

Why universities should steer climate action

Given their facilities and expertise, higher education institutions can play a key role by driving research and nurturing champions of sustainability

Tan Eng Chye

At the University Town's Education Resource Centre, there are heritage Tembusu trees that are intentionally conserved by building around rather than over them. At other parts of the campus, buildings are being re-engineered into green infrastructures with zero-energy emissions.

Climate change and sustainability present many complex multidisciplinary and interdisciplinary challenges, big and small, to all of us. As universities, being at the forefront of scientific and technological research offers us a great vantage point to create change, drive research, and seize opportunities to test cutting-edge practices and solutions by serving as living laboratories for experimentation.

There is certainly great urgency to transition to a low-carbon future. However, not everyone is pulling in the same direction. A study by sustainability solutions firm Engie Impact found that 90 per cent of companies in Asia Pacific lack confidence that their business units and employees are incentivised to decarbonise. Among them, half believe they do not have mechanisms to integrate carbon in investment and business decisions.

Universities must therefore be active participants in reshaping ways of thinking and operating so that climate action becomes a priority. This involves equipping our undergraduates, regardless of their major, with the requisite knowledge and skills to address a sustainable future.

National University of Singapore (NUS) researchers and industry partners are developing novel and more energy-efficient ways of cooling data centres in the tropics at the Sustainable Tropical Data Centre Testbed. Their goal: To reduce energy consumption and greenhouse gas emissions by up to

25 per cent, compared with data centres that are traditionally air-cooled.

Many other initiatives span across NUS, a signal that we are taking greater action against the existential threat of climate change.

Our graduates today will be the backbone of tomorrow's organisations, and they will play a part in steering their organisations' future. They need to appreciate broader issues, such as climate change, sustainability and volunteerism, among others.

At NUS, we are driving this through our revamped General Education curriculum, with the introduction of a new "Communities and Engagement" pillar from August this year. Students will have a hand in coming up with solutions to tackle societal needs and real-world issues, including threats to the environment.

We take heart that we are not alone. Universities around the world are finding ways to address sustainability more prominently in their education systems. Stanford University, for example, recently announced a new climate and sustainability school arising from a US\$1.1 billion (S\$1.5 billion) gift from venture capitalist John Doerr and his wife Ann – its first new school in 70 years.

ACCELERATING SUSTAINABLE RESEARCH

Apart from educating the young, higher education institutions are where much of the world's leading research is conducted today. Given their facilities and expertise, universities have the potential to significantly advance the technology and systems needed to tackle climate change.

According to the latest report from a United Nations climate panel, the negative impacts of climate change are mounting much faster than scientists predicted less than a decade ago. Research and development are,



The award-winning energy-efficient zero energy building SDE4 (above) at NUS has sustainable design features holistically integrated into its architecture, such as having more than 1,200 solar photovoltaic panels on its overhanging rooftop to supply renewable energy to meet its energy needs. PHOTO: NATIONAL UNIVERSITY OF SINGAPORE AND SERIE ARCHITECTS

therefore, critical for us to reduce our carbon footprint.

Recognising this, we have been accelerating our decarbonisation research at NUS, from developing novel processes to produce hydrogen, to finding innovative ways to capture, use and store carbon dioxide.

Eight teams led by NUS researchers have recently been awarded funding under the Low-Carbon Energy Research Funding Initiative to develop low-carbon energy technology solutions. These aim to reduce the costs and improve the efficiencies of hydrogen-related processes, and cut carbon dioxide emissions by capturing and converting them into useful products or for storage underground.

Around the world, we see more emerging technologies that bring us closer to a low-carbon future. For example, scientists at the University of Newcastle in Australia have developed new ultra-thin printable solar panels which can be produced rapidly at low cost, giving the manufacturing industry greater diversity.

In our day-to-day work, we engage in partnerships with business, industry, government and not-for-profits. We are preparing our students to take up the mantle for change and become the leaders of tomorrow. It is a responsibility that we should and must not take lightly. The threat of global warming is real, and the race to shape a greener future starts now.

Just as decades of investment into research to identify viruses and learn how to vaccinate against them have allowed for our rapid response to Covid-19, we must now channel that resolve, determination and collaborative approach into climate change.

CAMPUSES AS LIVING LABS

Given that most campuses function as microcosms of society, they can easily become a test bed for exploring climate change solutions. By using our facilities and community as a miniature model of this planet, we can learn things that will make campuses – and the world – better.

In collaboration with seven other publicly-funded universities in Hong Kong, the Hong Kong University of Science and Technology is facilitating an ambitious new initiative called the Sustainable Consumer Programme. It aims to engage over 100,000 students to adopt responsible consumption patterns in food, energy, water and other consumables.

Academics can also foster collaboration with industry partners on sustainability initiatives and programmes, such that the technological maturity, commercial viability and operational feasibility of scientific research can be validated in a real-world environment.

But we must not forget that universities also have significant emissions which contribute to our climate crisis. Only by understanding and reducing our own climate impacts can universities be credible and exemplary climate leaders.

This is why at NUS, we have been conscientiously reducing our carbon footprint through a range of initiatives, including installing rooftop solar panels campus-wide, consolidating and upgrading chiller plants to increase energy efficiency, and planting over 20,000 trees to date.

We are also ramping up the number of Green Mark Platinum Super Low Energy Buildings and Zero Energy Buildings through innovative sustainable design and construction strategies. For example, the award-winning energy-efficient zero energy building SDE4 – one of the world's six most beautiful buildings that redefine sustainable architecture, according to *Architectural Digest* last month – has sustainable design features holistically integrated into its architecture, such as having more than 1,200 solar photovoltaic panels on its overhanging rooftop to supply renewable energy to meet its energy needs. New sustainable precincts have also been earmarked across the campus.

We are planning to employ technology to green our campus, literally, with the planting of trees. Using data gathered from a variety of sensing technologies such as weather stations and meteorological towers to conduct environmental simulations, we will be able to find the best spots for trees to take root to cool the campus outdoor thermal environment.

Beyond infrastructure and technology is the drive to instil behavioural change throughout the campus community. For example, hostelites will be required to conscientiously sort and recycle their waste, and data on their daily waste generation and recycling behaviour will be available to them.

A LONG JOURNEY TOWARDS A BETTER FUTURE

The pressing work of climate change actions will be a long-drawn but worthy one. Universities play a key role in shaping our community to be future champions and leaders of sustainability.

We are a place where a diverse collection of disciplines, talent and interests intersect, and where opportunities for interdisciplinary research, teaching and innovation are created. In our day-to-day work, we engage in partnerships with business, industry, government and not-for-profits. We are preparing our students to take up the mantle for change and become the leaders of tomorrow.

It is a responsibility that we should and must not take lightly. The threat of global warming is real, and the race to shape a greener future starts now.

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