



GREEN HOSPITALS, HEALTHY COMMUNITIES: LESSONS ON SUSTAINABLE HEALTHCARE FROM SOUTHEAST ASIA

by Health Care Without Harm Southeast Asia
and Global Green and Healthy Hospitals



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Disclaimer: All case studies can be downloaded in the Global Green and Healthy Hospitals (GGHH) Connect Website; the innovative and online platform for the GGHH Community.

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Health Care Without Harm Southeast Asia

Global Green and Healthy Hospitals





WORK AT YOUR OWN RISK



Part 1

INTRODUCTION

Health Care Without Harm and the Global Green and Healthy Hospitals in Southeast Asia



Health Care Without Harm (HCW) is an international nongovernmental organization that works to transform health care worldwide so that it reduces its environmental footprint, becomes a community anchor for sustainability, and leads in the global movement for environmental health and justice. Health Care Without Harm Southeast Asia (HCWH SEA) leads these efforts in the region.

Situated in Manila, HCWH SEA serves as one of the key regional offices within the broader HCWH network. Our global network of regional offices in SEA, Europe, and the U.S, along with a set of strategic partners spread around the world, works to provide programs, initiatives, and advocacies to achieve this transformation of the health care sector on 6 continents.



One of HCWH's flagship initiatives is the Global Green and Healthy Hospitals (GGHH) program. GGHH is a worldwide community of hospitals, health care systems, and organizations dedicated to reducing the ecological footprint of health care operations and promoting environmental and public health. Launched in 2011, the GGHH network now boasts an impressive roster of over 1,850 members spread across more than 80 countries.

These healthcare institutions are deploying innovation, ingenuity, and investments to transform the healthcare sector and cultivate a healthier, sustainable future. The network serves as a community at global, regional and national levels to support collaboration and sharing of best practices to accelerate members' success in achieving their sustainability goals and transforming the health care sector.

In Southeast Asia, the GGHH program boasts a network of 282 members representing the interests of 20, 923 hospitals and health centers. Hailing from diverse countries within the region, these organizations share an unwavering dedication to mitigating their carbon footprint and championing sustainability not only within their own facilities but also throughout the broader community. Their collective actions show significant impact and are driving the sustainable health care movement forward both in the region and globally.

A select group of proactive GGHH members within this region have taken center stage in our extensive case study compendium. As we delve into the realm of sustainability best practices, seven healthcare institutions in Southeast Asia have excelled and their pioneering initiatives deserve special recognition.

HEALTHCARE AND ENVIRONMENT FOOTPRINT

In the world of healthcare, where the preservation of life and well-being stands as a primary principle, a parallel crucial concern is emerging – the preservation of our planet's health. The healthcare sector plays a pivotal role in ensuring the well-being of communities across the globe. Yet, [the sector's substantial environmental footprint](#) and resource consumption have raised concerns about its sustainability.

Citing findings from [a research by Health Care Without Harm \(HCWH\)](#), it is apparent that the health sector is an active contributor to the climate crisis, accounting for a significant 4.4% of the global net environmental footprint. To put this statistic into perspective, this is tantamount to the greenhouse gas emissions generated by 514 coal-fired power plants. Moreover, [another publication by HCWH and the World Health Organization \(WHO\)](#) revealed that typically, chemical and pharmaceutical waste constitutes less than 3% of medical waste; nevertheless, the improper disposal of these substances poses a significant threat. With many pharmaceuticals being used in households, it is unfortunate that only a few countries have established efficient waste collection systems.

As we dig deeper into these challenges, it becomes apparent that various facets of the healthcare industry bear responsibility for environmental degradation. On top of these are the critical areas of waste mismanagement, food insecurity, water scarcity, energy inefficiency, and transportation problems. These domains, intricately intertwined with healthcare operations, demand our focused attention and concerted efforts to forge a sustainable path forward.

In the diverse landscape of Southeast Asia, especially in developing countries where healthcare facilities are vital pillars of public health, the need for sustainable practices is paramount.

Through recent assessments undertaken by Health Care Without Harm Southeast Asia (HCWH SEA) in numerous hospitals across the region, a stark reality emerges. These evaluations reveal that sustainability issues surrounding waste, food, water, energy, and transportation have emerged as formidable challenges within the healthcare landscape. The implications of these challenges are profound, demanding urgent action to rectify the trajectory of environmental impact.

ABOUT THIS COMPENDIUM

This document discusses seven eye-opening case studies in Southeast Asia, each exemplifying healthcare facilities' commitment to sustainability, innovation, and resilience in the face of the growing environmental challenges. The case studies were conducted in different healthcare facilities in the region: Dr. Arturo P. Pingoy Medical Center (Philippines), Mary Johnston Hospital (Philippines), West Java Mental Hospital (Indonesia), St. Paul's Hospital Iloilo (Philippines), Sunway Medical Center Velocity (Malaysia), Buddhist Tzu Chi Dialysis Centre (Philippines), and Ibnu Sina Public Hospital (Indonesia).

The seven facilities are part of the Global Green and Healthy Hospitals, an international network of health organizations dedicated to reducing their environmental footprint and promoting public and environmental health. Each of them have shown remarkable sustainability practices that deserve recognition, dissemination, and replication – from reducing carbon emissions and recycling used cooking oil to harnessing renewable energy sources and implementing cutting-edge waste management strategies. The case studies reveal a multifaceted approach to sustainability that addresses not only environmental concerns but also enhances the quality of healthcare delivery.

In this compendium, our exploration of the sustainability practices that emerged from the case studies is structured around the five factors that are at the forefront of environmental challenges faced by healthcare institutions in the region – waste, food, water, energy, and transportation:



Waste Management: An in-depth look at how healthcare facilities are innovating waste management strategies, reducing waste sent to landfills, and promoting recycling.



Food Security: Exploring how healthcare institutions are contributing to sustainable food practices, enhancing patient nutrition, supporting local communities, and reducing environmental impacts in their food supply chains.



Water Conservation: Examining strategies employed by healthcare facilities to optimize water use, recycle wastewater, and enhance local water resilience.

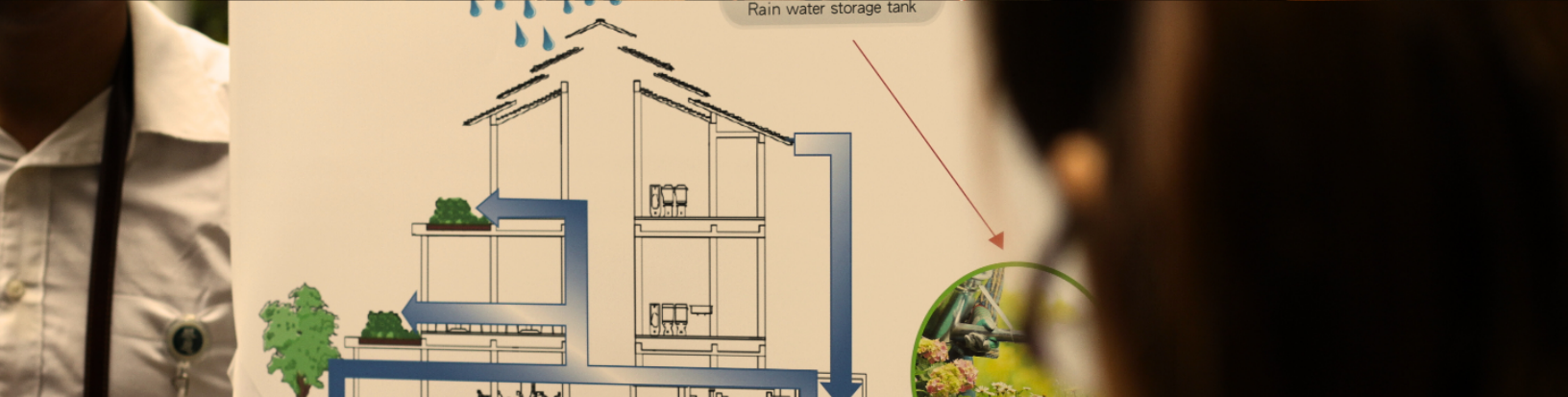


Energy Efficiency: Insights into how healthcare facilities are reducing energy consumption, harnessing renewable energy sources, and reducing their carbon footprint.



Transportation Solution: An exploration of innovative approaches adopted by healthcare facilities to mitigate the environmental impact of transportation, from carpooling programs to telemedicine services.

Our discussions are organized within this framework to offer a focused examination of the innovative practices and solutions adopted by the facilities, providing a more logical narration of our exploration of sustainability in healthcare across Southeast Asia.



Part 2

DISCUSSION

Waste, food, water, energy, and transportation represent five of the sustainability goals outlined by the Global Green and Healthy Hospitals network of HCWH. In contrast, these very objectives are some of the major culprits behind the healthcare sector's significant environmental impact.

Nevertheless, hope is within reach as seven healthcare facilities in Southeast Asia have successfully demonstrated the feasibility of achieving these sustainability targets. Each institution has adopted a distinctive approach tailored to local contexts, serving as trailblazers in the fight towards a more sustainable healthcare system in the region and on a global scale.

WASTE MANAGEMENT

Every year, [hospitals generate a staggering 5 million tons of waste](#). This challenge is complex and expensive, and it affects healthcare facilities worldwide, regardless of their size. In Southeast Asia, however, several healthcare institutions are taking proactive steps to address the issue of healthcare waste management head-on.

Within healthcare sustainability, waste management plays a central role. This section explores how healthcare facilities are pioneering waste management strategies to reduce landfill waste and champion recycling. Discover their innovative approaches, encompassing advanced technologies, meticulous waste sorting, and strategic partnerships, all while maintaining top-notch patient care standards.



From Kitchen Waste to Hygiene Essential

Highlights: waste repurposing, community engagement, cost reduction

A healthcare facility in Malaysia has embarked on an innovative project to upcycle used cooking oil (UCO) into all-purpose soap. This initiative by the **Buddhist Tzu-Chi Dialysis Centres (Tzu-Chi)** not only prevented environmental pollution but also reduced the facility's soap procurement costs. Beyond the center, the project was extended to the community, promoting UCO donation instead of improper disposal.

The issue at hand was the substantial amount of UCO generated in the center's kitchen, posing environmental hazards if disposed of improperly. The project aimed to raise awareness about responsible UCO management. Tzu-Chi immediately began collecting UCO to prevent pollution. On average, the kitchen produced 4-5 liters of UCO per week. The larger issue in Malaysia was the mismanagement of UCO, with significant portions poured into drains, causing pollution and damage to sewage systems.

Tzu-Chi's sustainability strategy involved turning UCO into eco-friendly soaps. They collected UCO from both the center's kitchen and the community. These soaps were

produced using a straightforward process that involved UCO, NaOH (caustic soda), and water, with no additional harmful chemicals. The initiative not only salvaged UCO but also educated the community about the importance of proper disposal and recycling. Tracking progress involved recording UCO collection and soap production. Through this project, Tzu-Chi aimed to reduce environmental pollution, save landfill space, and educate the community about responsible waste management.

Tzu-Chi's project effectively transformed UCO into eco-friendly soaps, addressing both environmental pollution and soap procurement costs. The initiative's success and community engagement highlighted the importance of small, consistent efforts in environmental conservation. The project's next steps involve continued community involvement, recycling UCO to promote sustainability, and raising awareness about proper waste disposal practices.

Multifaceted Recycling Strategy

Highlights: waste reduction, stakeholder involvement, systems and procedures

In Indonesia, **Ibnu Sina Public Hospital** in Gresik has implemented a sustainable program to address the increasing waste generated by the hospital. This initiative aims to reduce waste sent to municipal landfills and incineration through recycling. The hospital faced challenges related to the growing generation of domestic and hazardous waste due to increased hospital visits, single-use packaging waste, and inadequate municipal drinking water supply.

The hospital's sustainability strategy involves four recycling strategies based on waste type: a waste bank for recyclable domestic waste, black soldier fly maggot composting for food and kitchen waste, aerobic composting for yard waste, and chemical packaging waste treatment. The program requires proper waste segregation by internal stakeholders, including hospital departments and staff, to achieve its objectives. It has environmental benefits such as increased recycling coverage and reduced greenhouse gas emissions from waste incineration, as well as economic benefits from reduced fuel oil consumption for incineration and sales of recyclable waste.

While the hospital has made significant progress in waste reduction and recycling, it faced challenges during the COVID-19 pandemic when infectious waste had to be incinerated. The hospital also encountered limitations in recycling certain types of plastics. To combat these, the facility recognizes the importance of collaboration among hospital departments, the existence of standard operating procedure documents, and the incentives in encouraging staff participation. Future steps include expanding waste bins for organic waste in hospital common areas.

Ibnu Sina Public Hospital's sustainable waste management program has made substantial progress in reducing waste sent to landfills and incineration, with a focus on proper waste segregation and recycling.

Innovation Amidst the Pandemic

Highlights: waste control, collaboration and communication, data-driven

Mary Johnston Hospital (MJH), located in Tondo, Manila, faced significant challenges during the COVID-19 pandemic, including a severe shortage of personal protective equipment (PPE) and a surge in infectious plastic waste. To address these issues, MJH implemented a series of strategic measures to optimize PPE use, reduce healthcare waste, and ensure the safety of its staff and patients.

MJH classified exposure risk levels according to WHO and DOH guidelines and posted PPE requirements in various areas to encourage compliance. They also took control of PPE dispensing and forecasting to ensure a steady supply. Extensive educational and training sessions were conducted to ensure proper PPE usage, and the hospital even considered reprocessing certain PPE items to mitigate shortages. Additionally, they explored alternative PPE items made from water-resistant microfiber fabrics.

Throughout the pandemic, MJH closely monitored its actions and progress, producing a weekly COVID-19 Bulletin that served as a crucial reference for decision-making. This bulletin included data on COVID-19 cases, PPE supply levels, waste generation, and more. Throughout the process, MJH learned the need for multidisciplinary collaboration, continuous policy evaluation, and effective communication tools such as intranet messengers and social media.

MJH achieved substantial savings and waste reduction through these initiatives, including an estimated gross savings of Php8,673,350 and a reduction of 10,821 kg of hazardous waste from reprocessed PPE. Training sessions and workshops resulted in high compliance rates (97.5%) and rational PPE use. The hospital's approach highlights the importance of adaptability, sustainability, and collaboration in managing healthcare waste and PPE shortages during a pandemic.

Moving forward, MJH plans to conduct "new normal" waste audits, improve waste storage facilities, and shift from disposable to reusable PPE items, among other initiatives, to build on their progress and promote sustainable healthcare waste management.

FOOD SECURITY

Food in hospitals serves as more than mere sustenance; it is a cornerstone of patient care and recovery, nurturing both the body and mind. As healthcare institutions, [hospitals bear a responsibility to exemplify and promote top-notch dietary choices](#). For instance, altering the availability of processed foods within hospital walls can influence public perceptions and enhance the health of patients and staff, all without compromising financial viability or customer satisfaction. Furthermore, it is worth noting that [food constitutes a significant portion of hospital waste](#), and the extensive packaging associated with processed foods likely has substantial adverse global implications.

Transitioning from the broader perspective of food's significance in hospitals, we now turn our attention to an initiative in Malaysia, where a medical facility is taking the lead in food sustainability.

Healing Through Farming

Highlights: farm to table, community collaboration, organic nutrition

West Java Mental Hospital (WJMH) initiated a remarkable project to address food supply challenges during the COVID-19 pandemic by creating a small-scale organic farm on its premises, named Kebun Walagri. Situated in a mountainous area, WJMH faced limited food supply options, impacting healthcare workers, local communities, and small businesses. In collaboration with the local farmers union, WJMH harnessed its available land resources to establish the Kebun Walagri, an organic vegetable farm, in a concept known as Kampung Walagri (recovery village).

This visionary project not only bolstered food sustainability for the hospital and its surrounding communities but also served as a rehabilitation platform for patients. By repurposing the land, individuals undergoing rehabilitation had the opportunity to develop agricultural skills, and the farm became a venue for community engagement, reducing the stigma associated with psychiatric/mental hospitals. The project's multifaceted approach included a small bazaar where rehabilitated individuals actively participated in selling farm products, fostering social bonds and reinforcing their sense of belonging and purpose.

The project's success highlights the potential of sustainable, self-sufficient food systems within healthcare institutions, promoting resilience, community integration, and environmental well-being. This hospital farm not only contributed to WJMH's therapy program but also lessened stigma, encouraged community involvement, and enhanced food system resilience.

WATER CONSERVATION

In many developing countries, [healthcare operations often occur in areas without proper water and treatment facilities](#). This lack of water and sanitation infrastructure is a major problem that directly impacts hospitals and health care systems. [Water supply to healthcare facilities is often underestimated](#), yet it is a crucial element for ensuring patient safety and can also be a manageable source of infections.

Two healthcare institutions in Southeast Asia demonstrate that even in resource-constrained and geographically challenging environments, sustainable innovation in water conservation and security remains a top priority.

Self-Sufficient Hydration

Highlights: safe water access, budget-friendly

West Java Mental Hospital (WJMH) in Indonesia faced a critical issue related to access to safe drinking water. While clean water is a fundamental human right, many people globally lack access to improved water sources. The hospital, adapting to pandemic challenges, had to reallocate its budget and make operational efficiencies, including producing its own drinking water. This initiative aligned with promoting water sustainability, recognizing the importance of self-sufficiency in providing clean water.

In 2021, WJMH implemented a drinking water management system, sourcing water from an artesian well. This system encouraged hospital employees to use their own drinking water and supported the "Bring Your Own Tumbler" campaign initiated in 2020. The program was initially managed by an employee but is set to become part of the "Kampung Walagri Projects," a rehabilitation program for patients. Water quality standards were inspected to ensure safe consumption criteria were met.

The hospital's budget for drinking water from 2018 to 2020 ranged from Rp 49,000,000 to Rp 70,000,000 annually. Since the production of drinking water in 2021, WJMH saved more than Rp 100,000,000 by producing and using its own drinking water, emphasizing the financial benefits of this sustainability strategy. The next steps include obtaining licensing for mass production and marketing the drinking water to the surrounding community, using the selling process as part of the therapy program for rehabilitants. This initiative not only contributes to the hospital's sustainability but also serves as a model for responsible water management.

Saving Through Conservation

Highlights: information dissemination, technological advancement, cost-effectiveness

St. Paul's Hospital of Iloilo (SPHI) in the Philippines recognized the critical importance of water conservation and implemented an efficient wastewater recycling strategy in response to the increasing demand for water, rising costs, and various factors contributing to water consumption issues. To address these challenges, SPHI launched an educational campaign to teach patients and visitors about responsible water usage.

They implemented water conservation technologies, such as recycling ozonated wastewater from the Sewerage Treatment Plant (STP) for flushing toilets and garden irrigation, resulting in substantial monthly savings of P 124,200. Rainwater harvesting practices further added savings of P 14,172.77 per month, with the collected rainwater used for laundry and toilet flushing. Additional initiatives included installing water stations and providing staff with glass canisters and tumblers to reduce plastic bottle usage.

The Department of Engineering and Maintenance monitored water consumption closely, and recycling played a significant role in reducing water usage and expenses. The sewage treatment plant recycled approximately 72-84 cubic meters of water daily. Despite challenges like aging pipelines and increased water bills, SPHI continued its commitment to water conservation, exemplified by a decrease in water consumption even as patient census increased in 2022. The hospital remained dedicated to reducing water usage, conserving energy, lowering carbon emissions, and promoting water sustainability as part of its ongoing efforts.

ENERGY EFFICIENCY

Without a doubt, healthcare facilities have a [significant energy footprint](#), as its 24/7 operations are heavily reliant on energy-dependent equipment and technologies. Unfortunately, meeting this energy demand often results in notable greenhouse gas emissions and air pollutants. These emissions, regrettably, have a direct impact on the very communities the healthcare sector is committed to healing.

Amid the pressing need for sustainability, two healthcare facilities in the Philippines are directing their focus towards energy efficiency. By optimizing energy usage and embracing

renewable sources, these institutions not only reduce their environmental footprint but also improve financial stability, ensuring a greener and more resilient future for all.

Powered by the Sun

Highlights: sustainable engineering, mercury-free, disaster-resilience

The **Dr. Arturo P. Pingoy Medical Center (DAPPMC) in South Cotabato, Philippines**, has illuminated a path toward a greener, more sustainable future by harnessing the power of the sun. Situated in a disaster-prone region plagued by soaring energy costs and unreliable electricity supply, DAPPMC undertook a transformative journey to transition to renewable energy sources, particularly solar panels. The hospital's visionary leadership, led by the CEO/Medical Director, championed this initiative and formed a dedicated project team, collaborating with engineering consultants to ensure meticulous planning and execution.

The results have been striking. DAPPMC's transition to solar energy has led to significant financial benefits, with monthly cost savings and a 35-40% reduction in energy consumption, providing both financial stability and environmental gains. By switching to LED lights and inverter technology, the initiative also reduced energy usage and eliminated health risks associated with mercury-containing lights. Moreover, the solar panels have empowered the hospital with a reliable energy source during extreme weather events, ensuring uninterrupted healthcare services. Despite challenges such as limited financing options and technical support, DAPPMC's sustainability journey serves as a beacon of hope, illustrating the potential for healthcare facilities to lead the way in achieving a greener and more resilient future.

Policy Against Mercury

Highlights: policy implementation, green procurement, partnership expansion

Mary Johnston Hospital (MJH) Inc. executed a pilot project in partnership with the Clean Lighting Coalition (CLiC) and Health Care Without Harm South East Asia (HCWH-SEA) to transition to mercury-free, low-cost, and energy-efficient lighting from outdated CFLs. Located in Tondo, Manila, MJH is a non-profit healthcare institution emphasizing holistic healing and sustainability. The initiative aimed to eliminate

mercury use, reduce electricity expenses, and lower carbon emissions in line with MJH's commitment to sustainable healthcare practices.

MJH's strategic approach to the lighting retrofit project encompassed Capacity, Information, Finance, and Sustainability quadrants. The project team coordinated effectively through stages such as inception, execution, and documentation, conducting lighting audits, and awareness campaigns. They established sustainable procurement guidelines, ensuring project funding and resources sustainability. Policies and procedures were institutionalized, partnerships expanded, and additional sustainability strategies were initiated.

Despite challenges and delays, MJH's tenacious Engineering Team mitigated issues, successfully transitioning to LED lighting. The project was projected to save approximately P1,961,510 annually and contributed to significant environmental benefits, equivalent to preserving acres of U.S. forest and growing tree seedlings. This initiative showcased MJH's commitment to environmental and planetary health.

TRANSPORTATION SOLUTION

In the ever-evolving healthcare landscape, the mobility of patients, medical professionals, and supplies is a common necessity. Yet, conventional transportation systems can exacerbate air pollution and traffic congestion. The good news is that hospitals have the opportunity to embrace eco-friendly transportation alternatives, streamline logistics, and [champion telemedicine as a practical option](#). These steps not only help reduce the healthcare sector's carbon footprint but also ensure timely and accessible healthcare services. In Southeast Asia, a Malaysian medical facility has taken substantial strides towards greening its transportation systems.

Cutting Greenhouse Gasses

Highlights: net-zero-driven, active monitoring

Sunway Medical Centre Velocity (SMCV) in Malaysia has taken significant steps to reduce transport-related emissions and enhance sustainability in healthcare. Acknowledging the health risks posed by transportation-related air pollution, SMCV committed to the United Nations' Race To Zero campaign, aiming to achieve net-zero greenhouse gas emissions by 2050.



Part 3

CASE STUDIES

Transforming Used Cooking Oil into Soap - How A Small Effort Made A Big Impact by Buddhist Tzu-Chi Dialysis Centres (Penang, Malaysia)

Sustainable Healthcare Management in Recycling by RSUD Ibnu Sina Kabupaten Gresik / Ibnu Sina Public Hospital in Gresik Regency (Gresik, Indonesia)

Optimization of Personal Protective Equipment: Reducing the Impact of Healthcare Waste Amidst Pandemic by Mary Johnston Hospital (Manila, Philippines)

Initiating a Small Scale Organic Farm in the Hospital Yard by Rumah Sakit Jiwa Provinsi Jawa Barat / West Java Mental Hospital (Cisarua District, Indonesia)

Yard Drinking Water Management by Rumah Sakit Jiwa Provinsi Jawa Barat or West Java Mental Hospital (Cisarua District, Indonesia)

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Shifting Power to the Sun: Renewable Energy towards a Healthier Future by Dr. Arturo P. Pingoy Medical Center (Koronadal, Philippines)

A Switch to Mercury-Free, Low-Cost and Energy-Efficient Lighting by Mary Johnston Hospital (MJH), Inc. (Manila, Philippines)

Reduce Transport Associated Emissions by Sunway Medical Centre Velocity (Kuala Lumpur, Malaysia)



Case Study 1

Transforming Used Cooking Oil into Soap - How A Small Effort Made A Big Impact

**By Buddhist Tzu-Chi Dialysis Centres
(Penang, Malaysia)**



Demographic information

Buddhist Tzu Chi Dialysis Centres provide free dialysis treatment, EPO injections, blood tests, and regular specialist check-ups for all patients in three locations in Penang (PGDC), Butterworth (BWDC), and Alor Star (KDC), Malaysia. PGDC has 100 Patients with 43 HD Machines and 24 Staff. BWDC has 70 Patients with 40 HD Machines and 13 Staff and KDC has 80 Patients with 30 HD Machines and 30 staff



Case study summary

The case study is about the upcycling of used cooking oil to be made as an all-purpose soap that can be used inside the center. This initiative has helped the facility avoid disposing of the used cooking oil in drainage and earn additional savings by cutting the cost of buying soaps. This project was also translated to the community by mobilizing them to donate their used oil instead.



The issue

The households in Malaysia produce a significant amount of used cooking oil (UCO) from frying food six days per week, which is improperly disposed of into the sink, leading to environmental pollution and contaminating terrestrial and aquatic habitats. The consumption of UCO can negatively impact health and there is no reuse for cooking. The increasing production of UCO from household or food industrial sources is a growing problem in Malaysia, with the accumulated oil and grease causing major problems with drains and sewers. A survey conducted in Teluk Bahang, Penang, Malaysia, revealed that 17% of respondents discarded UCO into dustbins, while another 7% and 60% discarded it onto soil and drainage systems. The lack of awareness about proper UCO management is a significant issue, as it could cost the local council a lot to clean up clogs.





Sustainability strategy implemented

Malaysians are increasingly reusing cooking oil, but many discard it improperly, causing problems for the environment. To address this issue, the center has turned used cooking oil into eco soap, or green soap, which is considered sustainable and helps protect the environment. These soaps are made from used cooking oil, NaOH (caustic soda), and water, and are eco-friendly due to their decomposition in water. The suds that flow down the drain after washing are 100% safe for the environment and aquatic and marine animals. The soaps contain glycerine, which helps maintain skin moisture and protect against damage caused by dryness. They are used in the kitchen and as gifts for volunteers.



Implementation process

In September 2022, a fund-raising drive led to an overwhelming demand for UCO or expired cooking oil for soap making. To increase demand, community volunteers were encouraged to gather UCO for soap making. Within two months, over 250 liters of UCO were collected in two community areas. Tzu Chi Education & Environment Protection Centres were used to educate the community on the importance of reducing UCO in the sewage system. The project aims to create awareness and educate about the potential consequences of dumping UCO into the sewage system, similar to the buildup of cholesterol and fried foods in the arteries.



Tracking progress

The UCO collected were measured and recorded. During the initial stage, the UCO collected were not recorded as the soaps made were only used in the kitchen. The response and feedback were very encouraging and in September 2022, we started to promote this project at the community level and they kept track of UCO collection. The response was very positive and more UCOs were collected if not would end up in the water system.

Educational talks and sharing were done along the way to ensure that all participants were aware of the UCO contaminations and why homemade soaps are more environmentally friendly.

Not only was the UCO salvaged but also saved the cost of washing detergents which may have harmful chemicals that harm the water system.



Progress achieved

Transforming UCO into green soaps started in July 2020 and only from a kitchen until September 2022 when more people from the community started to participate in this project and more UCOs were salvaged.

Within a short few months, more people are aware and are doing their part in creating a more sustainable environment. We are working together to build a greener community. We hope to create a UCO awareness campaign for the public on the importance of proper disposal and recycling of UCO through community networking.

The amount collected may seem small, but it is a great start to a greener future, and proper management of UCO, we can reduce environmental pollution, save space in landfills, and reduce the costs of maintaining drainage/water treatment.





Challenges and lessons learned

Malaysia faces UCO management problems resulting from poor participation and a lack of full consumer compliance in waste management activities including waste collection and recycling. Cooking Oil is one of the most commonly reported types of water pollution and causes nearly a quarter of all pollution incidents. Careless disposal of UCO into drainage systems, onto land, or to watercourses is not only an offense but can be harmful to river birds, fish, and other wildlife.

While the government is on its way to exploring new probabilities, we, as individual and NGO organizations, can contribute our tiny bit in eradicating the impact of UCO. We should make it a habit to discourage the use of oils for deep frying and adopt healthier food options like baked, steamed, or even air-fried delicacies.

Create awareness and education to ensure UCO generated from individual households is not discarded into the kitchen sink, drain, or sewer. Community projects like soap making not only reduce the contamination impact but also save money and convert waste to something useful while taking care of the environment. We are now actively promoting this project at the Tzu Chi Environment Protection Education Centre in the local community.



Next steps

Engaging in community projects and networking provides an opportunity for members of the community and positive impact on society at large. Community volunteerism enables us to acquire life skills and knowledge, as well as provide networking which connects us to the community and makes it a better place for all of us to live in.

The best, and correct, thing to do with the UCO is to recycle it and make it into something useful. This process is simple and can have a lasting impact on the environment. Recycling UCO gives it a productive purpose long after it leaves the fryer and is our responsibility to do our part to contribute to a more sustainable environment and a healthier future.

The Environmental Protection Act 1990 places a Duty of Care on every industry to ensure "that all reasonable steps are taken to look after any waste you have and prevent its illegal disposal by others", this includes waste cooking oils and fats.

We may not be able to do a lot or be ready to make big changes, but small and consistent efforts over time can bring substantial results. We often ignore the power of a small step that can eventually take our lives to a higher scale. We believe that "the smallest step in the right direction can be the biggest step of our life." We hope to take the first step and keep moving towards the goal and making progress.

Environment pollution is not easy to deal with but we have to be persistent to protect and put in every little effort we could to make changes.

People can prevent oil pollution by simply collecting the used oil in a container or bottle and sending it to local recycling services. This can greatly reduce the amount of oil going into wastewater treatment systems and disposal sites.”

Remember that every effort, however small, counts.

Links

Promoting Health and Sustainability by Advocating Plant-Based Diet during COVID-19 Pandemic (Published 10th August 2020)

DaAi Channel: **【新聞】大哉教育廚房 回鍋油的蛻變**,
<https://www.facebook.com/DaAi.Channel.Malaysia/videos/341015680221167>

International Journal on Advanced Science Engineering Information Technology
Vol.5 (2015) No.4 ISSN: 2088-5334

Knowledge, Attitude, and Perception Towards the Consumption of Waste Cooking Oil between Suburban and Rural Communities

<https://core.ac.uk/download/pdf/296919535.pdf>

IOSR Journal of Environmental Science, Toxicology and Food Technology
(IOSR-JESTFT) e-ISSN: 2319-2402, p- ISSN: 2319-2399. Volume 8, Issue 10 Ver. III (Oct. 2014), PP 45-51 www.iosrjournals.org

Case Study 2

Sustainable Healthcare Management in Recycling

**By RSUD Ibnu Sina Kabupaten Gresik / Ibnu Sina
Public Hospital in Gresik Regency (Gresik,
Indonesia)**



Demographic information

Ibnu Public Hospital in Gresik, Indonesia, operated by the municipal Government of Gresik Regency, is a general hospital located in a 50,000 m² area. In 2021, it had a significant number of outpatient visits and currently offers 368 inpatient beds.



Case study summary

Ibnu Sina Hospital in Gresik is implementing a sustainable waste management program through composting strategies. The program focuses on reducing waste in landfills and incinerators, utilizing waste banks for recyclable domestic waste, BSF maggot composting for food and kitchen waste, aerobic composting for yard waste, and chemical packaging waste treatment. Collaboration between internal and external stakeholders is crucial for successful implementation, and achieving environmental and economic benefits.



The issue

Ibnu Sina Hospital generates domestic and hazardous waste due to increasing hospital visits and inadequate municipal drinking water supply. The hospital also generates packaging waste from hospital logistics, including IV solution bags, disinfectants, cleaning products, and hemodialysis acids. Chemical packaging waste, mostly made of recyclable plastic, is not recycled due to a lack of recycling facilities. The hospital's incineration of this waste poses risks to the environment and public health, emitting hazardous substances and contributing to its carbon footprint. Ibnu Sina Hospital has implemented waste reduction and reuse programs but still needs to recycle unavoidable waste.



Sustainability strategy implemented

The flow diagram of waste management including the sustainable methods in Ibnu Sina Public Hospital can be found in Figure 1.

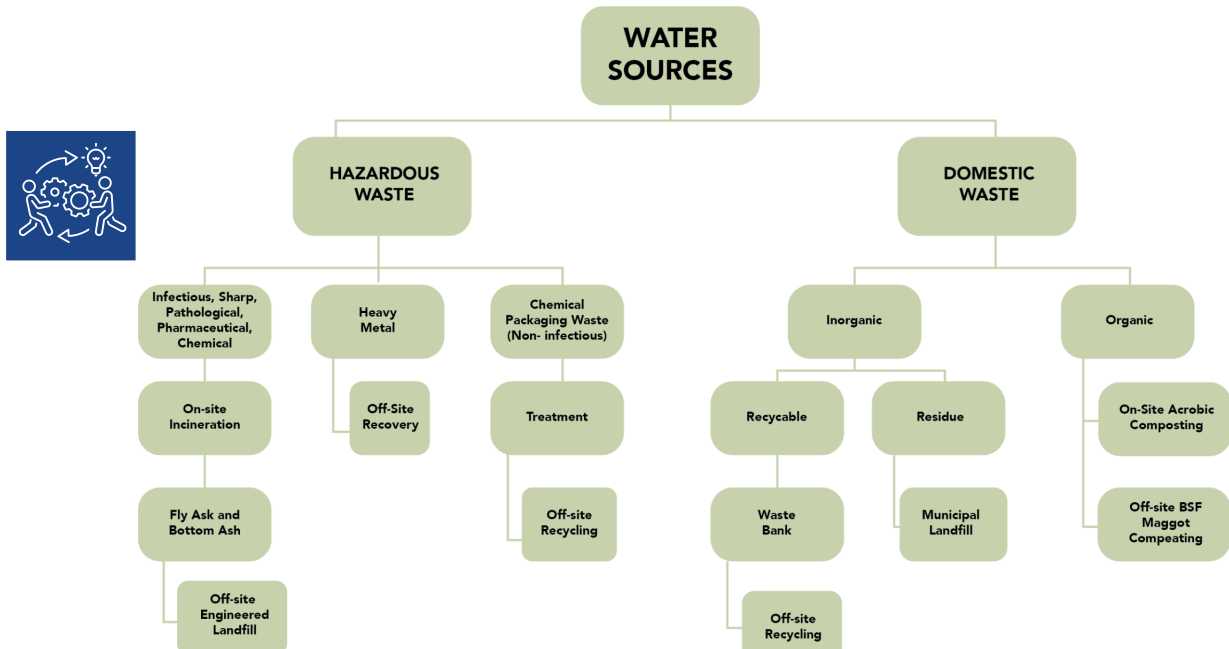


Figure 1: Waste Management Flow of Ibnu Sina Public Hospital

There are four strategies implemented to achieve the objectives of the program according to the type of waste as follows:

Ibnu Sina Hospital is implementing a Waste Bank for Recyclable Domestic waste, which encourages customers to send recyclable waste. The hospital collaborates with local Black Soldier Fly (BSF) maggot farmers to segregate food and kitchen waste, which is difficult to compost aerobically due to its high water content. Aerobic composting is used for yard waste, as dry organic waste is easily degraded in aerobic conditions. The hospital also recycles non-infectious chemical packaging waste, segregates IV solution bag waste inwards, and drops it at the pharmacy for recycling. The waste is then transported to a recycling center for recycling into non-food grade products.

Implementation process



The trial activity involved identifying recyclable domestic waste, kitchen and food waste, and chemicals in recyclable packaging. The program was implemented from March to December 2018 and fully implemented in 2019. The management team analyzed waste transport, established standard operating procedures, and disseminated information to all staff.

The officers planned the implementation equipment needed as follows:

- a. Waste Bank: Weight scale, stationery, plastic sacks, logbook, saving books, receipt sheets, flat plastic ropes.
- b. Chemical packaging waste treatment: Waste bins for IV solution bags placed inwards, waste bins for drop point placed at Pharmacy, plastic bags, plastic crushing machine, water containers for disinfection and washing, weight scale, plastic sacks, flat plastic ropes, chlorine and water, and plastic baskets.
- c. Aerobic composting: composting bins, weight scale, water sprayer, fermented liquid fertilizer, water, handheld shovel, buckets.
- d. Off-site BSF maggot composting: waste bins placed at catering service, buckets with lids, plastic bags.

The Department of Environmental Health in collaboration with various hospital departments and staff to implement a program for waste segregation. External stakeholders include PAMAGRES, Gresik Environmental Agency, local waste companies, and Global Green and Healthy Hospitals. The program involves hospital staff, janitors, catering services, in-patient wards, pharmacies, and the hospital Infection Prevention & Control Department for communication and monitoring.

The factor that influences the success of the program is strong collaboration with internal departments/staff to segregate the waste generated. Segregation is the initial key to recycling because it prevents waste contamination. Once the recyclable waste is contaminated by the infectious waste, it must be incinerated. Thus, if the waste is properly segregated, it can be managed according to its type leading to significant landfill and incinerator reduction.

Tracking progress

The officers closely connect with the departments and staff to segregate the recyclables, yard waste, and kitchen waste. To ensure the proper waste segregation of chemical packaging waste including solution IV bags, the officers conduct the daily monitoring at the recycling site and medical waste storage room. Every medical waste bag is labeled with the room name so it eases the officer to track the sources if the waste is not segregated properly. The evaluation of progress is conducted monthly to calculate the weight and percentage of recycled waste. The hospital also inputs all data to the Waste Data Form at the Hippocrates Data Center.



Progress achieved

Before the program was developed, the percentage of waste recycling in hospitals was 0%. All the domestic waste was disposed of at the city landfill while chemical packaging waste including IV solution bags was incinerated. Through the program, domestic waste and hazardous waste that ends up in landfills and incineration can be reduced. Thus, the efforts create a sustainable circular economy. Following are the consecutive achievements of the program from 2018 to 2021:

The amount ng using the BSF maggot method.

WASTE DIVERSION FROM END DISPOSAL

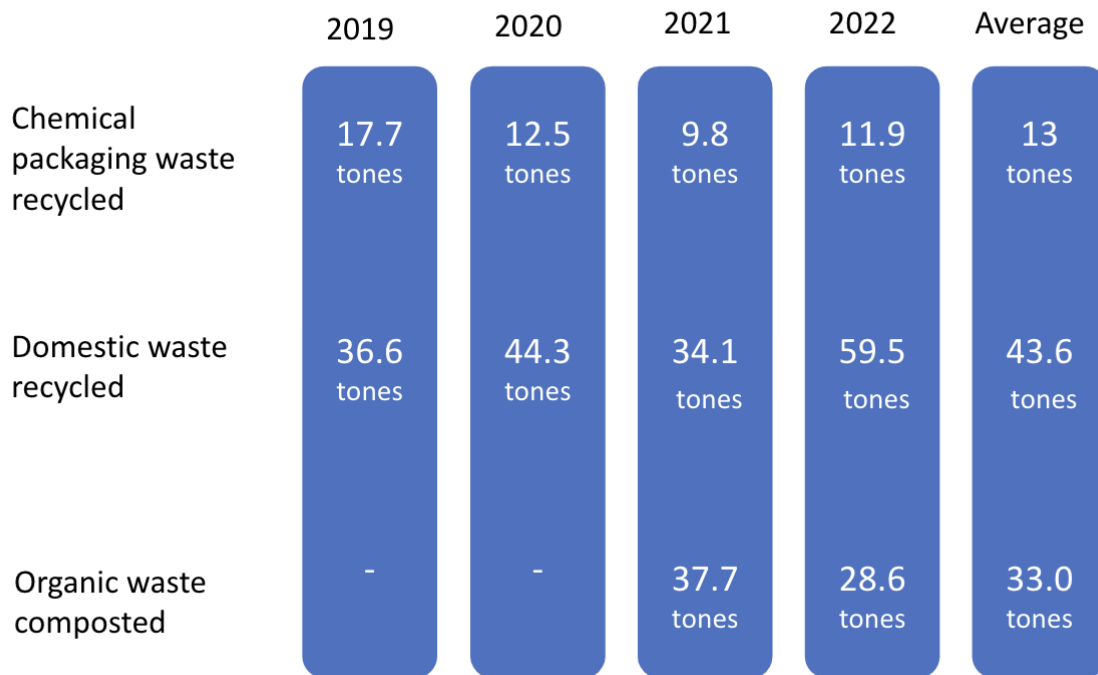


Figure 2: Waste diversion from end disposal

INCINERATION FOSSIL FUEL AND GREENHOUSE GAS REDUCTION

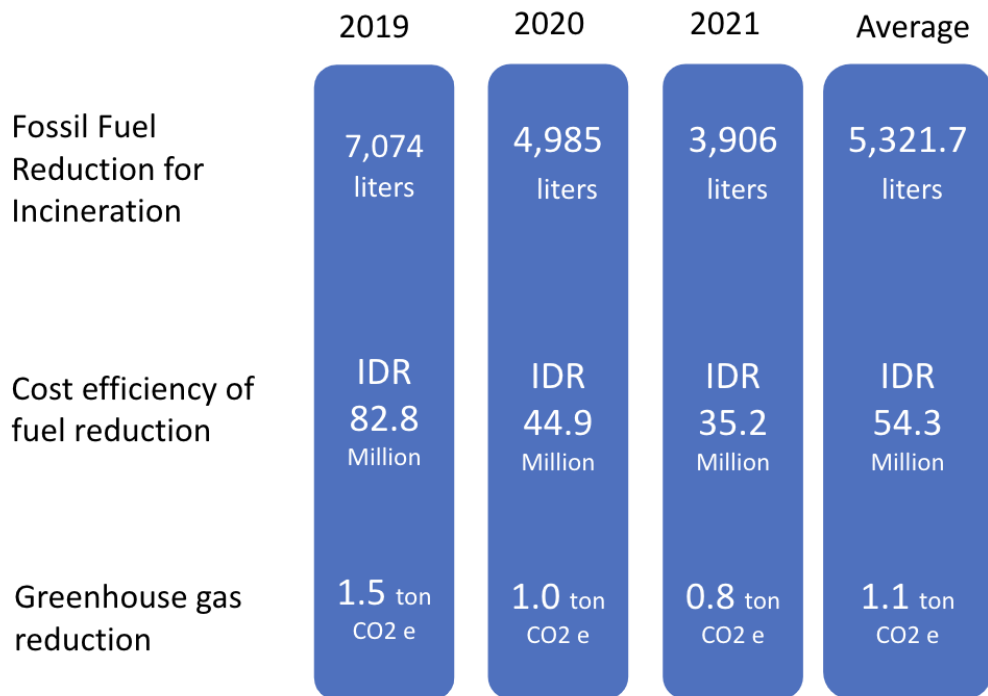


Figure 3: Incineration fossil fuel and greenhouse gas reduction



Challenges and lessons learned...

The challenge that the hospital faced in the recycling program was the pandemic, especially during the peak surge in Indonesia. During the pandemic, all the waste generated in the COVID-19 in-patient isolation room was identified as infectious including the domestic waste and IV solution bags according to the Indonesian Ministry of Health guidelines. Hence, the waste generated in the COVID-19 room was incinerated altogether. This led to a lesser amount of recycled waste in 2020 and 2021.

Another challenge is the waste management company does not receive single or multi-layered plastic film including plastic bags, food wrappers, and secondary packaging, etc. The companies also reject the (PET) (Polyethylene terephthalate) plastic. Thus, there is still abundant plastic residue from the hospital that ends up in the municipal landfill.

The lesson learned from the program is that sustainable waste management in healthcare facilities requires good collaboration with other hospital departments and staff to segregate the waste they generate. This can be done by imposing the practice through binding SOP documents. Furthermore, it can be learned that incentive encourages the staff to participate in sustainable waste management. Most of the waste bank customers are janitors who seek additional income which they can earn by becoming waste bank customers.



Next steps

The upcoming activity to develop the program is providing waste bins placed at the hospital parks, waiting rooms, and hallways to contain organic waste.

Case Study 3

Optimization of Personal Protective Equipment: Reducing the Impact of Healthcare Waste Amidst Pandemic

By Mary Johnston Hospital (Manila, Philippines)



Demographic information

Mary Johnston Hospital (MJH) Inc., founded in 1906 in Tondo, Manila, is a non-profit healthcare institution accredited by DOH, PHA, and PhilHealth. It boasts 120 beds and six clinical areas for residency programs: Internal Medicine, Pediatrics, Surgery, Obstetrics, Gynecology, and Family Medicine. Comprising three buildings on 10,000 sqm of land, it employs 460 personnel and emphasizes holistic healing with a "Healing Together" approach. It also invests in health system development based on the CIFS framework.



Case Study Summary

The experience of Mary Johnston Hospital during the height of COVID-19 will be covered in this case study, as well as how MJH strategically addressed the serious shortage of personal protective equipment and the escalating burden of infectious plastic waste.



The Issue

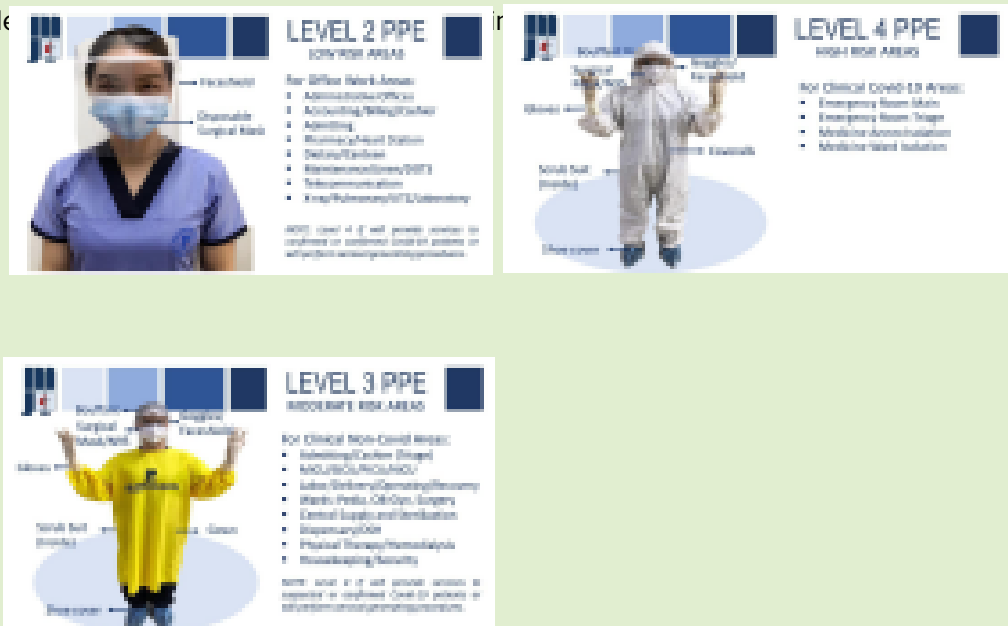
The COVID-19 pandemic has led to a severe shortage of personal protective equipment, particularly disposable gowns, coveralls, N95 masks, goggles, face shields, shoe covers, and aprons. Limited supplies from the government and non-government organizations have contributed to the issue. Equipment from non-government organizations was not applicable in high-risk settings or COVID-19 isolation rooms. There was a significant increase in waste, including personal protective equipment, plastic, and outsourced waste management. Hazardous healthcare waste wasn't consistently collected by the outsourced Waste Management Company, hence making it difficult to control and posing an infection risk in the main waste storage. Lack of training in donning and doffing PPE, institutional guidelines on proper reprocessing, and unsuitable patient rooms further contribute to the issue. The majority of patient rooms are not designed to accommodate COVID-19 patients.



Implemented Strategies

The Mary Johnston Hospital strategically implemented measures to significantly lessen the waste generated and expenditure from the use of personal protective equipment in response to the challenges of the COVID-19 pandemic. The following actions were led by the MJH-Total Quality Improvement Office:

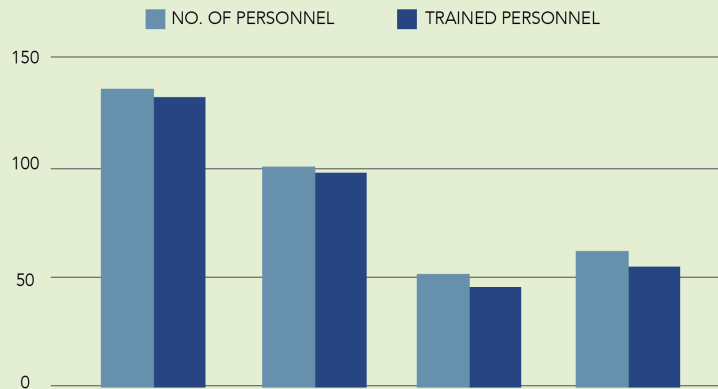
Exposure Risk Classification: According to WHO and DOH interim guidelines, the risk of exposure to COVID-19 in various places was categorized as Level 2-4 with specific PPE requirements. To encourage compliance, administrative control was implemented.



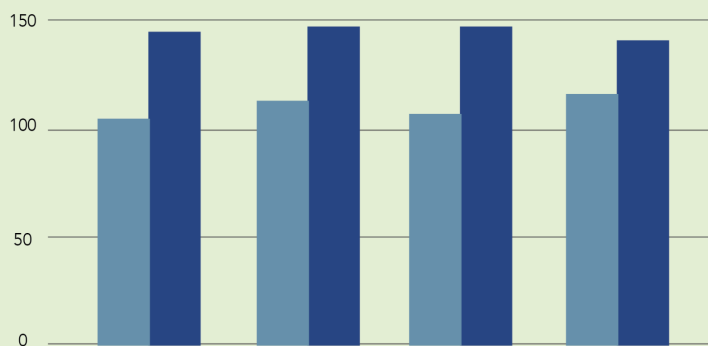
To ensure dependable supplies of PPE, the TQM initiated the dispensing, controlling, and forecasting of the needed PPE based on the number of patients and employees during the implementation of the skeletal workforce.

COVID-19 Education: To ensure proper PPE use, numerous educational, training, and workshop sessions were held. The Head Nurses and Unit Supervisors monitored their compliance and carried out performance reviews. The infection control nurse firmly instructed the right donning, doffing, sorting of worn PPE, and waste disposal and prioritized the training needs based on the risk category exposure.

NO. OF PERSONNEL VS. TRAINED PERSONNEL



LEVEL OF COMPLIANCE (CORRECT PPE USAGE)



Reprocessing PPE: The hospital considered reprocessing PPE (using previously worn PPE after decontamination or reprocessing methods), as a temporary strategy during the severe shortage. The hospital trained selected personnel from housekeeping and the central supply and sterilization unit who will facilitate the reprocessing of PPE in accordance following WHO interim guidance in processing PPE during the severe shortage.

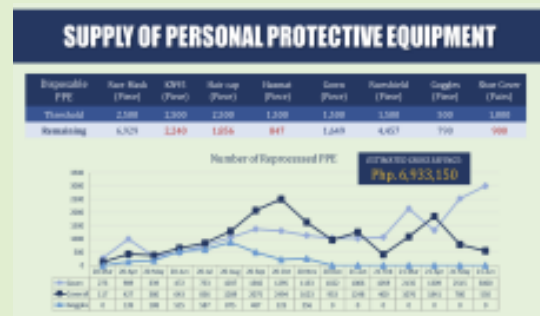
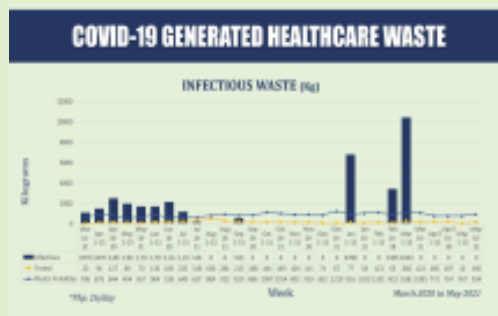


Advanced donning and doffing procedures, PPE segregation, inspection, cleaning, decontamination, sterilization, tagging, distribution, and recall processes are all covered in the reprocessing training. This temporary strategy prevented the operating cost of purchasing and disposing of expensive and limited PPE supplies.

Alternative PPE: Since not all purchased and donated PPE cannot be reprocessed. The hospital also considered alternative PPE items (using non-standardized or repurposed products as PPE items) as another strategy during the PPE scarcity. The linen section made alternative coveralls and gowns using microfiber water-resistant fabrics that can be reprocessed. All fabricated PPE is carefully inspected for any damage before and after the reprocessing.

*Maximum of 3x reprocessed/PPE

Monitoring And Feedback: The Directors continuously communicate the interim guidelines provided by the Department of Health on how to manage COVID-19. The unit heads immediately coordinated their concerns and observations with their immediate supervisors/managers and the TQM office issued a weekly COVID-19 Bulletin. The weekly monitoring of hazardous waste and the total savings from reprocessed PPE are also included in the bulletin.



Implementation Process

The Mary Johnston Hospital systematically improved the rational use of personal protection equipment while implementing initiatives to reduce the expense of healthcare waste. The timeline for implementation was also compared to the interim recommendations offered by the DOH, WHO, and other COVID-19-related memos.

January 2020	Formation of COVID-19 Response Team Meeting Reviewed the Interim Guidelines related to COVID-19 Management Formulated interim hospital guidelines for COVID-19 Management. Started the triage at the Emergency Room, Main lobby, and dispensary.
February 2020	Initiated a series of face-to-face in-house training on COVID-19 (High-risk). Released of Risk Exposure Category Level (Guidelines and Posters) Released of Donning and Doffing Video Presentation for employees.
March 2020	1st week: Transferred the PPE monitoring/dispensing to the TQM office. 2nd Week: Started monitoring of waste associated with COVID-19. 2nd: Construction of a COVID-19 Isolation facility for employees (Mango Tree). 3rd week: First confirmed COVID-19 case in MJH 4th week: Issued the 1st COVID-19 Bulletin.

April 2020	Initiated a series of face-to-face in-house training on COVID-19 (Residents). Adopted the WHO Interim guidance and started training on reprocessing of PPE among selected personnel.
May 2020	Started reprocessing of PPE due to shortage of gowns and coveralls. Construction of COVID-19 Isolation Unit for patients (Medicine Annex)
June 2020	Received the first PPE donations from the Government (DOH) Started fabrication (hospital-made) of PPE made of microfiber fabrics.
July 2020	Started the daily bed-tracker reporting to DOH: Critical Care Utilization Rate Started the weekly COVID-19 reporting to DOH: PPE, COVID-19 among employees, no. of the workforce in isolation areas, no. VTM, no. of swabbed employees. Increased volume of donated PPE from government and NGOs. Started skeletal workforce and work-from-home program.
October 2020	Started Telemedicine at the dispensary unit.
March 2021	Started the COVID-19 vaccination program (Sinovac and AstraZeneca)
November 2021	Started the COVID-19 booster vaccination (Pfizer)

The COVID-19 Bulletin, which is published every week, has evolved into a useful management tool and indicator. During the surge, peak, and decline of COVID-19, Total Quality Management was committed to producing a weekly e-copy for the directors that would serve as a crucial reference for their actions and choices.



Challenges and lessons learned

At the time of the pandemic, healthcare waste management called for multidisciplinary measures for various hospital departments. Healthcare professionals should collaborate to accommodate COVID-19 patients while becoming accustomed to the "new normal" of healthcare waste minimization techniques. The hospital policymakers shall continuously challenge the existing procedures, guidelines, and metrics not only on healthcare waste management but also on other related aspects that can contribute to the generation of hazardous or infectious waste. COVID-19 education and training among hospital staff and employees is a vital component of sustainability to ensure rational use and optimization during the severe shortage of PPE. Intranet messengers and social media become credible tools to communicate all the needed information and feedback necessary for COVID-19 management, such as compliance, health declaration, online training, surveys, bulletin, memoranda, and reports.



Next steps

Implementation of "new normal" waste audit twice a year. Expansion and improvement of the Main Waste Storage Area and Material Recovery Facility. Procurement of a grinder machine for vials, ampules, and IV bottles. Shifting from disposable to reusable microfiber water-resistant gowns and coveralls.



Progress achieved

MJH achieved progress in finance through immediate planning and temporary strategies during the COVID-19 shortage, resulting in significant savings of Php8,673,350 and weight reduction of hazardous weight of 10,821kg from worn PPE. Additionally, the creation of washable PPE resulted in about Php4,235,850 in savings. In capacity building, training sessions and workshops on proper hand hygiene and waste management improved compliance. Information tools like memos and bulletins were used to manage the pandemic's burden. Sustainability through positive communication and monitoring of hazardous materials helped devise long-term approaches for managing used PPE. From March 2020 to October 2021, the hospital successfully managed 1,316 confirmed cases of COVID-19.



Case Study 4

Initiating a Small Scale Organic Farm in the Hospital Yard

By Rumah Sakit Jiwa Provinsi Jawa Barat / West
Java Mental Hospital (Cisarua District, Indonesia)

Demographic information



Rumah Sakit Jiwa Provinsi Jawa Barat, or West Java Mental Hospital (WJMH), is a healthcare institution located in Southeast Asia, Indonesia. Situated on approximately 232,000 square meters of land in Kabupaten Bandung Barat, it operates as a hospital with 240 beds and employs a dedicated staff of 766 professionals.

Case study summary



The strict COVID-19 pandemic lockdowns that began in early 2020 resulted in decreased access to food supplies across Indonesia. The Kebun Walagri of West Java Mental Hospital's harvest provided additional supplies and income for the hospital's needs and helped increase the food supply for the surrounding communities.

The issue



West Java Mental Hospital (WJMH) is located in *Cisarua* District in northwest Bandung, a mountainous area around 20 km from Bandung City, which is ideal for mental health services. The hospital is situated on 23-acre land with only 20 percent being built for offices and hospital-based services which means there is around 18.4 acre of land to be optimized for better well-being of users and stakeholders. To make the land useful and resourceful, WJMH collaborated with the local farmers union (Gapoktan/Gabungan Kelompok Tani Wargi Punggupay) to use the land for farming activities.

The West Java Mental Hospital was also affected. While the food supply for hospital patients was secured through an annual contract with suppliers, the same did not hold for healthcare workers, the nearby communities, local farmers, and even small businesses, which were all impacted.

Sustainability strategy implemented



To overcome the limited food supply chain, the Green Hospital team from the West Java Mental Hospital (WJMH) created a small-scale farm according to green, healthy, and sustainable procurement principles using the fertile land within the hospital area to implement the concept of *Kampung Walagri* (recovery village). This initiative was a partnership established between hospital staff, recovering patients, and the local farmers union (Gapoktan/Gabungan Kelompok Tani Wargi Punggupay), which aimed to use the land to turn it into an organic vegetable farm which was given the name of *Kebun Walagri*.

As a result of this project, the *Kebun Walagri* harvest provided additional supplies and income for the hospital's needs and helped increase the food supply for the surrounding communities. In addition, the farm provided local farmers with a source of income and helped with the rehabilitation of patients. It also encouraged community visits that lessened the stigma of psychiatric/mental hospitals.

Implementation process

Commencing in 2020, this visionary project has brought together frontline workers in the health sector and the local agricultural community to create a transformative impact. At its core, the initiative centers on two key components, each with profound implications for both the environment and society.

First and foremost, available land resources are harnessed to cultivate agricultural products that play a pivotal role in bolstering food sustainability for the surrounding communities. This step not only contributes to the availability of fresh and locally sourced food but also supports the broader goal of regional self-sufficiency in food production.

The second component is equally transformative. The farmland is ingeniously repurposed as a training venue for rehabilitated individuals, providing them with the opportunity to develop practical skills in agriculture. This dual-purpose utilization of the land not only yields agricultural benefits but also serves as a therapeutic and vocational platform for people seeking rehabilitation.

One remarkable outcome of this multifaceted project is the small bazaar where those who were rehabilitated actively engage with the community by selling farm products. Beyond its economic significance, this interaction fosters social bonds and reintegrates people in rehabilitation into society, reinforcing their sense of belonging and purpose.



Challenges

In addition to the production aspect, individuals undergoing rehabilitation also acquire essential skills in marketing agricultural products. Some of them face challenges with basic financial literacy, while others need guidance in approaching and engaging potential customers. Teaching a wide range of soft skills is a vital component of the rehabilitation process.



Lessons learned

- Thinking more green and sustainable not only results in a resilient food system but can lead to self-sufficiency and support for each other.
- Local organic farming in the hospital can sufficiently provide hospital needs and even supply community needs.

- Hospital gardens contribute to a resilient food system as well as encourage community

visits that help the assimilation of individuals undergoing rehabilitation and lessen the stigma of mental hospitals.

Ultimately, this project demonstrated convincingly that a resilient food supply system could protect both the health of human beings and the environment.



Progress achieved

- This hospital farm is part of the WJMH therapy program for patients or individuals undergoing rehabilitation.
- It encourages the community to help re-integrate recovering patients.
- It lessens the stigma surrounding a mental hospital.
- It contributes to a resilient food system.

Links

<https://shipp-stories.savinglivesustainably.org/stories/story-4.html>

https://www.youtube.com/watch?v=l78MRyx3MA&ab_channel=HealthCareWithoutHarmSoutheastASIA

Case Study 5

Yard Drinking Water Management

By Rumah Sakit Jiwa Provinsi Jawa Barat or West Java Mental Hospital (Cisarua District, Indonesia)



Demographic information

The West Java Mental Hospital (WJMH), located in Bandung Barat, Indonesia, is a member of the Global Green and Healthy Hospitals in Southeast Asia. It has a workforce of 766 staff and a 240-bed capacity.



Case study summary

Given its location in an elevated region and proximity to mountain springs, it is appropriate for WJMH to install water treatment to ensure the provision of clean water.



The issue

Access to safe water is a fundamental human need and a basic human right. Contaminated water jeopardizes both the physical and social health of all people. It is an affront to human dignity. Yet even today, clean water is a luxury that remains out of the reach of many. Worldwide, more than a billion people have no access to improved water sources, while nearly two and a half billion live without basic sanitation.

To adapt to the pandemic, the WJMH had to shift the hospital's regular budget. The hospital had to allocate other resources for operations as well as to make several efficiencies in some sectors, including producing our drinking water.

Studies define and quantify 'basic water requirements' (BWRs) in terms of quantity and quality for four basic human needs: drinking water for survival, water for human hygiene, water for sanitation services, and modest household needs for preparing food.

The ability to produce and utilize one's drinking water is an essential aspect of promoting water sustainability.



Sustainability strategy implemented

In 2021, WJMH installed a drinking water management system from an artesian well to encourage all hospital employees to use their drinking water instead of packaged water.

This program also supported the "Bring Your Own Tumbler" campaign that has already been implemented since August 2020.

Implementation process

Currently, the water management is handled by an employee, but in the future, all the processes will become part of the “Kampung Walagri Projects,” a rehabilitation program for patients.

An inspection of the water quality standards was conducted by a sanitarian to verify that it meets safe consumption criteria.

Tracking progress

Year	Budget	Used
2018	Rp 65.650.000,-	Rp 33,276,000,-
2019	Rp 49,700,000,-	Rp 44,512,000,-
2020	Rp 70,080,000,-	Rp 45,030,000,-

Table: Budget for drinking water 2018-2020



Challenges and lessons learned

To license the product so we can make it worth selling.

To teach individuals in rehabilitation to be able to handle production and selling.

To promote and market the drinking water at a lower price, the community prefers to use our product instead of others already in the market.



Next steps

Take a licensing process for massive produce and market the drinking water to the surrounding community.

Using the selling process as the therapy program for the rehabilitant.



Progress achieved

Time	Number of gallon	Price	Total Saving
Jan-Dec 2021	2,556	Rp 20,000,-	Rp 51,120,000,-
Jan-Nov 2022	4,063	Rp 20,000,-	Rp 81,260,000,-
Total	6,619		Rp 132,380,000,-

Since 2018, the hospital budget for drinking water is approximately Rp 49,000,000,- to Rp 70,000,000,- each year. Since drinking water was produced in 2021, the average use of drinking water in 2021 is 213 gallons per month and 2,556 a year. The total consumption from Jan to Nov 2022 is 4,063 gallons. With the calculation of 2021 and 2022 only, WJMH already saved more than Rp 100.000.000,- by producing and utilizing its drinking water.

Case Study 6

The Efficiency of Waste Water Recycling in the Healthcare Industry

By St. Paul's Hospital of Iloilo, Inc. (Iloilo, Philippines)



Demographic information

St. Paul's Hospital of Iloilo (SPHI) is a non-profit Catholic institution founded in 1911 in Iloilo City, Philippines. It's a Tertiary institution with a 180-bed capacity. The hospital offers a range of specialized services, including nuclear medicine, a cancer center, an eye diagnostic and treatment center, and an HIV treatment hub.



Case study summary

Water conservation is the practice of using water efficiently to reduce unnecessary water usage for sustenance. It is essential to place significant importance on the conservation of water resources everywhere. The practice of efficient recycling and reusing water will contribute to a reduction in water consumption and greenhouse gas emissions.



The issue

Water constitutes 70% of the earth and the human body, which is why water conservation is vital. This applies not only to our personal lives but also to large institutions consuming thousands of metric tons daily. There are many reasons for the increasing demand for water, including the high cost, increasing demand from new machine technologies, deteriorated fixtures/pipelines, and potability concerns. Several factors also contribute to the increasing water demand, such as bad water-wasting habits, water meter errors, and pipe leaks.



Sustainability strategy implemented

To address the issues, patients and their accompanying individuals were educated on proper water usage while staying in the hospital. Water conservation technologies were also utilized, such as recycling Ozonated wastewater from the Sewerage Treatment Plant (STP) for flushing toilets and watering the garden in the St. Paul's Integrated Center of Expertise (SPICE) building. By reusing our wastewater, with a monthly output of 1,380 cubic meters, SPHI was able to save P 124,200 per month.

Rain Water Harvesting was also practiced, 162.80 cubic meters was harvested per month, giving an additional savings of P 14,172.77 per month. The harvested water goes to the Laundry Department for washing and flushing the toilets in the Main Building. Instead of chemicals, ozonators were put up to disinfect the laundry clothes.

Other initiatives implemented were the installation of water stations, the use of glass canisters, and tumblers given to staff to eliminate the use of plastic bottles.



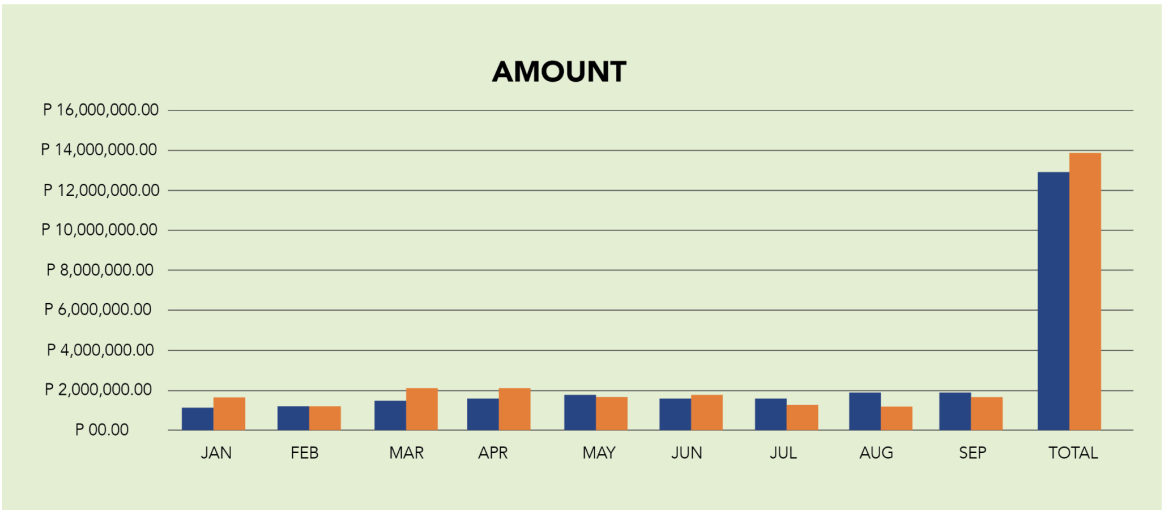
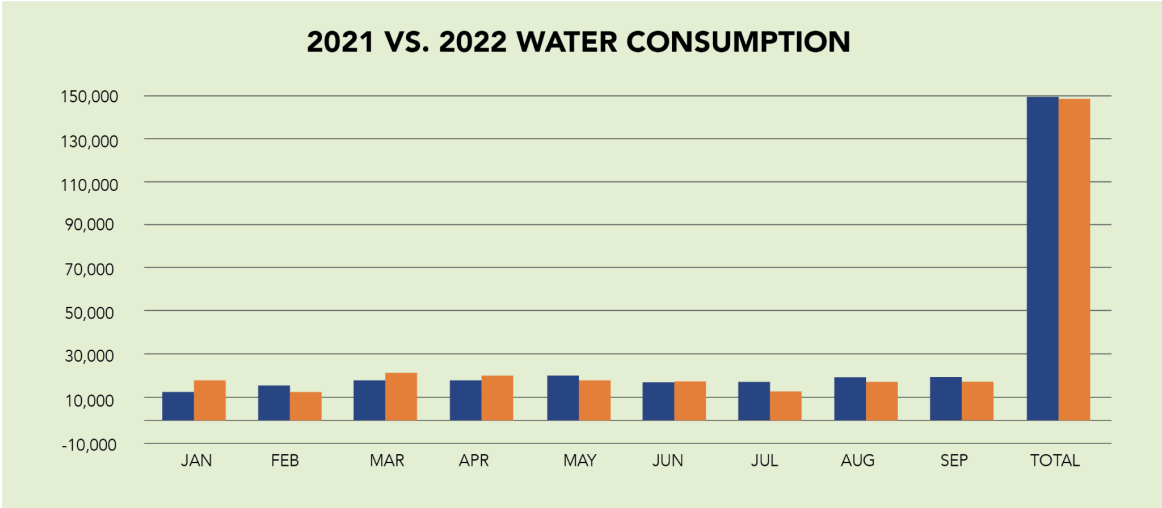
Implementation process

The Department of Engineering and Maintenance handles and monitors the water consumption monthly. Recycling water plays a significant role in reducing water consumption and expenses. The hospital's sewage treatment plant operates on a 5-6 hour cycle, producing approximately 18-21 cubic meters of reprocessed water per cycle. Each cycle takes about three (3) hours to process wastewater for reuse and 2.78 hours to fill the reservoir. The treatment facility can complete four (4) cycles per day, generating 72-84 cubic meters of recycled water daily. By limiting wasteful water usage, significant reductions in expenses and increased resource efficiency can be achieved.



Tracking progress

Due to some concerns, such as aging pipelines and increasing water consumption bills, the institution has requested the local water utility company to replace a clogged-up water meter, which may have affected the accuracy of its meter reading, as well as the replacement of other deteriorated components of the water distribution system. Due to these above-mentioned concerns, the institution also requested the local water utility company for a re-computation and the subsequent adjustment of its water consumption bill for the particular period. The local water utility company implemented an increase in water utilization rate from 87 pesos/cu.m in 2021 to 92 pesos/cu.m. in 2022. The hospital's annual water expenses increased by 8% from 12,799,692.14 to 13,841,499.39, although its actual water consumption for the same period has decreased by 1%. It is good to note that in 2022, our water consumption decreased while our patients' census increased. In 2021, patients' census was low due to the pandemic restrictions, but water consumption was high compared to 2022 data. This is a manifestation that the water conservation program, plus the augmented source of recycled water and rainfall harvesting, is helping save water. Despite the success of its program, the hospital is continuously trying to lessen water usage to lower its carbon footprint.



Challenges and lessons learned



Monitoring water consumption and properly maintaining the distribution system is currently a challenge. It was found that checking or monitoring monthly consumption incurs additional costs. SPHI is keeping track of the progress made on the issues discussed with the water source company.

Next steps



Once the monitoring issue is resolved, SPHI plans to consistently monitor the hospital's water usage, to reduce greenhouse gas emissions and promote water sustainability.



Progress achieved

The pandemic allowed the hospital to analyze and root out system losses in the water system through baseline analysis and monitoring. SPHI identified all available cisterns and reserves, and their capacities, and re-aligned building allocations based on projected demand and proximity of the resources.

- Lessen water consumption
- Conserve energy
- Reduce air and water pollution
- Reduce greenhouse gasses

Links

<https://iopscience.iop.org/article/10.1088/1757-899X/1229/1/012013/meta>

<https://globalizationandhealth.biomedcentral.com/articles/10.1186/s12992-020-0546-y>

Case Study 7

Shifting Power to the Sun: Renewable Energy Towards a Healthier Future

The benefits of using renewable energy in health care facilities that are located in disaster-prone areas.

By Dr. Arturo P. Pingoy Medical Center (Koronadal, Philippines)



Demographic information

The Dr. Arturo P. Pingoy Medical Center (DAPPMC) is a member of the Global Green and Healthy Hospitals in Southeast Asia and is located in the City of Koronadal, province of South Cotabato, Philippines, and was established on May 12, 1961. It is a 100-bed capacity, Level 2 hospital, composed of 4 buildings and with a land area of approximately 10,000 square meters.

DAPPMC has 400 personnel which includes regular, outsourced personnel, and visiting consultants.



Case study summary

As a facility that is located in a disaster-prone area, this case study aims to highlight the importance of bringing good energy and resilience building to the fore. The paper will tackle the experience of DAPMMC's shift to the use of renewable energy and their additional measures to support their mission to establish an energy-efficient facility.



The issue

In South Cotabato, DAPPMC faced a big problem which was the soaring energy costs that were taking a hefty toll on their financial resources. They had to use a lot of electricity for hospital equipment and air conditioners, which made up 5% of their total expenses.

The Philippines had some of the most expensive electricity prices in Southeast Asia on top of electrical issues in South Cotabato. Frequent power fluctuations and blackouts are often experienced in the area which affects the operations of the facility and could damage important medical equipment. Moreover, the region's heavy reliance on hydroelectric power is also unstable, especially during drought.

As energy prices continue to increase in the country, DAPPMC came up with a plan to use solar panels for energy to help them save money and ensure a reliable energy source even during disasters like floods or landslides, which were common in their area.



Sustainability strategy implemented

To tackle the challenges of unstable and unsustainable electricity supply, DAPPMC embarked on a transformative journey. Their vision is to harness the power of the sun by installing 897 solar panels, generating a 342 kWp, equivalent to a monthly yield of 36,389 kWh. This bold move was projected to slash the hospital's electricity expenses by 35-40%, marking a significant step towards sustainability.

To turn this vision into reality, DAPPMC sought the support of the Land Bank of the Philippines, securing the necessary financing to kickstart the project.

The DAPPMC Project Technical Group played a pivotal role in analyzing installation costs, estimated savings, and potential maintenance expenditures. They presented

a compelling case to the Board of Directors, who promptly allocated the budget needed for implementation.

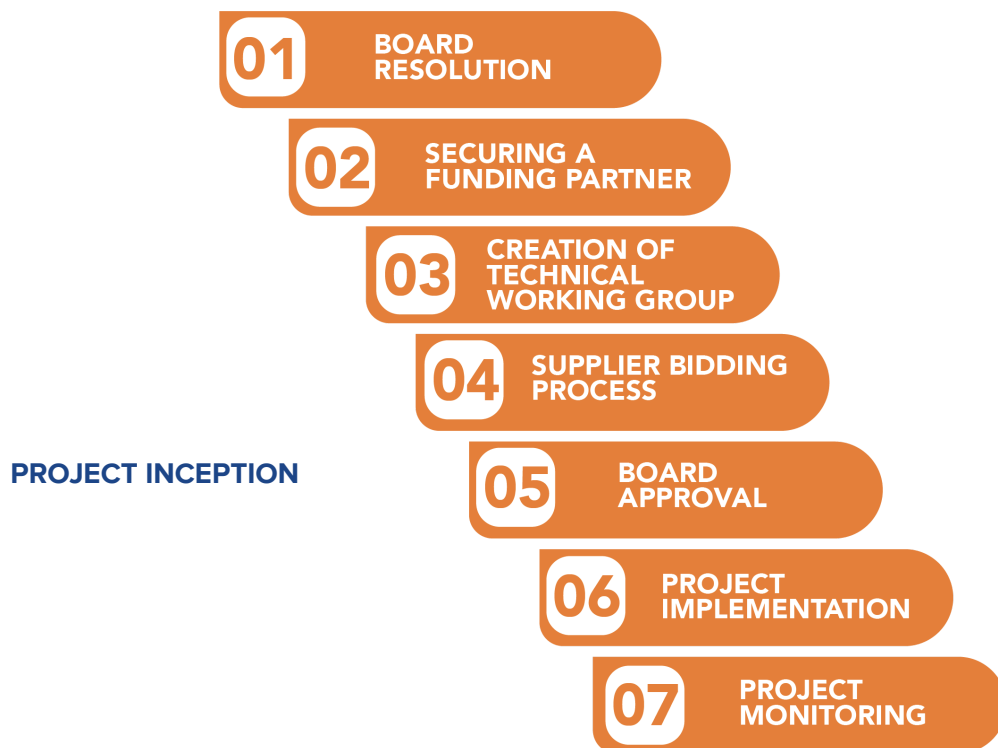
DAPPMC set a quest to find the partner implementer that could offer the most competitive price per kWp. They are entrusted with manufacturing and installing the solar panels, along with providing vital online technical support and comprehensive training on preventive maintenance. Leveraging its affiliation with the Private Hospital Association of the Philippines, Inc. (PHAPI), DAPPMC secured an additional discount, amplifying the project's cost-effectiveness.

To ensure the longevity and optimal performance of the solar panels, the DAPPMC General Services personnel took charge of their maintenance and cleaning, promptly reporting any performance-related concerns.



Implementation process

DAPPMC Leadership has been instrumental in the realization of this initiative to alleviate the increased energy expenditure and costs. As a result of the strategic planning, the facility established a project team with the CEO/Medical Director as the leader. The team engaged engineering consultants and held regular meetings to discuss the plans and monitor the progress of the project.



The DAPPMC Leadership is one of the key aspects in championing this initiative, driven by the pressing need to alleviate rising energy costs. Under the guidance of DAPPMC leadership, a dedicated project team was formed, with the CEO/Medical Director as the chair. This team collaborated closely with engineering consultants, holding regular meetings to deliberate on project plans and closely monitor its progress.

Since 2010 the solar energy project has already been indicated in DAPPMC's strategic plan. Over the subsequent years, from 2012 to 2016, the facility extended invitations to various suppliers for the bidding process. It wasn't until 2017 that Solar Philippines was chosen as the supplier by the Board of Directors, marking a significant milestone.

From 2017 to 2019, the implementation phase kicked off and the following activities were executed:

- The signing of the contract solidified the partnership.
- A formal Notice to Proceed was submitted, signifying the official commencement of the project.
- The engineering design was presented to the DAPPMC Board of Directors and Engineering Team for scrutiny and approval.
- Components were meticulously ordered and shipped to the site.
- A staging area was prepared, and a site warehouse was established to facilitate smooth operations.
- A comprehensive on-site Safety Training and Orientation ensured the well-being of all involved.
- The installation process commenced with the assembly of photovoltaic mounting structures.
- Solar modules and cables were meticulously installed.
- Inverters and distribution panels were integrated into the system.

→ August 2019 marked a crucial milestone, as rigorous testing, commissioning, and a final inspection were conducted to ensure the system's functionality and safety.

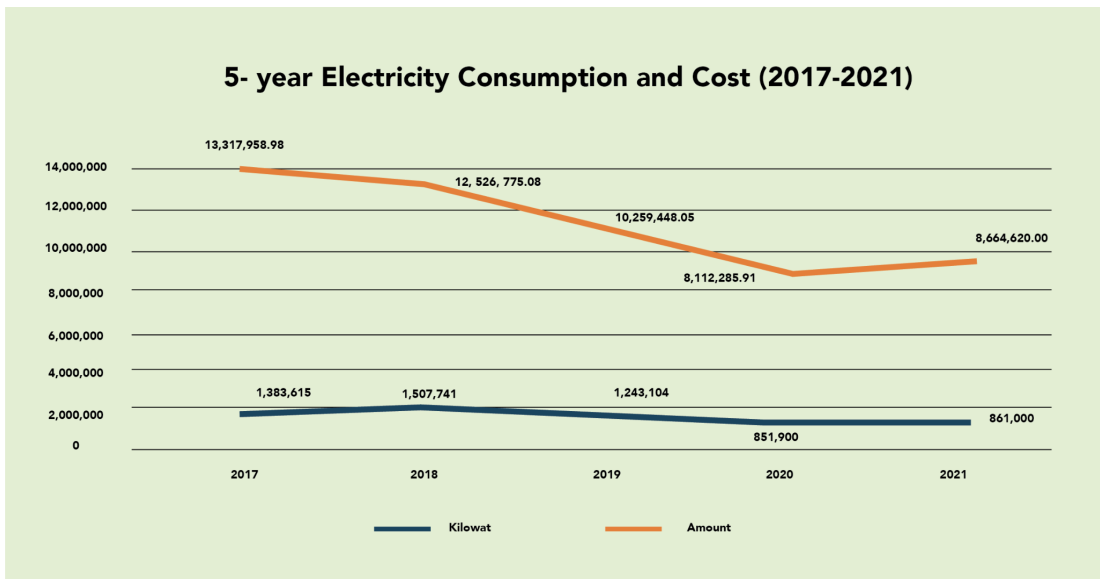
This diligent and systematic approach to implementation not only underscored DAPPMC's commitment to sustainable energy but also served as a blueprint for meticulous project execution.



Progress achieved

Financial benefits

Before converting to solar energy, the annual electricity expenditures reached an average of 13,000, 000.00 PHP or 245.31 USD. With the installation of the 342 kWp (kilowatt peak) Solar, the hospital achieved a 35-40% reduction of utilized energy from the electric cooperative, from 1,507,741 kWh (kilowatt hour) in 2018 to 861,000 kWh in 2021. The shift has contributed to an average monthly cost savings of P400,000 (P4.8M annually). The hospital projects a steady increase in savings because of the increasing electricity cost from electric cooperatives (10% increase annually).



Environmental benefits

Replacing 80% of the fluorescent lights with LED lights enabled the hospital to reduce energy consumption by 44% from its previous consumption of 801,360 kWh in 2018 to 352,598.40 kWh in 2021. This reduction is equivalent to a reduction of 213,566kgs of CO₂ emissions.

Replacing 92% of air conditioning units and refrigerators with inverter technology enabled the hospital to reduce energy consumption amounting to Php299,530.00 in 2021 and a reduction of 672,563.52 in carbon footprints in 2021 with 2,057,253.12 CO₂ from 2,729,816.64 CO₂ in 2017.

Health benefits

Staff not only can exercise for their health and fitness but contribute to the environmental goals of the hospital as well by using the stairs instead of the elevator with an average of 40 trips per day which consequently consumes additional energy.

LED lights are proven much safer as compared to mercury-containing fluorescent lights. Mercury exposure can be harmful to humans, especially women and their children.

Electricity source during major weather events.

As a facility that is located in an area dependent on hydroelectric power, having an independent and reliable source of energy is imperative to the continuous operation of the hospital especially during drought/El Niño.



Challenges and lessons learned

Challenges:

The DAPMMC has learned a lot, particularly in maintaining the solar panels. One of which is concerning maintenance which is important to keep the solar panels clean so they can effectively harvest solar energy. Along the way of implementing and maintaining this transition, the facility experienced the following hurdles:

There is a limited capital market/financing body interested in financing solar energy projects.

High initial capital outlay

Technical support is limited due to:

- Geographical location of the hospital
- The fast turnover rate of the provider's staff
- Local electrical engineers were not familiar with solar energy technology
- Pandemic restriction

The challenge of disposal of the hazardous waste of solar technology as this contains some hazardous materials such as electronics upon end of life.

Lessons Learned

The transition requires a significant investment but would eventually gain a larger return due to the funds saved and its incomparable impact on the environment. The hospital solar panel project helped promote public awareness and raised interest in renewable energy even for residential use.

Links

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<https://newsinfo.inquirer.net/1569019/doe-brace-for-higher-electricity-rates-as-coal-prices-surge>

<https://www.energy.gov/energysaver/led-lighting>

<https://forestry.denr.gov.ph/inremp/lanao.html>

Case Study 8

A Switch to Mercury-Free, Low-Cost, and Energy-Efficient Lighting

**By Mary Johnston Hospital (MJH), Inc. (Manila,
Philippines)**



Demographic information

Mary Johnston Hospital (MJH) Inc., founded in 1906 in Tondo, Manila, is a non-profit healthcare institution accredited by DOH, PHA, and PhilHealth. It boasts 120 beds and six clinical areas for residency programs: Internal Medicine, Pediatrics, Surgery, Obstetrics, Gynecology, and Family Medicine. Comprising three buildings on 10,000 sqm of land, it employs 460 personnel and emphasizes holistic healing with a "Healing Together" approach. It also invests in health system development based on the CIFS framework.



Case study summary

MJH, in partnership with the Clean Lighting Coalition (CLiC) and Health Care Without Harm South East Asia (HCWH-SEA), executed a pilot project from February to July 2022. This initiative aimed to replace outdated CFLs in the hospital, eliminating mercury use, lowering electricity expenses, and reducing carbon emissions, in line with MJH's commitment to sustainable healthcare practices.



The issue

In 2016, MJH adopted the "Healing Together" tagline, promoting holistic health and environmental stewardship through the MJ Green Initiative. Collaborating with GGHH, HCWH-SEA, and CLiC, MJH identified a critical issue: outdated CFLs posed a mercury exposure risk, harming public health and impacting electricity costs. Between 2019 and 2021, MJH spent PHP 29,600,000 on 2,400,000 kWh of electricity. These funds could support vital programs for pregnant women, children, HIV patients, and the Blood Center. In response, MJH partnered with CLiC in 2022 to retrofit outdated lighting with energy-efficient, non-toxic bulbs. This initiative aligns with global efforts to eliminate fluorescent lamp exemptions in the Minamata Convention on Mercury. The goals of the facility are the following:

- Reduce the use and emission of mercury
- Save electricity costs
- Reduce Carbon dioxide emissions



Sustainability Strategy Implemented

MJH strategically tackled the lighting retrofit project using the health system quadrants of Capacity, Information, Finance, and Sustainability:

Capacity: The project team, comprising hospital leaders from various specialties, ensured effective coordination through three key stages: inception, execution, and documentation. They conducted lighting audits and launched public awareness campaigns. During execution, they collaborated with experts for site visits, lighting replacement, and proper CFL disposal. The final stage focused on enhancing the information system.

Information: Concepts, action plans, and timelines were presented, followed by extensive information dissemination. Social media announcements, conferences, forums, and media engagements played a pivotal role in raising awareness.

Finance: Sustainable procurement guidelines were established with partner support. MJH has committed to sustaining project funding and resources. Lighting audit results guided LED bulb replacement procurement.

Sustainability: Under Management and Board leadership, three crucial elements were emphasized: policy development, partnership recognition, and project progression. Policies and procedures were institutionalized, partnerships expanded to promote creation care, and additional sustainability strategies like solar panel installation and waste audits were initiated. This holistic approach ensures ongoing support for the project while aligning with MJH's commitment to environmental and planetary health.



Implementation process

MJH, in collaboration with CLiC and HCWH-SEA, embarked on an environmentally conscious mission to curtail its carbon footprint. A pivotal project entailed transitioning from incandescent to LED lighting, encompassing four integral phases: initial energy audit, retrofitting planning, implementation, and the final audit.

In the preliminary energy audit phase, a proficient team oversaw the evaluation process, bolstered by a dedicated documentation team to ensure thoroughness. Subsequently, during the planning stage, a skilled expert crafted the retrofitting plan, meticulously identifying LED requisites and additional wiring prerequisites. Concurrently, MJH actively sought external contractors to execute the retrofitting endeavors, all in alignment with green building principles and sustainability goals.

MJH's steadfast dedication to sustainability prompted the selection of a reputable lighting fixture supplier that mirrored the eco-friendly ethos shared by CLiC and MJH. An adept engineering team was entrusted with the task of supervising the retrofitting process and overseeing the installation of lighting fixtures.

Despite encountering challenges that led to intermittent delays, MJH's tenacious Engineering Team adeptly mitigated issues as they arose. The project commenced in February 2022 and aimed for completion by July of the same year. This collective endeavor marked a monumental stride toward MJH's overarching mission of contributing to a greener, more sustainable future, harmonizing seamlessly with the objectives of CLiC and allied partners who share the vision of a more ecologically conscious world.



Challenges and lessons learned

The MJH Team has encountered challenges, almost in every stage of the project. Some delays were due to the changes in the members of both the HCWH-SEA team and the MJH. Coping with the challenges, certain procedures, such as sourcing vendors, submission of quotations, and other necessary documents, were revisited and redone as needed. Furthermore, internal policies of the hospital regarding procurement turn-around time and process were also something disregarded.

Briefly, MJH was reminded of the importance of considering community buy-in, awareness and messaging platforms, technology trends, budget projection, and governance for every project to pursue.



Progress achieved

With the base charge rate in the Philippines of 10php/kWh, it was projected that the project could save Mary Johnston Hospital an amount of P 5,374.00 daily or P 1,961,510 annually. The energy saved yearly was also equivalent to 2,299 tree seedlings grown for 10 years, 165 acres of U.S. forest in one year, and 0.938 acres of U.S. forest preserved in one year.



Links

<https://www.ecoshift.io/>

<https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results>

Case Study 9

Reduce Transport Associated Emissions

**By Sunway Medical Centre Velocity (Kuala Lumpur,
Malaysia)**



Demographic information

Sunway Medical Centre Velocity (SMCV) is a leading tertiary care hospital founded in September 2019, situated in Sunway Velocity, Kuala Lumpur, Malaysia. Strategically placed near Sunway Velocity Mall and Sunway Velocity Hotel, it offers a wide range of advanced medical services, including outpatient and inpatient specialty care, wellness programs, and 24/7 emergency services. With 237 beds, 62 consultant suites, and 6 operating theaters, SMCV ensures top-quality patient care from consultation to rehabilitation.



Case study summary

To reduce transport-associated emissions by developing transportation and service delivery strategies that can lessen the hospital's climate footprint and its contribution to local pollution. This includes offering additional services such as Rapid COVID-19 PCR Test samples to be analyzed immediately in our on-site lab, telemedicine, and carpooling program for work-related initiatives that require staff to travel.



The issue

Air pollution from transportation is a key contributor to health problems like respiratory illnesses and other lung-related diseases. Sunway Medical Centre Velocity is the first hospital in Malaysia to commit to Race To Zero by 2050. Race To Zero is a global campaign led by the United Nations on a mission to achieve net zero greenhouse gas emissions by 2050.

One of the sustainability goals is to reduce emissions created by transportation by establishing transportation and service delivery strategies that lessen the hospital's carbon footprint and its contribution to local pollution.

With the rise of COVID-19 cases in 2020, we also observe an increase in the demand for COVID-19 PCR tests, as well as an increase in dispatch travel due to the large number of samples that must be transported to other labs for testing.



Sustainability strategy implemented

- Review and develop transportation and service delivery strategies.
- Utilizing technological advancements to minimize the traveling necessity for patients, staff, and documents.

- The Race to Zero committee will create awareness among all employees through various educational tips about the importance of transportation choices and their effects on the environment.



Implementation process

- Sunway Medical Centre Velocity (SMCV) embarked on a series of initiatives to enhance sustainability and operational efficiency. These measures aimed to reduce the facility's carbon footprint while improving patient care and staff well-being.
- SMCV invested in on-site equipment for Rapid COVID-19 PCR Test analysis, reducing the need for external lab deliveries and streamlining the diagnostic process. Telemedicine was introduced, enabling remote patient evaluation and treatment, and reducing hospital visits, and emissions.
- To enhance administrative efficiency, an e-approval system was implemented, reducing the need for printing and dispatching documents. The Human Resource Department helped nurses secure nearby accommodations, promoting eco-friendly living.
- An Employee Carpool Program encouraged staff to share rides, reducing individual vehicle usage. Additionally, SMCV's strategic location, connected to two underground MRT stations, promoted public transportation use, aligning with sustainability goals. SMCV also provides 2 company vehicles for chartering for its staff to use for carpooling when attending conferences, training sessions, and events in a group.
- In summary, SMCV's approach to sustainability focused on operational improvements and eco-friendly practices. These initiatives not only reduced the facility's environmental impact but also demonstrated a commitment to efficient healthcare, staff well-being, and community health. These steps represented a meaningful move towards a greener and more sustainable healthcare future.



Tracking progress

- A comparison of the number of dispatches done before and after implementing Rapid COVID-19 PCR Test samples to be analyzed in the hospital's on-site laboratory and the number of tests done monthly.
- Number of staff registering for the Employee Carpool Program.
- Number of telemedicine cases done monthly.
- Monitoring the number of company vehicle chartering requests to attend conferences, training sessions, or events in a group.



Challenges and lessons learned

- The transportation data of our patients and staff is difficult to obtain, as we are unable to tell which mode of transportation they utilize, what type of fuel they use, or the distance they travel to our hospital daily for us to track transport-related emissions.
- There are many hospital staff who live far away from the hospital, work in shifts with different working hours, and have to drive their children to and from school, which makes carpooling difficult.
- The current MRT transit lines are not extensive and convenient for staff who are staying in areas without a nearby MRT station.
- Telemedicine is still relatively new in Malaysia. Thus, some patients still prefer to meet doctors physically instead of virtually.



Progress achieved

- Significant progress has been made at Sunway Medical Centre Velocity (SMCV) in improving efficiency and sustainability. Dispatch trips for Rapid COVID-19 PCR Test samples have been dramatically reduced, from 5 to just 1 during office hours, thanks to the implementation of in-house analysis.
- Telemedicine has also been a success, with over 1000 patient visits conducted remotely. The Employee Carpool Program has gained 32 participants, promoting eco-friendly commuting.
- Looking ahead, SMCV plans to install electric vehicle (EV) charging stations in its parking lot to encourage the use of electric vehicles among doctors. Additionally, the hospital is allocating space in a new building expansion for staff accommodation, enhancing convenience for its employees.
- To further reduce emissions, a Vehicle No-Idling Policy will be implemented within the hospital grounds. SMCV is also gearing up for virtual health management, enabling remote health monitoring through wearables, implantable devices, and mobile apps. This will allow patients to receive care from the comfort of their homes, reducing the need for physical clinic visits and saving travel time.
- These initiatives mark significant steps in SMCV's commitment to sustainability and efficiency, ultimately benefiting both patients and the environment.

Links

- <https://www.sunwaymedicalvelocity.com.my/en/>

RECOMMENDATIONS

Given the pressing need to confront climate change and the rapid deteriorating health of both our environment and our people, it is indeed an opportune time to make a dramatic transition with how the healthcare sector operates. In order to foster sustainability in the healthcare sector beyond the COVID-19 pandemic, it is imperative that healthcare facilities and the entire sector embrace collective action.

GGHH serves as an example of such collaborative efforts, bringing together healthcare facilities from around the world to work together in addressing sustainability challenges. Building upon its existing initiatives and amplifying their impact, GGHH not only sustains ongoing efforts but also expands and fortifies sustainable practices. This not only benefits the GGHH network but also ripples out to the broader community.

The success stories of GGHH facilities stand as inspirations, illustrating that sustainable healthcare is not just attainable but also beneficial. These achievements serve as powerful manifestations that the healthcare sector can play a significant role in environmental and public health well-being.

Healthcare facilities and institutions can make a domino effect by continuously documenting and sharing best practices, innovations, and research findings with the wider healthcare community. This knowledge-sharing approach will catalyze a culture of collaboration and learning, driving the entire sector toward a more sustainable future.

Prioritizing research and innovation to continually refine and expand sustainable practices should extend beyond individual facilities and involve collaborative efforts among various healthcare stakeholders, enabling the adaptation of newer, more sustainable methods. Furthermore, these researches will serve as evidence-based frameworks that tackle holistic sustainability in healthcare that will advocate for the institutionalization of sustainable and environmentally sound practices at regional and global level. Research also plays an essential role in policy-making processes as it lays down a strong foundation that informs and supports reforms. This can be utilized to strengthen policy advocacy work that deals with the growing challenges in healthcare and environmental degradation from the facility level and beyond.

Promoting education and awareness within the healthcare sector is essential, ensuring that professionals are equipped with the knowledge and skills required for sustainable healthcare. Collaborating actively with diverse stakeholders serves to amplify the collective impact of these initiatives. Engaging patients as informed partners in the pursuit of sustainability holds immense significance; their involvement can be pivotal in reinforcing the importance of sustainable healthcare and advancing positive change.

By collectively adopting these recommendations, the healthcare sector can become a driving force for sustainable practices, ensuring the well-being of both patients and the environment. Through a united effort that goes beyond individual facilities and extends to regional and global levels, we can facilitate a new era of healthcare that is both effective and environmentally responsible.

CONCLUSION

The case studies within this compendium underscore the intrinsic link between healthcare and environmental health . As healthcare facilities adopt sustainable practices, they not only reduce their environmental footprint but also enhance their capacity to respond effectively to diverse crises. Thus, prioritizing sustainability as a fundamental framework for healthcare institutions becomes essential in fortifying the health sector's ability to safeguard public health and our planet.

This compendium illustrates the sustainability achievements of healthcare facilities in Southeast Asia. The passion and creativity they have demonstrated to reduce their climate footprint and implement eco-friendly practices serves as a beacon, proving that sustainable healthcare is not just an aspiration but an attainable reality.

The success stories showcased here emphasize that healthcare facilities, irrespective of size or location, can achieve and catalyze positive change. As their sustainable practices resonate throughout the sector, they inspire hospitals and healthcare institutions worldwide. This compendium serves as a call to action, encouraging collaboration, innovation, and a shared commitment to environmental steward

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The Global Green and Health Hospitals (GGHH) is an international network of hospitals, health care facilities, health systems, and health organizations dedicated to reducing their environmental footprint and promoting public and environmental health.

To be able to realize its mission, the GGHH founded its sustainability agenda to promote greater sustainability and environmental health awareness in the health sector.

GGHH offers a variety of support and opportunities to capacitate its members through cutting-edge resources and platforms for its members to further advance their transformation to sustainable health care.

**Join our vibrant community! Visit our website:
www.greenhospitals.org**