*Ten Hospitals*
*Ten Journeys*
*One Mission*

# Advancing Green and Sustainable Healthcare

A Compendium of Case Studies from India's Private Health Sector

# *Advancing Green and Sustainable Healthcare*

## A Compendium of Case Studies from India's Private Health Sector

**2026 EDITION**

*Institutions created to heal us cannot continue to contribute to the environmental harms that make people sick...*

# From Footprint to Frontline

*Emily Bancroft*

**CEO, Health Care Without Harm**

Health Care Without Harm is proud to collaborate with the Public Health Foundation of India in the development of this compendium, which powerfully documents the vital role of the healthcare sector in addressing the global climate crisis.

The climate crisis is a public health emergency, and health systems are at the frontline. Institutions created to heal us cannot continue to contribute to the environmental harms that make people sick - nor can they falter as climate-driven disasters intensify. Health systems must rapidly reduce their environmental footprint while strengthening their ability to deliver care before, during, and after climate shocks. Climate-resilient healthcare is not optional; it is fundamental to protecting patients, safeguarding communities, and upholding the sector's healing mission.

The compendium is a practical resource that shares real-world examples from hospitals in India to inspire and motivate health facilities worldwide. By highlighting these experiences, this compendium supports peer learning and helps accelerate the adoption of climate-resilient practices across the health sector. The wide range of solutions featured reflects the complexity of India's health system and offers valuable lessons for all countries and contexts, regardless of resource levels or operating environments.

We commend the collaborative efforts of the Public Health Foundation of India – Centre for Environmental Health (PHFI-CEH) and the Health and Environment Leadership Platform (H.E.L.P.) network for bringing together and elevating these hospital-led experiences.  This compendium is more than a collection of case studies - it is a demonstration of what is possible when health systems step forward with urgency and innovation. We encourage leaders, policymakers, and practitioners around the world to draw from these experiences, adapt them to their own contexts, and accelerate progress toward resilient health systems that protect both people and planet.

*“Healthcare professionals are not only caregivers but also trusted community leaders.*

# Not Only Caregivers

*Dr. Alexander Thomas*

Chairperson, Health & Environment Leadership Platform (H.E.L.P.)

Climate change has emerged as one of the most pressing challenges confronting health systems today. Hospitals are increasingly required to respond to climate-related health risks while ensuring continuity of care, patient safety, and operational efficiency. At the same time, the healthcare sector must acknowledge and address its own environmental footprint. This dual responsibility calls for leadership, collaboration, and practical action.

Despite growing evidence on the health impacts of climate change, awareness and engagement among healthcare professionals remain inadequate. This gap underscores the urgent need to sensitise, educate, and empower healthcare leaders and practitioners to recognise climate change not merely as an environmental issue, but as a critical public health and healthcare delivery concern.

The Health and Environment Leadership Platform (H.E.L.P.) was established to provide such leadership by bringing together healthcare institutions committed to environmentally responsible and climate-resilient care. Over the years, the H.E.L.P. network has evolved into a vibrant community of hospitals that learn from one another, share innovations, and demonstrate that sustainability is achievable across diverse healthcare settings in India.

This compendium reflects the collective efforts of H.E.L.P. member hospitals that have translated intent into action. The case studies presented here highlight pragmatic, locally relevant solutions—ranging from energy efficiency and renewable energy adoption to water conservation, waste management, and resilient infrastructure. Together, they illustrate how environmental stewardship can be integrated into routine hospital operations while enhancing quality of care and patient well-being.

The HELP network was established through a collaboration between the Public Health Foundation of India's Centre for Environmental Health (PHFI-CEH) and Healthcare Without Harm (HCWH). This compendium, developed under their leadership, reflects a collective commitment to advancing sustainable healthcare in India. It serves as both a source of inspiration and a practical guide for hospitals looking to begin or enhance their sustainability journey.

Healthcare professionals are not only caregivers but also trusted community leaders. As such, we have a moral and professional responsibility to champion actions that protect the planet—not only for present needs, but for the health and well-being of future generations. By leading through example, healthcare institutions can influence communities, policymakers, and systems to place planetary health at the heart of public health discourse.

As the H.E.L.P. network continues to grow, so does the opportunity to accelerate collective learning and system-wide transformation. It is our hope that this compendium encourages healthcare leaders across the country to adopt, adapt, and scale proven strategies—strengthening resilience, reducing environmental impact, and contributing to a healthier future for communities and the planet alike.

*Sustainability in healthcare is not confined to large institutions or high-resource settings.*

PREFACE

# From Practice to Policy

*Professor Sanjay Zodpey*

**President, Public Health Foundation of India**

The Indian healthcare sector is increasingly confronted with the dual challenge of responding to growing health needs while addressing its environmental footprint. Hospitals operate continuously, consume significant energy and water, and generate substantial waste - placing them at the centre of both climate vulnerability and climate responsibility. Recognising this critical intersection, the **Centre for Environmental Health (CeH) at the Public Health Foundation of India (PHFI)** has initiated this compendium to document and disseminate practical, evidence-based sustainability solutions from across the healthcare sector.

Developed as a **collaborative effort with the Health and Environment Leadership Platform (H.E.L.P.) network**, and with the support of **Health Care Without Harm (HCWH)**, this compendium reflects PHFI's commitment to advancing climate-resilient and environmentally responsible healthcare systems in India. **PHFI brings together these case studies to highlight** how healthcare institutions are translating sustainability principles into actionable, context-specific practices that deliver environmental, operational, and patient-care benefits.

The case studies presented here represent hospitals of varying sizes and capacities that have adopted innovative approaches to energy efficiency, water conservation, waste management, and green infrastructure. These experiences demonstrate that sustainability in healthcare is not confined to large institutions or high-resource settings, but can be achieved through thoughtful planning, leadership engagement, and locally appropriate solutions.

By systematically compiling these experiences, this compendium aims to create a shared knowledge platform that encourages peer learning and informed decision-making across the healthcare sector. **PHFI brings you these case studies** as a practical resource for healthcare leaders, practitioners, policymakers, and public health professionals seeking to strengthen resilience while reducing environmental impact.

As climate risks continue to intensify, the need for collective action within the healthcare sector becomes increasingly urgent. This compendium aspires to inspire wider adoption of sustainable practices and foster a culture of environmental leadership across India's healthcare system—contributing to a healthier future for both people and the planet.

*“Environmentally sustainable healthcare is not an abstract ideal, but a practical, achievable approach.*

# Innovation in Every Context

*Dr. Raj Shankar Ghosh*

**Senior Advisor, PHFI-CEH**

Across India, hospitals are increasingly demonstrating that environmental sustainability can be integrated into everyday healthcare delivery. In India, where hospitals operate across diverse geographies, resource contexts, and patient needs, this challenge has become an opportunity for innovation. The Compendium of Good Practices in Delivering Environmentally Sustainable Healthcare brings together inspiring examples from the Healthy Environment Leadership Platform (HELP) network of hospitals, demonstrating how environmental responsibility can be embedded into everyday healthcare delivery.

The case studies documented in this compendium span hospitals in smaller cities, emerging urban centres, and large metropolitan cities across India. Despite differences in scale and context, these hospitals share a common commitment to providing healthcare that is efficient, equitable, economical, and ethical, while consciously reducing environmental impact. Their experiences illustrate that environmentally sustainable healthcare is not an abstract ideal, but a practical, achievable approach that strengthens health systems and improves patient care.

A key learning from this documentation process is the emphasis on context-sensitive design. Hospitals have thoughtfully adapted good practices to local needs, constraints, and opportunities—often demonstrating remarkable innovation. Equally important is how these innovations have been integrated into routine operations rather than remaining isolated pilots. Many hospitals have also taken steps to measure outcomes and impacts, creating evidence that supports learning, continuous improvement, and potential scale-up.

I encourage readers to share this compendium widely within their professional and hospital networks and to consider adopting and adapting the good practices highlighted here to advance environmentally sustainable healthcare delivery.

# Contributors

**Case Study Development and Documentation Team**

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**Editorial and Design Support**

Dr. Kaushik Ghosh

# Acknowledgment

This compendium is founded on the generous contributions of hospitals that shared their experiences, data, and operational insights on environmental sustainability and climate resilience. We sincerely thank all participating hospitals, whose leadership, facility managers, ESG teams, engineers, clinicians, and support staff documented real-world challenges and solutions, enabling the development of practical and context specific case studies from across India.

We acknowledge the Health and Environment Leadership Programme (H.E.L.P.) network for providing strategic leadership and coordination throughout the process. The network played a key role in facilitating hospital engagement, strengthening peer learning, and fostering collaboration among institutions committed to environmentally responsible healthcare.

We also acknowledge the support of Health Care Without Harm, whose global experience and technical perspectives helped strengthen the environmental focus of this compendium and align it with international best practices.

Special recognition is extended to the technical teams and frontline staff within participating hospitals who implemented and sustained the initiatives described, often alongside routine service delivery. Their efforts demonstrate that climate action in healthcare is achievable through practical, locally grounded solutions.

This compendium is intended as a shared resource to inform policy, guide practice, and support the wider adoption of sustainable and climate-resilient healthcare across India.

# Abbreviations

| | |
|---|---|
| AC | Air Conditioner |
| AHPI | Association of Healthcare Providers India |
| AHU | Air Handling Unit |
| AI | Artificial Intelligence |
| BEEP | Building Energy Efficiency Project |
| BEE | Bureau of Energy Efficiency |
| BLDC | Brushless Direct Current |
| BMS | Building Management System |
| CEH | Centre for Environmental Health |
| CFL | Compact Fluorescent Lamp |
| $CO_2$ | Carbon Dioxide |
| CSU | Ceiling Suspended Unit |
| DMAIC | Define, Measure, Analyse, Improve, Control |
| ECBC | Energy Conservation Building Code |
| ECM | Energy Conservation Measure |
| ECO Bench | Energy Conservation Opportunity Benchmarking Tool |
| ETP | Effluent Treatment Plant |
| FCU | Fan Coil Unit |
| GGHH | Global Green and Healthy Hospitals |
| H.E.L.P. | Health and Environment Leadership Platform |
| HCWH | Health Care Without Harm |
| HVAC | Heating, Ventilation and Air Conditioning |
| IoT | Internet of Things |
| KLD | Kilolitres per Day |
| kWh | Kilowatt-hour |
| LED | Light Emitting Diode |
| Mcal | Megacalories |
| MoU | Memorandum of Understanding |
| PHFI | Public Health Foundation of India |
| PICV | Pressure Independent Control Valve |
| PNG | Piped Natural Gas |
| PV | Photovoltaic |
| SEC | Specific Energy Consumption |
| SCM | Standard Cubic Metre |
| STP | Sewage Treatment Plant |
| UPS | Uninterruptible Power Supply |
| VFD | Variable Frequency Drive |
| ZLD | Zero Liquid Discharge |

# Table of Content

## ARRANGEMENT OF CASE STUDIES

The case studies in this compendium are presented in alphabetical order of the participating institutions/facilities.

The order of presentation does not reflect priority, performance, scale, or level of achievement, and is intended solely to ensure neutrality and ease of reference.

## KEY DEFINITIONS

**Small mid and large hospitals:** Hospitals with up to 50 beds are considered small, those with 51–200 beds medium, and those with more than 200 beds large. This classification follows common industry practice and is used to make comparisons easier.

**Climate-resilient health systems (WHO, 2015; WHO, 2023) and hospitals** are those that can anticipate, respond to, cope with, recover from, and adapt to climate-related stresses and shocks while continuing to provide quality care

**Environmentally sustainable (or climate-responsible) facilities** also optimize resource use and minimize environmental harm.

Together, these approaches are often referred to as **climate-smart**, integrating resilience and sustainability to protect health in the face of climate change.

# Introduction

The Indian healthcare sector is increasingly challenged by the impacts of climate change while simultaneously contributing to environmental degradation through high energy use, water consumption, and waste generation. Although several hospitals have begun adopting sustainable practices, these efforts often remain fragmented, limiting opportunities for shared learning and scale. This compendium addresses this gap by documenting evidence-based sustainability initiatives undertaken by private healthcare facilities across India.

By systematically presenting ten case studies from hospitals within the H.E.L.P. network, the compendium builds a practical repository of locally adapted, climate-responsive solutions. The documented practices reflect bottom-up approaches tailored to institutional realities, demonstrating how sustainability and resilience can be integrated into routine healthcare operations. Intended for healthcare leaders, practitioners, policymakers, and public health professionals, this compendium aims to support informed decision-making and accelerate the transition towards environmentally responsible and climate-resilient healthcare systems in India.

## HEALTH AND ENVIRONMENT LEADERSHIP PLATFORM (H.E.L.P.)

The Indian healthcare system, across both public and private sectors, is increasingly required to adapt to and mitigate the impacts of climate change. The Health and Environment Leadership Platform (H.E.L.P.), established in 2017 by the Public Health Foundation of India (PHFI) under the Centre for Environmental Health (CEH), in collaboration with Health Care Without Harm (HCWH), addresses this urgent need. As the India chapter of the Global Green and Healthy Hospitals (GGHH) network, H.E.L.P. works to reduce the environmental footprint of healthcare facilities while strengthening their adaptive capacity.

H.E.L.P. promotes leadership in sustainable healthcare by supporting energy and resource efficiency, advocating for evidence-informed policymaking, and building capacity among health professionals and institutions. With over 260 member hospitals across India, the network fosters collaboration and shared learning to advance climate-resilient healthcare delivery nationwide.

## ABOUT THE COMPENDIUM

Collaborative learning and knowledge exchange form the foundation of the H.E.L.P. network. This compendium presents ten illustrative case studies from H.E.L.P. member hospitals across India, highlighting practical and innovative sustainability initiatives implemented in response to growing climatic challenges. All featured hospitals are part of both the H.E.L.P. and GGHH networks and demonstrate a strong commitment to environmental sustainability and resilience.

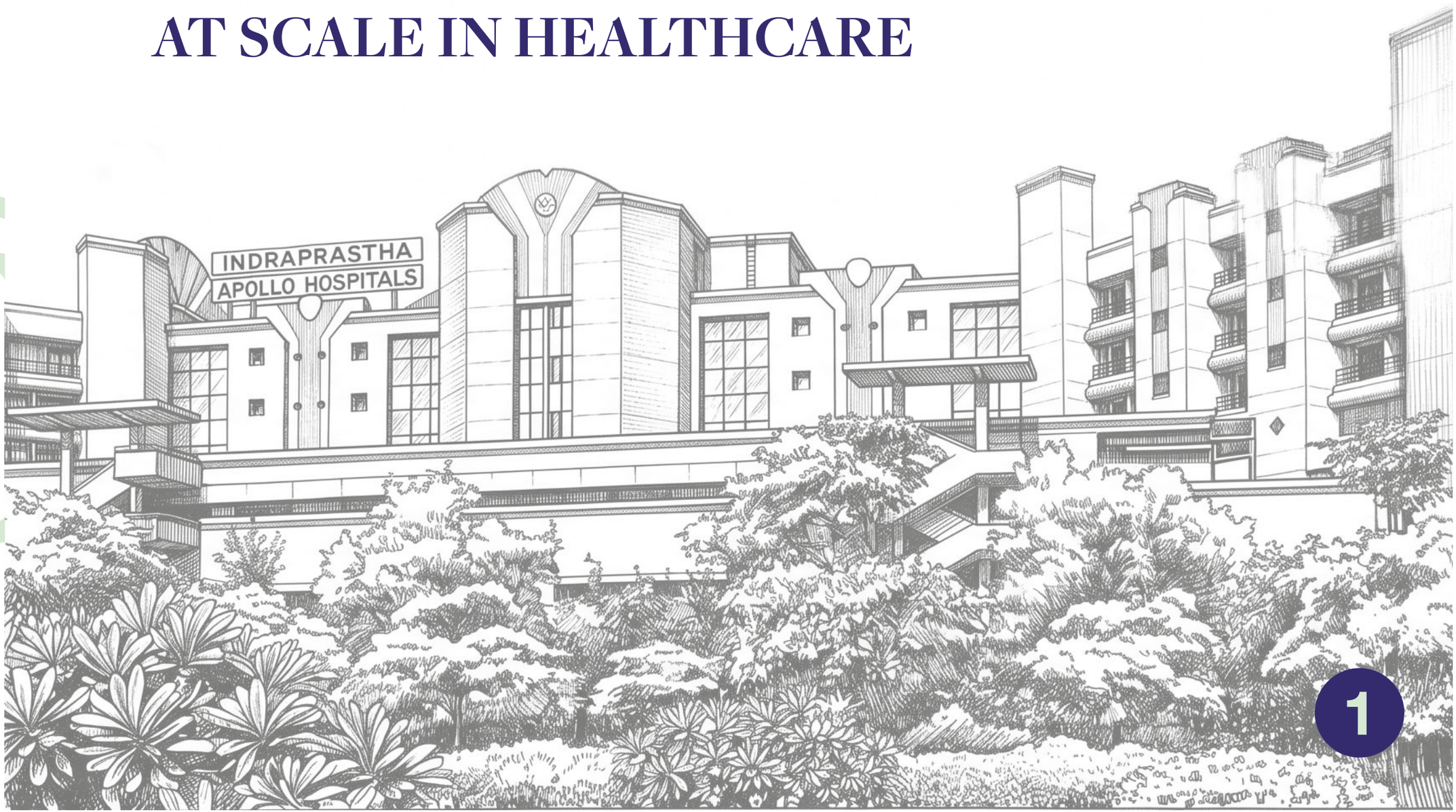
The documented cases span a wide range of interventions, from rainwater harvesting and wastewater reuse to renewable energy adoption, energy-efficient cooling systems, and sustainable building design. Each hospital has adopted a multidimensional approach, integrating environmental responsibility with patient safety, quality of care, and operational efficiency. While sustainability strategies vary across institutions, this compendium focuses on the most innovative, effective, and contextually relevant practices implemented by each hospital.

# CASE STUDIES

APOLLO HOSPITALS • PAN INDIA

*Energy Transformation*

# AT SCALE IN HEALTHCARE



## THE PROBLEM

APOLLO HOSPITALS operates large, energy-intensive facilities with round-the-clock clinical services, extensive HVAC loads, diagnostic equipment, and water-processing systems. Rising electricity consumption, high cooling demand, and the need for reliable hot-water and chilled-water systems contributed to increasing operational costs and carbon emissions. With 18 major facilities across India, the organization required a scalable, technology-driven strategy to reduce its environmental footprint and strengthen climate resilience.

## THE SOLUTION

Apollo Hospitals launched **Project Virya** in September 2021 as a flagship sustainability and energy-transition programme aimed at transforming hospital operations through advanced efficiency and digital intelligence. The initiative targets **saving 235 million kWh of energy** and **reducing 290,000 tonnes of $CO_2$ emissions** over a 10-year period, with an overall goal of achieving 20% reduction in energy consumption and carbon footprint across 18 of Apollo's largest hospital facilities in India. Project Virya reflects Apollo's commitment to climate-resilient healthcare by combining engineering innovation, smart systems, and data-driven optimisation at scale.

### ECM-Based Energy Efficiency Upgrades

Advanced ECM solutions were deployed across HVAC and utility systems, including VFDs on AHUs, pump optimisation, and evaporative cooling. Cooling tower retrofits, air curtains, ceiling-suspended units, and coil replacements further reduced thermal losses and energy demand.

### Machine Learning–Driven HVAC Optimisation

AI-based controls and reinforcement learning were applied to optimise chiller loading, chilled-water pumps, cooling tower fan speeds, and AHU VFD modulation, enabling continuous efficiency gains with stable indoor comfort.

### DeJoules Integrated Optimisation Platform

High- and low-side HVAC optimisation was achieved using VFDs, smart valves, sensors, thermostats, and PICVs, ensuring precise load matching, lower energy losses, and sustained performance across hospital systems.

### Water Quality and Reuse Improvements

STP-treated water quality was enhanced at Apollo Vanagaram, Madurai, and Chennai—facilities located in water-stressed and dry regions—significantly reducing dependence on freshwater sources and strengthening water circularity, with similar upgrades planned across additional hospitals.

PROJECT VIRYA

**235M kWh**
Energy Target
(10-year goal)

**290,000 T**
CO2 Reduction Target
(10-year goal)

**20%**
Energy and Carbon
Reduction Goal

**18**
Apollo Hospitals
Facilities in India

**Savings equivalent to the annual electricity consumption of 770,667 households — demonstrating large-scale environmental and social impact.**

## THE IMPACT

| | |
|---|---|
| **69.4M kWh** | **ENERGY SAVINGS** across Apollo facilities till 31 March 2025. |
| **81,000T** | **$CO_2$ EMISSION AVOIDED** significantly lowering the system-wide carbon footprint. |
| **320** | **MEASURES** of energy conservation completed, strengthening long-term sustainability. |
| **74,145,777 Mcal** | **ENERGY** total energy savings generated. |
| **₹77 crore ($9.3M)** | **COST** cumulative savings. |
| **770,667** | **HOUSEHOLD** Saving achieved equivalent to the annual electricity consumption. |
| **10,24,812 L** **DIESEL**<br>**5,30,381 SCM** **OF PNG** | Saved through aggregate efficiency gains across HVAC, power backup, transport, and other hospital operations, reducing dependence on fossil fuels. |

## Contributors

**Viyom Gupta**
Chief Engineer,
Indraprastha Apollo Hospitals, New Delhi

**Dr. Karan Thakur**
Vice President — Corporate Affairs & Sustainability, Apollo Hospitals

## Hospital Profile at a Glance

| | |
|---|---|
| **Type** | Private |
| **Location** | New Delhi |
| **Beds** | 729 |
| **Doctors** | 400 |
| **OT** | 20 |
| **Footfall** | 1,51,185 (OPD + IPD) |

## LESSONS LEARNT

**Smart controls and machine-learning optimization** deliver substantial energy savings when applied to large, continuous HVAC operations.

**ECM technologies and VFD-enabled systems** are essential for reducing electricity demand in hospitals.

**Water quality improvements through STP-treated water** enhance sustainability and reduce freshwater dependency.

**Scalable interventions**, when applied across multiple hospital units, amplify impact and accelerate carbon reduction.

**Continuous innovation, data-driven monitoring, and cross-facility standardization** are key to sustaining long-term energy efficiency.

BHAGAT CHANDRA HOSPITALS • PALAM, NEW DELHI

*Climate-Smart Healthcare through*

# INTEGRATED ENERGY AND RESOURCE EFFICIENCY

## THE PROBLEM

BHAGAT HOSPITALS faced rising operational costs and environmental pressures driven by high electricity consumption, excessive water use, and limited access to renewable energy. The absence of government subsidies, limited technical capacity among mid-level staff, unreliable vendors for sustainable technologies, and inconsistent leadership engagement further constrained adoption of green solutions. The hospital required cost-effective, low-risk interventions with clear payback periods, while ensuring uninterrupted, high-quality patient care in a resource-constrained urban setting.

## THE SOLUTION

Bhagat Hospitals implemented an integrated sustainability strategy combining renewable energy, efficiency upgrades, water conservation, and staff capacity building.

**Rooftop Solar Power**

Installed rooftop solar power systems despite space and design constraints, supported by careful vendor selection, proper earthing, long-term maintenance planning, and development of in-house technical capacity.

**Solar Water Heating**

Deployed solar water-heating systems, which significantly reduced the dependence on the electric geysers.

**BLDC Fan Installation**

Became the first hospital in the region to install BLDC fans across facilities, achieving nearly 70% reduction in fan-related electricity consumption.

**LED Lighting Retrofit**

Implemented comprehensive LED lighting retrofits, including colour-coded operation theatres with optimized lighting layouts.

**Water-Efficient Fixtures**

Installed flow retarders and sensor-based taps in critical areas such as operation theatres, reducing water use without compromising hygiene.

**Passive Design Strategies**

Designed hospital spaces to maximize natural ventilation and daylighting, enhancing patient comfort and reducing energy demand.

**Staff Capacity Building**

Conducted regular staff training and sensitization programmes on energy and water conservation, building awareness across all levels of the workforce.

## THE IMPACT

**Proof that small hospitals can implement high-impact, affordable climate solutions with measurable outcomes.**

**40%** water consumption reduced across facilities in a water-stressed urban context

**2-4 Years** payback period achieved on most sustainability interventions

### ENERGY BILLS

Significant monthly reductions recorded through rooftop solar, BLDC fans, and LED lighting retrofits across all facilities.

### MAINTATENANCE COSTS

Recurring painting and plastering expenses eliminated through adoption of sustainable building materials.

### CARBON EMISSIONS

Dependence on grid electricity and electric water heating reduced, lowering the facility's overall carbon footprint.

### PATIENT EXPERIENCE

Improved indoor comfort through natural ventilation and daylighting.
Institutional reputation strengthened as a climate-responsive facility.

## Contributors

**Dr. C. M. Bhagat**
Medical Director

**Ms. Ankita Yadav**
Assistant

## Hospital Profile at a Glance

| | |
|---|---|
| **Type** | Private |
| **Location** | Mahavir Enclave, Delhi |
| **Beds** | 80 |
| **Doctors** | 23 |
| **OTs** | 4 |
| **Footfall (2024)** | OPD: 41,783 / IP: 5,218 |

## LESSONS LEARNT

### Leadership and Accountability

- Leadership commitment is critical to institutionalising sustainability and ensuring accountability.
- Small healthcare facilities can become effective climate leaders through strategic, evidence-based investments.

### Systems and Planning

- Building in-house technical capacity reduces long-term costs and dependence on external vendors.
- Vendor quality and transparent selection processes directly influence system performance and durability.
- Preventive maintenance planning is essential for sustaining renewable and efficiency systems.
- Integrated planning across energy, water, and building design produces greater benefits than isolated actions.

### People and Behaviour

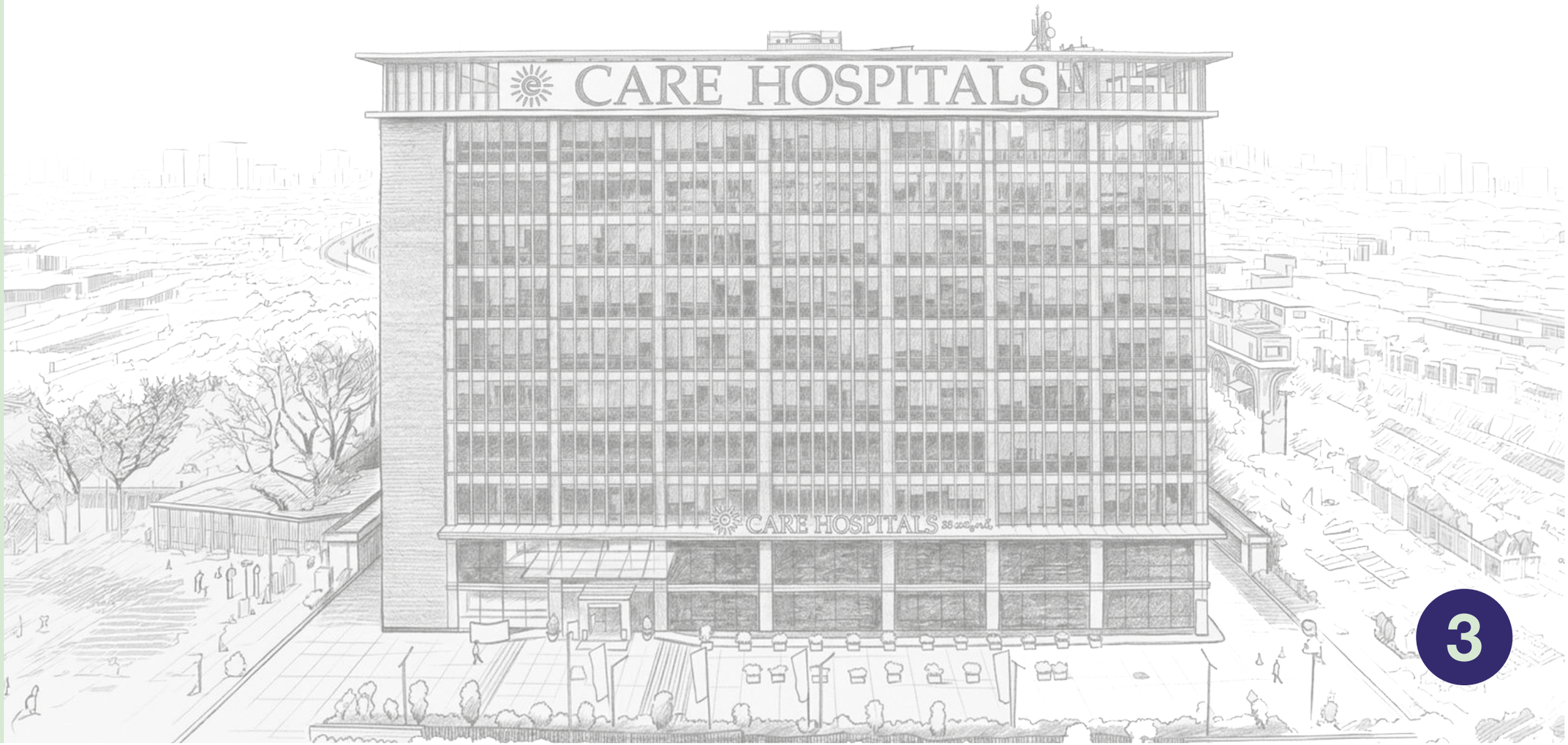
- Behaviour change among staff requires continuous engagement and reinforcement.
- Simple, low-cost interventions — BLDC fans, flow retarders, sensor taps — deliver rapid and tangible returns.
- Timers, sensor-lights, and monitoring.

CARE HOSPITALS • GACHIBOWLI, HYDERABAD

CARE HOSPITALS

*Energy-Efficient Healthcare Infrastructure*

# THROUGH RETROFITTING



## THE PROBLEM

CARE HOSPITALS faced rising energy consumption due to ageing HVAC systems, inefficient pumps, outdated lighting, and poorly performing hot-water and solar systems. The absence of a modern building management system further limited energy monitoring. These inefficiencies increased operational costs, contributed to avoidable carbon emissions, and challenged the hospital's goal of transitioning towards a climate-responsible healthcare model.

## THE SOLUTION

Under the Energy Efficiency Project, the hospital implemented a comprehensive technical upgrade across key utility systems:

**HVAC Modernization**

- Installed new energy-efficient water-cooled VFD chillers.
- Introduced VFD-driven chilled and condenser water pumps.
- Upgraded low-side systems: replaced old AHUs, CSUs, and FCUs with custom-designed high-efficiency units.
- Optimised balancing of hot and cold air distribution to improve indoor air quality

**Lighting Efficiency**

Replaced all CFL fixtures with LED lighting, reducing electricity load significantly.

**Hot Water System Optimization**

Replaced conventional electric geysers with high-efficiency heat pumps.

**Renewable Energy Strengthening**

Refurbished the existing 50 kW solar PV plant to enhance performance.

**Centralized Building Management**

Introduced a new IoT/cloud-based Building Management System for real-time energy profiling and performance monitoring.

**Water Management System**

Metering and monitoring of water consumption, with measures for reduction, reuse, and recycling.

**Dedicated Sustainability Process**

- A cross-functional engineering and quality team used a structured Define, Measure, Analyse, Improve, Control process to evaluate opportunities.
- Business cases were prepared with historical data and reviewed by senior management prior to implementation.

## THE IMPACT

**One of the lowest Specific Energy Consumption figures in India's healthcare sector — achieved through systematic retrofitting.**

**₹0.75 Cr ($90,000)** approximate annual energy savings.

**600T of $CO_2$** equivalent reduced through efficiency improvements.

**130 kWh/m²/year** maintained Specific Energy Consumption (SEC).
Far below the BEE benchmark of 264 kWh/m²/year

### HVAC & SYSTEMS RELIABILITY

Stability and reliability of HVAC, hot water, and lighting systems significantly improved post-retrofitting.

### ENVIRONMENTAL STEWARDSHIP

Hospital's commitment to environmental responsibility strengthened through measurable efficiency gains.

### PATIENT EXPERIENCE

Ambience improved across the facility, enhancing comfort and experience for patients and staff.

## Contributors

**Mr. Shiva Kumar**
VP Engineering & Projects, CARE Hospitals Group

**Mr. MD Zeeshan Ahmed**
Senior Manager ESG, CARE Hospitals Group

**Mr. Suresh V**
Senior Manager Maintenance, CARE Hospitals Hitech City, Hyderabad

## Hospital Profile at a Glance

| | |
|---|---|
| **Type** | Private |
| **Location** | Gachibowli, Hyderabad, Telangana |
| **Beds** | 220 |
| **Doctors** | 99 |
| **OTs** | 6 |
| **Footfall** | 1,18,200 |

## LESSONS LEARNT

### Measurement & monitoring

- Pilferage and wastages can be minimised through comprehensive monitoring and measurement of consumption.
- Energy conservation is a continuous improvement process requiring periodic monitoring and corrective action.
- Energy audits and benchmarking help prioritize interventions and maintain performance across hospital units.

### Investment & returns

- Return on investment was achieved in less than one year.
- Capital investment in energy-efficient technologies delivers measurable financial and environmental returns.

### Implementation & systems

- The automated system significantly reduced the need for human intervention.
- Implementation must consider business continuity and appropriate technology–application fit.

CSI LOMBARD MEMORIAL MISSION HOSPITALS • UDUPI, KARNATAKA

*Building a Climate-Resilient Hospital*

# THROUGH WATER SUSTAINABILITY


4

## THE PROBLEM

A century-old hospital struggled with seasonal water scarcity, ageing infrastructure, and high dependence on external water sources, making it vulnerable during peak summer months. Limited groundwater recharge, leakages, and climate-induced variability in water availability particularly during summer months threatened uninterrupted service delivery and operational resilience.

## THE SOLUTION

Under the **INSPIRE – Team Water Initiative**, the hospital implemented a **multi-pronged climate-resilient water management model:**

### Reviving on-site water sources

Eight existing wells across the campus were desilted and structurally reinforced to improve groundwater recharge capacity, restoring a reliable on-site water source that had deteriorated over decades of neglect.

### Harvesting rain across every rooftop

Rainwater harvesting systems were installed across all hospital buildings, the nursing school, the paramedical college, and the auditorium, and were also integrated into new construction to capture and utilise rainwater systematically.

### Reducing consumption through everyday choices

Low-cost behavioural interventions were introduced across the facility — press-type taps to prevent continuous flow, smaller buckets to reduce per-use consumption, and dual-flush systems with a reduced flush volume of three litres.

### Treating and reusing wastewater on campus

A 100 KLD Sewage Treatment Plant was established to treat wastewater and reuse it for garden irrigation, vehicle washing, and general cleaning, eliminating dependence on freshwater for non-clinical purposes.

### Tracking every litre with meters and colour codes

Flow meters were installed to monitor water consumption routinely, and a pipeline colour-coding system was introduced to distinguish clean water lines from treated water lines, preventing cross-contamination and improving operational clarity.

INSPIRE – TEAM WATER INITIATIVE

**7**
Wells rejuvenated through desilting and reinforcement

**100 KLD**
Sewage Treatment Plant daily reuse capacity

**3 Litres**
Reduced flush volume (down from 6 litres)

**100%**
External water purchase eliminated year-round

**One of the lowest Specific Energy Consumption figures in India's healthcare sector — achieved through systematic retrofitting.**

## THE IMPACT

**100 KLD** Sewage treated and reused daily for gardening, vehicle washing, and cleaning

**100%** External water purchase eliminated — year-round water self-sufficiency achieved

### WATER SECURITY

Continuity of care assured even during peak summer months and seasonal water scarcity periods.

### COST SAVINGS

Substantial reduction in operational expenditure through complete elimination of external water purchase.

### CONSERVATION BEHAVIOUR

Per-use water consumption reduced across the facility through low-cost behavioural interventions.

## Contributors

**Deena Prabhavathi**
Administrative Officer

**Kavyashree V. Shetty**
Operations Manager

## Hospital Profile at a Glance

| | |
|---|---|
| **Type** | Trust |
| **Location** | Udupi, Karnataka |
| **Beds** | 150 |
| **Doctors** | 15 |
| **OTs** | 4 |
| **Footfall** | OPD: 42,288 / IP: 3,874 |

## LESSONS LEARNT

**Infrastructure & systems**

- Start with simple, low-cost interventions (e.g., tap retrofits, leak detection).
- Combine infrastructure upgrades with staff awareness to sustain outcomes.
- Integrate STP and rainwater harvesting even in phased retrofits.

**People & behaviour (1 bullet):**

- Track savings (financial and water volume) to demonstrate value and sustain administrative commitment.

HAJELA HOSPITAL • BHOPAL, MADHYA PRADESH

HAJELA HOSPITAL

*Climate-Responsible Healthcare through*

# SUSTAINABLE HOSPITAL OPERATIONS

## THE PROBLEM

As climate change intensified extreme weather, heatwaves, and pollution in central India, healthcare facilities like Hajela Hospital faced growing operational vulnerabilities including increased cooling demand during heatwaves, strain on power and water supply systems, and challenges in managing rising biomedical waste. Inefficient energy systems, water misuse, and single-use plastic dependence contributed to high environmental footprint and avoidable costs. Limited awareness of sustainability practices among healthcare workers, combined with ageing infrastructure, further increased energy and resource consumption.

## THE SOLUTION

**Energy efficiency**

- Replaced old AC units, lift motors, washing machines, and refrigerators with high-efficiency, 5-star rated models.
- Installed BLDC fans to significantly reduce power consumption compared to conventional ceiling fans.
- Transitioned from traditional desktop computers to all-in-one computer systems, reducing electricity use and electronic waste.
- Introduced motion-sensor LED lighting and automated timers for outdoor lighting.
- Strengthened renewable energy adoption through refurbishment and expansion of solar energy systems.

**Water and waste management**

- Installed water-level sensors and introduced efficient flushing systems to prevent water wastage.
- Reused treated wastewater through proper effluent treatment.
- Ensured 100% waste segregation, promoted recycling, and eliminated single-use plastics in pharmacy and food services.

**Green campus and operations**

- Promoted green transport options, battery-operated vehicles, and campus plantation initiatives.
- Integrated noise control measures and encouraged design aligned with green building principles..

**Leadership and networks**

Reinforced leadership commitment through active participation in the Health and Environment Leadership Platform (H.E.L.P.).

**Reduce, Reuse, and Recycle (3R) Initiative**

The hospital actively implements the 3R principles—Reduce, Reuse, and Recycle—by minimizing paper usage, reusing paper for internal purposes wherever possible, and recycling used paper to support sustainable healthcare operations.

**A small hospital in central India that took on energy, water, waste, and transport — and won national recognition for all of it.**

## THE IMPACT

### ZERO SINGLE-USE PLASTIC
Achieved in pharmacy and food services across the facility

### MULTIPLE NATIONAL AWARDS
Cleanest Hospital of Bhopal (2020, 2022), AHPI awards (2022, 2024, 2025), and other national recognitions

### ENERGY & COSTS
Significant reduction in energy consumption across appliances and infrastructure, with lower operational costs through improved efficiency and renewable energy adoption.

### WATER SECURITY
Improved water security through conservation measures and wastewater reuse.

### WASTE COMPLIANCE
Enhanced waste compliance and elimination of single-use plastic across the facility.

### INSTITUTIONAL REPUTATION
Enhanced reputation as a leading climate-resilient small healthcare organisation in India.

HAJELA HOSPITAL

## Contributors

**Dr. Anoop Hajela**
Director

**Mrs. Sindhu Nair**
Quality Manager

## Hospital Profile at a Glance

| | |
|---|---|
| **Type** | Private |
| **Location** | Bhopal, Madhya Pradesh |
| **Beds** | 50 |
| **Doctors** | 26 |
| **OTs** | 4 |
| **Footfall** | IP + OP: 30,589 |

## LESSONS LEARNT

### Technology & efficiency

- Energy-efficient equipment yields rapid operational and financial benefits.
- Technology upgrades, such as BLDC fans and all-in-one computers, offer high-impact, low-maintenance energy savings.
- Behaviour change, alongside technical improvements, is essential to sustain performance.

### Planning & leadership

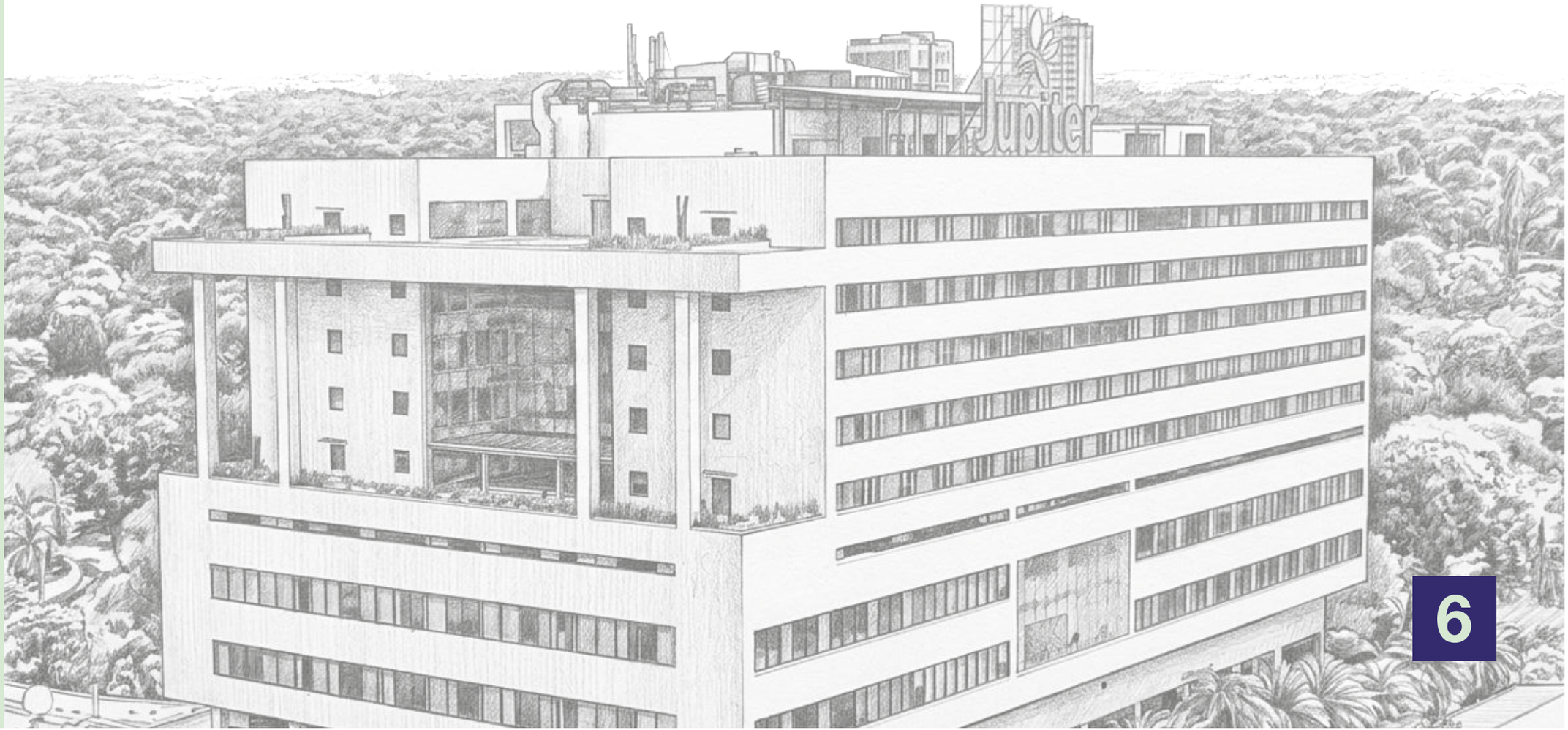
- Integrated planning across energy, water, waste, and transport strengthens overall sustainability.
- Continuous monitoring and benchmarking help demonstrate value and secure administrative commitment.
- Climate-responsible initiatives are scalable and can guide similar hospitals aiming for green transformation.

JUPITER HOSPITAL • PUNE, MAHARASHTRA

Jupiter Hospital
Patient First

*Hospital Sustainability through*

# ENERGY-EFFICIENT INFRASTRUCTURE



## THE PROBLEM

Jupiter Hospital sought to reduce its growing energy footprint driven by intensive HVAC loads, 24×7 operations, and rising electricity costs. The hospital needed a climate-responsible design approach that could enhance energy efficiency, ensure long-term financial savings, and comply with national building energy standards. With limited examples of energy-efficient hospital design in India, developing a scalable model for the healthcare sector was also a priority.

### Key Challenges

- High energy demand from the HVAC system in a large tertiary-care environment.
- Limited insulation and glazing performance causing heat gain and elevated cooling loads.
- Absence of integrated heat-recovery and free-cooling mechanisms.
- Need to meet BEE star-rating requirements and benchmark hospital performance.
- Requirement for broader sustainability features beyond HVAC.

## THE SOLUTION

### HVAC energy-efficiency measures

- **Building envelope upgrades** — High-performance glazing, roof insulation, and improved external wall insulation to minimise heat gain.
- **Free cooling integration** — Ward floors equipped to directly use suitable outdoor air for space cooling, bypassing cooling coils when ambient conditions permit.
- **Heat recovery integration** — Heat-recovery wheels installed with treated fresh air units at ward level to improve fresh-air cooling efficiency.
- **Performance benchmarking** — Full HVAC system design evaluated using the Energy Conservation and Commercialization (ECO) benchmarking tool under Bureau of Energy Efficiency (BEE) guidelines, achieving a 4-star rating.
- **Optimised chiller plant design** — Chiller sizing and selection carried out using dynamic energy simulation software rather than static design assumptions.
- **Efficient cooling tower systems** — Water-cooled chillers supported by variable-speed drives, premium-efficiency pumps, and certified cooling towers.
- **Humidity control optimisation** — Condenser water utilised for air reheating in AHUs to maintain indoor relative humidity efficiently.

### Environmental sustainability measures beyond HVAC

- **Zero Liquid Discharge (ZLD)** — All wastewater treated and reused for gardening and flushing, eliminating discharge and reducing freshwater demand.
- **Rainwater harvesting** — Entire roof water harvested, filtered, and stored, enabling significant water savings and reducing stormwater run-off.
- **Energy-saving systems** — Gearless VFD-controlled elevators reducing lift energy use by 35%; energy-efficient transformers compliant with ECBC standards; complete transition to LED lighting.
- **Heat pumps** — Used for hot-water generation and as a backup for humidity control in critical HVAC units.

BEEP: 4 - STAR

**64 kWh/m²/yr**

Better than the 200 kWh/m²/yr national benchmark

**₹2.15 Crore**

One-time capital investment

**Only hospital**

In India designed under the BEEP energy-efficiency framework

**One-time capital investment of ₹2.15 crore.Substantial recurring annual savings. The only hospital in India designed under BEEP.**

## THE IMPACT

**64 KWH/M²/YR**

Better than the national benchmark of 200 kWh/m²/yr — by design, not retrofitting

**₹1.92 CR**

Annual energy savings (USD 230 thousand) at prevailing electricity rates

**14,81,024 KWH**

Annual electricity savings achieved across the facility

**35%**

Reduction in elevator energy use through gearless VFD-controlled lifts

**SCALABLE MODEL**

Successfully demonstrated a replicable model of energy-efficient hospital design for India — the only hospital designed under the BEEP framework.

**CLIMATE RESILIENCE**

Reduced dependence on external water supply, improved thermal stability, and enhanced system reliability during extreme weather events.

* The data is collected from a study in 2019.

Jupiter Hospital
Patient First

## Contributors

**Dr. Shilpa Tatake**
Chief Executive Officer

**Mr. Neelesh Shinde**
Group Chief Technical Officer & Head-Projects

## Hospital Profile at a Glance

| | |
|---|---|
| **Type** | Private |
| **Location** | Thane, Maharashtra |
| **Beds** | 350 |
| **Doctors** | 199 |
| **OTs** | 14 |
| **Footfall** | OPD: 21,906 / IPD: 24,378 |

## LESSONS LEARNT

### Design & investment

- Early integration of energy-efficient design significantly enhances overall building performance.
- Investment in insulation, glazing, and heat-recovery systems yields long-term financial and environmental gains.
- One-time capital investment of about ₹2.15 crores (USD 260 thousand) can generate substantial recurring annual savings, demonstrating strong return on sustainability-focused design.

### Systems & benchmarking

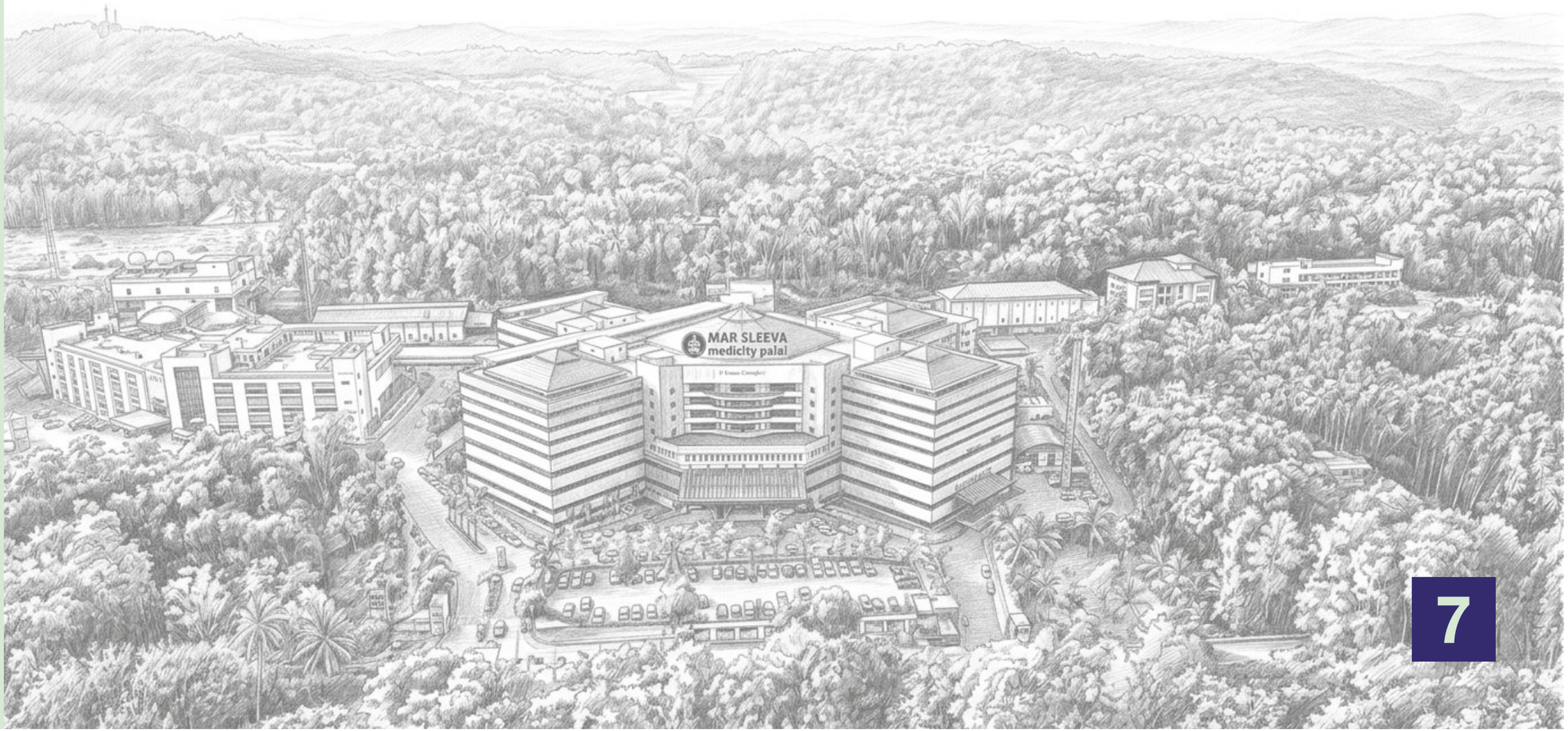
- Combining HVAC efficiency, water conservation, and electrical upgrades creates a holistic sustainability model.
- National benchmarks and tools like ECO Bench help quantify benefits and justify capital investment.

MAR SLEEVA MEDICITY • PALAI, KERALA

MAR SLEEVA®
medicity palai
A Temple of Health

*Climate Resilience through*

# ENERGY-EFFICIENT HEATING AND COOLING

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## THE PROBLEM

As a 24×7 tertiary-care hospital, Mar Sleeva Medicity Palai faces high and continuous demand for cooling and hot water. Ageing systems, building envelope inefficiencies, and absence of real-time monitoring led to elevated electricity use, rising costs, and increased carbon emissions. The hospital also needed to align with national sustainability standards while ensuring uninterrupted patient comfort.

**Key Challenges**

- High cooling load from large built-up area and continuous operations.
- Poor thermal insulation, increasing HVAC energy consumption.
- High electricity use for hot-water generation during peak occupancy.
- Lack of real-time performance monitoring for HVAC optimization.
- Need to lower environmental footprint and comply with sustainability mandates.

## THE SOLUTION

### Smart cooling systems

- Installed water-cooled VFD chillers to match cooling output with actual demand.
- Integrated the entire HVAC network into a centralized Building Management System (BMS) for continuous monitoring and automated load optimization.
- Adopted decentralized zone-level controls to deliver precise cooling/heating with minimal energy use.

### Building envelope strengthening

- Strengthened the building envelope with double-glazed windows, double-door entrances, and air curtains to reduce conditioned-air loss.

### Renewable hot-water generation

- Introduced a solar-assisted heat pump supported by a solar water heater for efficient hot-water generation.

## THE IMPACT

**30%**
Reduction in electricity use for hot-water generation through hybrid solar–heat pump systems

**10-15%**
Reduction in overall HVAC energy consumption through VFD chillers and BMS-led optimisation

**CARBON & COSTS**
Reduced carbon emissions and strong operational cost savings supporting long-term financial sustainability.

**THERMAL COMFORT**
Improved temperature stability and comfort across critical units and operating theatres

**SYSTEM RELIABILITY**
Greater system reliability through preventive alerts and real-time corrections via BMS.

**Real-time monitoring did not just improve efficiency — it made the hospital more reliable for patients around the clock.**

MAR SLEEVA® medicity palai
A Temple of Health

## Contributors

**Fr Jose Keeranchira**
Associate Director, Hospital Operations & Projects

**Dr. Polly Thomas**
Senior Manager — Engineering

## Hospital Profile at a Glance

| | |
|---|---|
| **Type** | Trust (Diocese of Palai / PDMET) |
| **Location** | Kottayam, Kerala |
| **Beds** | 648 |
| **Doctors** | 210 |
| **OTs** | 10 |
| **Footfall** | 4,00,000 |

## LESSONS LEARNT

### Technology & envelope

- Building-envelope improvements significantly reduce cooling load and improve equipment performance.
- Hybrid renewable systems ensure reliable hot-water supply even with variable weather.
- Integrated planning of energy upgrades delivers far better outcomes than isolated interventions.

### Monitoring & people

- Continuous BMS monitoring is key to early detection of inefficiencies and sustained savings.
- Training and coordination across departments are essential for maintaining efficiency gains.

PARAS HOSPITALS • PANCHKULA, HARYANA

PARAS HEALTH
Partners In Health

*Climate-Resilient Hospital through*

# WATER CONSERVATION AND RECYCLING


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## THE PROBLEM

Paras Hospitals is a high water-demand facility due to patient care, sanitation, laundry, kitchen, and horticulture needs. Peak occupancy months created additional stress on municipal supply and borewell sources. Increasing water scarcity in North India, driven by climate change, declining groundwater levels, and irregular rainfall, made it essential for the hospital to adopt a sustainable and resilient water-management approach to safeguard uninterrupted operations.

## THE SOLUTION

### Diversifying water supply

- Utilized multiple water sources: borewell supply, municipal water, and in-house STP/ETP treated water.
- Recycled treated wastewater from a 50–60 KLD STP and ETP for horticulture, landscaping, flushing, and non-potable use.

### Reducing consumption at source

- Installed foam-type tap aerators to reduce flow rates without compromising hygiene or user comfort.

### Monitoring and behaviour

- Monitored monthly water consumption to identify inefficiencies, occupancy-related spikes, and seasonal variations.
- Strengthened operational practices through regular leak checks and staff awareness on water-efficient behaviours.

SAVING ACHIEVED

**2,148–3,086 KL**

Baseline monthly consumption

**2,158–3,073 KL**

Post-aerator monthly consumption

Saving achieved despite higher footfall in several months

**A simple foam aerator on every tap. An average saving of 162 kilolitres every month.**

## THE IMPACT

**162 KL**

Average monthly water saving recorded post-aerator installation

**50–60 KLD**

Treated wastewater recycled daily through STP and ETP for non-potable reuse

**WATER SUPPLY RESILIENCE**

Reduced dependence on municipal supply and lowered groundwater extraction throughn systematic recycling across the facility.

**CLIMATE RESILIENCE**

Strengthened long-term resilience by increasing reuse of treated water and moderating overall freshwater demand in a water-scarce region.

**OPERATIONAL EFFICIENCY**

Net water savings achieved across several months, demonstrating improved efficiency and resilience even during peak occupancy periods.

## Contributors

**Dr. Pankaj Mittal**
Facility Director

**Dr. Shweta Prabhakar**
Medical Superintendent

**Dr. Gaurav Bindal**
Unit Head Administration

## Hospital Profile at a Glance

| | |
|---|---|
| **Type** | Private |
| **Location** | Panchkula, Haryana |
| **Beds** | 232 |
| **Doctors** | 94 |
| **OTs** | 7 |
| **Footfall** | OPD: 7,95,873 / IPD: 16,992 |

# LESSONS LEARNT

### Supply and monitoring

- Integrated water-supply planning enhances reliability during peak demand and supply fluctuations.
- Monthly tracking is essential for early detection of inefficiencies and managing occupancy-driven variations.
- The model is replicable across hospitals looking to build climate-resilient and resource-efficient water systems.

### Technology and people

- Low-cost technologies such as tap aerators deliver substantial savings without affecting patient care.
- Staff involvement and behavioural reinforcement significantly enhance conservation outcomes. efficiency gains.

SRI SATHYA SAI INSTITUTE OF HIGHER MEDICAL SCIENCES • BENGALURU

*Fostering a Zero-Waste Culture*

# IN A SUPER SPECIALITY HOSPITAL

## THE PROBLEM

SSSIHMS (a unit of Sri Sathya Sai Central Trust), is a 330-bed super speciality hospital providing completely free healthcare. Its operations generate large volumes of dry and mixed waste, most of which was earlier sent to incinerators or open landfills through municipal contractors, contributing to pollution. This challenge reflects a wider national issue, as India recycles less than 10% of its plastic waste, while a significant share still gets into the environment, underscoring the need for sustainable waste management models.

Recognizing the environmental impact of healthcare & also to showcase the value placed on unsolicited donations used to run the institute, SSSIHMS aims to create wealth from waste, and maximize the number of patients treated with the available resources.

Gaining confidence with the progress made at SSSIHMS, the Sri Sathya Sai Central Trust has launched Project Zero-Waste to Landfill across all Sai institutions.

## THE SOLUTION

### Key components

- Clear protocols and on-the-job training for all staff to standardise waste handling practices.
- Three-way segregation (organic, recyclable, reject) in all public areas.
- Detailed dry-waste segregation at source into paper, plastics, metals, glass, and others to maximise resource recovery.
- Dedicated waste stations within clinical areas to streamline segregation at source.
- Partnerships with authorised recyclers through formal MoUs.
- Innovative repurposing of packaging crates for storing dry waste between pickups making the system low-cost & sustainable.
- Community participation via plogging, awareness marathons and waste collection drives.

### Low-cost innovations

- Replacing paper cups with steel glasses in snack counters and the dental department.
- Using cloth bags stitched from textile waste instead of plastic scrub wrappers.
- Procuring milk, sanitiser, and other consumables in larger pack sizes to reduce packaging waste and make procurement economical.
- Separating mild steel caps of aluminium ETO canisters to improve value generated from scrap.
- Upcycling mattresses into mulch mats and coir pots.
- Encouraging patients to carry reusable water bottles.

ZERO-WASTE MODEL

**100+**
Tonnes of dry waste recycled by December 2025

**₹0.30 Crore**
Revenue generated from scrap sales in 2025

**3-Way**
Segregation system — organic, recyclable, reject

**Free**
All healthcare provided at zero cost to patients

**India recycles less than 10% of its plastic waste.**

**SSSIHMS built a model that proves it can be done differently.**

## THE IMPACT

### 100+ TONNES
Dry waste recycled by December, 2025.

### 46 TONNES
Recycled in first two years alone January 2021 to December 2022

### 60 TONNES
Recycled between January to December 2025

### ₹0.30 CRORE
Revenue generated from scrap sales in 2025.

### CAMPUS ENVIRONMENT
A visibly cleaner, odour-free hospital environment, improving experience for patients, staff, and visitors.

### WASTE MINIMISATION
Noticeable reduction in overall waste generation through upstream minimisation efforts — less waste created, not just better waste managed.

## Contributors

**B. Satish Chandra**
Sr. Manager — Central Stores

**Dr. N. Renuka**
Microbiologist & Secretary-HICC

## Hospital Profile at a Glance

| | |
|---|---|
| **Type** | Trust |
| **Location** | Bengaluru, Karnataka |
| **Beds** | 330 |
| **Doctors** | 200 |
| **OTs** | 12 |
| **Footfall** | OPD: 2,00,000 per annum |
| | IPD: 10,500 per annum |

## LESSONS LEARNT

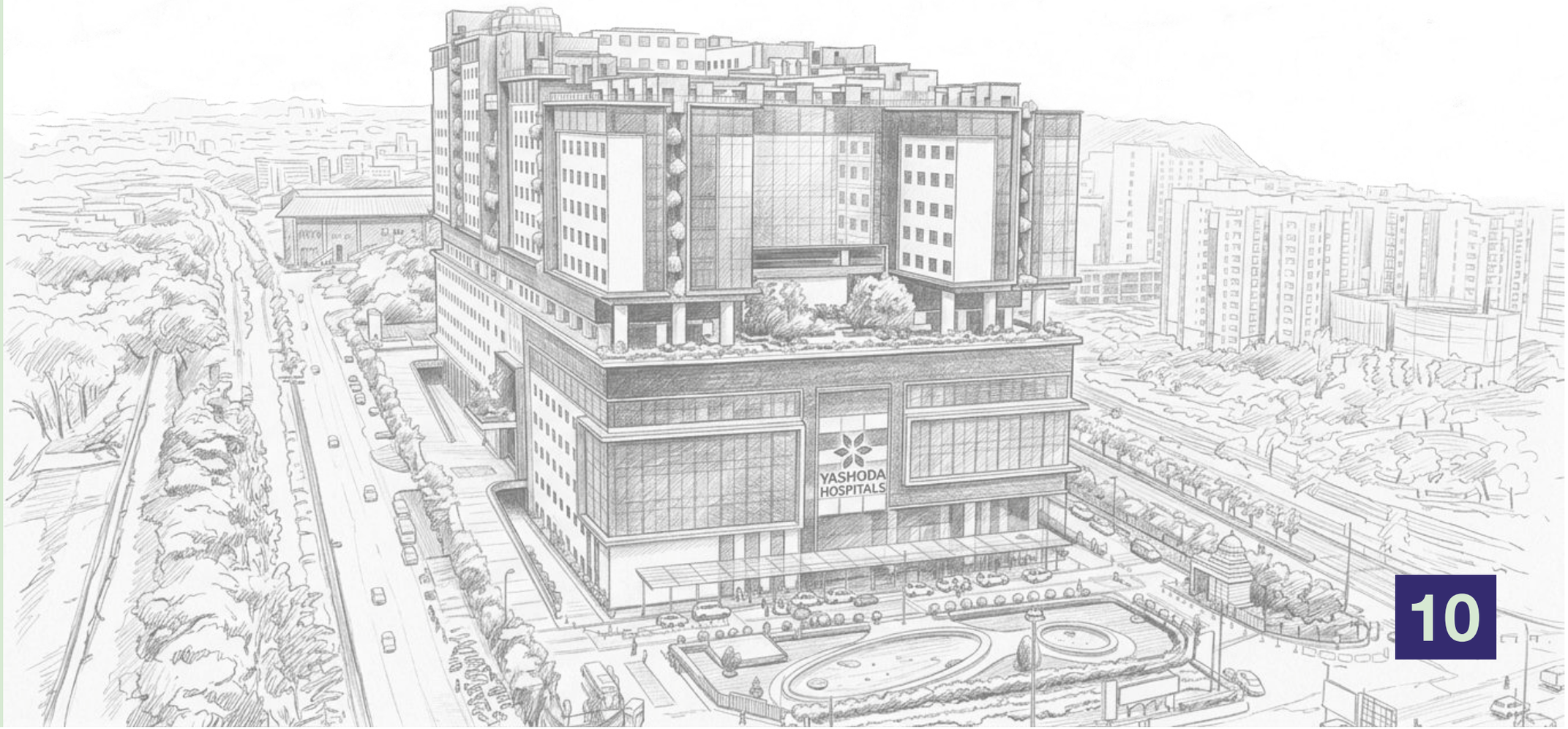
- A low-cost dry-waste management system not only reduces environmental impact but can also generate revenue, reducing waste-management expenditure.
- Initial staff resistance is natural; consistent protocols, hands-on training, and regular monitoring are essential for behaviour change and long-term success.
- Involving volunteers and community participation helps reduce burden on staff and helps sensitize volunteers and create a ripple effect.

YASHODA HOSPITAL • HITEC CITY

YASHODA HOSPITALS

*Energy-Efficient Hospital through*

# OPTIMUM DESIGN FEATURES

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## THE PROBLEM

A modern multi-speciality hospital requires uninterrupted cooling, lighting, hot-water and reliable power. However, conventional HVAC systems, lighting fixtures, escalators and water-treatment processes resulted in high energy consumption, increased peak-load demand and rising operational costs.

## THE SOLUTION

**High-efficiency HVAC plant**

The hybrid combination optimally sized Water-cooled centrifugal chillers and air-cooled screw chillers, providing efficient cooling with lower energy draw under the dynamic load conditions.

**VFD-enabled cooling towers and pumps**

Weather-responsive speed control to cut unnecessary energy use.

**Advanced BMS**

Automated HVAC operations with real-time monitoring for performance optimisation and preventive control.

**Dynamic online UPS systems**

Parallel-configured UPS units improving power stability for critical areas.

**Heat-pump for hot-water system**

High-efficiency heat pumps replacing electrical boilers, reducing energy consumption.

**LED lighting with automated controls**

Complete shift to LEDs supported by timer-based automation.

**Optimised escalator operation**

Speed reduction from 0.5 m/s to 0.35 m/s for comfort and energy savings.

**STP & ETP-based water reuse**

Extensive wastewater treatment and reuse, achieving ₹8 lakh/month savings in water-related costs.

**Strom water reuse**

Large storm water collection tanks (1700KL) were accommodated at the sub-grade at the design stage to ensure the collection of a large quantity of storm water & reuse after treatment.

## 8 UPGRADES

- High-efficiency HVAC
- VFD cooling towers & pumps
- Advanced BMS
- Dynamic UPS systems
- Heat-pump hot water
- LED with automation
- Optimised escalators
- STP & ETP water reuse

**Eight integrated upgrades. One cohesive system.**

**Not one big intervention — eight smaller ones, working together, sustaining savings every single month.**

# THE IMPACT

### ENERGY CONSUMPTION

Significant reduction in electricity consumption across cooling, lighting, and hot-water systems.

### WATER MANAGEMENT

Lower dependence on municipal water through large-scale STP/ETP & stormwater reuse.

### OPERATIONAL RELIABILITY

Greater operational reliability is enabled by BMS and UPS automation.


### CARBON FOOTPRINT

Reduced carbon footprint through integrated energy and water efficiency measures.

### REDUCED EXPENDITURE

Lower operational expenditure, strengthening long-term sustainability performance.

YASHODA HOSPITALS

## Contributors

**Prasanna Kumar Potdar**
Vice President, Engineering

**Savinay Hotkar**
Senior Manager, Engineering

## Hospital Profile at a Glance

| | |
|---|---|
| **Type** | Private |
| **Location** | Hyderabad, Telangana |
| **Beds** | 600 |
| **Doctors** | 288 |
| **OTs** | 18 |
| **Footfall (2024)** | 3,52,818 |

## LESSONS LEARNT

### Design & systems

- Energy-efficient design at the outset ensures sustained financial and environmental gains.
- Continuous BMS-based monitoring is essential for maintaining system efficiency.

### Operations & savings

- Water-reuse systems generate high recurring savings with simple operations.
- Multiple small improvements can cumulatively deliver major energy savings in hospitals.

# REFLECTIONS

*While most hospitals have prioritised reducing emissions, fewer have explicitly planned for climate adaptation.*

# *What the Evidence Shows —*
# AND WHAT IT DOES NOT YET TELL US

The case studies presented in this compendium demonstrate that Indian healthcare facilities are no longer passive recipients of climate impacts but active agents of environmental stewardship. Across diverse institutional contexts, ranging from small hospitals to large multi-campus healthcare networks, facilities have adopted practical, measurable strategies to reduce energy consumption, conserve water, manage waste responsibly, and improve overall resource efficiency. These initiatives show that sustainability in healthcare is both technically feasible and operationally advantageous.

A key insight emerging from the case studies is the effectiveness of integrated, systems-based approaches. Hospitals that combined energy efficiency with water conservation, waste management, and smart building design achieved greater and more sustained benefits than those implementing isolated interventions. Importantly, many successful measures were low-cost and replicable, such as tap aerators, BLDC fans, efficient lighting, and behavioural nudges, making sustainability accessible even to resource-constrained facilities.

The compendium also highlights the growing role of digital intelligence and monitoring systems, including building management systems and machine learning–based optimization in enhancing efficiency while maintaining patient comfort and clinical safety. These tools enable hospitals to move from static infrastructure upgrades to continuous performance improvement.

However, the documentation reveals an imbalance between mitigation and adaptation efforts. While most hospitals have prioritized reducing emissions and resource use, fewer have explicitly planned for climate adaptation, such as heat resilience, water security during extreme events, or continuity of care during environmental disruptions. Strengthening adaptive capacity, particularly in small and medium hospitals serving vulnerable populations, remains an urgent priority.

Collectively, these case studies reaffirm that climate action in healthcare delivers co-benefits for operational resilience and financial sustainability. They also underscore the importance of leadership, staff engagement, and peer learning in embedding sustainability into routine healthcare practice.

*Five priorities for scaling*

# Sustainable Healthcare Across India

1. **Embed Sustainability into Health System Planning and Standards**

   Environmental sustainability should be integrated into national and state health infrastructure guidelines, facility accreditation processes, and procurement norms. New construction and retrofits must adopt energy, water, and waste-efficiency standards by design rather than as add-on interventions.

2. **Prioritize Low-Cost, High-Impact Interventions at scale**

   Proven measures such as energy efficient lighting and cooling, water-saving fixtures, renewable energy integration, and performance monitoring should be rapidly scaled across private and public facilities. These interventions deliver quick returns while building momentum for deeper system transformation.

3. **Strengthen Institutional Capacity and Leadership Ownership**

   Greening healthcare requires informed leadership and empowered facility managers. Targeted capacity building for administrators, engineers, and procurement teams is essential to translate sustainability goals into sustained operational practice.

4. **Leverage Data, Digital Tools, and Performance Benchmarking**

   Routine measurement of energy, water, and waste performance, supported by digital monitoring systems enables facilities to identify inefficiencies, track improvements, and justify investments. Benchmarking fosters transparency, accountability, and peer learning.

5. **Promote Collaborative Learning and Knowledge Exchange**

   Structured platforms for sharing best practices across hospitals particularly between large institutions and small or resource-constrained facilities can accelerate adoption of context-specific solutions and avoid duplication of effort.

# Conclusion

This compendium serves as a living document, capturing real-world experiences, emerging innovations, and evolving insights on sustainability in healthcare. By documenting cases from small, medium, and large hospitals, it reflects the diversity of challenges and solutions across the Indian healthcare landscape.

Through sharing practical strategies and lessons learnt, the compendium seeks to foster collective learning and accelerate the adoption of effective, scalable sustainability practices.

**Continued collaboration within the H.E.L.P. network will enable the development of a robust repository of contextual knowledge – supporting healthcare facilities across India to integrate environmental sustainability into resilient health system design and practice.**

*“A living document — capturing real-world experiences as they continue to unfold.*

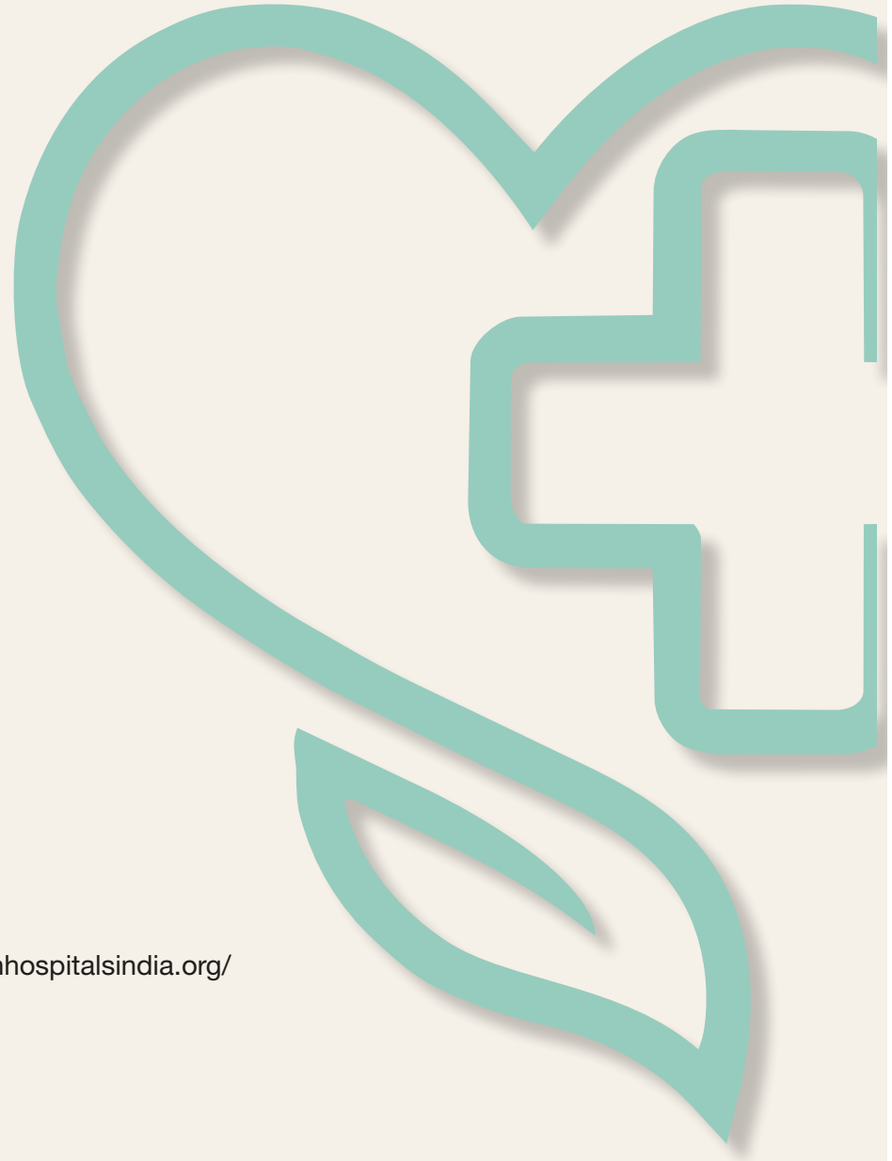
Health Care Without Harm

GLOBAL GREEN and HEALTHY HOSPITALS

CENTRE FOR ENVIRONMENTAL HEALTH
PUBLIC HEALTH FOUNDATION OF INDIA

H.E.L.P
HEALTH & ENVIRONMENT LEADERSHIP PLATFORM
A PHFI AND HCWH GREEN HEALTH INITIATIVE

भारतीय जन स्वास्थ्य प्रतिष्ठान
PUBLIC HEALTH FOUNDATION of INDIA



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**H.E.L.P. Website:** https://greenhospitalsindia.org/