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Decarbonising facilities in Malaysian healthcare

Dr Khairul Azmy Kamaluddin, Ts Noor Muhammad Abd Rahman, and Dr Muhammad Syukri Imran Abdullah discuss the advancement of sustainability programmes by the Malaysian Ministry of Health (MOH) to reduce carbon emissions in the public healthcare sector.

The Malaysian public healthcare sector has signed itself to the national sustainability development program roadmap which allows for the adoption of green technologies and practices across public services including the public healthcare sector. The country is moving forward towards more sustainable practices and lifestyles to address issues of climate change and unsustainable consumption, as well as inefficient water resource management (EPL 2023).

This article provides an overview and updates on the advancement of sustainability programmes by the Ministry of Health (MOH) to reduce carbon emissions particularly in the public healthcare sector. Major adaptations by MOH include energy efficient building, adopting renewable energy resources to offset power demand and waste reduction, as well as a green building initiative program. MOH will continue to commit towards sustainability and make planetary health and the climate agenda a priority in its actions.

From energy efficiency to green building initiative

The year 2015 marked a new milestone in the Malaysian healthcare facility management (FM) practice when Sustainable Energy Management Program (SEMP), Waste, Reuse and Recycle (3R) Program and the Indoor Air Quality (IAQ) management was first introduced (MOH 2015a).

Under the new FM contract, the FM companies acted both as facility managers and Energy Service Company (ESCO). As ESCOs, the companies are involved in a range of energy management services such as energy audits and energy consumption monitoring, as well as implementing renewable energy (RE) and energy efficiency (EE) projects.

The SEMP model applied in government hospitals is based on a regional certification system or ASEAN Energy Management Scheme (ASEANS)

which adopts ISO 50001:2011. To further strengthen the efficient management and conservation of energy, MOH has issued a hospital energy policy on all government-run healthcare facilities from 2016 (MOH 2016b). The introduction of the policy was a crucial step in accelerating the green building agenda for the public healthcare sector.

There are already around 60 Energy Managers hired by the FM companies to manage government hospitals as part of the aim of achieving the highest Energy Management Gold Standard (EMGS)

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rating. As of June 2022, all government hospitals and institutions under the FM contract have met the minimum certification requirement. At least 55 hospitals have managed to achieve the highest 3-Star rating offered by the energy standard. This has led to the national level recognition of several hospitals by the government through the national energy award (see Figure 1).

Up to December 2021, the estimated total monetary savings achieved from the SEMP programme is about RM200 million. This translates to 500 GWh electrical energy savings or about 360 kt reduced carbon emissions. MOH has been adopting strategic options in the carbon management hierarchy, starting from improving work process, being energy efficient, and moving towards using renewable or alternative energy sources.

The green building initiative is an ongoing effort by MOH to decarbonise its healthcare facilities. The greening effort encompasses efficient use of building energy and water supply, the use of renewable energy, adopting waste reduction measures, enabling reuse and recycling practices, good indoor environment quality management, and consideration of environment in the design, construction, and operation of buildings. At present, there are already 14 government hospitals in Malaysia that have registered under the USGBC LEED green building certification program. The program provides a framework for hospitals to shift from 'business as usual' towards improving efficiency, lower carbon emissions, and creating healthier spaces for staff and patients. Four hospitals have been awarded LEED Gold certification while another two hospitals have managed to achieve Platinum level under the globally recognised LEED standard (Figure 2). Hospital Langkawi was the first government hospital to register itself under the LEED green building certification program (existing building operation and maintenance category, EBOM) and received gold certification in 2010 (Figure 3). The hospital has set the pace and precedent for other government hospitals to pursue the green building pathway which is part of a 2030 MCH mission to decarbonise government healthcare facilities (Rahman, 2019). Prior to that, two private healthcare establishments have been certified green in regional Green Building Index (GRI) Malaysian green building certification system (Suhaimi & Zakaria 2014).

Energy projects

MOH has implemented a significant number of energy projects to further decarbonise and reduce its carbon footprint. Major key energy projects include upgrading inefficient and aging chillers to magnetic bearing chillers or



Figure 1. National level recognition of highly energy efficient government hospitals.

solar chillers, switching to LED lighting, installing solar thermal hot water systems, and small scale solar PV as well as solar tube chimneys for daylight harvesting.

These energy projects were either carried out through conventional methods or through energy performance contracting (EPC) process. Figure 4 shows the first EPC project that was implemented in Hospital Teluk Intan in 2017. To date there are 11 completed energy projects and 32 EPC based projects with another

12 projects are still ongoing (ESD MOH 2022). Figure 5 shows a solar hot water system that was commissioned in Hospital Mtn Sarawak in 2020 (Ghazan et al., 2020).

Apart from that, other mechanisms were also deployed to implement energy projects in healthcare facilities, such as utilising internal and external funds. An example of external funding was energy efficiency funding provided by the Malaysian Energy Ministry (MESTECC).

MESTECC has been actively implementing energy efficiency (EE) projects in the country involving retrofit work of 50 government owned buildings including hospitals with EE technology worth RM200 million (Leok 2019). It has been widely accepted that hospital buildings have been identified as one of the highest energy users in the country (FERNANDEZ, 2010) which explains and justifies the scale of effort at national level to retrofit such buildings. Another approach to make available and expand the use of renewable energy in the healthcare sector is allowing independent energy providers (IEPs) to build and operate facilities to generate electricity, particularly solar PV system (SFS), within hospital property boundaries and split to the hospital at a competitive



Figure 2. One of the two Malaysian hospitals that managed to achieve Platinum level under the globally recognised LEED standard.



Figure 3. Hospital Sultanah Hafsa Langkawi was the first hospital in Malaysia to achieve green building certification from the globally recognised LEED Standard.