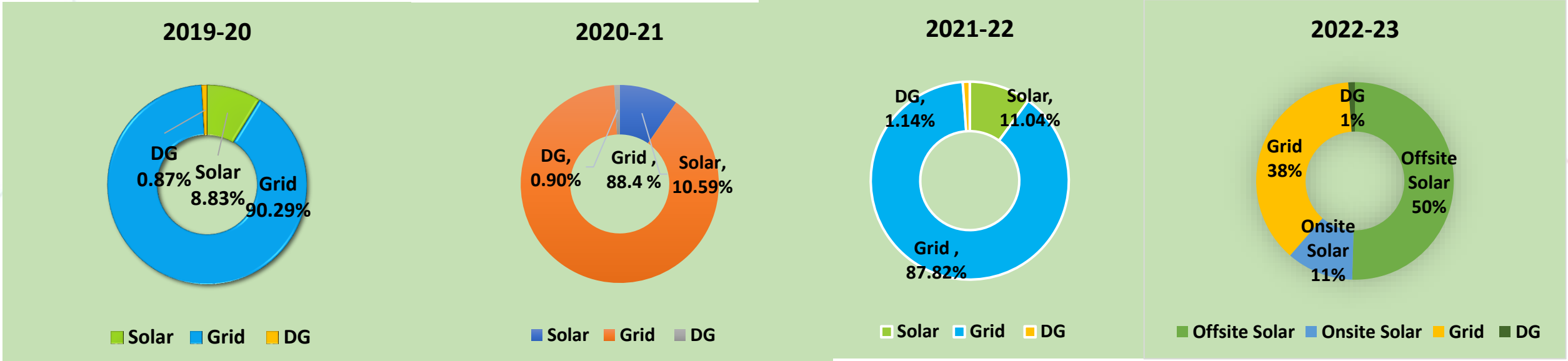
Technology (Electrical)	Type of Energy	Onsite Installed Capacity (Kw)	Onsite Generation (LkWh)	Offsite Installed Capacity (Kw)	Offsite Generation (LkWh)	Total Solar Generation/Utilization (LkWh)	% of Overall electrical Energy
2020-21	Solar PV Panels	420kW	5.46	0	0	5.46	10.59%
2021-22	Solar PV Panels	480kW	5.99	0	0	5.99	11.04%
2022-23	Solar PV Panels	480kW	5.92	20000	27.26	33.18	61.40%

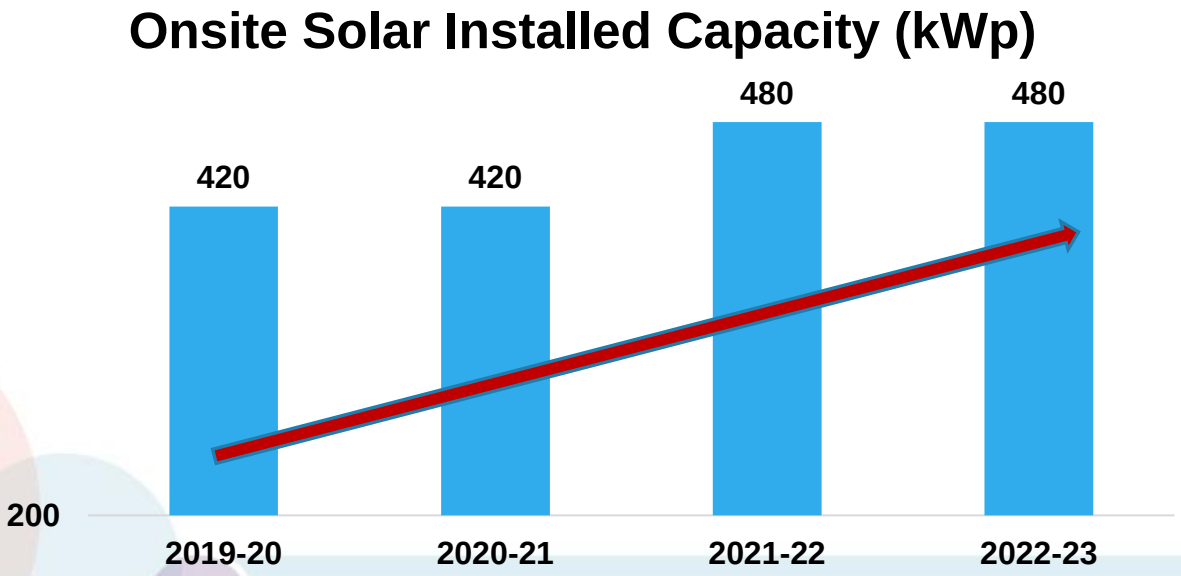
Technology (Thermal)	Type of Energy	Onsite/Offsite	Installed Capacity (kCal)	Usage (LCal)	% of Hot Water Usage
2020-21	Solar Water Heater	Onsite	8000	25.55	70%
2021-22	Solar Water Heater	Onsite	8000	22.18	75%
2022-23	Solar Water Heater	Onsite	8000	22.76	76%

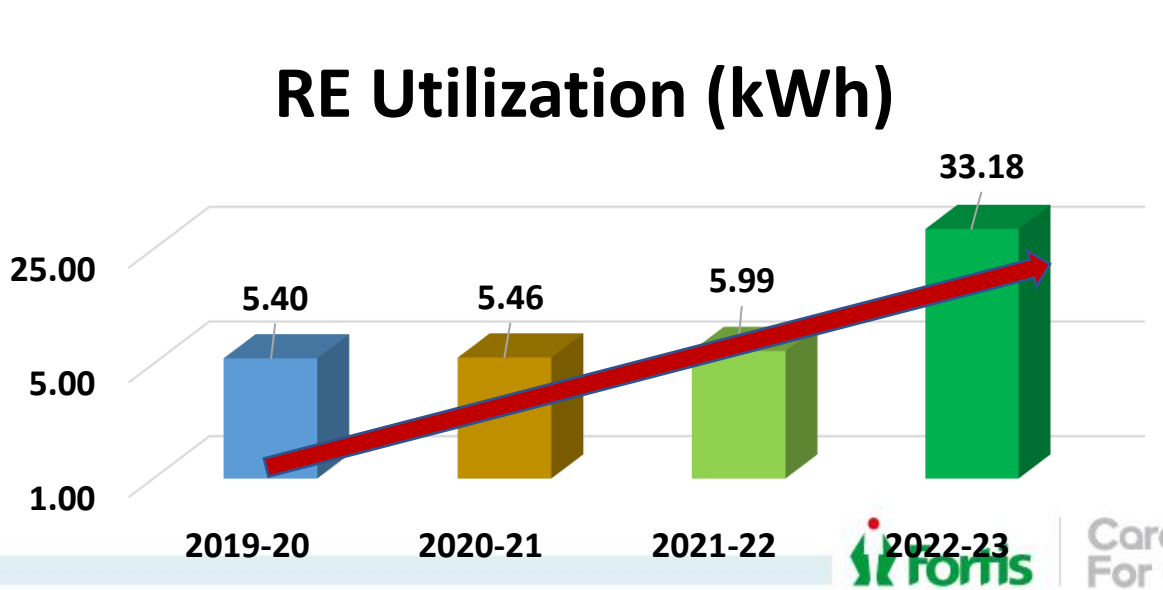




Utilization of Renewable Energy Sources







Results Achieved on Green & Clean Energy Initiatives

Green Initiatives	Amount Saving INR (Million)	CO2t Reduction	Equivalent to trees planted
Going the LED way	3.39	432	29376
Solar electricity generation Rooftop	0.25	68	4674
Solar water heating	1.98	57	3917
Solar electricity generation in car parking	0.2	65	4538
Rain water harvesting pits			Improved ground water security

Reduction of 622 CO2t by these projects & 42505 equivalent trees planted

Solar electricity generation Rooftop

Solar electricity generation in car parking

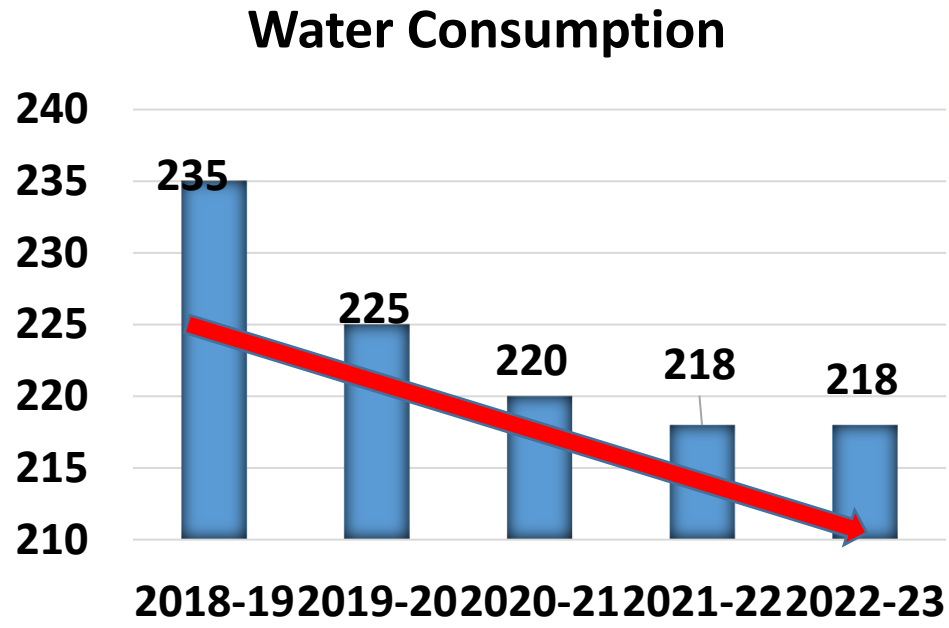
Going the LED way

Rain water harvesting pits

Solar water heating

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.



550KLD Sewage treatment plant

Water use reduction by efficient fixtures

System level Water Metering facility

Rain Water Harvesting Pits

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.**

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

Our Green chillers provide air conditioning comfort with lowest electrical energy

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

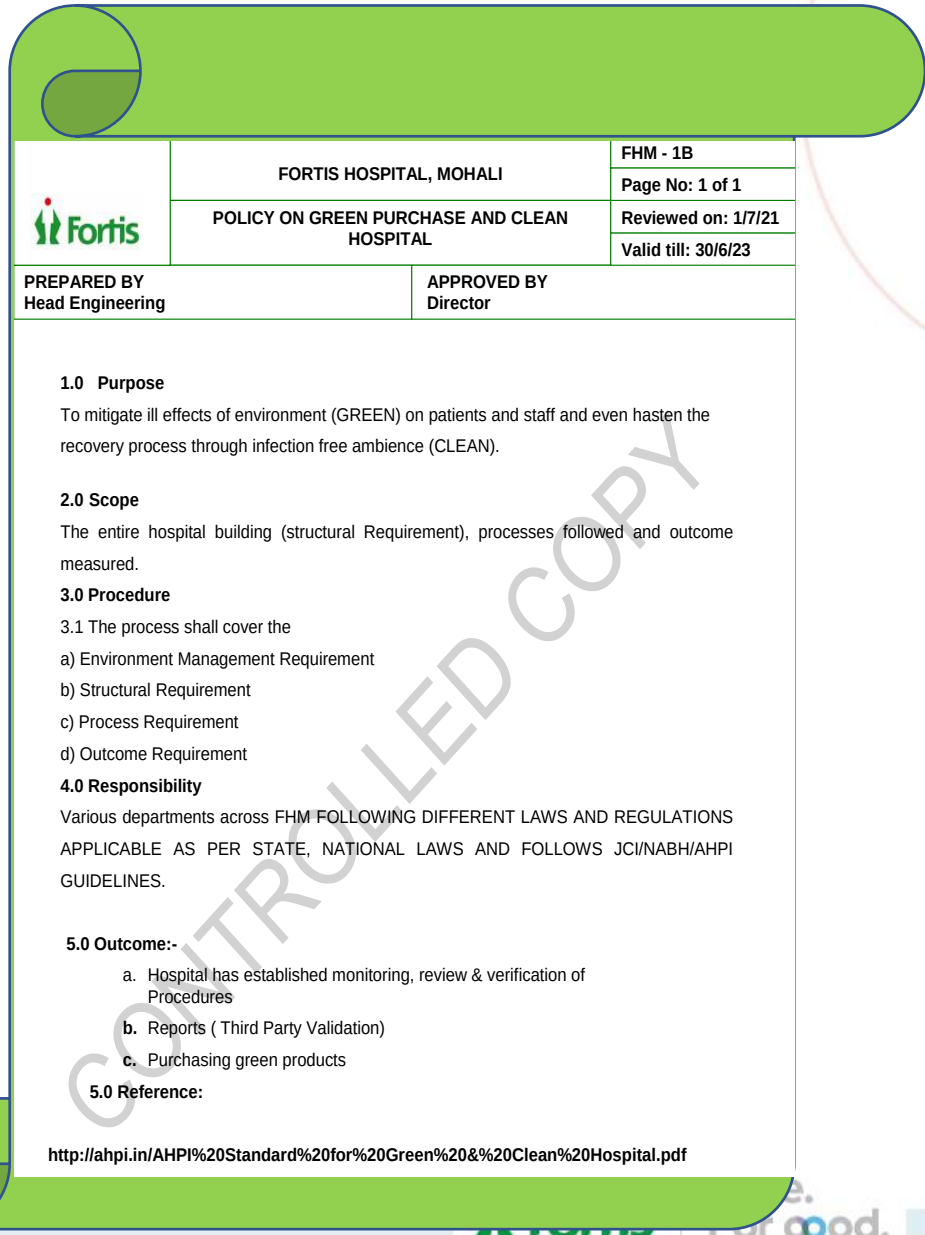
GHG Inventorisation

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. 10 Million INR for this program Globally.

2022-23 Project was part of the same corporate budgeting program.

Reduction of 2787CO2e tons from 2018 till 2023.



Fortis	FORTIS HOSPITAL, MOHALI	FHM - 1B
		Page No: 1 of 1
	POLICY ON GREEN PURCHASE AND CLEAN HOSPITAL	Reviewed on: 1/7/21
		Valid till: 30/6/23

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:

http://ahpi.in/AHPI%20Standard%20for%20Green%20&%20Clean%20Hospital.pdf

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.**

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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

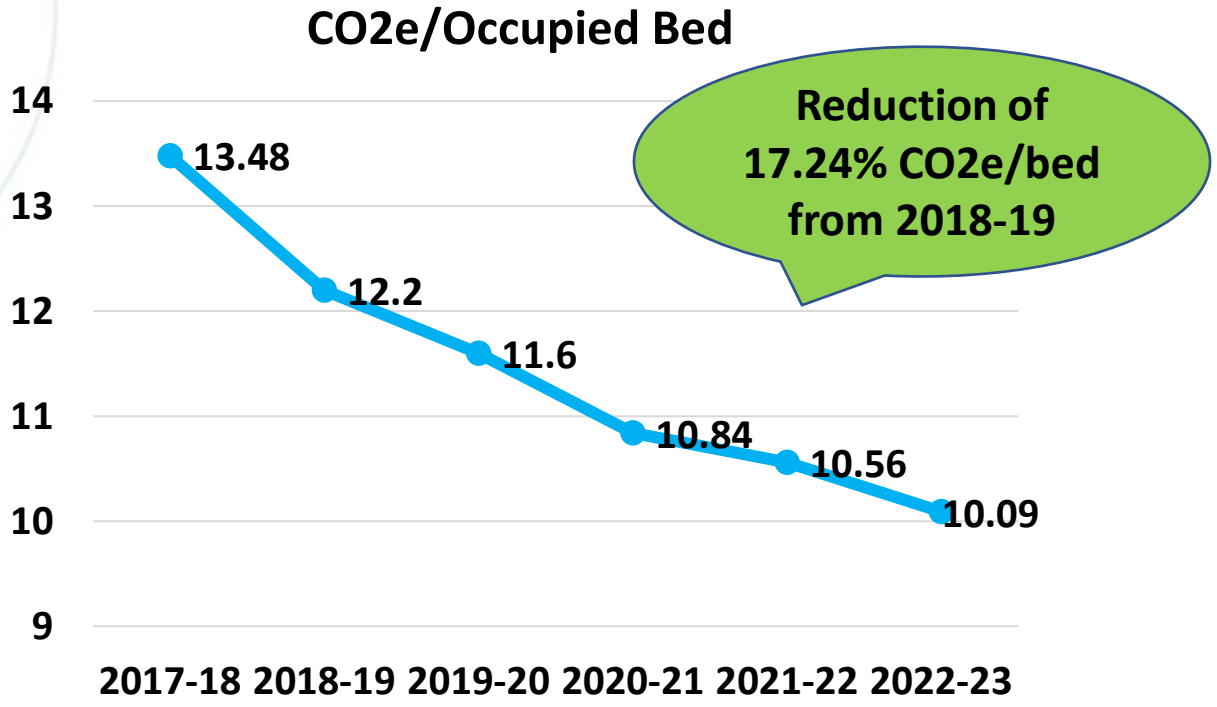
Energy Indirect Emission
Scope 2

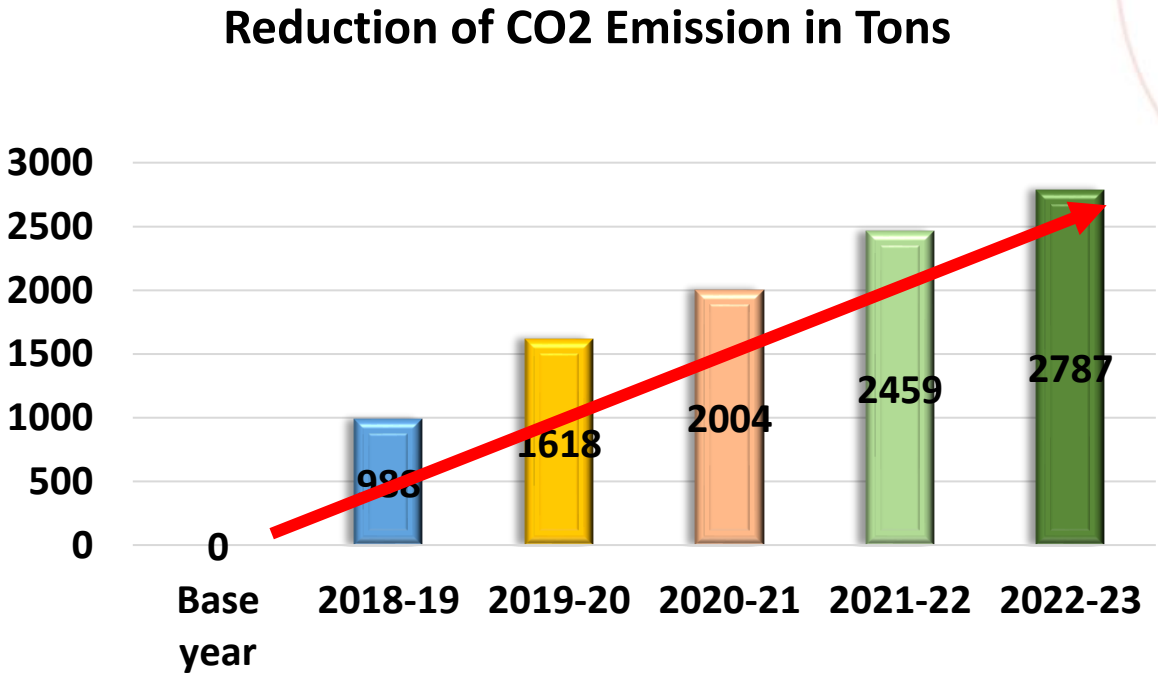
- Emission from Electricity usage
- Emission from RE (as per ACI guideline)

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

Carbon Footprint Reduction





What changed in 3 years ?

Reduction of 17.24% CO2e/bed from 2018-19	Reduction of 2787 tCO2e from 2018-19

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)

Environmental Monitoring

FHM strives to maintain healthy indoor air Quality.

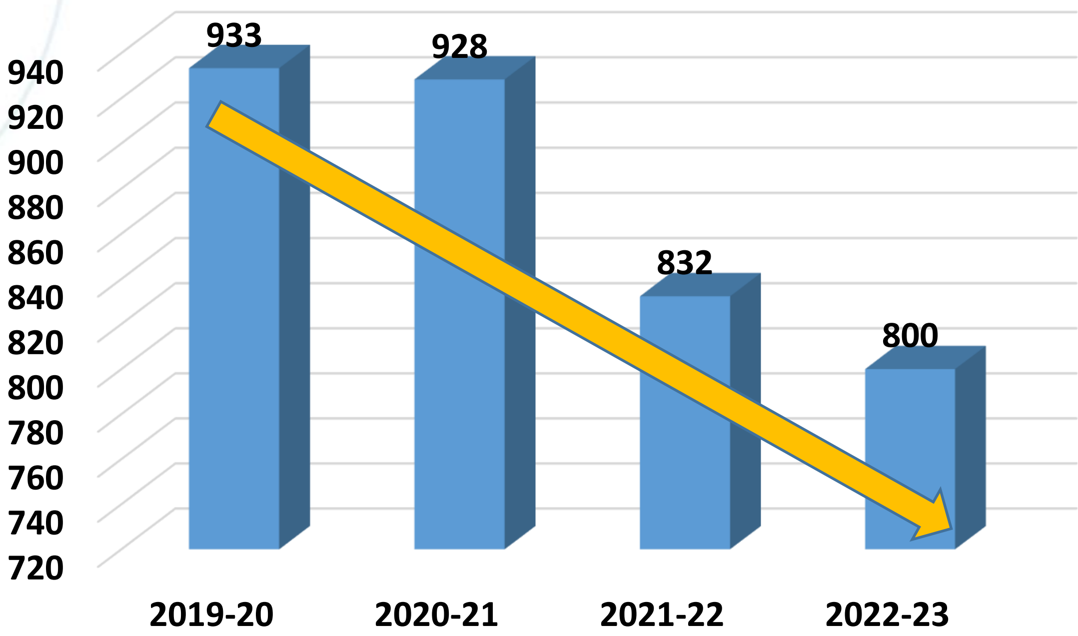
- **3rd party air quality check** is done at regular intervals.
- Co2 sensors installed in return ducts of all AHUs & automatic fresh air intake when value crosses set parameters.
- Portable Co2 meters used to check Co2 level in all offices & crowdy areas multiple times in a day
- In FY2023-24, **UV 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)	7.0µg/m³	_____	IS:5182(P-23):2006 Reaff. 2017
2	Respirable Suspended Particular Meter (PM10)	70.8	100.0µg/m³	IS:5182(P-23):2006 Reaff. 2017
3	Sulphur Dioxide (SO2)	6.5	80.0µg/m³	IS:5182(P-2):1999 Reaff. 2001
4	Nitrogen dioxide (NO2)	20.7	80.0µg/m³	IS:5182(P-6):2006 Reaff. 2017
5	Fine Particulate matter (PM2.5)	36.2	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 inside throughout the hospital which further upgrades the air quality & gives a feel- good factor for all the footfalls.

Waste Utilization and Management

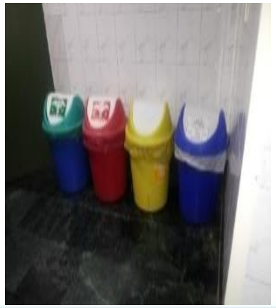
Waste Generated (kg/Occupied bed)



- **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

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Energy excellence frame work-FHM

Energy management structure

+

Total Employee Involvement

+

Monitoring and review systems

+

Energy Audits

+

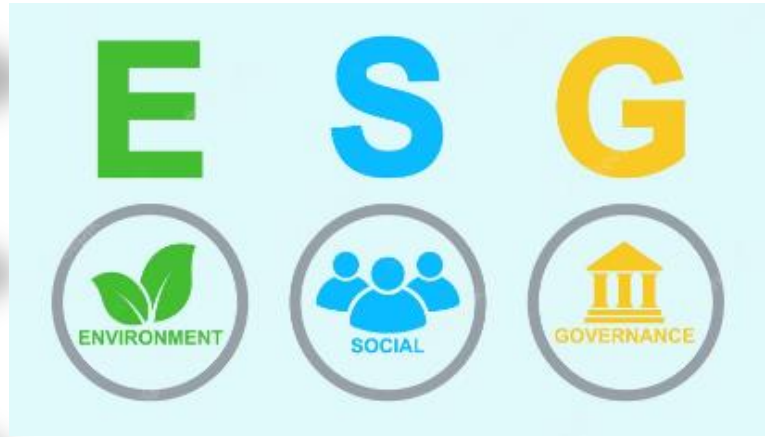
Bench Marking

+

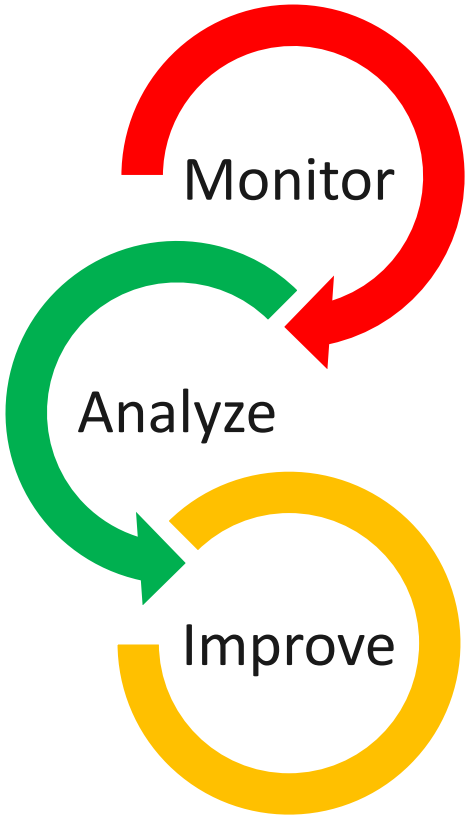
Energy management planning

+

Energy Efficient Equipment's



Energy excellence



Energy Management Team

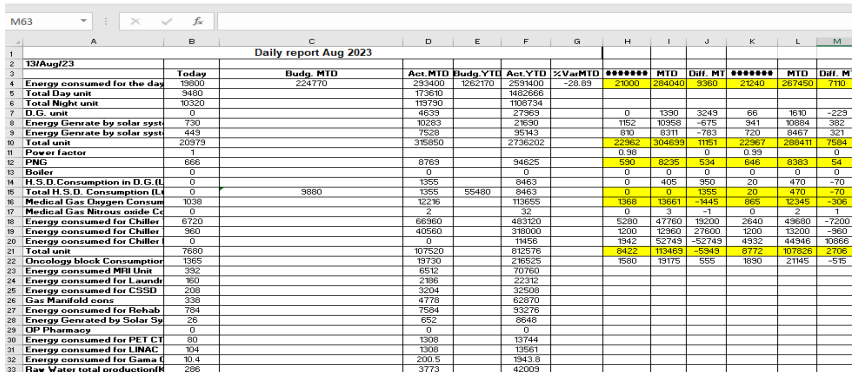
- ✓ At Site we have dedicated Engineers who continuously record and monitor the energy consumption and the same is being verified by Central Energy Team on weekly basis.
- ✓ Central Energy Team has calibrated instrument and carry out four preliminary audit and one energy audit.

Energy Measurement, Monitoring & Reporting

Energy Performance Review

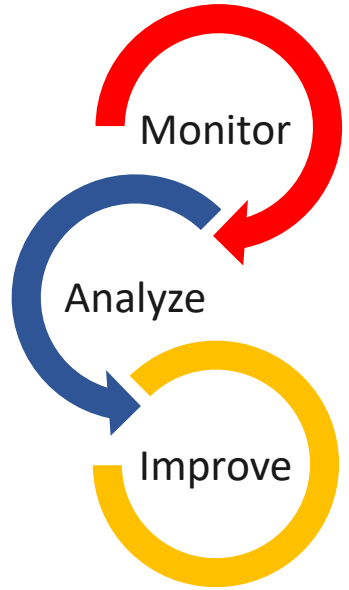
Continuous Monitoring → Daily Report Generation → Weekly Review by Chief Engineer → Monthly Review By Unit Head → Quarterly Review by Zonal Director

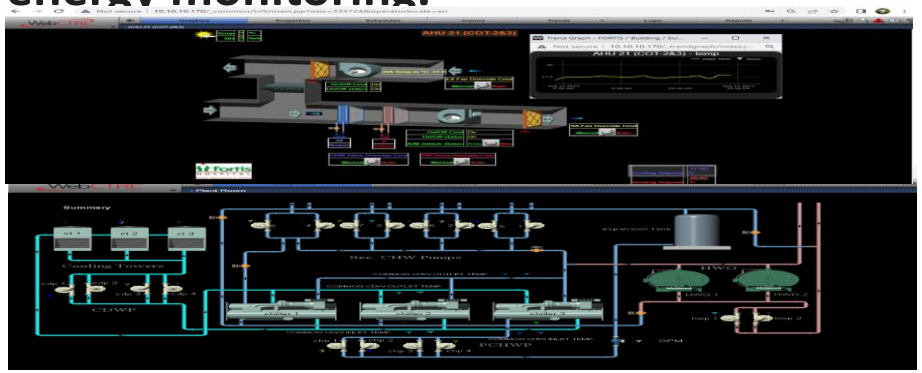
- Dedicated energy Meters for all the panels
- Separate energy meters for lighting, HVAC
- All the Tenants have separate energy meter.
- All the energy meters are linked to BMS for energy monitoring.
- Record of daily energy meter recording
- Annual calibration of all energy meters.
- Carry out variance analysis of energy.
- Monthly review of energy balancing by energy Management Cell



Daily report Aug 2023

	Today	Budg. MTD	Act.MTD	Budg.YTD	Act.YTD	%VarMTD	MTD	Diff. MT	MTD	Diff. M
13/Aug/23										
Energy consumed for the day	19800	224770	293400	1262170	2531400	-28.83	21000	264040	9360	21240	267450	7110
Total Day unit	9480		173610		1482666							
Total Night unit	10320		119790		1108734							
D.G. unit	0		4639		27363		0	1390	3249	66	1610	-223
Energy Genrate by solar syst	730		10283		21690		1152	10958	-675	941	10884	382
Energy Genrate by solar syst	449		7528		95143		810	8311	-783	720	8467	321
Total unit	20979		315850		2736202		22962	304699	11151	22367	288411	7584
Power factor	1						0.96		0	0.99		0
PNG	666		8769		94625		590	8235	534	646	8383	54
Boiler	0		0		0		0	0	0	0	0	0
H.S.D.Consumption in D.G.(L	0		1355		8463		0	405	950	20	470	-70
Total H.S.D. Consumption (L	0	3880	1355	55480	8463		0	0	1355	20	470	-70
Medical Gas Oxygen Consum	1038		12216		113655		1368	13661	-1445	865	12345	-306
Medical Gas Nitrous oxide Co	0		2		32		0	3	-1	0	2	1
Energy consumed for Chiller	6720		66960		483120		5280	47760	19200	2640	49680	-7200
Energy consumed for Chiller	960		40560		318000		1200	12960	27600	1200	13200	-960
Energy consumed for Chiller	0		0		11456		1942	52743	-52743	4932	44946	10866
Total unit	7680		107520		812576		8422	113463	-5943	8772	107826	2706
Oncology block Consumption	1365		19730		216525		1580	19178	555	1890	21145	-515
Energy consumed MRI Unit	332		6512		70760							
Energy consumed for Laund	160		2186		22312							
Energy consumed for CSSD	208		3204		32508							
Gas Manifold cons	338		4778		62870							
Energy consumed for Rehab	784		7584		93276							
Energy Genrated by Solar Sy	26		552		8648							
OP Pharmacy	0		0		0							
Energy consumed for PET CT	80		1308		13744							
Energy consumed for LINAC	104		1308		13561							
Energy consumed for Gama C	10.4		200.5		1943.8							
Raw Water total production(K	286		3773		42009							





Kaizen Initiatives by in-house Technicians & Supervisors Team

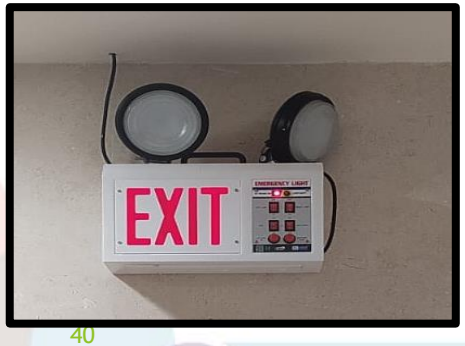
Timer Controller for peripheral lighting

Motion Sensor for corridors

Limit Switch for Air curtains and Fire shaft Door

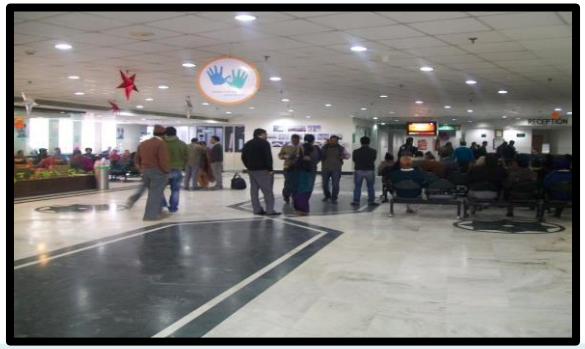
Damaged pedestal fan converted into wall mounted fan in engineering Area

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

Implementation of ISO 50001

ISO 50001 Implementation WIP

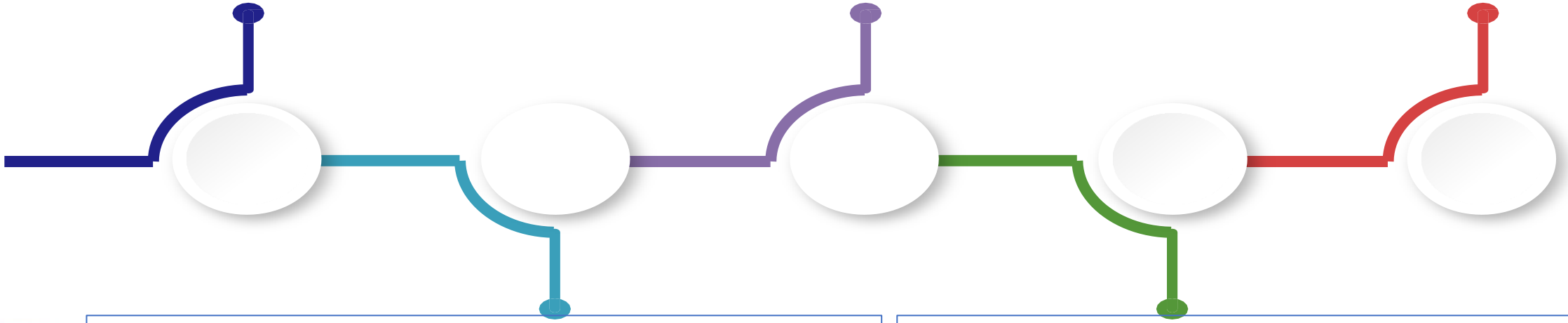
0.05% investment of energy saving projects on total turnover of the company

Learning from CII Energy Award programs

GHG emission classification under Scope 01, Scope 02 & Scope 03.

Interaction with professional peers of other buildings & implemented new idea.

Clarity on EPI/SEC & Contribution to Nation Building



Software tool for calculating GHG emission under the 3 categories.

Hospital buildings are different with regard to energy usage in other buildings.

ESG Champion's Oath!

I, , take an oath

that starting today, I will do the following to champion ESG at work!

- ☐ *I will print only if necessary*
- ☐ *I will always switch off devices after use*
- ☐ *I will not waste water*
- ☐ *I will Reduce, Reuse & Recycle*
- ☐ *I will encourage diversity & inclusion at workplace*

Signature: Date:

*This card is to be printed double-sided on discarded waste papers collected from office/ hospitals – with non personally identifiable & non confidential data on other side & displayed on one's workstation.

Fortis Care. For good.

Update on Net Zero Hospital Plan

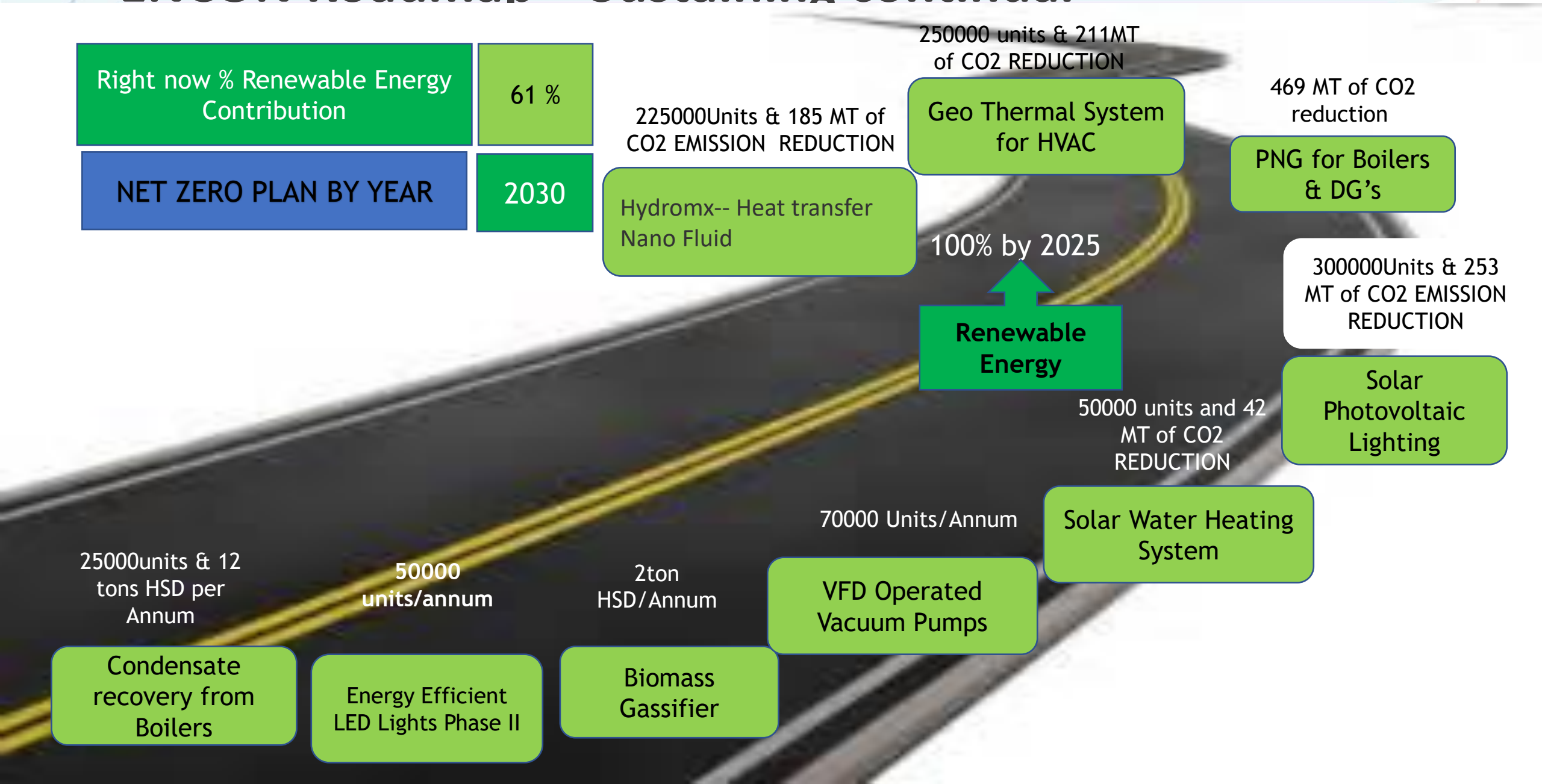
Energy Conservation & Efficiency	Continuous focus on conservation & efficiency through System based approach, Life cycle cost approach
Develop Green Infrastructures	FHM has developed green building policy and framework
Use of renewable energy	FHM is currently running on 63% RE Onsite solar provides 10% RE and remaining comes from offsite Solar PV Panels
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**

ENCON Roadmap – Sustaining continual

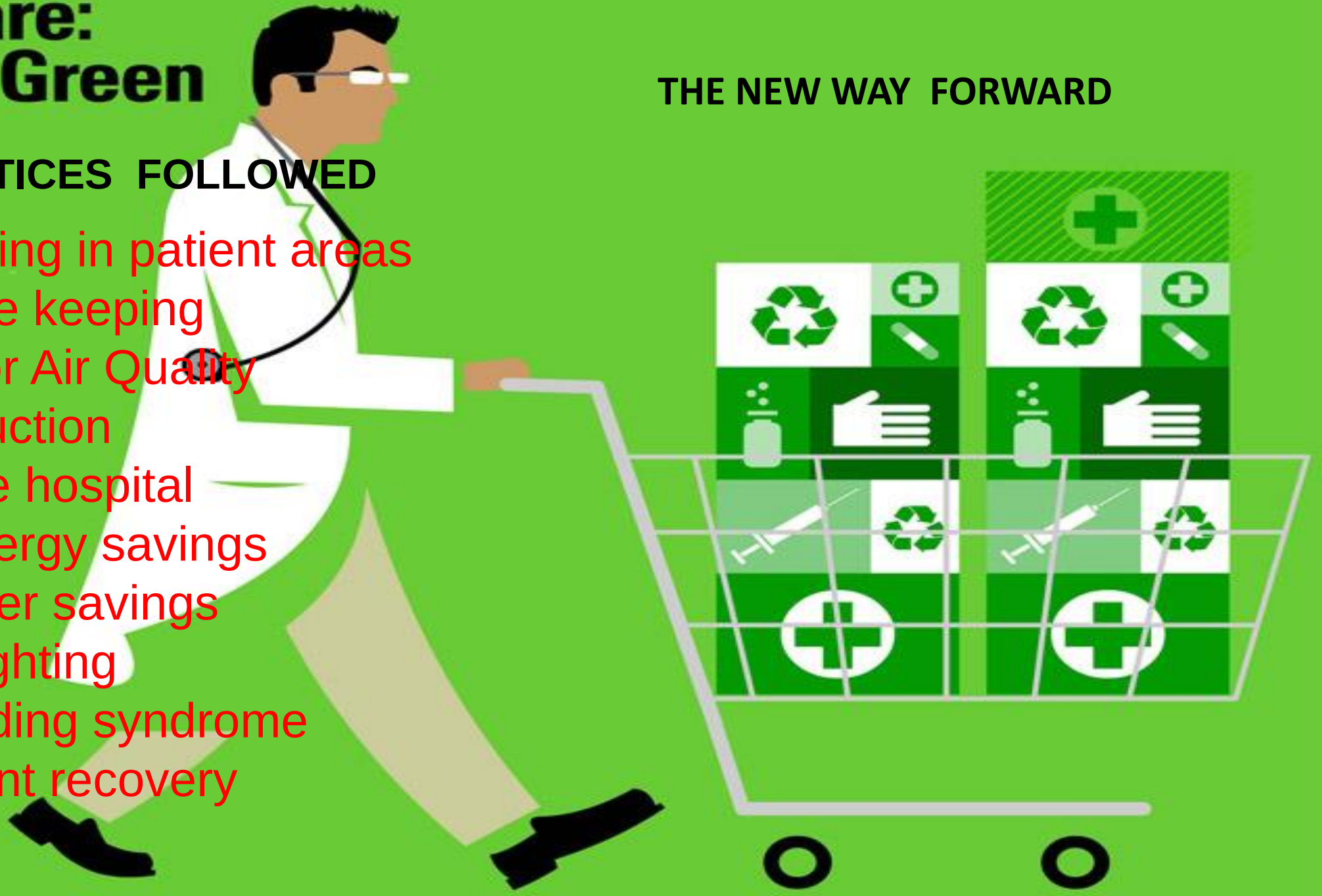


Healthcare: Globally Green

THE NEW WAY FORWARD

BEST PRACTICES FOLLOWED

- Natural lighting in patient areas
- Green house keeping
- Better Indoor Air Quality
- Sound Reduction
- Mercury free hospital
- 20t-40% Energy savings
- 35-40% water savings
- Good day lighting
- No sick building syndrome
- Faster patient recovery

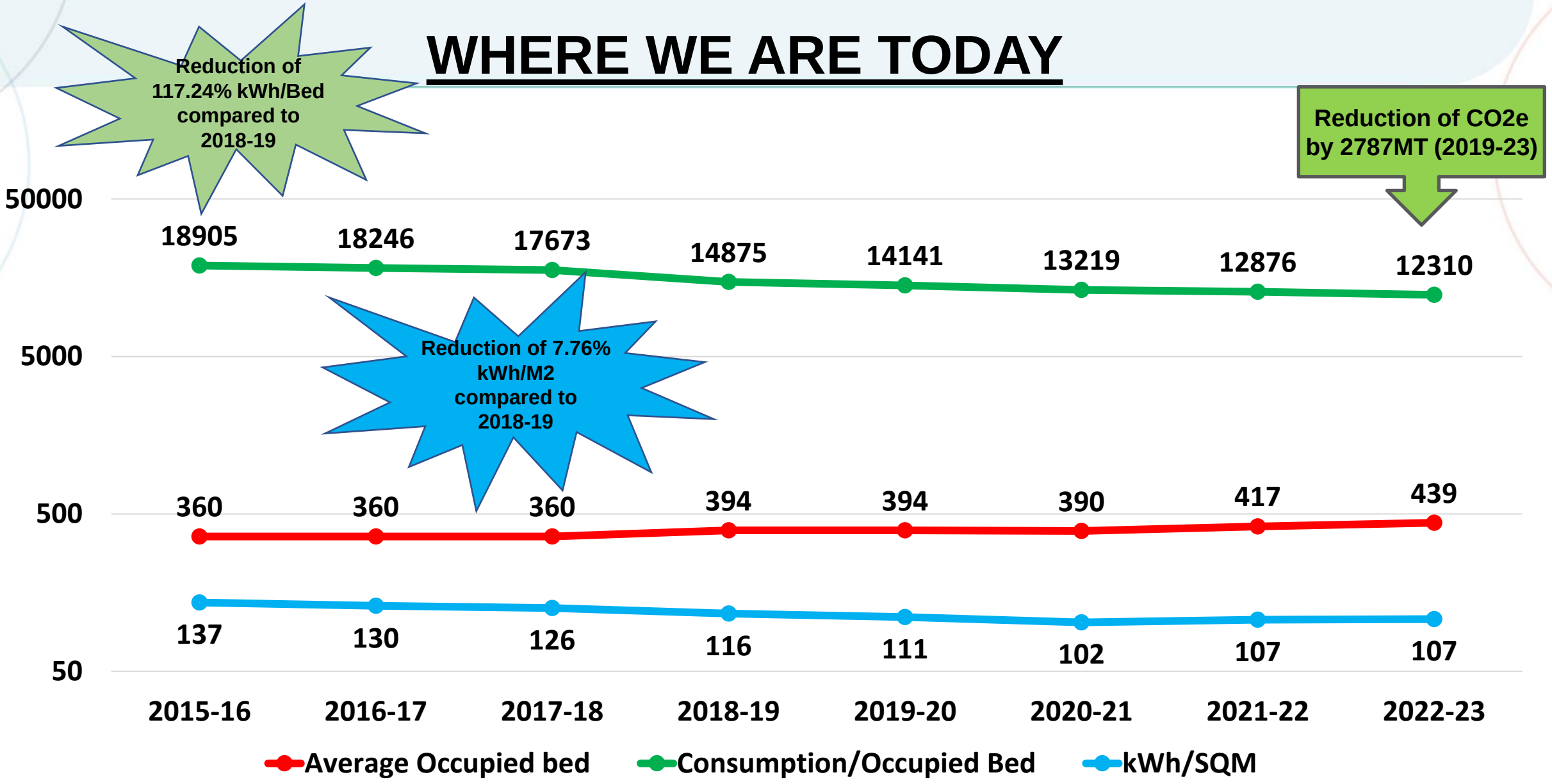


ENCON EFFORTS: Key Impact

Area	Key Impact
Energy Efficiency	• 7.76% SEC reduction achieved in last 3 years
Water Conservation	• 3.11% reduction in last 3 years
Renewable Energy	• Using 61 % Renewable Energy
GHG Reduction	• 13.01% 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	• 3 Project recognized as innovative projects • Started use of Eco friendly HK chemical and paints

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

WHERE WE ARE TODAY



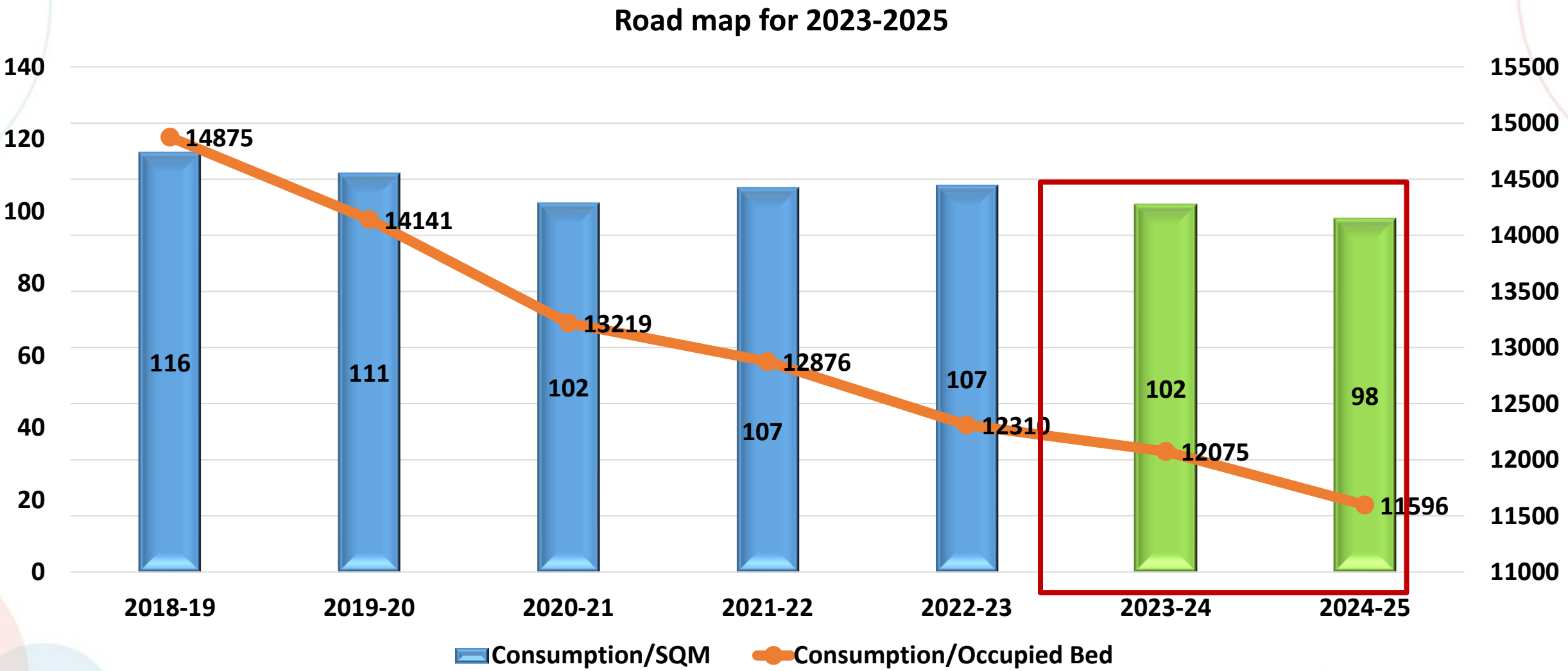
Benchmarks 17762 KWh/Bed & 200kWh/m2 (By Bureau of Energy Efficiency, Govt. of India ECO-III project)

ENCON PROJECTS PLANNED

ENCON PROJECTS PLANNED IN FY 2023-25	
Year	**Description**
2023-24	Hydromx-- Heat transfer Nano Fluid
2023-24	Geothermal for chilled ground water
2023-24	OT AHU's replacement
2023-24	VSD Chiller
2023-24	Enhancing Renewable Energy
2023-24	PNG for DG sets instead of HSD
2023-24	Energy efficient elevators/cooling towers (2nd Phase)
2024-25	Geothermal for chilled ground water
2024-25	VFD Operated AHU's (3rd phase)
2024-25	Heat Pump for Hot Water
2024-25	Power Optimizer for Chiller Machines
2024-25	Harnessing Wind Energy

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

Going Forward



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

FHM Awards & Recognition

- AHPI Award for Quality Beyond Accreditation - 2019,2020, 2022
- AHPI Award for Best Green Hospital- 2017,2019
- NABH Nursing Excellence- 2016,2020
- CII National award for Excellence in Energy Management- 2016, 2017,2019,2020,2022
- Indian Health & Wellness Awards 2016
- BEE NATIONAL ENERGY CONSERVATION AWARD 2015
- AHPI Award for Nursing Excellence - 2019
- Asia Pacific Hand Hygiene Excellence Award- 2015
- No. 1 Private Multispecialty Hospital in Chandigarh – The Week – Nielsen Best Hospitals Survey -2015
- Fortis Hospital, Mohali, wins CAHOtalks Video Competition on COVID-19 Management
- State Energy Conservation Award PEDA- 2019, 2020
- Doc n Doc Gammex Saviour - Best Multispecialty Hospital - 2014
- Best Sustainable Hospital Project Award by HBII-MEDGATE - 2014
- Pan Fortis Innovation Award - 2014
- Intel Embedded Challenge Award for Innovation in Industry (Catheter reprocessing) 2014

Minimizing Wastage >>> Innovation

Not just lives, but saving the earth as well.

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Mob.: 9872305900