

**S**INGAPORE marks 2018 as the year of “climate action”. It is committed to reducing carbon emissions by 36 per cent from the 2005 levels by 2030. The country envisions its future as a zero-waste nation.

This implies that all forms of resources, including water, energy and materials, will be recovered and re-used repeatedly.

Circular Singapore of the future will be a new economy with unpolluted air, land and water, zero waste and having a low carbon footprint. Ultimately every person, precinct, industry, business and service will be rooted in “circular culture”.

In Asia, Singapore is playing a pivotal role as a talent and financial hub and test-bed for circular economy solutions. From July 8 to 12, the National Environment Agency (NEA) will be organising the CleanEnviro Summit Singapore.

It is a global platform for policy-makers and innovators to identify, develop and share scalable and viable solutions in the context of the circular economic future.

Waste management and treatment, cleaning innovations, pest control technology solutions, sustainable energy and pollution control will be deliberated at this event.

Singapore is proactively taking diverse measures to transition to circularity. The proposed extended producer responsibility (EPR) is aimed at growing electronic waste. It discourages manu-

## Circular culture the future for Singapore



facturers from designing products with built-in obsolescence and encourages them and importers to play an active role in the collection and management of e-waste.

Singapore embraced energy efficiency and renewable energy so as to decouple economic growth from the increase in carbon emissions. Globally, energy efficiency has improved 13 per cent between 2000 and 2016. Solar energy adoption is growing despite limitations posed by the weather.

Singapore is on track to implement carbon tax from next year. Big companies are responding to these measures. For example, Keppel Corporation plans to cut its carbon emissions by 28.8 per cent from the 2010 levels by 2030.

Measures such as optimising operations, adopting sustainable building designs and materials and using energy-efficient equipment led to an estimated \$37 million in cost savings and an avoidance of approximately 77,000 tons of carbon emissions last year.

Moreover, Keppel is integrating sustainability principles throughout the supply chain which extends beyond Singapore’s borders. The circular economy solutions are in a nascent stage.

Deeper research and innovations are needed to fully harness this framework. For example, manufacturing is increas-

ingly becoming intelligent and shifting towards more technologically complex products – thus making them more difficult to conform to a circularity framework.

New innovations are needed to increase circularity by boosting overall recycling rates to 80 per cent and cutting down carbon emissions per unit of manufacturing by 50 per cent or more.

Designing services, products and processes with circularity in mind is the future. Recently NEA launched a \$45 million research funding initiative called Closing the Waste Loop in partnership with Singapore National Research Foundation to develop innovations to extract value and resources from key waste and residue streams, including plastics, food, electrical and electronic products and incineration ash.

NEA also launched a \$10.8 million Environmental Robotics Programme for the development of robotics solutions to the cleaning of public spaces, waste collection and monitoring and sampling for pest and pollution control.

Further innovations are needed in smart grid and energy storage technologies to improve, among other areas, the ways of cleaner electricity generation, recover nutrients and facilitate virtuous circularity of food waste, recover resources from waste waters and upcycle batteries.

More has to be done to adopt digital

technologies and smart systems for real-time tracking and analysis of air, land and marine pollution and sharing of data and information for entrepreneurs to develop innovative solutions.

The circular culture is in need of disruptive innovations and new business models. Singapore’s experiences will be emulated by other nations in Asia and around the world to realise their own goals of sustainable development.

Circular Singapore is our future. It is underpinned by transition from the safest, efficient and prosperous city to a smart, healthy and livable city supported by shining examples of sustainable circular solutions.

➔ [tabla@sph.com.sg](mailto:tabla@sph.com.sg)

Professor Seeram Ramakrishna is  
Chair of Circular Economy Taskforce,  
National University of Singapore.

In association with

