Source: *The Straits Times,* pA22
Date: 4 March 2021

Engineering for a healthy planet

Engineers play a role in the path to sustainable development and a low-carbon economy

Seeram Ramakrishna and Jaspal Singh

For The Straits Times

Climate change is the greatest existential threat facing mankind today. The world is perilously close to the tipping point beyond which there is little hope of stopping the march to oblivion.

The only way to prevent this catastrophe is for the world to reach a state of net-zero emissions before global temperatures rise by a further 2 deg C, which is expected to happen by 2050.

Small as Singapore is, it is not immune to global warming and urgently needs to prepare for the consequences. As Deputy Prime Minister Heng Swee Keat explained in his 2021 Budget statement, considerable resources will be set aside over the coming years to protect the island from rising sea levels, as an example.

While building protections against the effects of climate change is crucial, this is not enough.

Everyone needs to play a part to transition to net-zero emissions by 2050, or very soon thereafter, in line with the target set by many countries to achieve net-zero economies by 2050.

For the reality is that in Singapore, the situation is more urgent given its highly modern, urbanised landscape.

Its average temperature has been rising by 0.25 deg C per decade since 1950, roughly twice the rate at which global temperatures are rising. Its average daily temperature was 26 deg C in 1970. By 2019, this had risen to 28.3 deg C.

No wonder the coolest month today is hotter than the hottest month in the 1970s.

The Government is to be commended for tabling the Singapore Green Plan (SGP) 2030 at this critical juncture, even as it is taking an "all hands on deck" approach to dealing with the coronavirus pandemic.

It shows how seriously the Government takes its responsibilities as a signatory to the Paris Agreement, which it ratified in September 2016.

SGP 2030 is the clarion call for all Singaporeans – and especially engineers – to step up to the daunting challenge of rolling out the plan to help achieve the mammoth goal of a net-zero emissions world by 2050.

Why engineers?

Because engineers are fundamentally the principal change agents when it comes to transforming daily lives, and Singapore's world ranking, in terms of development.

For example, those in their 60s and 70s will recall how, in the tumultuous days following independence, Singapore pushed its best and brightest to study engineering, as rapid industrialisation and transformation into an export-led economy was then perceived as the only path to survival as a newborn nation.

Singapore also scoured the world to attract leading engineering minds to the country, to lead and inspire its budding indigenous talent in the field. The result was that it leapt from Third World to First World status within a generation.

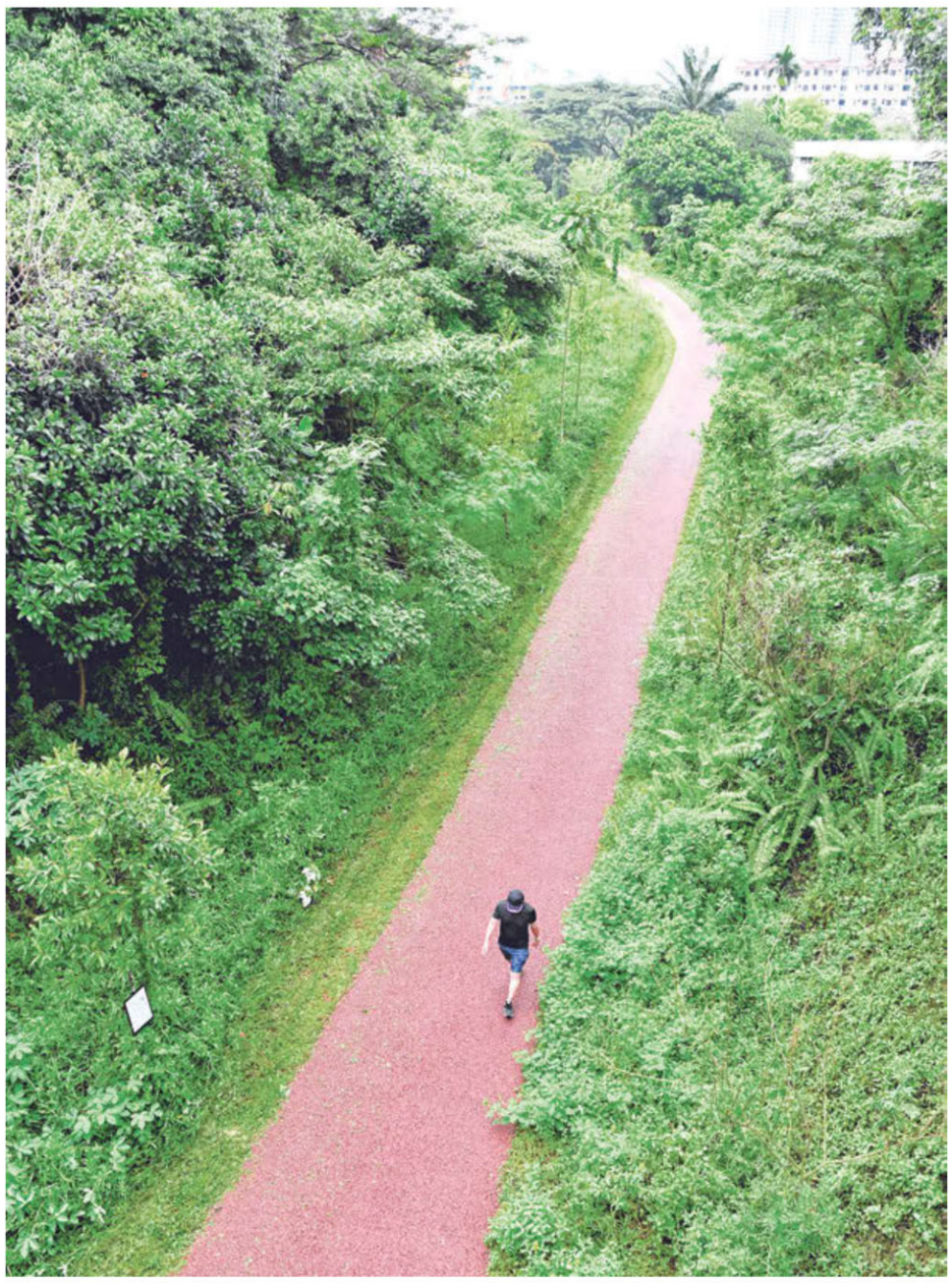
Today is World Engineering Day for Sustainable Development. It is an occasion to honour these unsung heroes who are quietly and industriously leading the way to a sustainable future by transitioning the world's "linear" economies of "take, make, use and throw", into "circular" or low-carbon economies.

CHALLENGES OF GOING CIRCULAR

Hence, the theme of World Engineering Day 2021 is "Engineering for a healthy planet".

Moving to a circular economy is a formidable challenge in a highly competitive, market-driven world, as traditionally, designers and innovators do not factor in sustainability considerations when making commercially competitive products and services.

Some also engage in sinister business practices known as "predetermined obsolescence" (deliberately designing a product with a limited shelf life so that a replacement is needed); while others embellish their environmental, social and governance reports and engage in deceitful misrepresentation, sometimes called "greenwashing".



The green corridor near Commonwealth Drive. The Singapore Green Plan 2030 is a clarion call for all Singaporeans, especially engineers, to help achieve the goal of a net-zero emissions world by 2050. ST PHOTO: CHONG JUN LIANG

The sad reality is that sustainability considerations lead to increased business costs, and it has become acceptable to prioritise convenience and consumerism over sustainability, thus leading to resource over-consumption, environmental degradation and waste.

The world urgently needs to be reminded of its accountability to Mother Earth and posterity. This requires re-imaging all products and services through the lens of sustainability. This is no mean task, as this means a profound cultural change on a global scale.

In fact, one study has estimated that the global man-made mass now exceeds the total biomass on planet Earth, causing undue stress on the environment and eco-balance.

The world urgently needs to be reminded of its accountability to Mother Earth and posterity. This requires re-imaging all products and services through the lens of sustainability. This is no mean task, as this means a profound cultural change on a global scale.

Innovative engineering and technology solutions are crucial to effective delivery of these noble objectives. In other words, millions of engineers around the world need to deeply embrace sustainability thinking so as to achieve the UN Sustainable Development Goals (SDGs), which are a collection of 17 interlinked global goals set in 2015 to achieve a better and more sustainable future for all by 2030.

Sustainability cuts across all sectors of society, and generating sustainability solutions requires multi-disciplinary and co-production collaboration.

Upstream, starting with the education sector, engineering education needs to provide deep hands-on experience in actual projects with sustainability considerations as opposed to mere lectures and textbook learning.

More than 7,000 institutions of higher learning around the world declared a "climate emergency" in 2019, and pledged themselves to a three-point plan: first, committing to carbon neutrality by 2050; second, mobilising more resources for action-oriented climate change research and skills creation; and third, increasing the delivery of environmental and sustainability education across curricula, campus and community outreach programmes.

There is also a need to infuse sustainability and an understanding of its ethics and practice values into schools and curricula.

THE SPECIAL ROLE OF CITIES

About half of the world's population now live in cities and by 2050, nearly two-thirds of all humans are projected to live in cities.

Cities contribute about 80 per cent of the global GDP. They are responsible for 70 per cent of global carbon emissions and energy consumption. Hence, sustainable development cannot be realised without concerted action in urban communities, of which Singapore is a prime example.

Much is already being done in Singapore since it ratified the Paris Agreement. It has, for example, ramped up its programme to capture more energy from the sun, and there are also plans to phase out internal combustion engine vehicles by 2040.

Going forward, more needs to be done to help companies upgrade to industrial technologies with better sustainability credentials and adopt sustainable practices. New technologies, such as carbon capture, utilisation and storage, and low-carbon hydrogen, need to be test-bedded and scaled up.

Companies need to embrace design thinking concepts to make sure their products are durable, not disposable; easy to maintain and repair; and have good end-of-life management (such as recycling or re-manufacturing, rather than disposal). These are all activities that benefit from engineering thinking.

Sound engineering solutions are essential in carrying out the range of UN SDGs – such as to provide clean water, clean energy, clean air and nutritional food; to provide resilient infrastructure to mitigate extreme weather events and climate change; and have sustainable infrastructure such as transportation systems, waste management, water supply and sanitation, power supply, and digital networks.

Singapore is already a world leader in many areas: in terms of long and healthy lifespans, high per capita income, world-class universities, researchers per million population, Internet speed, economic competitiveness, innovation and entrepreneurship, low unemployment rate, density of greenery, population served by modern sanitation (100 per cent), and collection and treatment of waste water (100 per cent).

As a wealthy developed nation, the onus is on Singaporeans to embrace the Singapore Green Plan 2030 to reach the goal of halving total emissions by 2050 from its 2030 peak, with the aim of achieving net-zero emissions soon thereafter.

We think in broad sweeps, but live life in detail. On World Engineers Day, we call on engineers to take on board this challenge to think of how to build systems and facilities that will help Singapore reach that goal.

stopinion@sph.com.sg

• Seeram Ramakrishna is a professor of mechanical engineering at the National University of Singapore (NUS) and chair of the Circular Economy Taskforce. Jaspal Singh, a retired civil servant, is an adjunct senior research fellow at the Institute of Policy Studies, NUS, and chair of the ESG Committee of the Singapore Institute of Directors.