



Sustainability in Action

Photos by Khoo Teck Puat Hospital
Text by Daryl Lai

Climate change is here to stay. There's no stopping its progress but we can try to stem the spread. Doctors and climate change may seem worlds apart, but you'd be surprised at how much doctors and their institutions can contribute to the slowing down of climate change.

As part of the focus for this issue, *SMA News* takes a look at a hospital that has been at the forefront of sustainability and green initiatives – the Khoo Teck Puat Hospital (KTPH). Almost everything that went into the hospital – from the concept to the design – was for a green reason and sustainability.

A sustainable hospital

Yishun Health has always placed sustainability and environmental consciousness at the forefront of its culture and the construction of KTPH was led with a complicated brief. The design required a hospital that was energy efficient and sustainable – very unlike existing hospitals. The resulting hospital was more than just a facility to treat

patients; it was a co-created, patient-centred and community-integrated compound where healing came together from the combination of medicine, design, environment and sustainability.

The winning design worked passive design considerations into the KTPH building, and ensured that it not only met the goals of community integration, but of sustainability as well. The combination of vibrant, landscaped grounds and a green, sustainable design won KTPH the Building and

Construction Authority's Green Mark Platinum Award in 2009.

A green environment inside and out

The state of the environment can directly impact public health – surroundings full of litter, polluted water sources and dirty air can all affect wellness in patients as well as the general public. Ongoing research also suggests that accelerating climate change will lead to rising temperatures



around the world, meaning more aggressive flu seasons and a more rapid spread of vector-borne diseases. As such, it was important to put in place several methods of harnessing natural energy for a greener hospital.

Natural ventilation

With Singapore's year-round heat and humidity, air-conditioning has become a staple of life. With this boon, however, comes consequences for the environment – air-conditioners accounted for about 19% of Singapore's total emissions, the second highest behind industries.¹ To combat this, the hospital's design incorporates a unique V-shaped structural layout that angles each of its three blocks to block out direct sunlight and channel natural wind through its interior. This orientation means that about 35% of the hospital is naturally ventilated, allowing 8.6 million kWh of electricity to be saved annually, enough to power the air-conditioning of 6,718 households for an entire year. Subsidised wards benefit the most from the hospital's layout, as they are now well ventilated with the natural power of the wind. While private wards are air-conditioned, the units are turned off automatically when the windows are opened. The rooms are also fitted with ceiling fans as a form of natural ventilation.²

Solar panels

Given the amount of sunlight that Singapore is exposed to, the natural direction in sustainability would be to harness solar energy. The hospital's dedication to a green and energy efficient layout led to the installation of solar panels on its roofs to utilise this clean, renewable energy and to minimise carbon emissions. Not only does the hospital convert solar energy into electricity for its use, but it also has a solar thermal system that produces hot water for the hospital's needs. These renewable energy initiatives have enabled the hospital to increase its energy efficiency by up to 30% as compared to other hospitals.³

Harnessing rainwater

Yishun Pond is one of Singapore's stormwater collection ponds, collecting rainwater runoff from the surrounding

areas. One of the challenging points in the initial design brief was to integrate the pond into KTPH. The result is a one kilometre promenade surrounding the pond that extends seamlessly from the main courtyard of the hospital, drawing the pond in and making it an integral feature of the hospital rather than just an add-on. In exchange for KTPH channelling rainwater collected on the hospital premises back to the pond, the Public Utilities Board provides water back to KTPH at a discounted rate. Water from the pond is treated and channelled back to the hospital for its irrigation needs, reducing the hospital's reliance on potable water. Sensors were also installed to detect rain and stop any irrigation to prevent water wastage.

Rooftop garden

Rooftop gardens have been shown to improve building performance, including improved air quality, increased energy efficiency and a reduced urban heat island effect.⁴ KTPH's rooftop garden is manned by a team of dedicated volunteers, and boasts over 100 species of plants and vegetables.⁵ The produce is harvested and used in the hospital kitchen, and also sold to the public and staff on selected days. Proceeds go to the hospital's Green Fund, which is used to purchase more seeds, soil and other gardening needs to keep the garden running.

Continuing sustainability efforts

As KTPH's Operations Deputy Director for Facilities Management, Mr Chin Yew Leong, pointed out, "Green design and technology are well and good, but it is only the first step; you have to sustain it."⁶ KTPH has been doing an admirable job at sustaining its green efforts, taking steps to ensure the inevitable impact of everyday operations is minimised via policies, building design and facilities management.

Apart from these steps, a significant part of the organisation's focus is on mindset change. Mr Chin, who chairs Yishun Health's Green Committee, acknowledges that sustainability requires more than just a ground-up effort; it takes a commitment from leadership that is willing to lead by example and implement green, sustainable policies and strategies. It



is a challenge, Mr Chin says, to deliver healthcare of the highest level and ensure the hospital runs smoothly, while at the same time being an advocate for sustainability in the environment.⁶

Mrs Chew Kwee Tiang, CEO of KTPH, said, "[KTPH is] committed to performing our primary role as a healthcare provider while proactively minimising our impact on the environment"⁶; and reiterates that sustainability was always a part of the hospital's vision since 2000 – to build a hospital that would not only do its duty to its patients, but to the environment as well. ◆

References

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3. Khoo Teck Puat Hospital. Reducing carbon footprint. Available at: <https://bit.ly/2xWafA7>.
4. National Parks Board. Rooftop greenery – the horizontal dimension. Available at: <https://bit.ly/2xWwTZd>.
5. Healing through nature: Khoo Teck Puat Hospital. *Green Pulse* 2018 1(8): 4-7. Available at: <https://bit.ly/3belm5C>.
6. Khoo Teck Puat Hospital. Going beyond medicine. *Aha* 2019 6: 18-23. Available at: <https://bit.ly/2wsK10k>.

Legend

1. KTPH overlooking the Yishun Pond
2. One of the hospital's roof gardens tended to by volunteers