



Shaping a Sustainable Future in Healthcare

By

Ir. Shamila Ariaratnam

She is the EETD Deputy Chairman.

The Institution of Engineers Malaysia (IEM) successfully organised an exciting webinar titled “*Shaping a Sustainable Future in Healthcare*” on 4 October 2025 (Saturday) from 10.00 a.m. to 12.00 noon via the Zoom platform. The session, organised by the Healthcare and Biomedical Engineering Working Group under the Electrical Engineering Technical Division (EETD), drew an encouraging participation of 100 attendees.

The speaker, Ir. Shamila Ariaratnam, shared valuable insights into how engineering innovation, leadership, and sustainability can converge to reshape the healthcare landscape. The session emphasised the critical role engineers play in driving environmental stewardship, operational efficiency, and social responsibility in the healthcare sector. Ir. Shamila opened her session by highlighting that sustainability in healthcare is no longer an optional initiative but a pressing necessity. The healthcare industry, traditionally focused on patient outcomes, now faces increasing pressure to manage its ecological footprint. From energy consumption to waste generation, hospitals represent one of the most resource-intensive facilities in any urban ecosystem. She noted that sustainability in healthcare encompasses far more than green buildings or energy-efficient technologies; it represents a holistic approach that includes environmental protection, community health, and equitable access to care. By integrating sustainability into healthcare operations, hospitals can achieve long-term cost savings, improve patient wellbeing, and contribute to global climate goals.

A major focus of the talk was energy efficiency and renewable energy adoption in hospitals. Ir. Shamila shared the example of Prince Court Medical Centre (PCMC) in Kuala Lumpur, which inaugurated a 420-kilowatt solar power system in April 2024 as part of Malaysia’s National Energy Transition Plan towards net-zero emissions by 2050. In addition, the introduction of Malaysia’s first electric motorcycle ambulance by PCMC in August 2024 illustrated how healthcare innovation can align with environmental objectives—reducing carbon emissions while improving emergency response times in congested areas. She also cited Ng Teng Fong General Hospital (NTFGH) in Singapore as a regional benchmark for sustainable hospital design. The facility features energy-efficient systems, solar thermal heating, natural ventilation, and rainwater harvesting, achieving a 22% reduction in potable water use and a 30% improvement in energy efficiency.

Ir. Shamila addressed the challenges of medical waste management and the growing adoption of circular economy principles in healthcare. She discussed emerging pyrolysis technologies that decompose waste without oxygen, converting it into reusable energy while minimizing harmful emissions. Additionally, she emphasised that hospitals should move towards pharmaceutical take-back programs and material recovery systems that promote safe disposal and recycling of medical products. Such initiatives not only reduce environmental pollution but also contribute to a culture of responsible consumption and resource recovery.

In today's technology-driven world, digitalisation serves as a powerful enabler of sustainability. Ir. Shamila shared how healthcare institutions such as Mount Sinai Health System have adopted AI and IoT-based energy management systems to optimise power consumption across facilities. The adoption of Electronic Health Records (EHRs), digital prescriptions, and telemedicine reduces paper usage, travel emissions, and operational inefficiencies. These innovations demonstrate how digital healthcare can simultaneously advance patient care and environmental goals.

The speaker further elaborated on sustainable operational practices beyond energy and waste management. Hospitals like Tan Tock Seng Hospital (TTSH) in Singapore have introduced plant-based meal options and zero-waste food initiatives, while Sunway Medical Centre in Malaysia has implemented advanced water-efficient chiller systems and rainwater harvesting technologies to conserve water. She also highlighted the importance of green mobility, noting that the UK's National Health Service (NHS) has embarked on an ambitious journey toward a zero-emission ambulance fleet by 2040, under its *Net Zero Travel and Transport Strategy*. Similar initiatives, she encouraged, could be adapted in Malaysia to reduce healthcare-related transportation emissions.

Beyond environmental sustainability, the talk also emphasized social sustainability and healthcare equity. The Ministry of Health Malaysia (MOH), through its Klinik Kesihatan network, has long championed accessible healthcare. Complementing this, the IHH Healthcare Malaysia's Life Renewed Programme and the H.E.A.R.T. Project with Management and Science University (MSU) were highlighted as exemplary models providing free or subsidised medical care to underprivileged communities.

Furthermore, Ir. Shamila cited Gundersen Health System in Wisconsin, USA, as a model of climate-resilient healthcare infrastructure—being the first energy-independent health system in the U.S., generating more energy than it consumes through partnerships in biogas, wind, and solar energy. In her closing remarks, Ir. Shamila stressed that engineers are instrumental in advancing sustainability across all levels of healthcare delivery—from infrastructure design to policy-making and community engagement. She urged participants to view sustainability not merely as a compliance requirement, but as a professional and ethical responsibility.

Through innovation, interdisciplinary collaboration, and strategic implementation, engineers can help healthcare organisations transition toward carbon neutrality, resilience, and equitable access. Her final message resonated deeply with attendees: "By embracing technology, policy change, and community-driven solutions, the future of healthcare sustainability will be defined by efficiency, resilience, and equity. Together, we can build a greener and healthier world for generations to come." The session concluded with an engaging Q&A segment, where participants explored practical steps for hospitals to integrate sustainability within existing operations.

Digital Transformation & Paperless Healthcare

Mount Sinai Health System has implemented a comprehensive digital energy optimization strategy to enhance sustainability and operational efficiency across its facilities.

Figure 2: Mount Sinai Main Hospital 2011–2014 Total Energy Savings

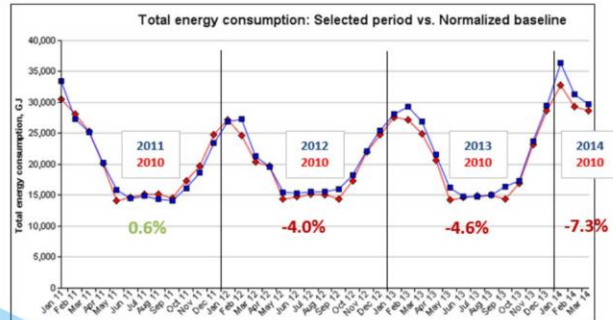


Figure 1: Total Energy Savings by Mount Sinai Hospital from 2011 to 2014

Energy Efficiency & Renewable Energy

Implementation in Real Life – Prince Court Medical Center (PCMC)

PCMC in Kuala Lumpur has implemented several energy-efficient initiatives to enhance sustainability and reduce its environmental impact:

- **Solar Power Installation:** In April 2024, PCMC inaugurated a 420-kilowatt solar system to harness renewable energy, aligning with Malaysia's National Energy Transition Plan to achieve net-zero greenhouse gas emissions by 2050.
- **Electric Motorcycle Ambulance:** In August 2024, PCMC introduced Malaysia's first electric motorcycle ambulance. This eco-friendly vehicle improves emergency response times in congested areas while reducing carbon emissions.



Figure 2: Sustainability Initiatives undertaken by Price Court Medical Centre