



FORTIS HOSPITAL MOHALI, A MULTY SPECILITY HOSPITAL

CII 23rd National Award for Excellence in Energy Management-2022

***Presented By: - Mr Neeraj Tandon
Chief Engineer***



BUILDING DETAILS



Total Plot Area	8.22acre
Built-up area	50336sqm
No of Beds	448
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 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 360(448) 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

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 courtyard to reduce heat load of building. It reduces the energy consumption as well as feels good for patients







Solar PV panel installed on rooftop. It reduces cooling load. It reduces 0.5% to 0.75% energy consumption



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

Energy Efficiency Summary

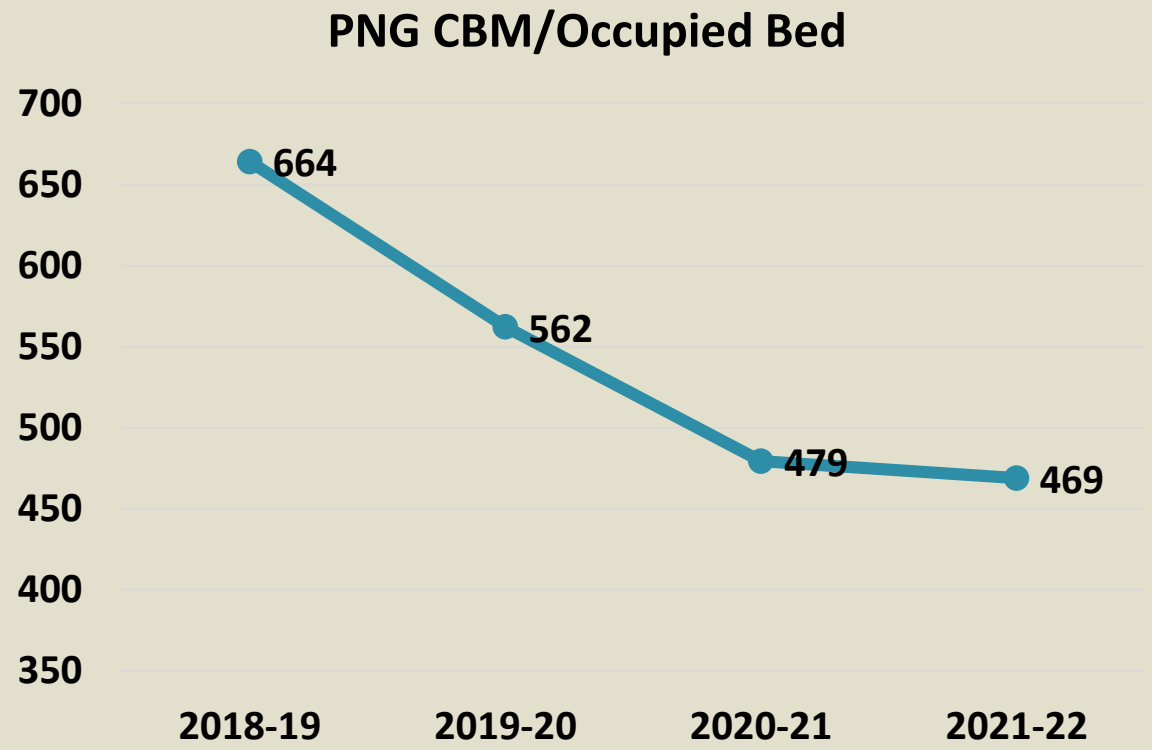
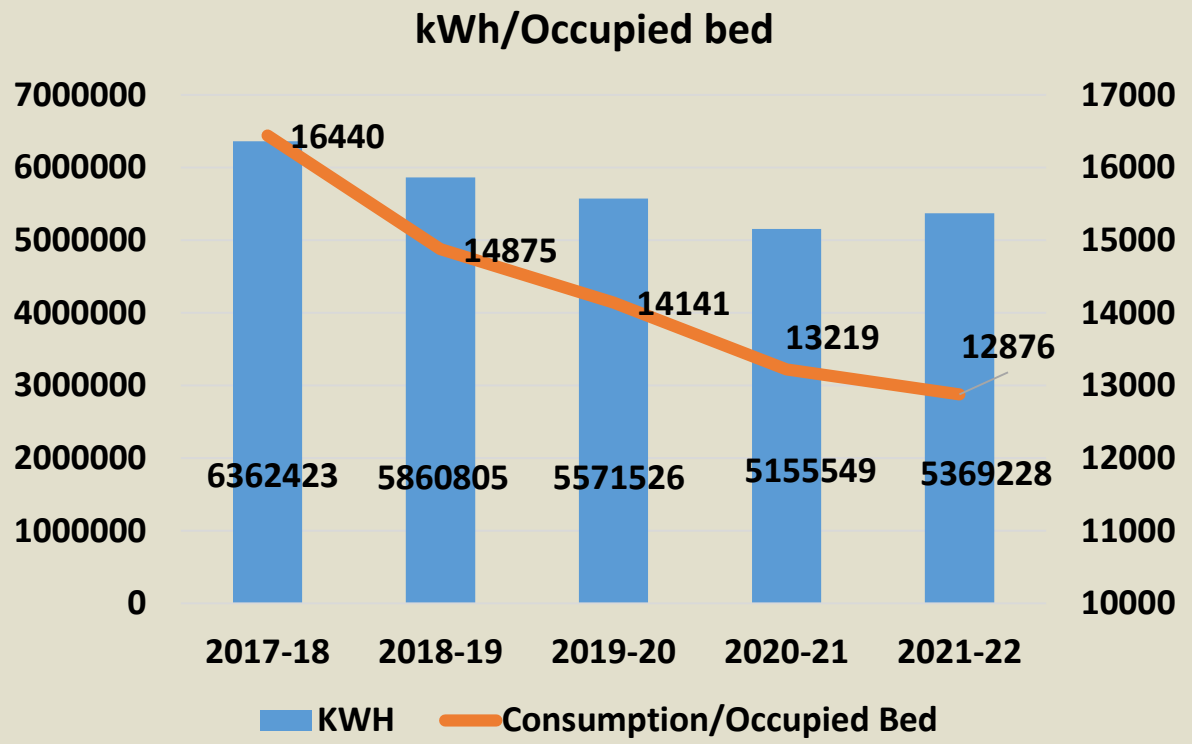
Description-	2018-19	2019-20	2020-21	2021-22	% Change 2018-19 vs 2021-22
Specific Electrical Energy Consumption (kWh/Sqm)	116	111	102	107	 -7.76%
Average Occupancy	88%	88%	87%	93%	 5.68%
kWh/Occupied Bed	14875	14141	13219	12876	 -13.44%
Energy Consumption kWh in Lakhs	58.61	55.72	51.56	53.69	 -8.39%
Energy Cost kWh in Lakhs	473.20	462.90	440.80	453.30	
Energy Saving Cost in Lakhs	31.3	10.30	22.10	-12.50	
Units per cost in INR	8.07	8.31	8.55	8.44	

What changed during the last year?

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

The nearest Competitor SEC (Specific Energy Consumption) of Hospital buildings stands at 158 Kwh / Sqm

Sp. Energy Consumption (Electricity & Fuel)



What changed during the last year?

13.44% kWh/Occupied bed reduction compared to 2018-19

29.37% 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 post Covid .

FORTIS MOHALI ENERGY PERFORMANCE VS GLOBAL, NATIONAL & COMPETITION BENCHMARK

Fortis Mohali Kwh/sq.mtr	Competition Benchmark	BEE National Benchmark	Global Benchmark
107	118	200	205

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

Specific Energy consumption of Fortis Mohali is 107 kWh/m²

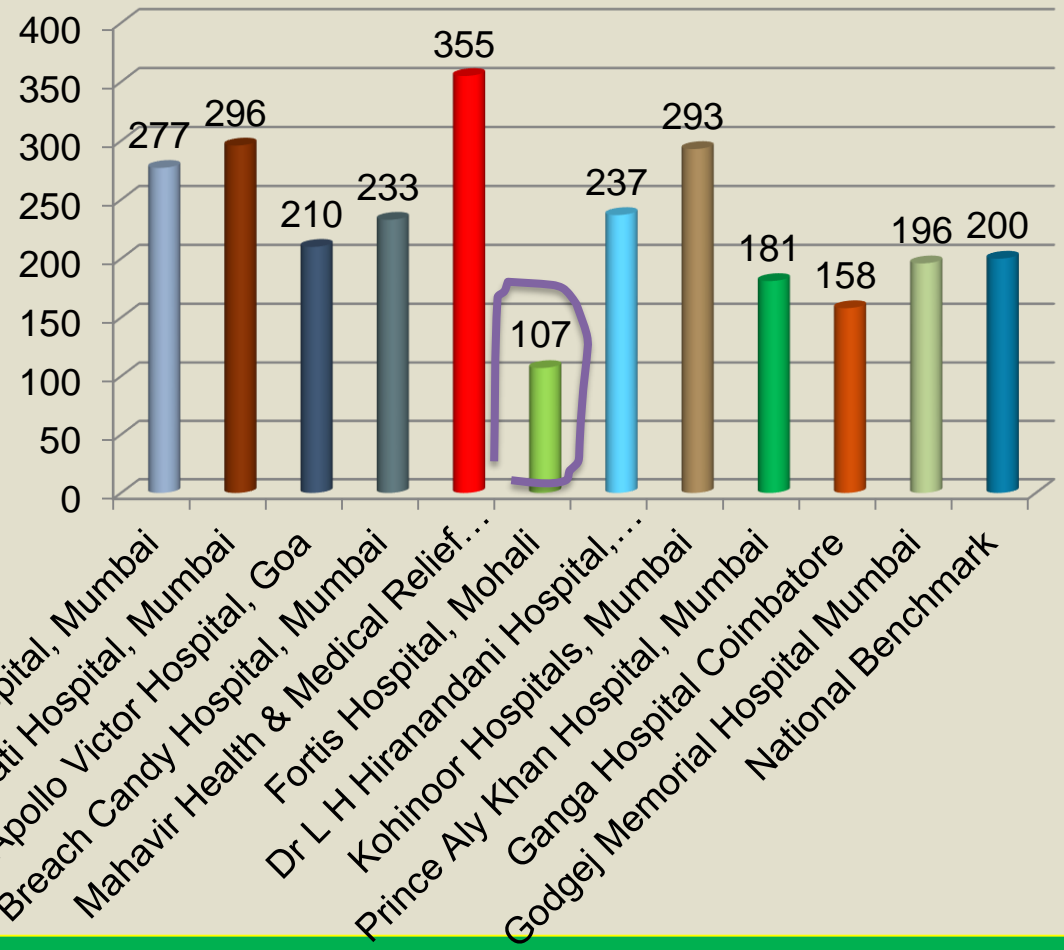
Global benchmarking defined by Serbia, UK and Germany (CIBSE TM 46), (EnEv) 205kWh/m²

Specific Energy consumption of Fortis Mohali is 107 kWh/m² which is 52 % below the global benchmarking and 54% below the National Benchmark

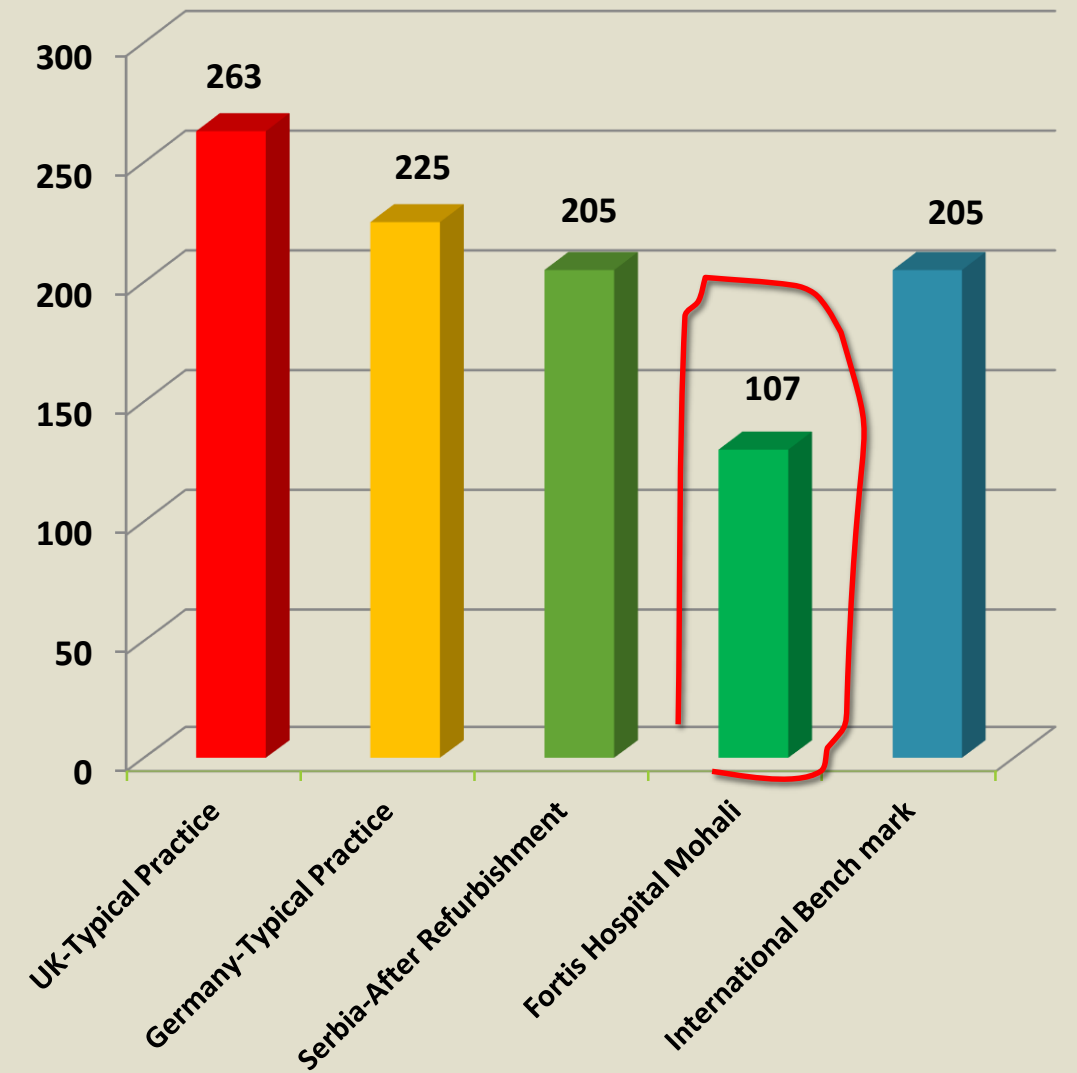
NATIONAL BENCH MARKING (KWH/SQM)

International Benchmarking

Specific Energy Consumption (kWh/Sqm/Year)



Specific Energy Consumption -kWh/Sq.Mtrs./year

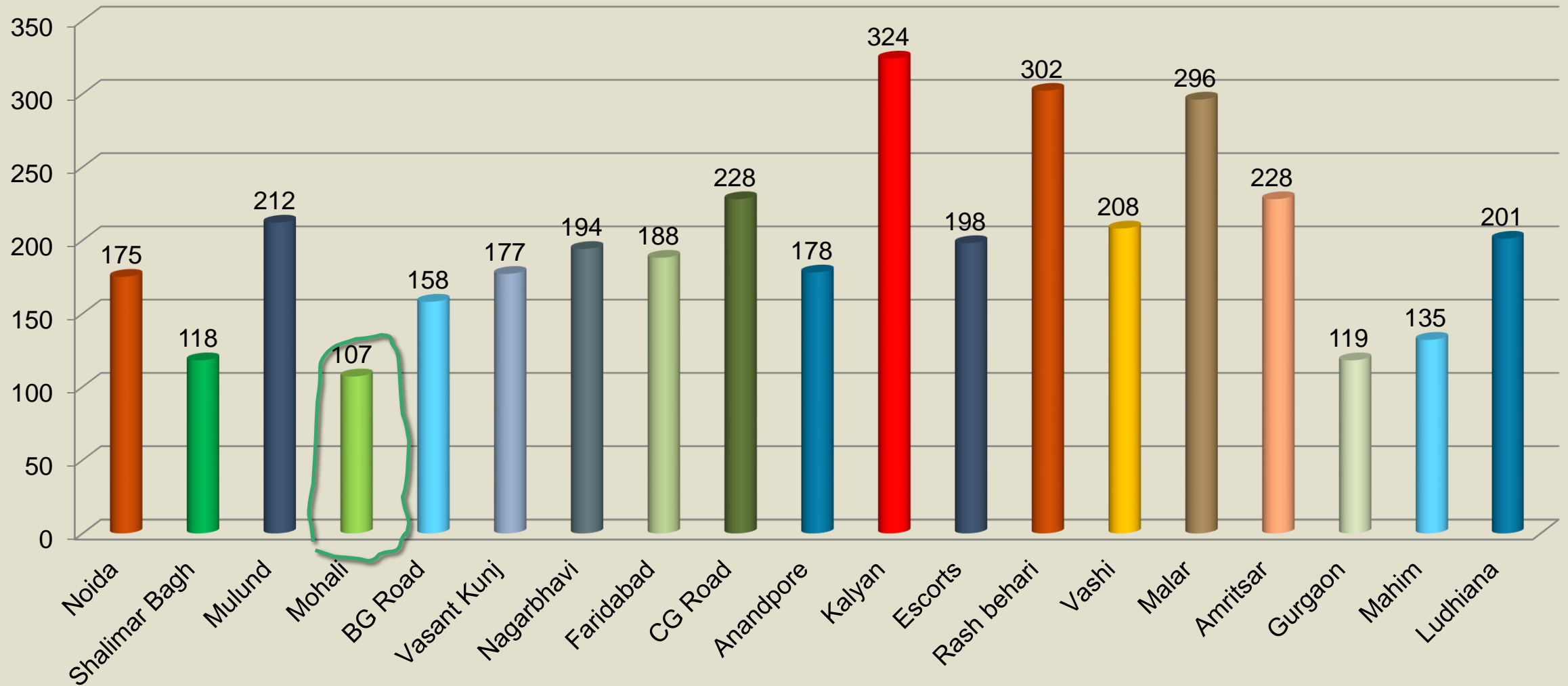


Reference A report on Energy efficient hospitals survey by CII, BEE National benchmark is defined for Hospitals is 200 kWh/m²

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

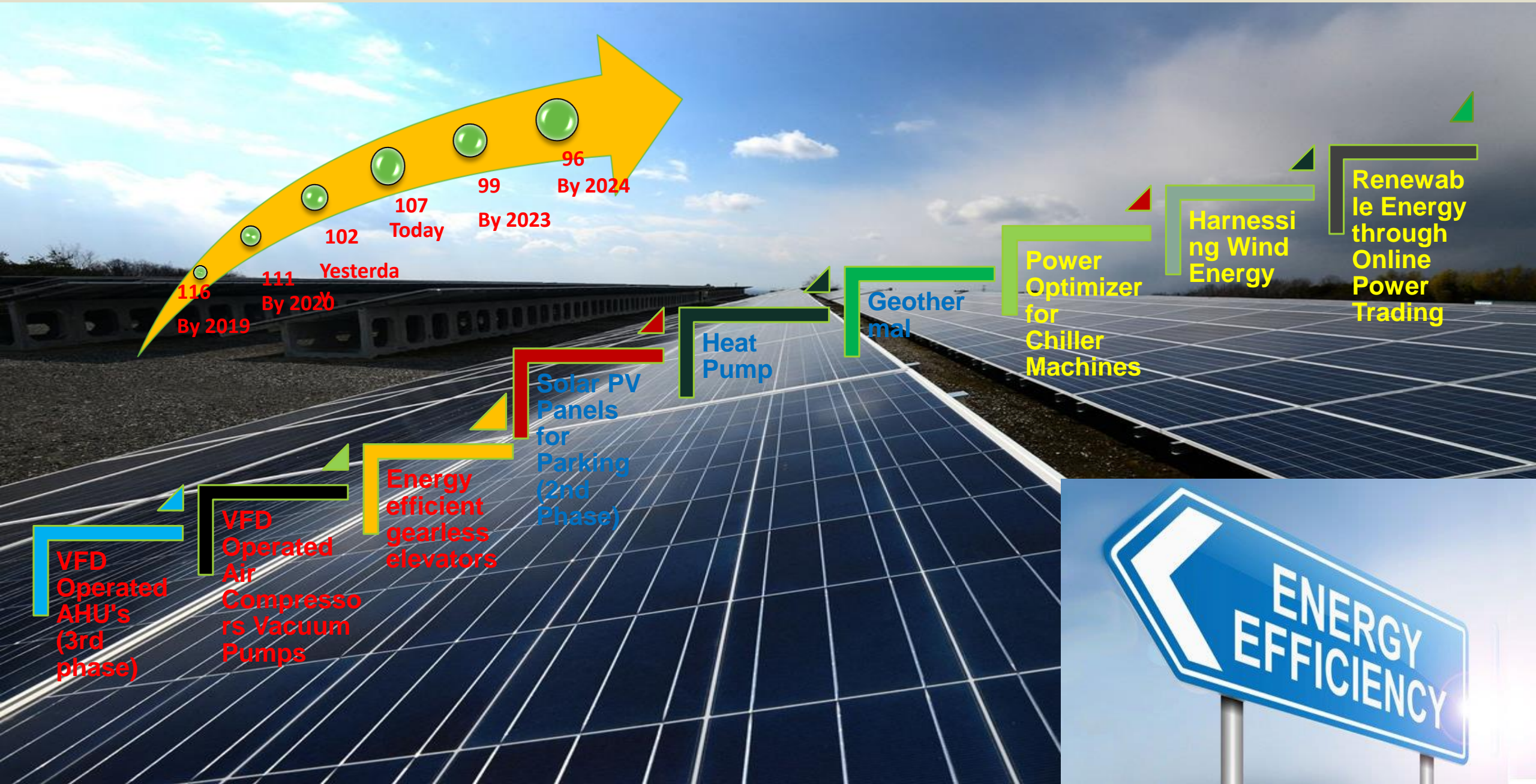
EPI Index across Fortis Hospitals

Energy performance Index



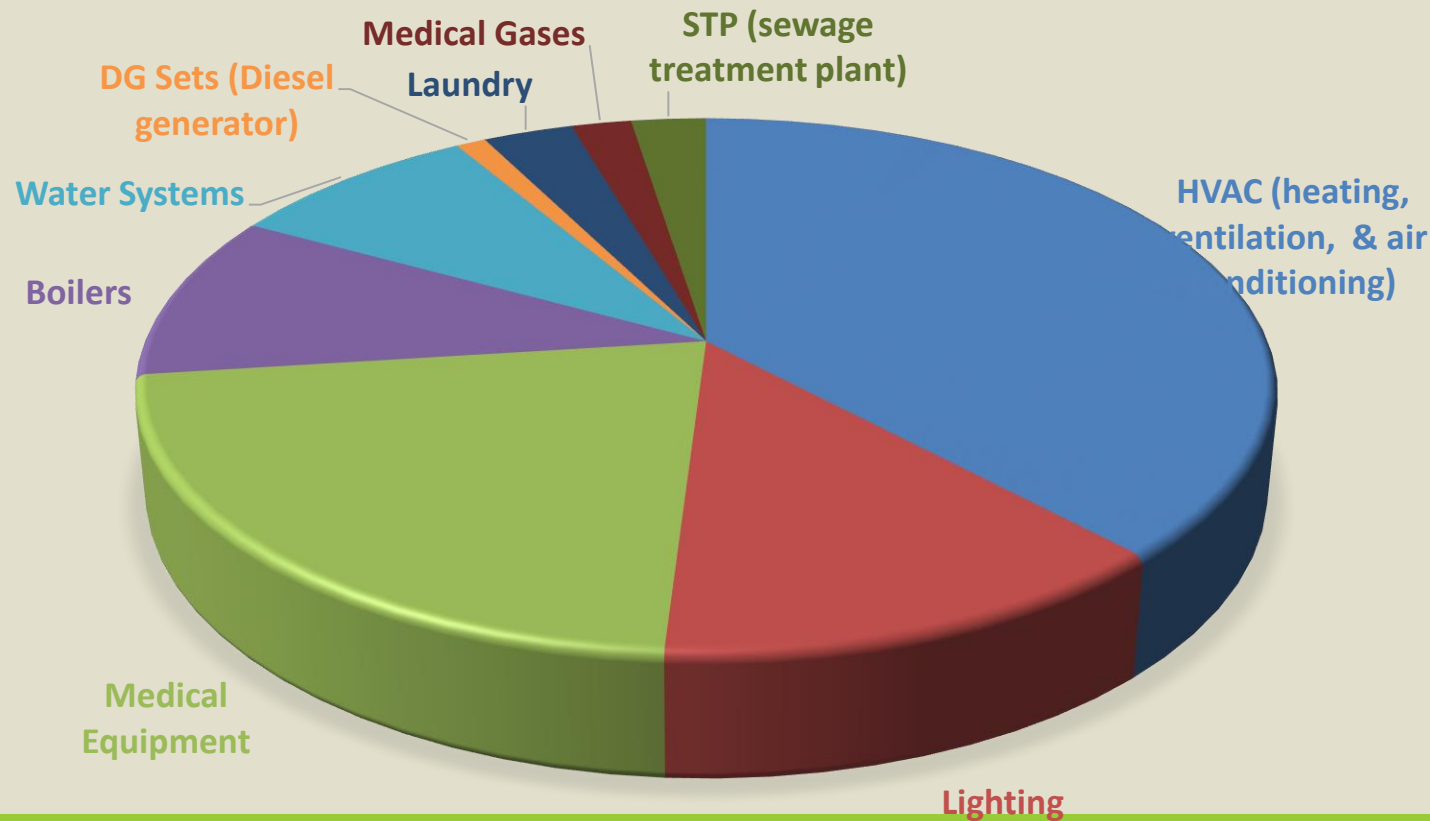
Energy performance Index for Fortis Group Hospitals All Weather

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
HVAC (heating, ventilation, & air conditioning)	41 %
Lighting	9%
Medical Equipment	28%
Boilers	8%
Water Systems	6.5%
DG Sets (Diesel generator)	1%
Laundry	2.5 %
Medical Gases	2%
STP (sewage treatment plant)	2.0%

Our Encon Journey

Best Design Award from American Institute of Architects

1999

2019-20

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 sleep mode automatically

2020-21

1. Double skin AHU with VFD
2. Split AC's replaced with FCU's
3. Humidity controls in OT's
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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

2019-20
EPI 111

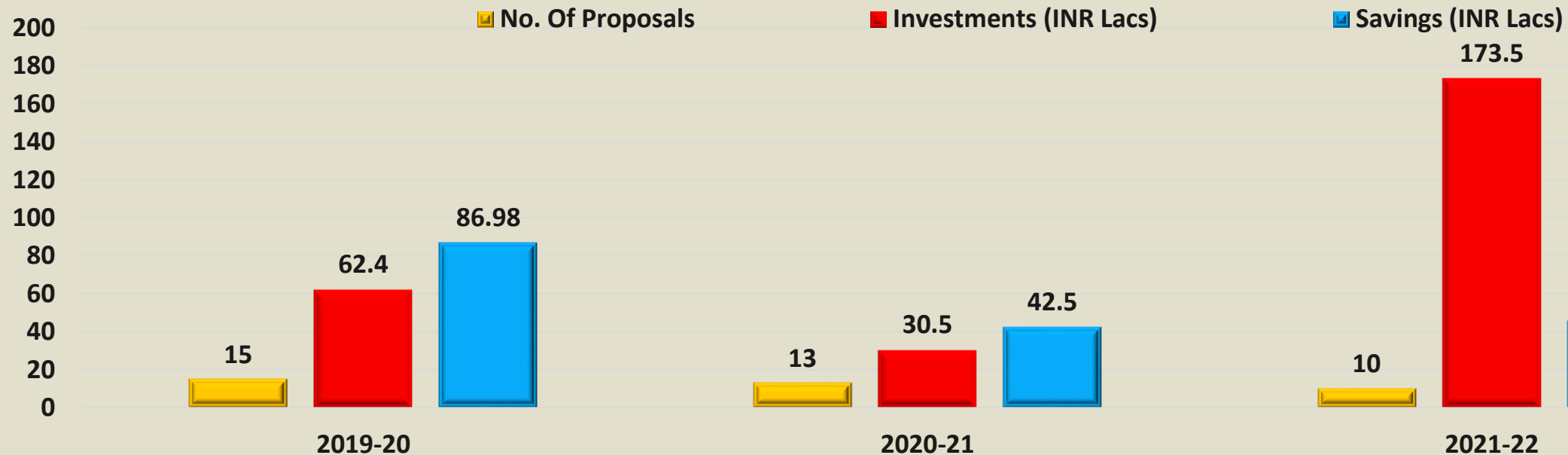
2020-21
EPI 102

2021-22
EPI 107

BEE National Benchmark 200

SUMMARY OF PROJECT IMPLEMENTED IN LAST THREE YEARS

Year	No of Energy Saving Projects	Investments (INR Million)	Electrical Savings (Million kWh)	Thermal Savings Million Kcal/MTOE)	Savings (INR Million)
2019-20	15	6.24	0.746	0.007	8.698
2020-21	13	3.05	0.422	0.015	4.25
2021-22	10	17.35	0.56	0	4.583



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

Best Design Award from American Institute of Architects, 1999

1999

Solar Water Heating System

Solar Photovoltaic Panels

2016

Kitchen Waste Composting

Power Optimizer for reduction of kVAR

2017

PNG for Boilers

Automatic Chiller tube cleaning system

Two OT's ran with one AHU

5 no's VFD Operated AHU's

2018

MBBR Based STP & ETP

Chillers on VSD

2019

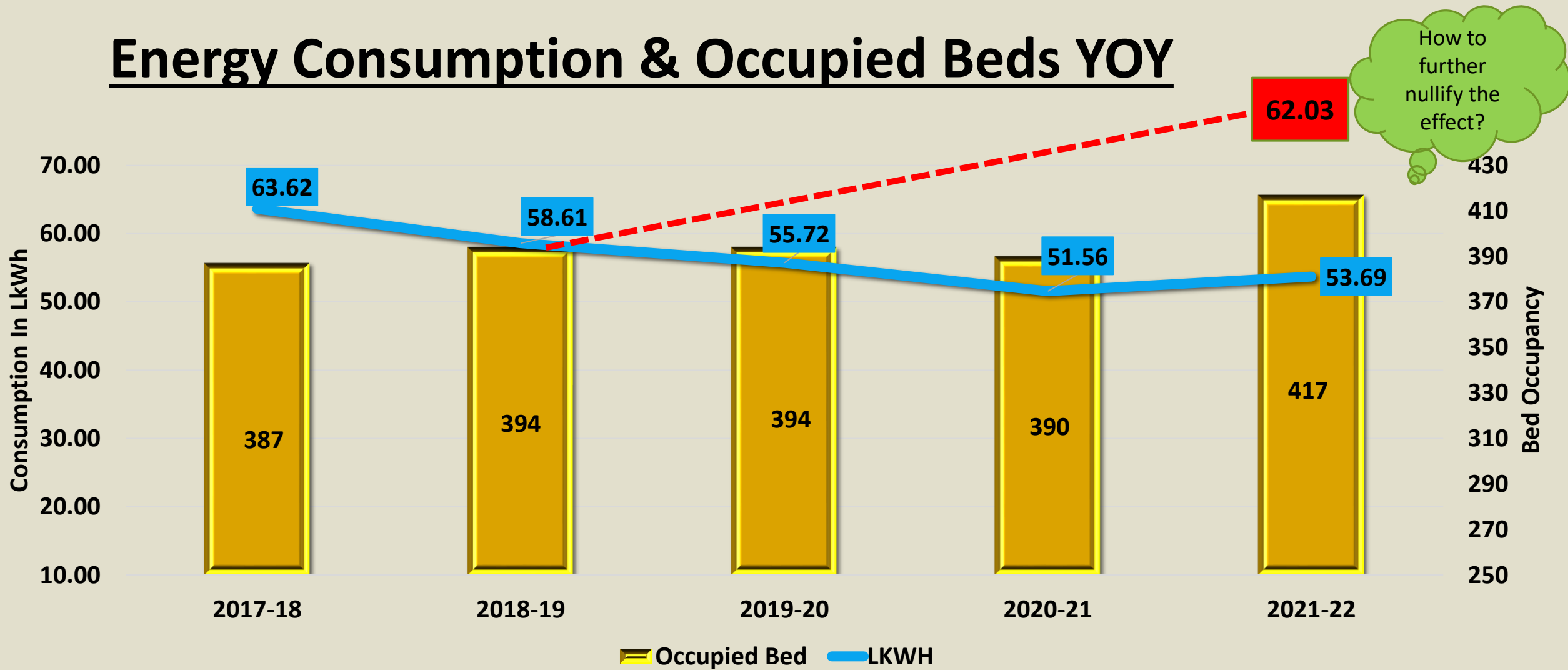
Emergency lights on UPS to remain switched off

2020

Gearless Elevators

2021

Energy Consumption & Occupied Beds YOY



What changed during the last year?

- ✓ Reduction in energy consumption is 8.39% 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 2020-21

Innovative Project (1)

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

Statement:

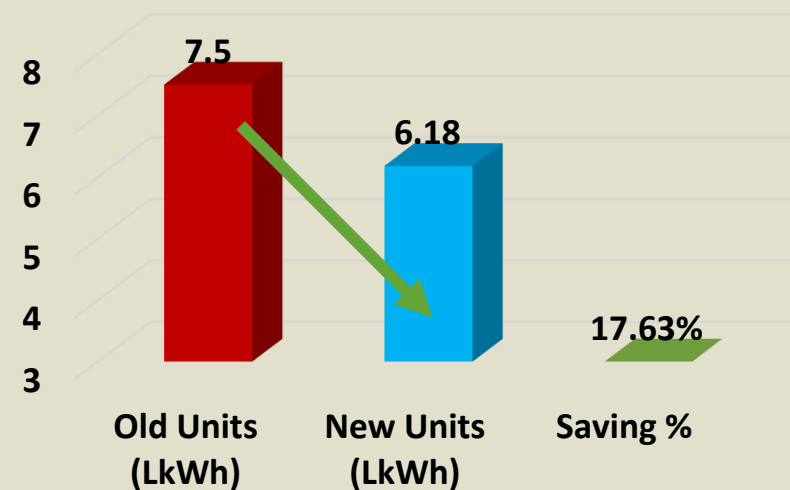
Since the inception of cancer block, energy planning was initiated through ATS i.e. UPS supply was in use for OT/ICU's , in order to conserve energy trials were taken and connected the load to existing central UPS there by resulted in huge savings.



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.

Power Consumption Analysis



Cost Benefit Analysis

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

Innovative Project (2)

Trauma & Vascular OT's chilled water supplies routed through main HVAC Plant pump

Statement: Two OT's were in Cancer block ,hence with separate chilled water pump and line, modified and connected with existing pump for OT's , thereby shutting off one chilled water pump contributed to savings.

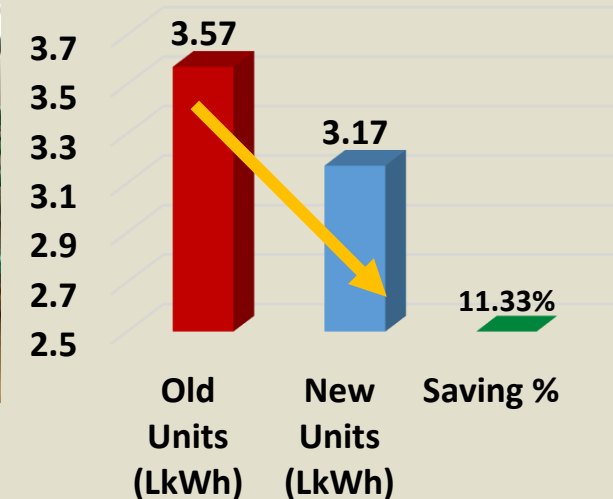
Trigger for implementing the project

It always pains to see wasteful expenditure but one cannot argue the arrangements provided by the execution the projects team to the operations team. Thus identified the gap and planned the activity in lean time over the weekend and did connected with the same old blocks OTs pumps chilled water running line thus saving running of secondary pump to that block.

why innovative: Innovative because Optimum Utilization of equipment was achieved besides a back up is also created in the time of breakdown or preventive maintenance time. Separate pumps were working hence not only putting heat load on to entire plant room but also contributing to higher energy consumption. Decided to place a chilled water line tapping to the main line running for OTs thus not only save energy but also created a stand by for emergency use..



Power Consumption Analysis



Cost Benefit Analysis

Energy Savings	40430kWh
Cost Savings	INR 3.34Lakhs
Investment	INR 1.5Lakhs
Payback	11 Months

Innovative Project (3)

Harnessed fresh air usage in winters for ICU and OTs and Patient rooms thereby chiller running hours were reduced

Statement:

Fresh air usage was not harnessed properly especially for winters. Modifications were done and for ICU's wards & OT's were catered with fresh air besides common areas, resulted in less chiller operation.

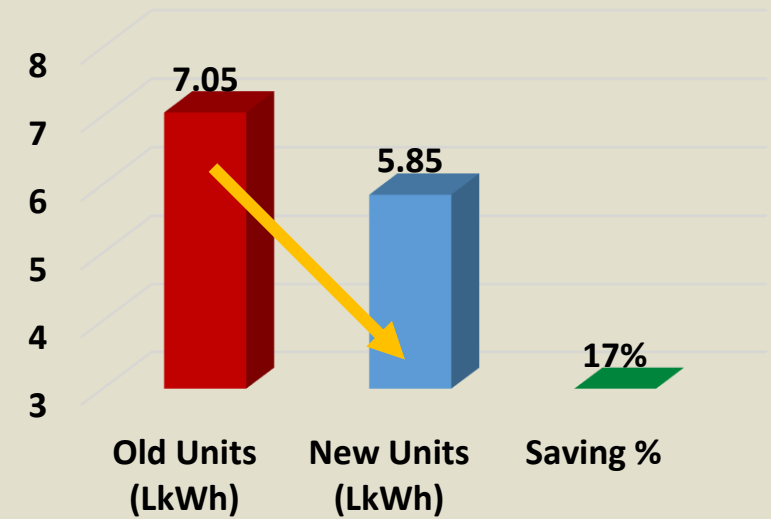
Trigger for implementing the project

Winters are severe for almost one and half months. Many a time it was felt to use the fresh air to stop air conditioning . We tried in OTs and got encouraging results thus thought of replication in ICU and patient areas. Decided to go in for modifications for future in patient lobbies etc as well.

why innovative:

Fresh air utilization in winters was not harnessed to the extent that the chillers get stopped hence decided to utilize fresh air of course with filtrations easily on OTs and got encouraging results. Then went to do replica in ICUs and patient rooms as well resulted in chiller to stop for nearly 2 months and resulted in huge energy savings.

Power Consumption Analysis



Cost Benefit Analysis

Energy Savings	120560kWh
Cost Savings	INR 9.95Lakhs
Investment	INR 1Lakhs
Payback	11Months

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



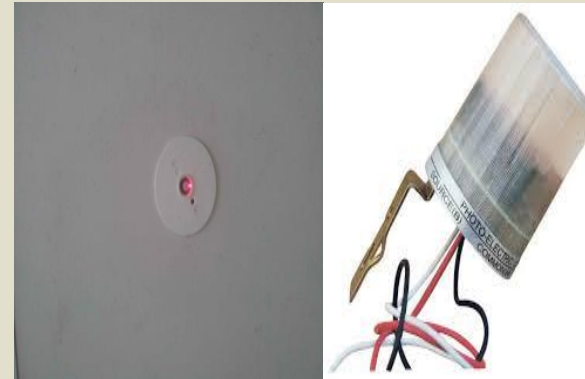
Solar PV Panels



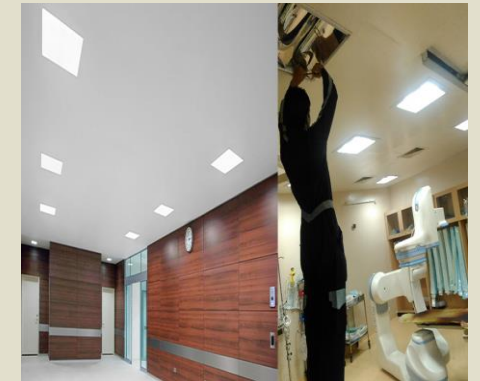
Ahu with EC fans



motion sensors



LED for new areas



Savings of 5.55LkWh Power Units & 455MT CO2e

All Projects have Replication Potential

LIST OF ENERGY CONSERVATION PROJECTS IN 2021-22

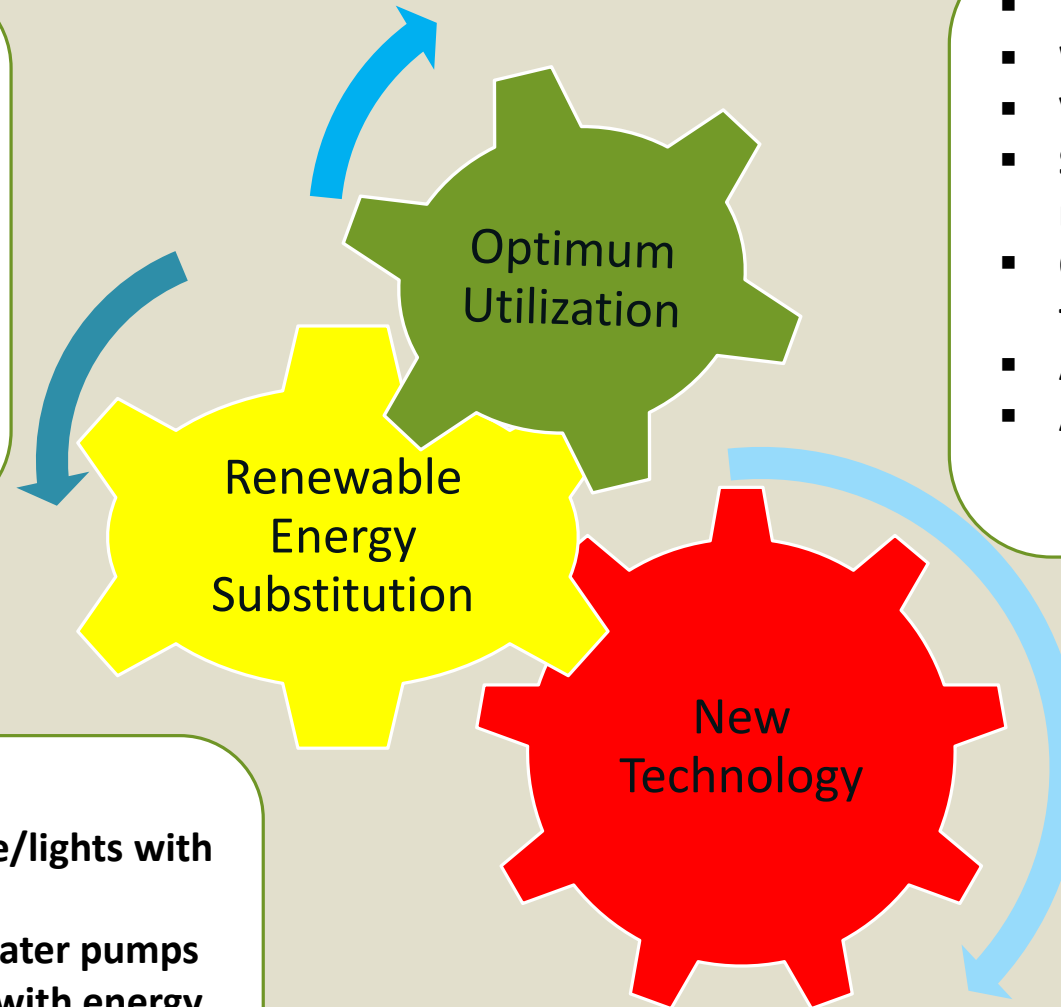
Sr. No	Title of Project	Year	Annual Electrical Saving (kWh)	Annual Thermal Saving (Ton/Year)	Total Annual Savings (Rs million)	Investment Made (Rs million)	Payback (Months)	CO2e Reduction (MT)
1	Energy efficient gearless elevators	2021-2022	67880	0	0.56	6.5	145	55.66
2	Disconnection of 2x80 KVA & 2X20 kVa UPS & given supply through main central UPS	2021-2022	132250	0	1.09	0	0	108.45
3	Trauma & Vascular OTs chilled water supplies routed through main pump	2021-2022	40430	0	0.33	0.15	11	33.15
4	Harnessed fresh air usage in winters for ICU, OT's and Patient rooms thereby chiller running was reduced	2021-2022	120560	0	0.99	0.1	1	98.86
5	5 no's VFD Operated AHU's	2021-2022	54200	0	0.45	3	55	44.44
6	Solar PV Panels for Parking (2nd Phase)	2021-2022	89780	0	0.74	5	81	73.62
7	Ahu replaced with EC fans 1 no's for power savings	2021-2022	19775	0	0.16	1.5	44	16.22
8	Optimized electrical supply by switching off alternate lights /emergency lights, motion sensors in office areas, washrooms	2021-2022	10000	0	0.08	0.1	15	8.20
9	LED for new areas as well	2021-2022	20450	0	0.17	0.3	3	16.77
10	Mercury free hospital	2021-2022	0	0	0.00	0.7	0	0.00
	Total		555325	0	4.58	17.35		455.37

These projects have been replicated in other units

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

- 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



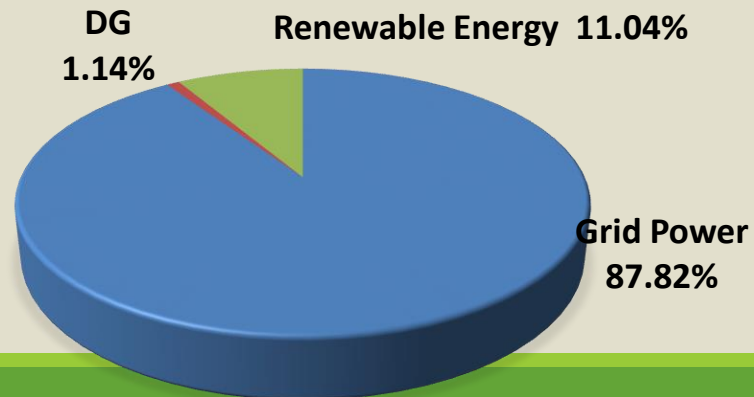
- Energy efficient gearless elevators
- Waste Heat Recovery
- VFD on Identified AHU's
- Sharing one AHU for two OT's during night hours
- OTs chilled water supplies routed through main pump
- Ahu replaced with EC fans
- AHU's with 100% Fresh Air in OT

UTILISATION OF RENEWABLE ENERGY SOURCES

Technology (Electrical)	Type of Energy	Onsite/Offsite	Installed Capacity (Kw)	Generation (LkWh)	% of Overall electrical Energy
2019-20	Solar PV Panels	Onsite	420kW	5.399	8.83%
2020-21	Solar PV Panels	Onsite	420kW	5.459	10.59%
2021-22	Solar PV Panels	Onsite	480kW	5.992	11.04%

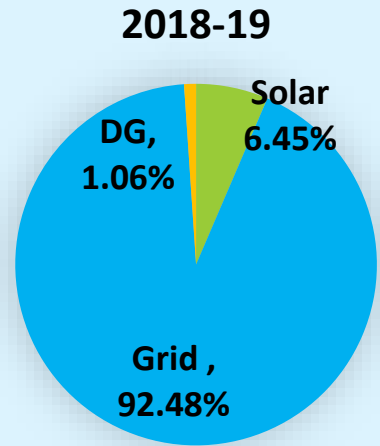
Technology (Thermal)	Type of Energy	Onsite/Offsite	Installed Capacity (kCal)	Usage (LCal)	% of Hot Water Usage
2019-20	Solar Water Heater	Onsite	8000	27.35	68%
2020-21	Solar Water Heater	Onsite	8000	25.55	70%
2021-22	Solar Water Heater	Onsite	8000	22.18	75%

ENERGY CONSUMPTION TREND 2021-22

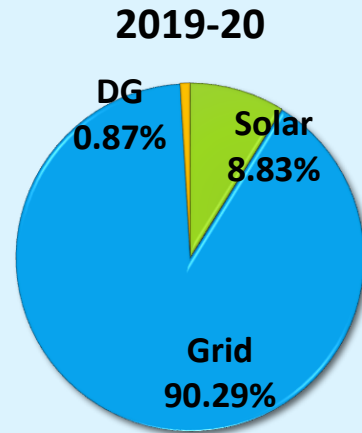


Utilization of Renewable Energy Sources

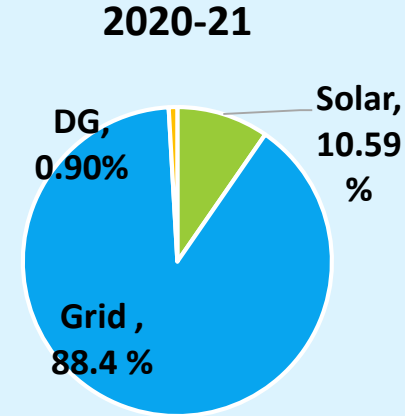
Net Renewable Energy Share



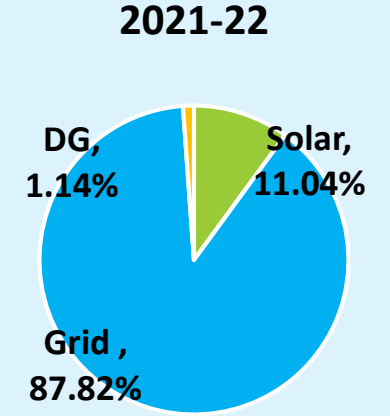
■ Solar ■ Grid ■ DG



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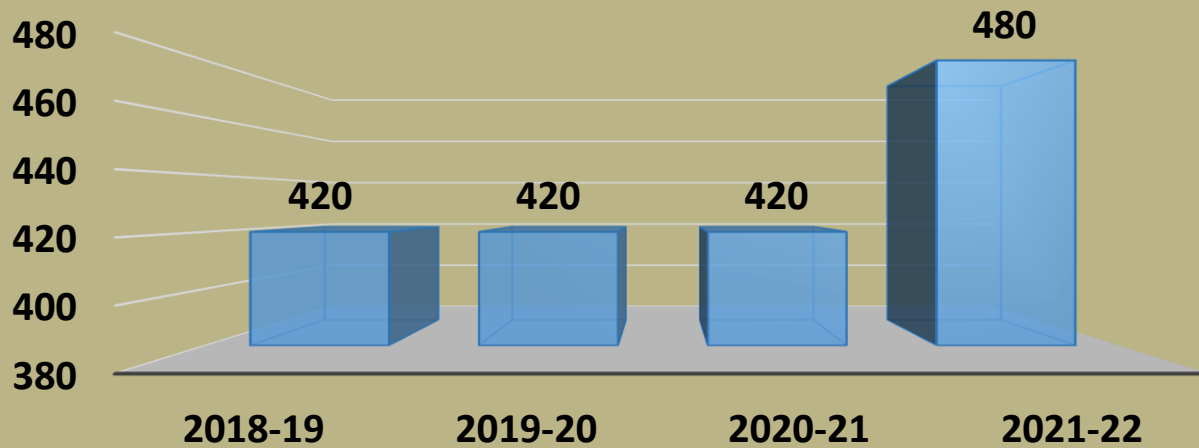


■ Solar ■ Grid ■ DG

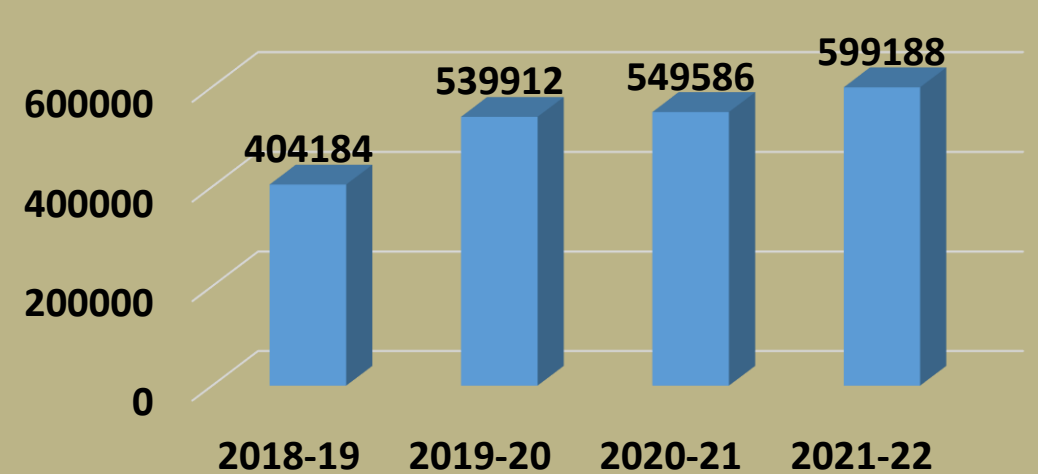


■ Solar ■ Grid ■ DG

Solar : Installed Capacity (kWp)



Solar Generation (kWh)



Results Achieved on Green Initiatives In Last 3 Years

Going the LED way

Outcome:

- 432 Tonnes of CO2
- Equivalent 29,376 trees planted
- Savings in Million Rs.3.39



Solar electricity generation in car parking

Outcome:

- 74 Tonnes of CO2
- Equivalent 4,538 trees planted
- Savings in Million Rs. 0.20



Solar electricity generation Rooftop

Outcome:

- 72 Tonnes of CO2
- Equivalent 4,674 trees planted
- Savings in Million Rs. 0.25



Solar water heating

Outcome:

- 57 Tonnes of CO2
- Equivalent 148 trees planted
- Savings in Million Rs. 1.98

Rain water harvesting pits

Outcome:

- Improved ground water security



Managed through Vendors
Involvement

Reduction of 635MT CO2e by these projects

Utilization of waste material

FHM Generates mainly these type of waste

- Water, Paper, waste oil and E waste.
- Water waste is treated by using STP/ETP and reused in Gardening/Landscaping.
- We use identified vendor for paper, waste oil and E waste for recycling as per state laws.
- Condensation recovery in heating water for daily usage

SEWAGE TREATMENT PLANT



- 500 KLD Sewage Treatment plant with ultra filtration membrane.
- 100% Recycled water using for irrigation, cooling tower and flushing system. Zero discharge

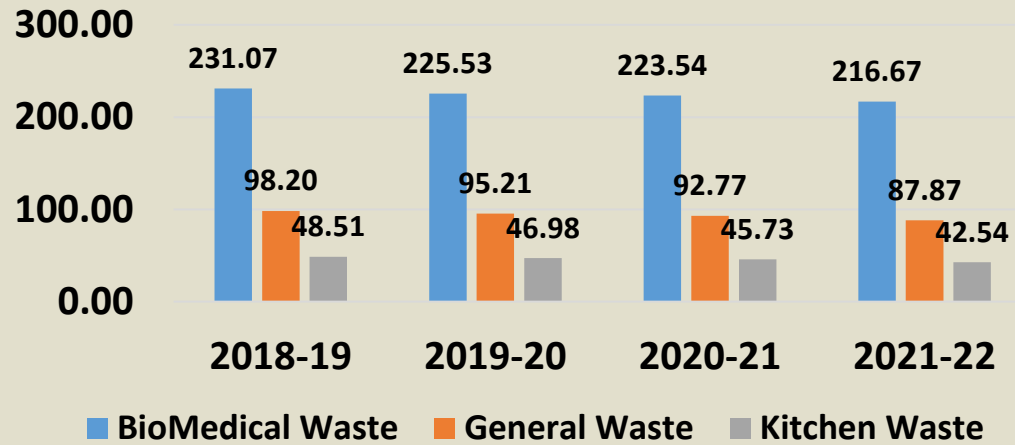
DRY AND WET GARBAGE FROM KITCHEN



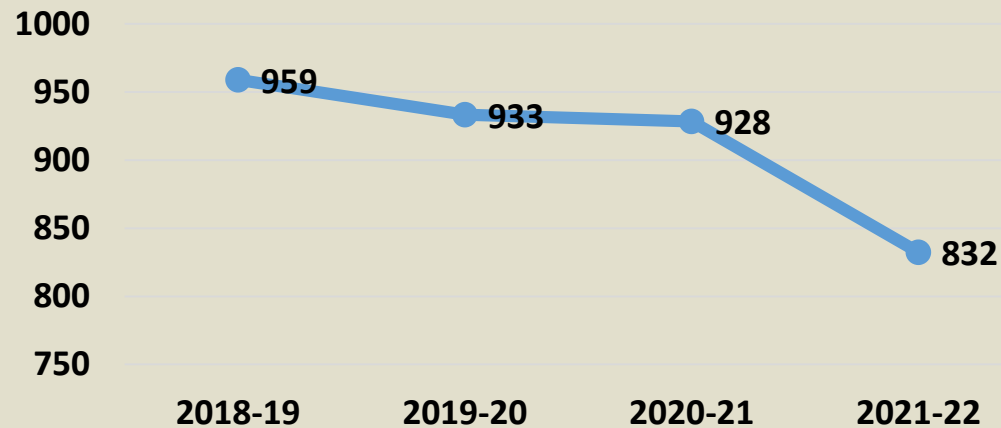
- Segregation of dry and wet garbage at kitchen
- Kitchen waste being used in making manure.
- Dry garbage being composted too and left over being given to authorized persons for making bio gas.

Waste Utilization and Management

Waste Generated in Tonnes



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

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.

2020-21 Project was part of the same corporate budgeting program.

Reduction of 2459CO2e tons from 2018 till 2022.

	FORTIS HOSPITAL, MOHALI	FHM - 1B
	POLICY ON GREEN PURCHASE AND CLEAN HOSPITAL	Page No: 1 of 1
		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

- Environment Management Requirement
- Structural Requirement
- Process Requirement
- 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:-

- Hospital has established monitoring, review & verification of Procedures
- Reports (Third Party Validation)
- Purchasing green products

5.0 Reference:

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

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

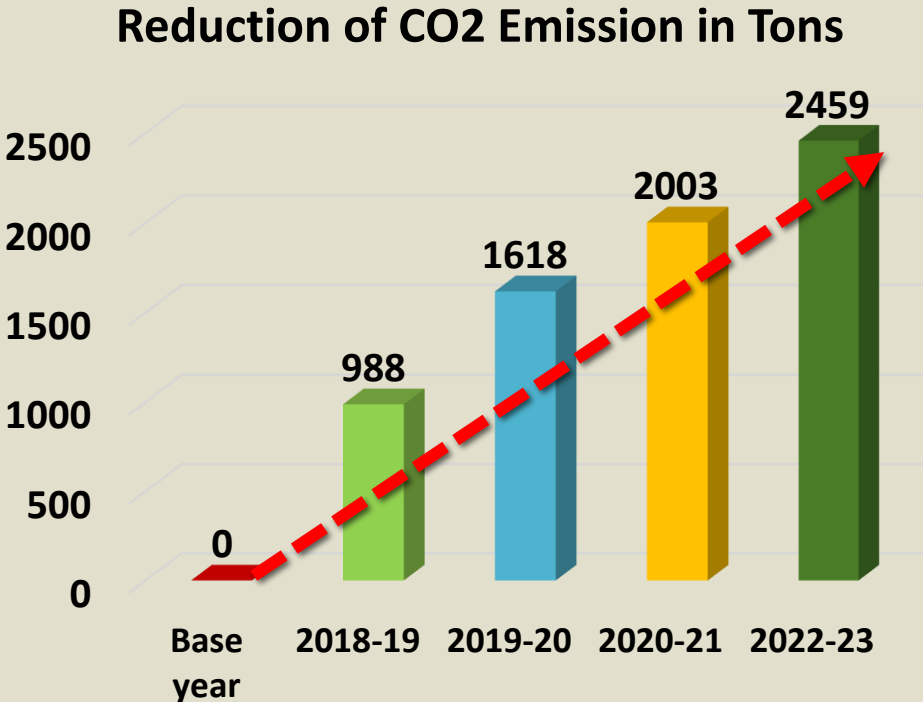
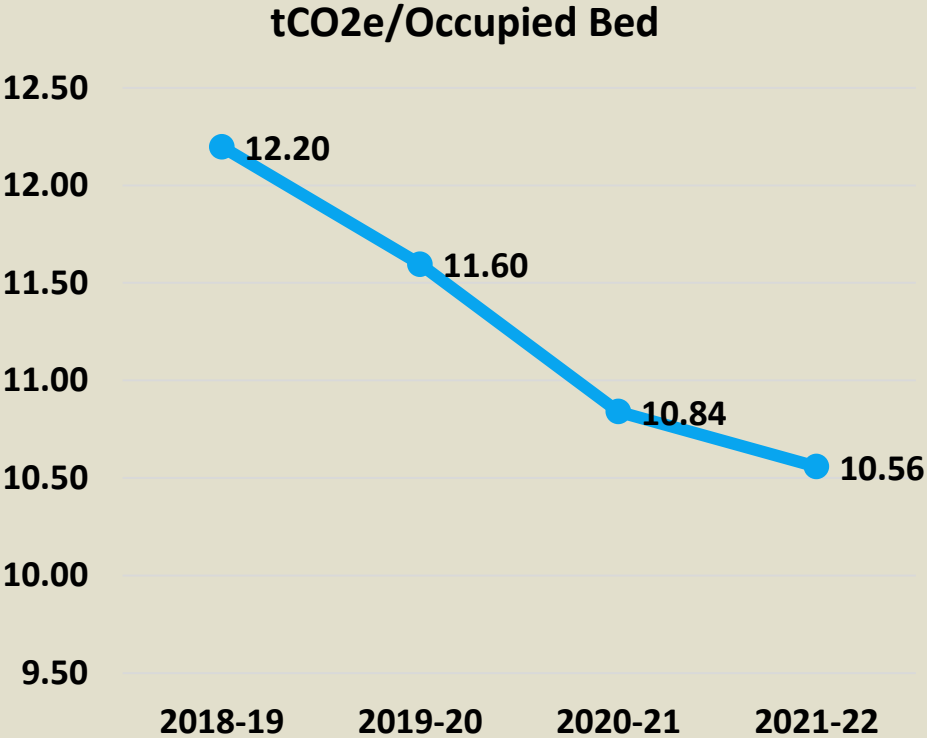
Energy Indirect Emission Scope 2

- 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 13.44% CO2e/bed from 2018-19

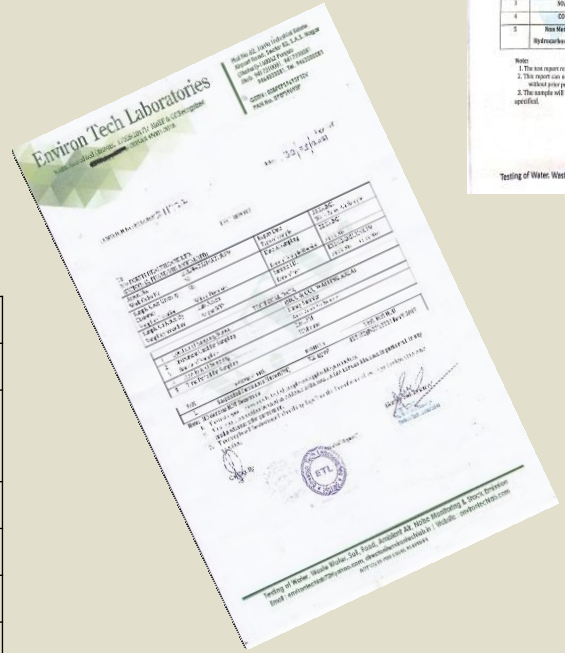
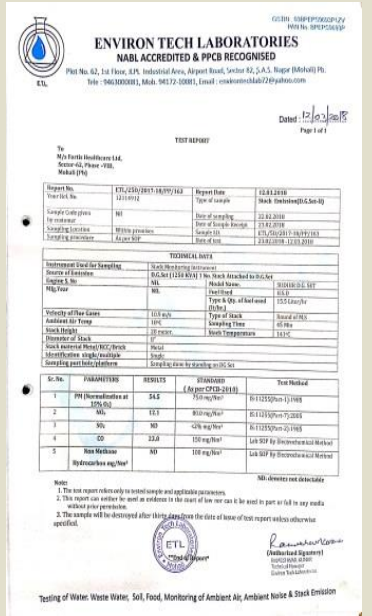
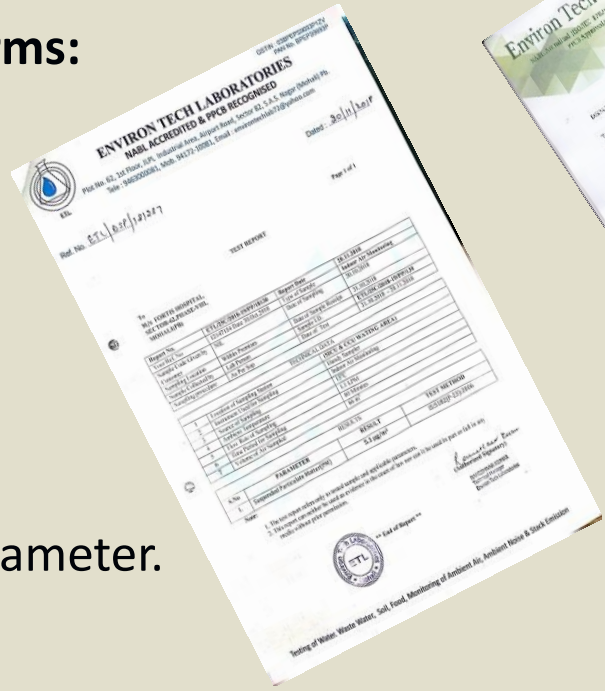
Reduction of 2459 tCO2e from 2018-19

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

100% Compliance against the pollution norms:


- DG Sets Stack monitoring.
- Air Quality monitoring
- 24 hrs Ambient Noise monitoring
- DG Sets Noise monitoring.
- Monitoring & controlling of waste water parameter.
- Monthly drinking water analysis.
- Medical Compressed Air Validation as per ISO 8573-1: 2010 (E)



Sr. no.	Parameters	Results	Standard	Test Method
1	Suspended Particulate Meter(PM)	7.1µg/m ³		IS:5182(P-23):2006 Reaff. 2017
2	Respirable Suspended Particular Meter (PM10)	73.1	100.0µg/m ³	IS:5182(P-23):2006 Reaff. 2017
3	Sulphur Dioxide (SO2)	10.7	80.0µg/m ³	IS:5182(P-2):1999 Reaff. 2001
4	Nitrogen dioxide (NO2)	13.1	80.0µg/m ³	IS:5182(P-6):2006 Reaff. 2017
5	Fine Particulate matter (PM2.5)	39.9	60.0µg/m ³	SOP (ETL/SOP/02-Section-4):2015
6	CO	ND	2.0µg/m ³	IS:5182 (P-10)
7	Lead (pb)	ND	1.0µg/m ³	Lab. SOP (BY AAS)
8	Ozone (O3)	ND	100.0µg/m ³	CPCB Guideline

Green Supply Chain Management

To reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemicals, biological and particulate contaminants which adversely affect air quality, human health, building finishes, building systems and the environment. Management has created its Green Cleaning Policy. Candor aims to progressively move towards 100% sustainable cleaning procedures and products/equipment.

	FORTIS HOSPITAL, MOHALI	FHM - 1B
	POLICY ON GREEN PURCHASE AND CLEAN HOSPITAL	Page No: 1 of 1
		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%26%20Clean%20Hospital.pdf>



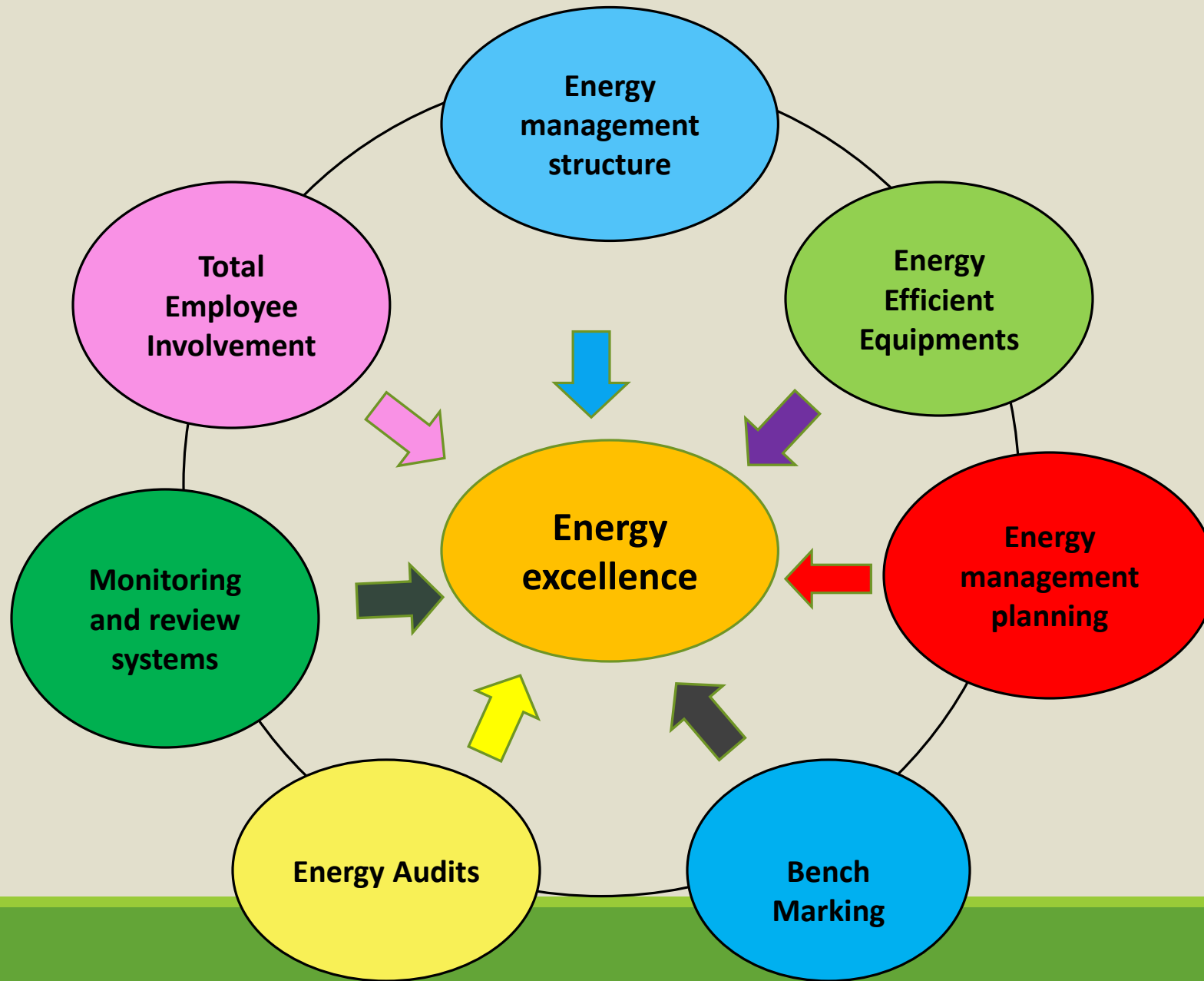
Green Supply Chain Management

Green purchase Policy

FHM is a niche sustainable developer & has adopted sustainable purchase policy encompassing:

- ❖ **Preference for GreenPro products**
- ❖ **Emission reduction - Buy local materials, try to minimize distance between source & project site**
- ❖ **Welfare - Buy CRI certified Material**
- ❖ **Health & safety - Buy low VOC paints, sealants, adhesives**
- ❖ **Staff welfare - Buy GS 37 (or similar) compliant HK chemicals**
- ❖ **Conserve resources - Buy materials having more recycled content**

Energy excellence frame work-FHM



Energy Measurement, Monitoring & Reporting

Energy Performance Review

Continuous Monitoring

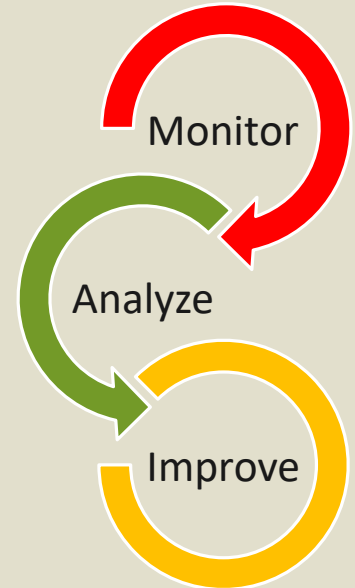
Daily Report Generation

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



Kaizen Initiatives by in-house Technicians & Supervisors Team

**PF maintained
between 0.99 to 1**



**Conventional
lights replacement
with LED**



**Battery Operated
Emergency lights in
Corridors/stairs**



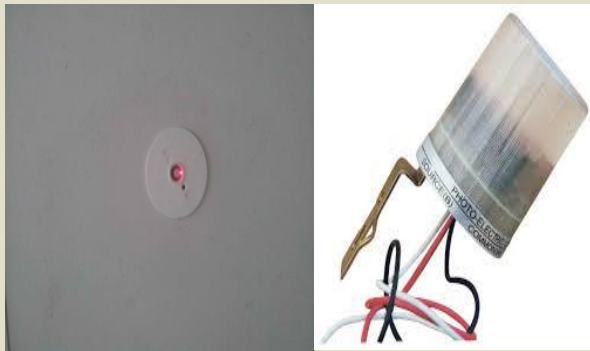
**Limit Switch for Air curtains
and Fire shaft Door**



**Damaged pedestal fan
converted into wall
mounted fan in
engineering Area**



motion sensors



**Timer Controller for
peripheral lighting**



**Motion Sensor for
corridors**



WATER – CONSERVATION METHODOLOGY

Use of New Technology

Automated Water Taps

Sprinkler System for Irrigation

Automated Urinals

Water Recycling

STP Plant

ETP Plant

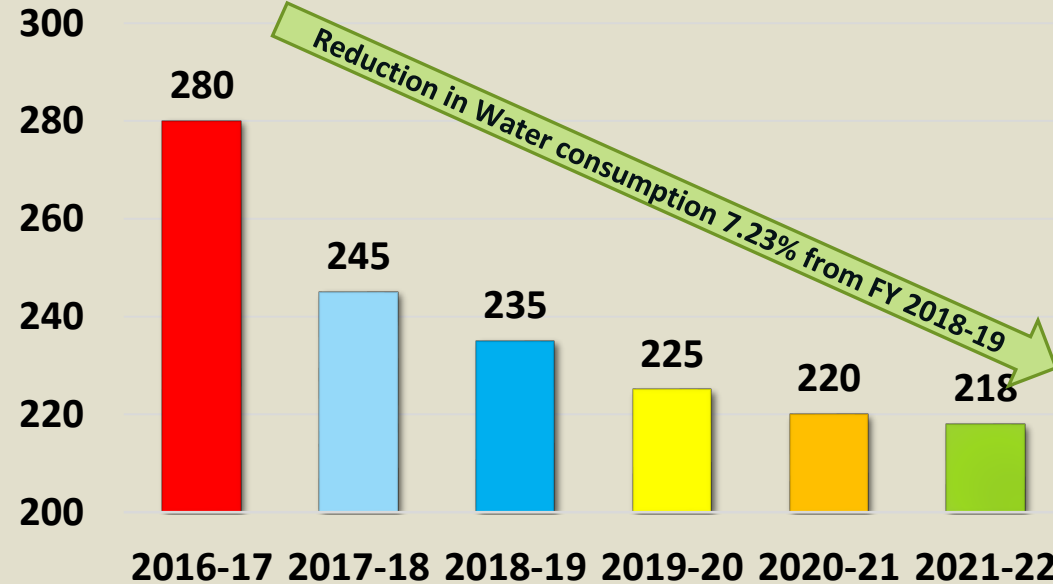
UV/SOFTNER in STP

RO Reject Water

Water Less Urinals - Bio Tabs



Water Consumption Trend KL/Day



Efficiency Improvement

Benchmarking

Auditing

Monitoring & Analysis

Improving

Renewable Substitution

Rain Water Harvesting

Municipal Waste Water Treatment and Reprocessing

Innovation

MGF Backwash

AHU Condensate

Cooling Tower blow down Reuse

Water Flow Restrictors



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.**
- **Software tool for calculating GHG emission under the 3 categories.**
- **Interaction with professional peers of other buildings & implemented new idea.**
- **Hospital buildings are different with regard to energy usage in other buildings.**
- **Clarity on EPI/SEC & Contribution to Nation Building**

Globally Green: Healthcare

BEST PRACTICES FOLLOWED

- Natural lighting in patient areas
- Green house keeping
- Better Indoor Air Quality
- Sound Reduction
- Mercury free hospital
- 10%-15% Energy savings
- 5-10% water savings
- Good day lighting
- No sick building syndrome
- Faster patient recovery



ENCON EFFORTS: Key Impact

Area	Key Impact
Energy Efficiency	<ul style="list-style-type: none">• 8.39% reduction achieved in last 3 years
Water Conservation	<ul style="list-style-type: none">• 7.23% reduction in last 3 years
Renewable Energy	<ul style="list-style-type: none">• Using 11.04 % Renewable Energy
GHG Reduction	<ul style="list-style-type: none">• 13.44% Reduction in GHG Emission since last 3 years
Waste Management	<ul style="list-style-type: none">• 100% Kitchen waste being used to make manure
Green Supply Chain	<ul style="list-style-type: none">• Environment friendly HK/Cleaning agents & Chem.
Others	<ul style="list-style-type: none">• 3 Project recognized as innovative projects• Started use of Eco friendly HK chemical and paints

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

Long Term Vision On Energy Efficiency

- ❖ We aim at bringing down our SEC of 107 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

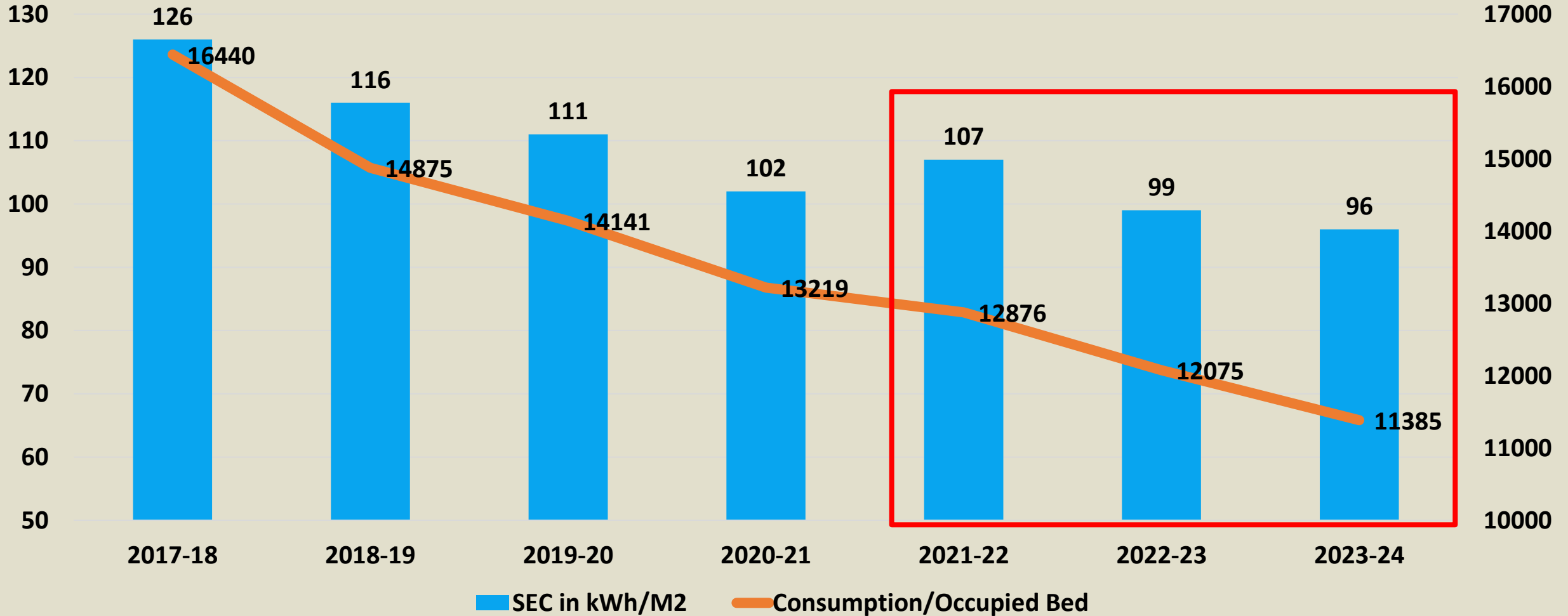
Energy managers and technical support available for FHM

ENCON PROJECTS PLANNED IN FY 2022-24

Year	Description
2022-2023	Energy efficient elevators/cooling towers
2022-2023	Open access power source
2022-2023	Geothermal for chilled ground water
2022-2023	VSD Chiller
2022-2023	OT AHU's replacement
2023-2024	VFD Operated AHU's (3rd phase)
2023-2024	Heat Pump for Hot Water
2023-2024	Power Optimizer for Chiller Machines
2023-2024	Harnessing Wind Energy
2023-2024	Renewable Energy through Online Power Trading

Going Forward

Road map for 2021-2023



FHM Awards & Recognition



NABH Nursing Excellence- 2016

**AHPI Award for Quality Beyond Accreditation -
2019,2020**

**BEE NATIONAL ENERGY
CONSERVATION AWARD 2015**

**State Energy Conservation Award PEDAA-
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**

**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**

