NUS SUSTAINABILITY REPORT 2025

Cover | Mangroves such as these are among the world's most effective natural carbon sinks, storing vast amounts of carbon while supporting biodiversity and coastal resilience. Through the Initiatives for Climate, Oceans & Nature, which is part of NUS Sustainable Futures, NUS researchers are studying how mangroves and peatlands capture and store carbon, analysing plant–microbe and soil interactions by using advanced tools such as artificial intelligence, microbiome science, and data analytics. Their findings support evidence-based conservation, restoration, and governance strategies that strengthen climate resilience and nature-based solutions across Southeast Asia.

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President's Foreword

At the National University of Singapore (NUS), sustainability is a long-term commitment that shapes how we educate, research, innovate, design our campus, and empower leadership and action within our community.

Over the past three years, we have made progress in this mission. We have deepened interdisciplinary collaboration, expanded sustainability education, advanced impactful research, transformed our grounds into a living laboratory for sustainability solutions, and spearheaded sustainability initiatives both within and outside the campus.

This report reflects the progress we have made across these areas in 2025, spanning from launching a first-of-its-kind Master's in sustainable healthcare, to supporting NUS-born startups that are making a difference in areas such as energy conservation and carbon emission reduction.

In 2026, Singapore designated the Year of Climate Adaptation — a timely reminder that climate change is no longer a distant challenge. At NUS, we are supporting national efforts through research and real-world applications that strengthen climate resilience.

Our researchers are developing integrative urban solutions to tackle extreme heat, coastal vulnerability, and flood resilience, while projects under Initiatives for Climate, Oceans & Nature are advancing nature-based solutions, marine conservation, and peatland restoration. On campus, we are integrating sustainability features such as wind corridors and biophilic design to improve thermal comfort. We are also expanding our renewable energy portfolio, targeting 12 megawatt-peak (MWp) of solar energy by 2028.

Artificial Intelligence (AI) is also emerging as an important enabler of sustainability. Across NUS, AI is being applied to optimise campus cooling systems, improve energy monitoring, strengthen waste management processes, and support climate and weather modelling.

At the same time, we recognise that AI itself carries environmental costs, particularly in energy and resource consumption. Through initiatives such as the NUS Energy Solutions Hub and the Sustainable Tropical Data Centre Testbed, we are advancing research into energy-efficient digital infrastructure and sustainable cooling technologies suited for tropical environments.

As we look ahead, NUS remains committed to bringing together academia, industry, government, and society — to develop solutions that help build a more sustainable, resilient, and equitable future for Singapore and beyond.

Professor Tan Eng Chye
President
National University of Singapore

Chief Sustainability Scientist's Message

Often, we treat environmental problems as isolated incidents.

We see a flood and think of how we can improve drainage in the area or erect flood barriers. We see plastic bottles in the trash and think the answer is more recycling bins.

While not wrong, these solutions are incomplete as they fail to consider the larger system that created the problem. For natural disasters like floods, this would include climate change and carbon-intensive energy production. For the proliferation of plastic waste, consumer psychology and materials engineering play a part.

With the twin crises of climate change and biodiversity loss upon us, and their consequences becoming ever more complex, we are seeing the creation of wicked problems. This leads us to the big question: how can we simultaneously grow more food, produce more energy, and conserve more biodiversity — while tackling the impacts of climate change?

The answer lies in mission-driven research that leads to impactful solutions. For that, we need experts from across disciplines to collaborate, to work seamlessly across domains and sectors, putting their minds and hearts together to solve the world's hardest problems. It is this belief that sets the foundation for NUS Sustainable Futures, which frames the university's approach to sustainability.

Launched in 2025, this agenda-setting initiative aims to break down academic and sectoral silos, empowering experts from science, social sciences, policy, industry, and government to tackle environmental challenges together.

NUS Sustainable Futures works across faculties and schools at NUS, as well as research institutes, centres, laboratories, consortia, and partnerships to facilitate greater collaborations in priority research topics in sustainability. These range from clean energy technology and sustainable digital infrastructure to peatland restoration, climate and weather science, and urban design and resilience.

The initiative is strategically organised around three problem-solving communities: NUS Energy Solutions Hub (NESH); Initiatives for Climate, Oceans & Nature (ICON); and Integrative Urban Solutions (IUS).

Beyond research, it also includes the Sustainability Academy, which develops and curates professional programmes to upskill learners on topics ranging from green finance to carbon services.

There is great urgency for countries to act appropriately and decisively. NUS Sustainable Futures is the university's commitment to turn knowledge into real-world solutions that create impact at scale.

Professor Koh Lian Pin
Vice President (Sustainability and Resilience)
Chief Sustainability Scientist
National University of Singapore

Our Approach to Sustainability

At NUS, the fight against climate change is interdisciplinary in nature, where intellectual resources are harnessed across multiple academic domains. It stems from the recognition that the most pressing environmental challenges the world faces today are complex and cannot be solved by any one area of expertise.

Through its efforts in education, it shapes future leaders passionate about securing a sustainable future. Its growing number of sustainability programmes and courses equip students with the necessary knowledge and skills to not only see the importance of the natural world, but to also protect it.

At the same time, the university challenges the limits of environmental research. Specifically, NUS Sustainable Futures, an agenda-setting initiative launched in 2025, has brought academia, industry, and government closer in research collaboration, to create solutions in fields spanning clean energy technology and sustainable digital infrastructure, peatland restoration, climate and weather science, and urban design and resilience.

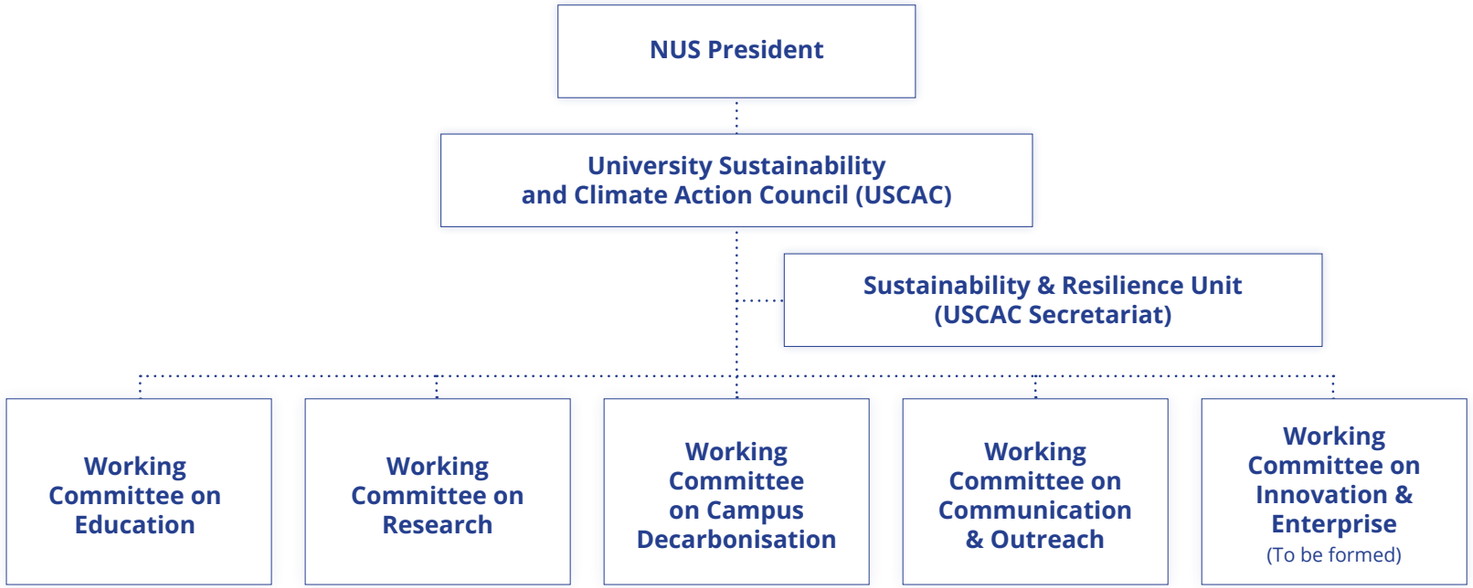
Meanwhile, its sprawling campus serves as an innovation testbed, providing a real-world environment to develop, test, and scale novel technologies. And through the NUS community — from students and alumni, to faculty members and administrators — it influences and inspires others to take climate action.

Sustainability Governance

Since 2021, NUS' sustainability efforts have been governed by the University Sustainability and Climate Action Council (USCAC), chaired by the NUS President. Four years on, it entered a new phase, taking the University's sustainability efforts to the next level. The revised USCAC setup will allow the university to look and plan well ahead, and serve as a platform for coordinating, facilitating, and catalysing sustainability action.

In 2025, the chairmanship of USCAC, which continues to report to the NUS President, was handed over to Professor Low Teck Seng, Senior Advisor, Office of the President. He is supported by Deputy Chairman, Professor Koh Lian Pin, who is also Chief Sustainability Scientist, as well as Council members comprising senior university leaders, and faculty with sustainability expertise from various fields. The Council also includes student representation at both the undergraduate and graduate levels.

USCAC oversees a set of working committees that drive key areas of importance for NUS, including: education; research; campus decarbonisation; innovation and enterprise; and communications and outreach. Its structure remains dynamic, with the possibility of new committees being formed to meet the evolving needs of the university.



Report Scope

As the third edition of the NUS Sustainability Report, this publication provides an update on the university's contributions to environmental and climate-related sustainability in 2025.

Like the previous two editions, it does not claim to be a complete documentation of all that has been done. Rather, it takes a more qualitative approach with carefully selected features that showcase the range and depth of NUS' commitment to sustainability.

This year's report includes a new section on Innovation & Enterprise, which spotlights startups conceived within NUS and/or with NUS-developed technology. While the focus remains on the university's contributions to the environment, the line-up of stories also showcases the social aspects of the effort.

Many of the programmes and initiatives highlighted in the following pages support the United Nations Sustainable Development Goals (SDGs) — a global framework designed to accelerate sustainability and climate action by 2030. Broadly, these efforts contribute to the following SDGs:

Depending on the type of data, three different reporting time frames were used:

- AY: Academic Year – A one-year study period, comprising two semesters and a special term (every August to July of the following year)
- FY: Financial Year – A one-year fiscal year, typically used for financial accounting and budgeting (every April to March of the following year)
- CY: Calendar Year – A one-year period from January to December

Data highlighted in this report are from NUS unless otherwise stated.

2025 Impact at a Glance

Data as at December 2025 unless otherwise indicated.

Education

>530 sustainability-centric courses delivered across the undergraduate and postgraduate curriculum (AY2025)

26% of undergraduates took at least one sustainability-related course (AY2025)

57% of undergraduates found jobs in sustainability-related industries (CY2025)

Research

S$248M in competitive funding for sustainability research (FY2025)

61% of sustainability-related papers were published in the top 10% of academic journals (CY2025)

167 collaborations with external partners on sustainability-related research projects (CY2025)

Campus

10.2MWp of campus solar photovoltaic capacity commissioned

73% reuse rate achieved at campus drink stalls through a 7-month Bring-Your-Own campaign

68% of target to plant 100,000 trees on campus by 2030 achieved

Innovation & Enterprise

215 sustainability-related startups founded by NUS community or supported by NUS, of which **44** are spin-off companies based on NUS technology (As at Mar 2026)

Leadership

15% of senior NUS leaders engaged in consultation work or held non-executive directorships in sustainability-related companies

Nurturing Sustainability Leaders

EDUCATION

Translating Knowledge into Practice

To take on the sustainability challenges of the future, Singapore needs to nurture a pipeline of green talent competent in the emerging fields of carbon markets, sustainable healthcare, low-carbon fuels like hydrogen, and more.

One way NUS supports this effort is through the NUS Sustainability Academy. The Academy, which is a part of NUS Sustainable Futures, is a one-stop shop for continuing education and training programmes spanning climate, nature, energy, green finance, and other sustainability topics. It coordinates and develops a pipeline of courses, partnering with schools and faculties across NUS, as well as government agencies and the industry, to upskill learners from the public and private sectors, empowering them to respond to climate challenges and seize emerging opportunities.

On the graduate studies front, an initiative called the Common Pool of Electives was piloted in 2024 and 2025, to encourage more interdisciplinary and multidisciplinary thinking. Under the scheme, each sustainability-related master's programme sets aside a limited number of seats in a chosen course per semester, for students from other sustainability-related master's programmes.

NUS also introduced several new education programmes in 2025. The new Professional Certificate in Carbon Services and Trading teaches individuals about developing and managing various types of carbon projects, and trading carbon credits.

Meanwhile, the NUS Centre for Sustainable Medicine launched the Master of Science in Sustainable Healthcare — the first of its kind in the world — and the Executive Fellowship in Sustainable Healthcare to equip healthcare professionals and senior healthcare leaders with the knowledge and skills to deliver quality care for patients, while decarbonising their health systems.

Finally, the Minor in Hydrogen and Low Carbon Technology and the short course titled "Introduction to Hydrogen Energy" educates students on the latest in hydrogen and low-carbon technology.

Taken together, they represent NUS commitment to keep pace with the evolving sustainability landscape, and to support Singapore's sustainability agenda.

Highlights in Numbers

Undergraduate Education
(AY2025)

7
sustainability-themed majors

21
sustainability-themed second majors and minors

35
sustainability-themed specialisations

Postgraduate Education
(AY2025)

16
sustainability-related master's programmes

Graduate Employment
(CY2025)

57%
of undergraduates found jobs in sustainability-related industries

Informal Education
(As at Dec 2025)

>20 environmental student groups

Professional and Executive Education
(CY2025)[1]

6
Executive Education Programmes

14
Short Courses*

9
Professional Certificates & Advanced Professional Certificates

10
Graduate Certificates

* Short Courses may be stacked towards Professional Certificates

Enrolment in Sustainability-Themed Programmes

3,458 students taking undergraduate majors, minors, and specialisations (AY2025)

1,573 students taking master's programmes (AY2025)

909 training places in professional and executive education (CY2025)

[1] **Change in Reporting Basis**: From CY2025, reporting metrics for Executive Education Programmes and Short Courses will track only those with enrolment, rather than those offered, to better reflect actual execution. Due to this revised methodology, CY2025 data is not directly comparable with previous sustainability reports.

Preparing Professionals for the Complexities of Carbon Markets

To complement Singapore's goal of achieving net-zero emissions by 2050, NUS launched a Professional Certificate in Carbon Services and Trading, aimed at professionals already in or entering the industry. Learners acquire skills in developing and managing various types of carbon projects, and in trading carbon credits.

The programme, which runs over eight days, comprises three courses: Navigating Policy Developments and Trends in Carbon Markets; Carbon Project Development; and Carbon Measurement, Reporting, and Verification.

The Professional Certificate in Carbon Services and Trading teaches participants how to manage carbon trading.

These courses consist of dialogues with academic, industry, and government representatives, giving participants insights into Article 6 of the Paris Agreement, and the eligibility criteria for Singapore's International Carbon Credit Framework.

They also learn about the latest trends in carbon markets, project development considerations, and scientific methodologies and technologies for carbon accounting and measurements. The Carbon Project Development and the Measurement, Reporting, and Verification courses culminate in group projects, allowing learners to put their skills into practice. The Professional Certificate also connects learners with experts and market players.

Participant Ms Li-Ling Ch'ng, who co-leads the Environmental, Social & Governance Practice at RHTLaw Asia LLP, praised the course for its quality. "The group project was a fantastic way to help us apply what we learnt in class," she added. "It was not easy at all, but so rewarding for me in understanding just a fraction of how complex measuring, reporting, and verifying a [carbon] project is."

As carbon markets continue to evolve, programmes like this help ensure professionals are better equipped to engage with emerging standards, tools, and practices.

> "The course has equipped me with practical tools and frameworks that I can directly apply to my work in developing and managing carbon projects."
>
> **Mr Ben Tan**
> Manager at the Energy Department in Mitsui & Co (Asia Pacific) Pte. Ltd, on the Professional Certificate in Carbon Services and Trading

The NUS Centre for Sustainable Medicine launched two new graduate programmes in 2025.

New Graduate Programmes in Sustainable Healthcare, Including World's First Master's

As climate change drives up the incidence of heat-related, respiratory, and vector-borne illnesses, it also causes the already significant carbon footprint of healthcare to mount.

To equip healthcare professionals and leaders with the knowledge and skills to deliver quality care while decarbonising their health systems, the NUS Centre for Sustainable Medicine (CoSM) announced two new graduate programmes to be offered at Yong Loo Lin School of Medicine at the United Nations Climate Change Conference of the Parties (COP29) in 2024.

They include the world's first-of-its-kind Master of Science in Sustainable Healthcare (MSc-SH), which had its first intake in August 2025. Students took specialist modules on carbon analytics, the implementation of sustainable healthcare practices, and change management in healthcare.

The programme boasts a world-class faculty of global experts — government leaders, members of the World Health Organization, seasoned professionals from The Lancet medical journal — and an interdisciplinary learning experience with classes from the Medicine, Sustainability and Geography, Engineering, and Public Health faculties. It opens up pathways for a healthcare career in the fast-growing sustainability industry.

Ms Debbie Chan, a student of the first cohort of the MSc-SH, said the programme showed her how resource-intensive the healthcare sector is, and helped her "better contextualise and implement healthcare policy and operational decisions".

The second programme, the Executive Fellowship in Sustainable Healthcare, which also had its first run in 2025, aims to help senior leaders and professionals in healthcare deliver high-quality, climate-ready care for patients and populations. Learners attain a Graduate Certificate after completing two advanced courses on net-zero analytics and implementing net-zero healthcare in the year-long programme, and will be inducted into the CoSM's Sustainable Healthcare Leaders' Network upon graduation.

With environmental pressure mounting, CoSM's efforts to address carbon emissions in healthcare will be essential in ensuring the health and well-being of both patients and the planet.

> "The CoSM [team] is devoted to the Fellowship programme, sharing their vast knowledge and skills and helping each Fellow make additional relevant connections with experts as needed."
>
> **Associate Professor Raanan Raz**
> who attended the Executive Fellowship in Sustainable Healthcare

New Hydrogen Energy Education Offerings Support Singapore's Energy Transition

As Singapore pivots towards ammonia and other hydrogen carriers as preferred hydrogen storage solutions, NUS has introduced a Minor programme and a short course to cultivate expertise in this emerging sector.

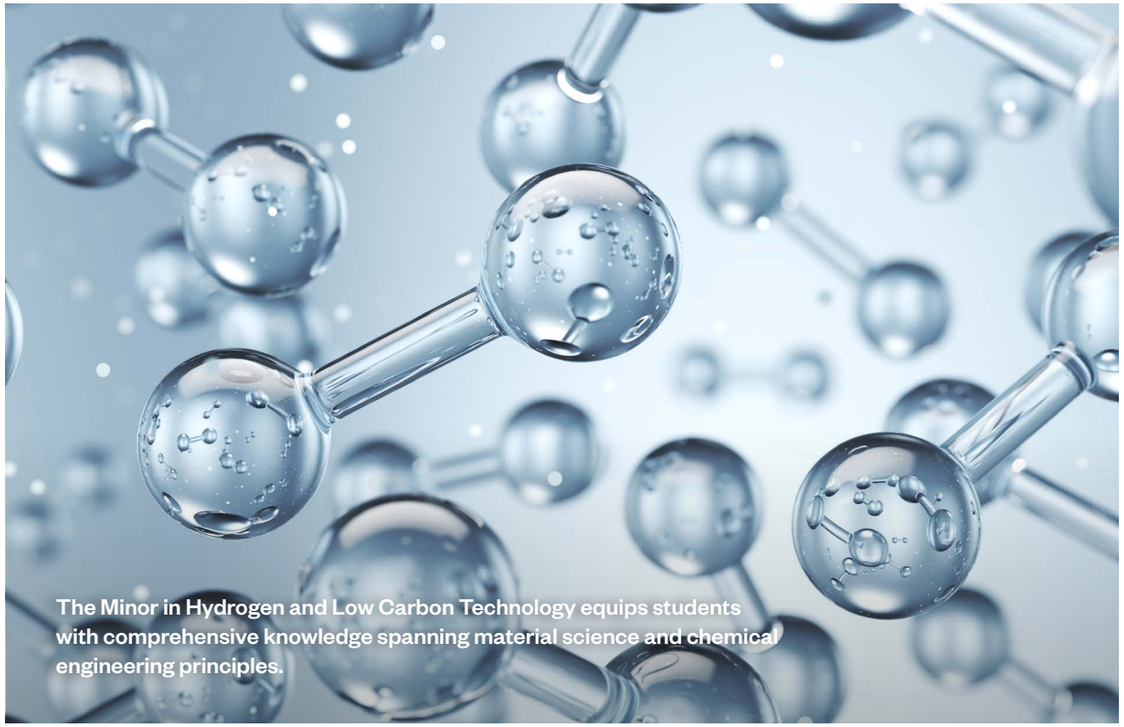
Launched in AY2025, the Minor in Hydrogen and Low Carbon Technology — open to all NUS undergraduates — has attracted about 50 sign-ups. "I signed up because I'm driven to redefine energy through hydrogen and battery innovation, creating pathways towards a sustainable, carbon-neutral world," said Year 3 Chemical Engineering student Shruti Moovendran.

Offered by the College of Design and Engineering's Department of Chemical and Biomolecular Engineering, and supported by the Centre for Hydrogen Innovations (CHI), the programme equips students with comprehensive knowledge spanning material science and chemical engineering principles, the latest hydrogen and low-carbon technology from the industry perspective, and chemical process safety.

By emphasising interdisciplinary collaboration and effective communication of complex technical concepts, it also prepares graduates for careers in researching, developing, and implementing hydrogen systems across various industries.

CHI has also partnered with the Sustainable Energy Association of Singapore and the NUS School of Continuing and Lifelong Education to conduct a short two-day course for working professionals. Titled "Introduction to Hydrogen Energy", it provides an overview of hydrogen energy technologies, policies, and global markets. NUS faculty and industry veterans deliver content ranging from fundamentals to global and regional market analyses.

The first two runs attracted close to 30 participants from diverse backgrounds, including engineers, market analysts, and trade association professionals.



The Minor in Hydrogen and Low Carbon Technology equips students with comprehensive knowledge spanning material science and chemical engineering principles.

"With my new certification, I am confident that I can better leverage my chemical expertise and think of novel ways to support Singapore's rapidly developing hydrogen ecosystem."

Mr Zhang Pinzheng
Centre of Innovation at the Energy Research Institute @ NTU, on the short course "Introduction to Hydrogen Energy"

Pursuing Possibilities

RESEARCH

(Source: OceanX)

Breaking Silos, Delivering Impact

As the world continues to suffer from the effects of climate change, from record-high temperatures to extreme weather events, it has become even clearer that the solutions needed will not come from a single discipline, sector, or geography.

With this in mind, NUS restructured how it drives research with the newly launched university-wide initiative, NUS Sustainable Futures.

This interdisciplinary initiative centres on three sustainability missions designed to build vibrant research communities involving academia, industry, government, and society:

NUS Energy Solutions Hub
Focuses on improving energy sustainability and resilience

Initiatives for Climate, Oceans and Nature
Focuses on technological innovations and nature-based solutions that address climate change, biodiversity loss, and environmental degradation

Integrative Urban Solutions
Focuses on a multidisciplinary approach to enhance urban resilience and sustainability

This is complemented by active participation in national and regional research initiatives. In 2025, NUS joined the Climate and Weather Research Alliance Singapore, a national partnership that advances tropical weather and climate science. This has enabled projects that seek to improve weather observations, develop next-generation climate models, and enhance prediction accuracy using high-resolution modelling and artificial intelligence.

On the food security front, the university co-leads several programmes which received additional funding from the Singapore Food Agency in 2025. They include the:

- AquaPolis R&D Programme, which aims to improve the nutritional value of locally produced seafood while lowering production costs;
- Seed Innovation Hub, which advances crop breeding by developing seeds with desired traits such as faster growth and higher nutritional value; and
- Centre for Precision Fermentation and Sustainability, which focuses on developing efficient and sustainable production of healthy lipids and functional proteins.

Today, nearly one in three NUS faculty members conducts sustainability-related research. The university will build on this momentum to translate research into meaningful, real-world impact.

Highlights in Numbers

Research and Academic Publications
(CY2025)

18%
(or 2,673)
of research and academic papers published are sustainability-related

61%
of sustainability-related papers are published in the top 10% of academic journals

87%
of sustainability-related publications involve collaboration with other institutes

4%
of sustainability-related publications involve corporate collaboration

144
collaborating countries/regions for NUS' sustainability-related publications

2.44
Field-Weighted Citation Impact for sustainability-related publications*

* Measures how well-cited a publication is compared to similar publications

26%
of sustainability-related publications rank among the top 10% most cited worldwide

Research Collaborations
(CY2025)

167
collaborations with external partners on sustainability-related research projects, of which

71
are with research institutes and institutes of higher learning

85
are with companies and industry associations

11
are with government agencies

Grants
(FY2025)

S$248M
in competitive funding for sustainability research

Tackling Hard-To-Abate Emissions Through Energy Innovation

Powering global trade and the digital economy, sectors like maritime transport, industrial energy systems, and data centres have proven particularly difficult to decarbonise. They rely heavily on fossil fuels, underscoring the need for scalable, low-carbon fuel alternatives.

To meet these challenges, the NUS Energy Solutions Hub (NESH) brings together fundamental research, engineering innovation, and industry collaboration to develop and deploy integrated energy solutions — focusing on problems unique to tropical and urban environments.

A research track under NESH is sustainable digital infrastructure, where innovative cooling technologies, software optimisation methods, and renewable energy integration into computing operations are developed to enhance energy efficiency in computing and data centres.

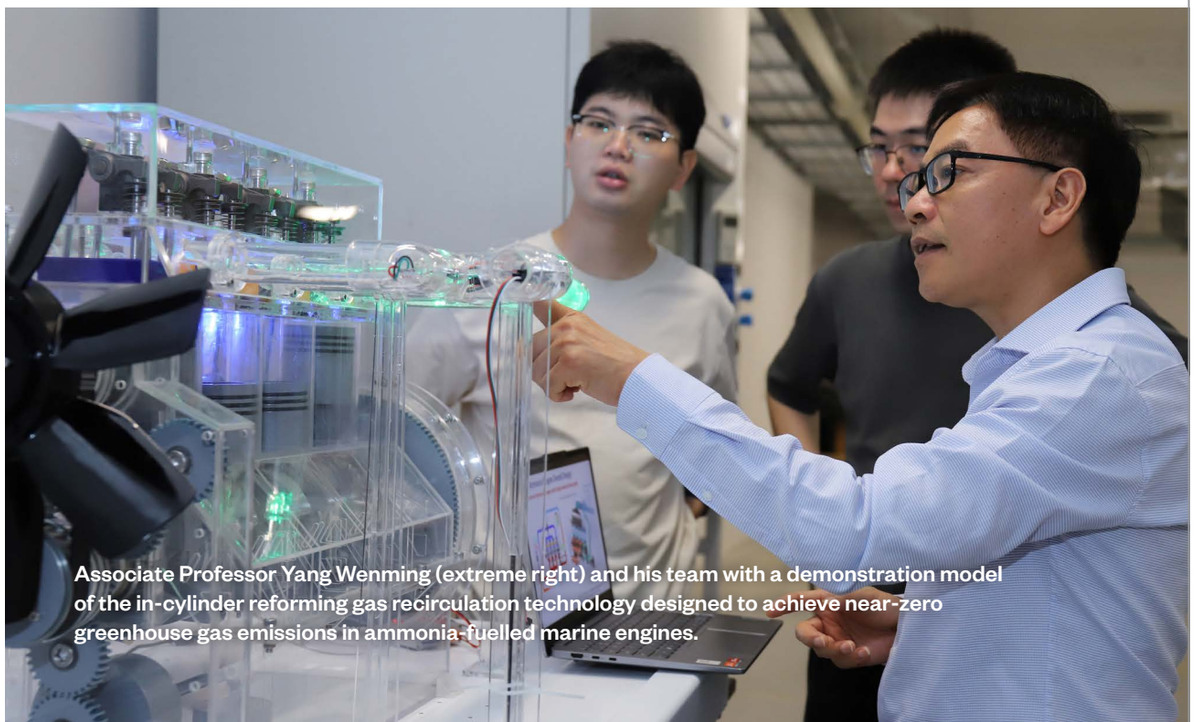
Building on the successful implementation of Phase 1 of the Sustainable Tropical Data Centre Testbed (STDCT), NUS is partnering with JTC Corporation to establish STDCT Phase 2 on Jurong Island. This expanded testbed strengthens NUS' capabilities to pilot and validate energy-efficient cooling, low-carbon power systems, and digital infrastructure solutions under real-world conditions, supporting scalable deployment across Southeast Asia.

NUS is also driving innovations for sustainable industry and transportation, particularly in the maritime sector. At the NUS Centre for Hydrogen Innovations (CHI), Associate Professor Yang Wenming is leading research to develop a novel ammonia-based maritime engine prototype. It features an advanced in-cylinder reforming gas recirculation technology that enables high-efficiency combustion with near-zero greenhouse gas emissions.

Beyond low-carbon combustion, maritime carbon capture and conversion are emerging as promising routes to decarbonise shipping. Professor Yan Ning and his team are exploring novel catalysts for converting captured carbon dioxide into methanol, closing the carbon loop and supporting a circular carbon economy. Additionally, CHI is collaborating with industry partners to explore ammonia cracking, power decarbonisation, and sustainable fuel pathways.

The work at NESH also includes sustainable and resilient multi-energy districts, sustainable redevelopment for urban resilience, as well as data-driven energy strategy and policy. Collectively, they enable NUS to develop impactful energy solutions that are efficient, adaptable, and scalable.

STDCT 2.0 will allow data centre operators to test and optimise low-carbon solutions such as liquid-cooling infrastructure, which includes the use of seawater. (Source: This image was generated using AI-Know, powered by Google's Imagen 4 model.)



Associate Professor Yang Wenming (extreme right) and his team with a demonstration model of the in-cylinder reforming gas recirculation technology designed to achieve near-zero greenhouse gas emissions in ammonia-fuelled marine engines.

Responding to Global Climate, Ocean, and Biodiversity Challenges

Effective governance of nature-based carbon sinks in Southeast Asia requires balancing ecosystem protection with local rights and livelihoods.

The Initiatives for Climate, Oceans & Nature (ICON) anchor efforts to protect and restore nature through cross-disciplinary research, innovation, and policy engagement.

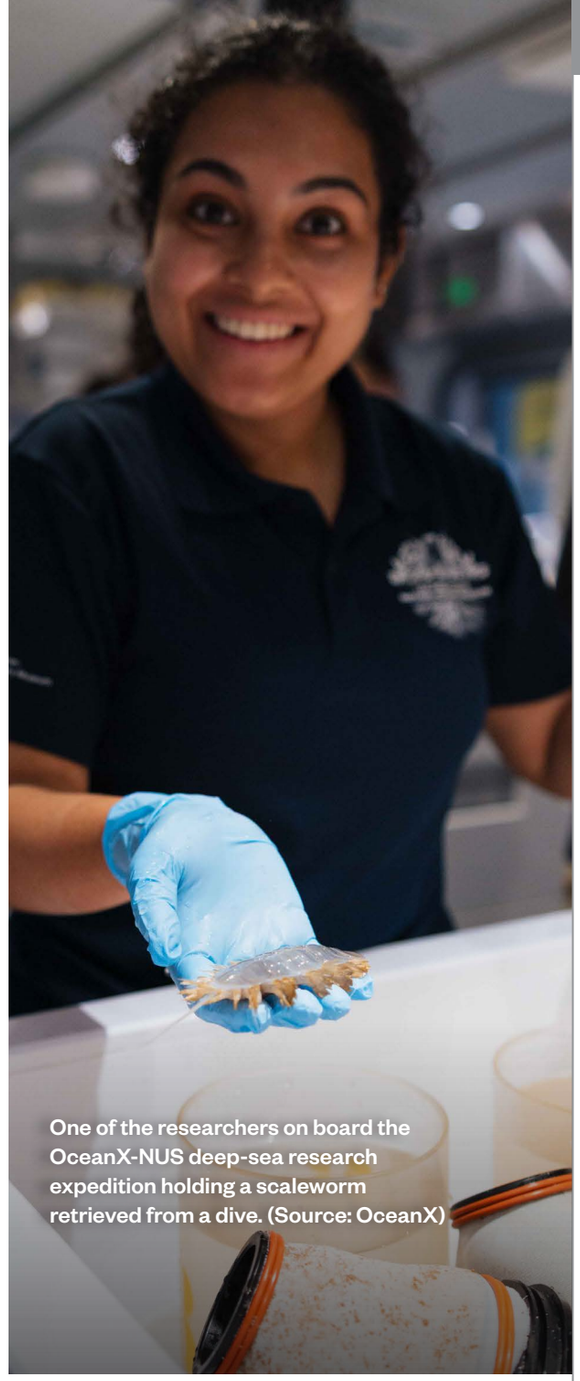
A pillar under the ICON umbrella is marine environmental sustainability, with projects like Singapore's first major deep-sea research voyage — a 24-day NUS-OceanX deep-sea scientific expedition to the largely unexplored Monsoon Rise seamounts in the eastern Indian Ocean. It mapped marine biodiversity across more than 17,000 km² of deep-sea terrain, creating baseline data for sustainable ocean management and ocean health.

On land, ICON's focus extends to integrated peatland restoration and conservation. Peatlands and mangroves are vital carbon sinks that regulate climate, support biodiversity, and sustain local livelihoods, but they are increasingly threatened by climate change, deforestation, agricultural conversion, and wildfires.

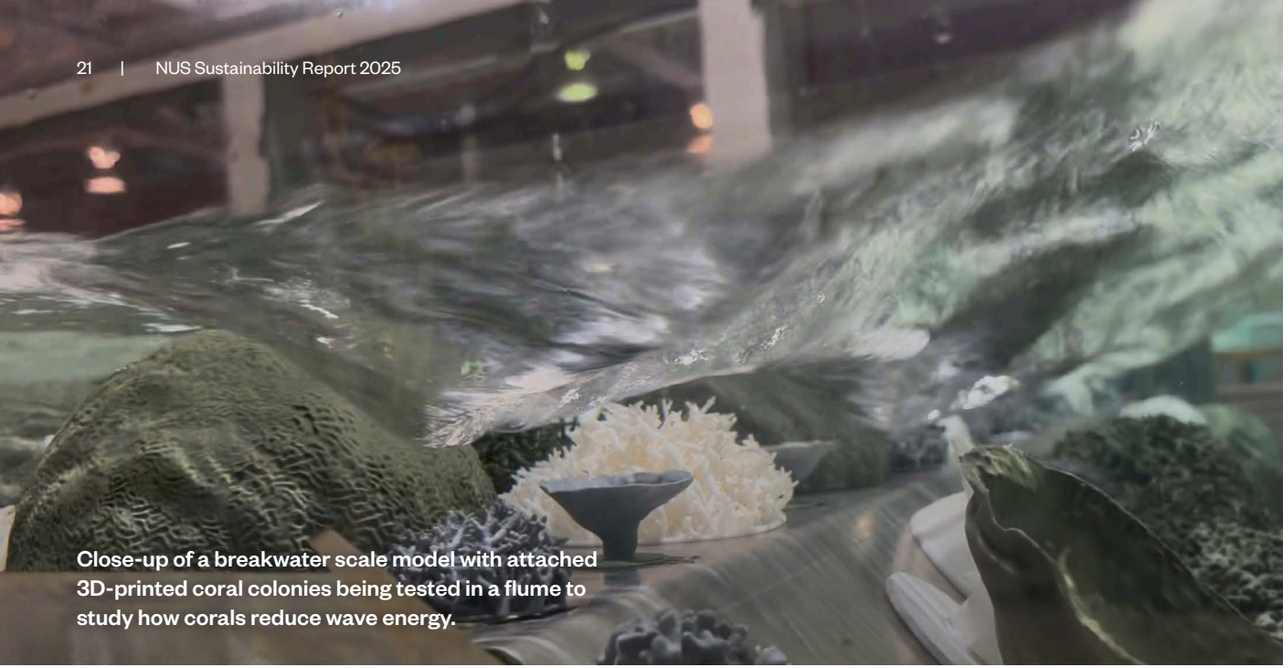
Researchers like Associate Professor Sanjay Swarup at the NUS Environmental Research Institute seek to understand their true value and impact, and conduct research that integrates ecology, microbiome science, metabolomics, artificial intelligence, and data analytics. Plant microbe and soil interactions are analysed, with predictive insights generated for peatland conservation and carbon sequestration. His work supports scalable, nature-based climate solutions that inform both science and policy in the region.

ICON also addresses the societal dimensions of climate change mitigation. A project led by Professor David Taylor from NUS Geography explores the governance of various nature-based carbon sinks (NCS) in the form of terrestrial and mangrove forests, peatlands, and agricultural soils. It also aims to understand how the governance and management of NCS in Southeast Asia may be carried out in ways that are both environmentally effective and socially equitable. Through such research, Southeast Asia is positioned to lead the way in managing carbon-dense ecosystems for a more just and resilient future.

Through ICON, NUS is also accelerating research in sustainable water infrastructure, planetary and human health, and water, energy, and food security. These efforts help build climate resilience, conserve biodiversity, and support sustainable development locally and regionally.



One of the researchers on board the OceanX-NUS deep-sea research expedition holding a scaleworm retrieved from a dive. (Source: OceanX)



Close-up of a breakwater scale model with attached 3D-printed coral colonies being tested in a flume to study how corals reduce wave energy.

Building Climate-Resilient Cities with Integrative Solutions

Rapid urbanisation and climate change are intensifying heat stress, flood risk, and coastal vulnerability, putting pressure on the liveability of cities around the world.

Addressing these complex challenges requires a holistic approach that links engineering, environmental science, policy, and social systems to build sustainable, resilient cities.

The Integrative Urban Solutions (IUS) initiative at NUS does just this. With urban health as one of its key focus areas, researchers examine how climate change, urban planning, and economic disparities impact population health.

For instance, research led by Associate Professor Yuan Chao from NUS Architecture harnesses Geographic Information Systems-based climate modelling and planning tools to identify urban heat hotspots and estimate the impact of different design interventions on heat dispersion.

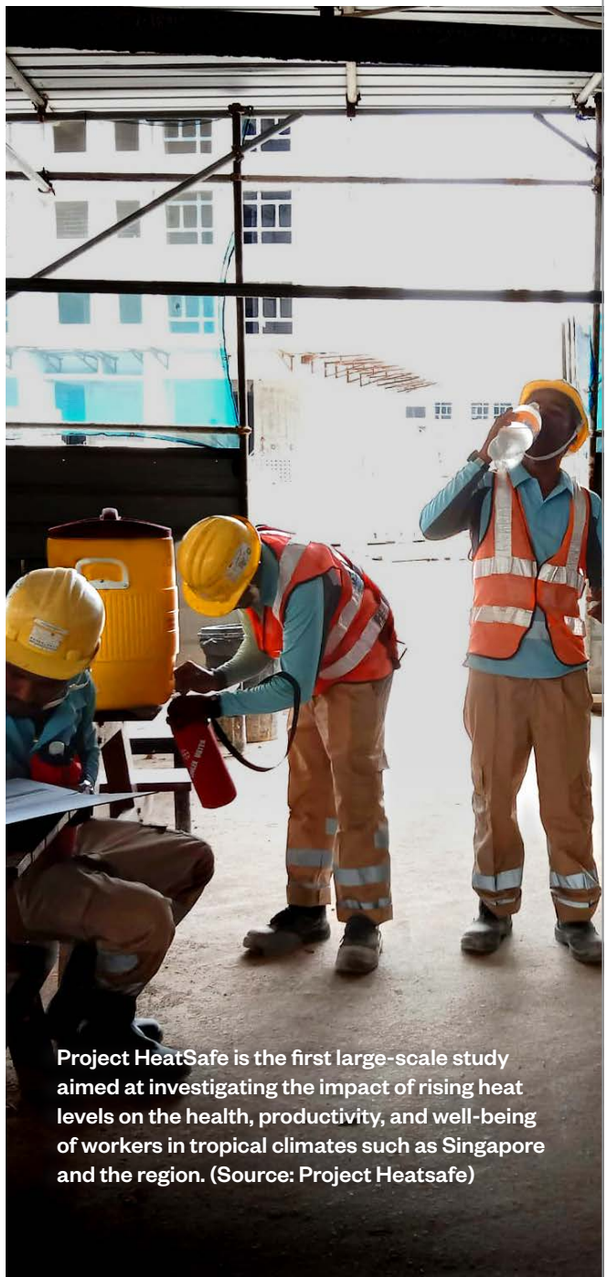
Meanwhile, Project HeatSafe, led by Associate Professor Jason Lee from the Heat Resilience and Performance Centre at NUS Medicine, investigates the impact of heat stress on outdoor workers in Southeast Asia. Its findings of reduced productivity and performance in workers resulted in new policies to protect these workers in Singapore.

Another focus area is resilient urban climates, which explores using tools like climate modelling, sensor networks, and nature-based solutions to mitigate climate-related stressors like extreme heat and flooding.

To combat sea-level rise, Associate Professor Peter Todd from NUS Biological Sciences and the Coastal Protection and Flood Resilience Institute (CFI) Singapore is developing hybrid coastal protection solutions tailored to Singapore's coast. For example, his team is studying whether submerged breakwaters that support coral growth can reduce more wave energy than breakwaters without corals, while also enhancing marine biodiversity.

At NUS Geography, Assistant Professor Li Yuzhu is conducting research on how sediment transport and deposition, and human interventions such as land reclamation, will shape coastal morphology and ecosystem health. These aim to inform coastal planning, marine conservation, and nature-based solutions.

Together with other IUS research tracks in land use and mobility, social capital, and urban economics, NUS researchers are looking to integrate insights from across disciplines — to design cities that are resilient, resource-efficient, and people-centred.



Project HeatSafe is the first large-scale study aimed at investigating the impact of rising heat levels on the health, productivity, and well-being of workers in tropical climates such as Singapore and the region. (Source: Project Heatsafe)

Ideas into Impact

INNOVATION & ENTERPRISE

Scaling Ideas into Impact

For aspiring entrepreneurs, the journey from cutting-edge research to scalable deep tech solutions is demanding. Ideas must be tested early, refined with industry, and built around clear paths to adoption.

NUS Enterprise, the entrepreneurial heart of the University, supports this journey through an innovation flywheel — where talent, research, capital, and entrepreneurship continually reinforce one another. Since 2001, NUS Enterprise has nurtured 10 unicorns, over 3,000 start-ups, and 5,500 students, enriching innovation and start-up ecosystems globally.

The journey begins with talent. Through the NUS Overseas Colleges programme, which spans more than 15 innovation hubs, undergraduates spend up to a year interning with technology start-ups and learning how companies are built in competitive markets. At the graduate level, the NUS Master of Science in Venture Creation builds on this foundation by sharpening commercial thinking and venture-building discipline.

Beyond nurturing student founders, NUS Enterprise empowers Singapore innovators to transform lab discoveries into impactful ventures. In 2025, the NUS Graduate Research Innovation Programme (GRIP) transitioned into National GRIP, a unified national platform supported by S$50 million over five years from the National Research Foundation, NUS, and Nanyang Technological University.

As ventures take shape, they need the right ecosystem to grow. BLOCK71, NUS Enterprise's global network of physical accelerators across 11 cities, connects start-ups to markets, mentors, partners, and regional opportunities. Its Technology Transfer and Innovation unit also helps translate NUS research into real-world impact through technology transfer, industry partnerships, and commercialisation support.

The four start-ups featured in this section, Ecovolt, Terraco Earth, Fitobite, and Hydgen, are success stories of this innovation flywheel in action. As they scale, they attract stronger talent, build industry confidence, draw more sophisticated capital, and reinforce NUS' role as a hub for research translation and venture building.

Highlights in Numbers

Innovation and Enterprise
(As at Mar 2026)

215

sustainability-related startups founded by NUS community or supported by NUS, of which

44

are spin-off companies based on NUS technology

S$1.3B

in grants and equity funding raised by sustainability-related startups founded by NUS community or supported by NUS, of which

S$71M

is raised by spin-off companies based on NUS technology

Curbing Vampire Energy Waste

Featuring: Ecovolt

Leaving devices plugged in even when they are not in use is a common habit. But few realise that this makes up around 16 per cent of electricity consumption in many homes and offices — resulting in so-called vampire energy waste.

Sustainability startup Ecovolt aims to change this unthinking practice. Through its custom-designed smart plugs, miniature circuit breakers and building management system integrations, Ecovolt enables its clients to monitor and manage their electricity use via an artificial intelligence-enabled platform.

Mr Glenn Quah installing Ecovolt's smart miniature circuit breaker.

The system also recommends schedules to reduce wastage, and allows users to remotely or autonomously power down devices, turn off plugs, and manage physical facilities like lighting and air-conditioning systems. These can be adjusted based on occupancy.

"Our goal is to help every building in Singapore go smart, digitalise, and get data that was previously inaccessible, so building operations teams can monitor and manage these buildings," said Ecovolt Chief Executive Officer (CEO) and co-founder Mr Raphael Chew.

The company has come a long way since it won the Sustainable Development Goals Open Hack @ NUS 2024 with its proposal to address vampire energy waste. As young university students, the three founders were met with scepticism when Ecovolt was first launched in 2025. They had to field questions such as whether their solution was viable or if it would affect critical infrastructure. But the three NUS Overseas College alumni quickly put those doubts to rest — the young entrepreneurs knew what their product was capable of.

Currently housed in NUS start-up incubators BLOCK71 at THE HANGAR and BLOCK71 Social Impact Hub, Ecovolt's system is today part of sustainability solutions adopted in at least 27 buildings, with the latest being City Developments Limited's office at Republic Plaza.

Ecovolt co-founders Mr Raphael Chew, Mr Eugene Chia and Mr Glenn Quah (left to right).

The startup is currently in talks with NUS about potential upcoming collaborations where its solutions will not only help to track the energy consumption in a medical laboratory, but also monitor and control humidity and lighting in the university's new agricultural laboratory.

Ecovolt is able to deliver 8 to 20 per cent energy savings without having to completely rewire buildings. It has reduced 100 tonnes of carbon dioxide since July 2025, and is targeting to cut 1,000 tonnes in 2026. This is equivalent to removing more than 200 passenger vehicles from the road for a year.

> "Our mission is to help every building in Singapore to reduce greenhouse gas emissions, operate more efficiently, and hit the sustainability mandate of the Singapore Green Plan."
>
> **Mr Raphael Chew**
> CEO and co-founder of Ecovolt

Breakthrough Carbon Capture Technology

Featuring: Terraco Earth

Carbon capture has long been seen as a way to clean up heavy industry. However, for many factories, it is a financial non-starter.

Conventional systems rely on liquid chemicals called amines that react with carbon dioxide. Once the gas is trapped, the liquid must be heated to very high temperatures to release it again. That step requires large boilers, steam, cooling water, and wastewater treatment. The technology works, but it is economically viable only at a massive scale.

Terraco Earth was formed to solve this problem. The company was spun out of NUS after its co-founders, Ms Sumarni Rifemi and Ms Felicia Effendi, met while on their NUS Master of Science in Venture Creation (NUS MSVC) journey.

During their final semester in 2025, they embarked on their project in a venture creation practicum, a highly experiential core course within the NUS MSVC. Told to treat their project as a real startup, the duo interviewed cement firms, oil and gas companies, and power plants — so-called "hard-to-abate" sectors — and discovered that cost was what prevented them from embracing carbon capture.

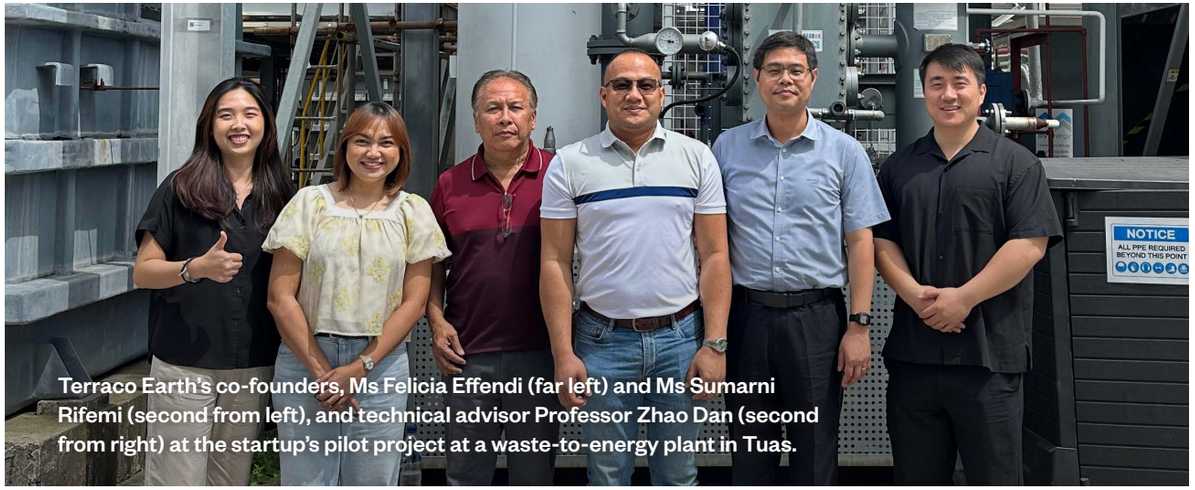
They built a solution based on metal–organic frameworks (MOFs) developed by Professor Zhao Dan, now Terraco Earth's technical advisor. "MOFs are solid materials that trap carbon dioxide like a sponge, physically rather than chemically," Ms Effendi explained.

When a light vacuum is applied, the gas is released, without boiling or steam, thus significantly reducing energy consumption. Almost all of the carbon is then reused to make anything from cement to furniture. Terraco Earth estimates that its system can reduce capital costs by about 25 per cent, and operating costs by more than 50 per cent.

Terraco Earth's solution initially faced some scepticism from large multinational corporations. But they pressed on, supported by the likes of SGInnovate and other industry partners willing to test early systems.

Today, the startup's pilot project at a waste-to-energy research plant in Tuas, Singapore captures one tonne of carbon dioxide a day using real exhaust gas, making it the first MOF-based carbon capture pilot of this scale in Southeast Asia. The team aims to scale to 300 tonnes daily within five years.

If this scale is reached, Terraco Earth could finally make carbon capture viable for thousands of smaller plants that, until now, could not afford to act.



Terraco Earth's co-founders, Ms Felicia Effendi (far left) and Ms Sumarni Rifemi (second from left), and technical advisor Professor Zhao Dan (second from right) at the startup's pilot project at a waste-to-energy plant in Tuas.

> "Terraco Earth is positioned as a promising next-generation, world-leading carbon capture solution. Looking ahead, Terraco Earth aims to achieve large-scale industrial deployment and set new benchmarks for energy-efficient carbon capture technologies worldwide."
>
> **Professor Zhao Dan**
> Technical Advisor of Terraco Earth

Plant-Based Proteins for Strong, Healthy Ageing

Featuring: Fitobite

At age 40, people start to lose muscle mass, leading to a higher risk of falls and fractures. While the problem is inevitable, the rate of muscle loss can be slowed with balanced nutrition and exercise.

To support this, deep-technology food innovation startup Fitobite is creating protein supplement products like powders and ready-to-drink liquid shots using plant-based proteins.

An issue with most protein supplement products in the market is the use of whey protein. Apart from containing synthetic amino acids that could cause kidney issues, whey protein is made from dairy, which contains lactose, a sugar that becomes more difficult to digest at older ages. Dairy production also has a larger carbon footprint, a result of the land use, water consumption, and emissions from raising cattle.

Fitobite's plant-based proteins are not just a lactose-free alternative but also a more eco-friendly option, using legumes to obtain the nine essential amino acids required in human diets. The Indonesia-based company employs an extraction method developed by NUS, deriving proteins from mung beans, rice, pea, and soy beans.

"This combination results in the perfect amino acid profile and provides nutrition for the 40-plus age group," said Chief Executive Officer (CEO) and co-founder of Fitobite, Ms Christentia Steffany.

The idea for Fitobite was first developed during her time at the National University of Singapore, specifically in the NUS Master of Science in Venture Creation (MSVC). The venture creation practicum helped shape her entrepreneurial thinking, and refine the foundation of the business.

Today, the startup works with local Indonesian farms to source these legumes, supporting the agricultural community and reducing the carbon footprint caused by food transportation and packaging. Fitobite has already secured deals with distributors, and its products will also be sold on an e-commerce website. The protein powders will be launched in September 2026, while the liquid shots will be sold in 2027.

Through its products, Fitobite aims to provide sustainable, lactose-free, high-quality proteins — a growing demand driven by an ageing population. By 2050, the proportion of people aged 60 and above in Southeast Asia is expected to reach 22.9 per cent, up from 12.2 per cent in 2024.

"We'd like to be a pioneer for an active ageing population, using all-natural and plant-based ingredients."

Ms Christentia Steffany
CEO and co-founder of Fitobite

Fitobite's products use legumes, which are not only a lactose-free alternative but also a more eco-friendly option than other plant-based proteins.

Green Hydrogen — On-site, On demand

Featuring: Hydgen

Hydgen's Anion Exchange Membrane electrolyser being used in a fertiliser plant.

Hydrogen is the most versatile molecule on Earth, serving as a critical building block for everything from fertilisers to steel. However, while hydrogen itself is a clean fuel, the way we currently obtain it is not.

More than 95 per cent of the world's supply is grey hydrogen, produced from fossil fuels. This process generates a billion tonnes of carbon dioxide emissions each year, equivalent to around 2 per cent of global emissions.

Even when companies try to switch to green hydrogen — made by splitting water with renewable electricity — they hit a wall of logistics.

Conventional green hydrogen is usually made in massive, centralised plants that must operate continuously. To get that gas to a factory, it must be compressed or liquefied and trucked across long distances. Furthermore, most current green technologies rely on rare and expensive metals like iridium.

Enter local startup Hydgen, whose decentralised system produces ultra-pure hydrogen exactly where it is needed. "By producing hydrogen on-site, we also remove an entire layer of expense in terms of transport and storage," explained Dr Michael Gryseels, Executive Chairman and co-founder of Hydgen.

Its breakthrough Anion Exchange Membrane technology uses a specialised "filter" and proprietary catalysts made from abundant, low-cost materials to split water into hydrogen and oxygen. This allows Hydgen's machines to be more durable and significantly cheaper to build than traditional models. These systems are actively operating at various industrial customer sites today.

The innovation was born from research at NUS by Hydgen's two other co-founders, Dr Goutam Dalapati and Dr Krishna Kumar. Supported by a National Research Foundation grant, their work stretched from 2019 to 2023. In 2024, with an initial investment from Dr Gryseels, as well as funding and mentorship from the NUS Graduate Research Innovation Programme, the team finally turned their lab experiment into a commercial product.

To date, Hydgen has raised more than US$8 million, with clients from sectors that range from oil and gas, to automobile. It is on track to build a 250 kilowatt system by late 2026, and hopes to eliminate 750,000 tonnes of carbon dioxide annually by 2031.

With its game-changing innovations, Hydgen is proving that the path to a zero-carbon future is finally within economic reach. Sustainability aside, they are also enabling companies to achieve energy security and industrial reliability.

> "We have the technology which we believe can actually be one of the key components for decarbonising heavy industry."
>
> **Dr Goutam Dalapati**
> Chief Technology Officer and co-founder of Hydgen

Sustainability in Action

CAMPUS

Building a Resilient Campus for the Future

Rising temperatures due to climate change calls for an integrated approach to sustainable campus planning to mitigate urban heat, manage rising carbon emissions from campus expansion, and enable habits and behavioural change.

Under the NUS Campus Sustainability Roadmap 2030, the university is used as a living laboratory to achieve its ambitious sustainability targets — where campus infrastructure and grounds are not just used to respond to sustainability challenges but also actively tapped on to develop solutions that can be scaled beyond campus boundaries.

Designing for Climate Resilience

On campus, the average daytime temperature rose by 0.42 deg C between 2020 and 2025. To address this, the University Campus Infrastructure (UCI) is strengthening its longer-term climate-responsive planning by integrating features like wind corridors, expanded green spaces, and biophilic design to improve outdoor thermal comfort in the refreshed Kent Ridge Masterplan. Rejuvenated precincts are also being designed to harness wind, shade, and greenery as climate-responsive strategies.

A key upcoming development is Kent Green at the Engineering precinct, a major green space scheduled for completion beyond 2030. Supported by Singapore's first and densest micro-climate sensor network at an Institute of Higher Learning (IHL), it enables longitudinal measurement of micro-climate conditions for evidence-based sustainable campus planning.

The university is also steadily progressing towards its goal of planting 100,000 trees by FY2030. It planted 12,901 trees in FY2025, bringing the cumulative total to 68,122 trees.

Driving Decarbonisation at Scale

NUS is advancing its three-year Decarbonisation Plan (2025–2027), which aims to deliver about 11 kilotonnes carbon dioxide equivalent ($ktCO_2e$) in emissions reductions and move towards FY2019 baseline levels by FY2027.

As of FY2025, it has commenced projects contributing 7 $ktCO_2e$ of the targeted reductions under the Plan. FY2025 Scope 1 and 2 emissions were 120 $ktCO_2e$, compared to the baseline of 113 $ktCO_2e$ in FY2019 and 118 $ktCO_2e$ in FY2024.

This is despite a 6 per cent growth in campus gross floor area (GFA) since FY2019 and corresponding rise in energy demand due to growing research activities, professional and executive education offerings, student housing, and generative artificial intelligence computing needs. Emissions would have been higher without prior reduction efforts.

A key focus is the deployment of dynamic ventilation controls in laboratories — the first implementation of its kind in Singapore. By responding to real-time occupancy and air quality levels, these systems enable significant energy savings while maintaining safety. To be trialled in MD6 of the NUS Yong Loo Lin School of Medicine, this could achieve four times the energy savings of manually optimising fixed ventilation levels, representing a shift towards intelligent, demand-driven building management for energy intensive laboratories at IHLs.

Since NUS began tracking key energy-intensive laboratory buildings in FY2022, electricity consumption across these buildings has decreased by 4 gigawatt-hour (GWh) to 79GWh in FY2025, which translates to 1.6 $ktCO_2e$ in emissions reduction. This is driven by continued energy efficiency and optimisation efforts, particularly in ventilation management. Hostels also recorded a 1.7 GWh (or 0.7 $ktCO_2e$) reduction from FY2024 to FY2025, supported by initiatives such as setting higher minimum temperature setpoints.

Following its 10.2 megawatt-peak (MWp) campus-wide solar photovoltaic (PV) system implementation to date, the university is fast-tracking the second phase of deployment and studying alternative solar deployment solutions to maximise on-site capacity, targeting 12 MWp of installed capacity by FY2028 and 14 MWp by FY2030. This will generate 15 GWh of electricity, equivalent to powering over 3,500 HDB four-room flats for a year.

Beyond operational carbon, UCI completed a low-carbon construction materials study, leading to embodied carbon targets being set for new and renovated buildings.

Shaping a Culture of Sustainability

Recognising that infrastructure and technology alone are insufficient, NUS continues to deepen its focus on dialogue and behavioural change. Over the past year, efforts to shape a campus culture that is adaptive, resource conscious, and aligned with sustainability goals have expanded.

These include managing energy budgets alongside user acceptance of hybrid cooling in Yusof Ishak House, co-developing energy reduction plans with faculties, and driving takeaway disposables reduction through reuse campaigns in campus food courts and canteens. From its inception in August 2025 to March 2026, the reuse initiative achieved a 73 per cent adoption rate, signaling that reuse norms are taking root.

NUS is also deepening engagement with hostelites to inculcate waste sorting norms. Data from newly deployed Resource Sorting Stations will support efforts to improve the campus recycling rate, which currently stands at 21 per cent.

Further information on the university's Campus Sustainability 2030 framework and environmental performance can be found in its Environmental Disclosures.

Targets and Performance

Decarbonise

FY2030 Targets

30% ↓ in Scope 1 and Scope 2 emissions from FY2019 baseline (113 $ktCO_2e$)

Reduce Scope 1 and Scope 2 emissions towards FY2019 baseline by around FY2027

20% ↓ in Energy Use Intensity (EUI) from FY2019 baseline (195 kWh/m^2)

Embodied carbon of 500 $kgCO_2e/m^2$ for new buildings and <200 $kgCO_2e/m^2$ for renovated buildings, where feasible **[New]**

FY2025 Performance

120 $ktCO_2e$ Emissions in FY2025 (vs 118 $ktCO_2e$ in FY2024)

196 kWh/m^2 Energy Use Intensity (EUI) (vs 193 kWh/m^2 in FY2024)

While emissions increased marginally amid 1% growth in GFA, it is anticipated to plateau at baseline levels by FY2027 with the ongoing 3-year Decarbonisation Plan.

Completed a low-carbon construction materials study, leading to new embodied carbon targets being set for new and renovated buildings.

Achievements to Date

7 $ktCO_2e$ in emissions reductions through projects implemented from FY2021 – FY2024

7 $ktCO_2e$ (of 11 $ktCO_2e$ targeted) in emissions reductions underway through projects as part of the 3-year Decarbonisation Plan from FY2025 – FY2027

10.2 MWp of campus solar PV capacity commissioned*

* 84% of campus solar energy is used to generate Renewable Energy Certificates and is not counted towards emission reduction efforts.

Defend Against Climate Change

FY2030 Targets

Develop a long-term mitigation plan to address outdoor thermal comfort using insights from the CoolNUS-BEAM initiative

100,000 trees to be planted by FY2030

FY2025 Performance

The refreshed Kent Ridge Masterplan incorporates climate-responsive planning (e.g., Kent Green), using data from the campus micro-climate sensor network.

12,901 trees planted in FY2025

Achievements to Date

68,122 trees planted since 2018, including reforestation of Lower Kent Ridge Road

60% campus tree canopy coverage

Dematerialise

FY2030 Targets

50% recycling rate achieved through waste sorting and reusing norms

30% ↓ in daily waste disposed per capita from FY2021 baseline level (0.14 kg/day/capita)

Close plastic and food waste loops

FY2025 Performance

21% Campus recycling rate (vs 19% in FY2024)

0.20 kg Daily waste disposed per capita (vs 0.22 kg in FY2024)

The increased recycling rate was driven by sustained clean stream recycling, increased food waste recycling, and a strengthening reuse norm on campus.

Achievements to Date

73% reuse rate at campus drink stalls through a 7-month Bring-Your-Own campaign

15 Data-enabled Resource Sorting Stations deployed across hostels

Closed plastic waste loop with polyethylene terephthalate (PET) recycling and established spoke-hub for food waste recycling

Wind Corridors for a Climate-Resilient Campus

Students and staff at the Engineering precinct can look forward to a new green space beyond 2030. Called Kent Green, it is designed to improve thermal comfort. The open green and tree-lined boulevard will channel prevailing natural wind and provide shade, offering a breezy walk from the redeveloped Raffles Hall to neighbouring amenities and buildings.

Kent Green is part of the UCI's strategy on climate-responsive design. This includes drawing in sea breezes and leveraging the monsoon seasons to establish wind corridors — unblocked paths that allow air to flow through. The approach was applied previously on campus at UTown Green and Frontier's Academic Green, where green lungs were created based on local terrain and microclimate conditions.

In response to changing climate realities, Singapore has designated 2026 the Year of Climate Adaptation. Harnessing winds is one such adaptation effort by NUS, which is also planning for more naturally ventilated spaces in buildings that will minimise the need for cooling systems, and save energy and costs.

The strategy is grounded in data. For Kent Green, weather stations that form part of the university's micro-climate sensor network capture prevailing wind patterns in the Engineering precinct. Project consultants will tap this data for more accurate wind simulations instead of relying on general assumptions to optimise the design of wind corridors.

Singapore has been warming at a rate of 0.24 deg C per decade over the last 40 years. On campus, the average daytime temperature rose by 0.42 deg C between 2020 and 2025. By harnessing winds, NUS aims to build a climate-resilient campus as global warming speeds up.

University Town is an example of climate-responsive design, with the precinct planned around wind corridors that channel airflow through its spaces, including the open area known as UTown Green (pictured).

Fume hoods are the single greatest driver of laboratory ventilation demands. UCI is working towards implementing Singapore's first laboratory with dynamic ventilation to improve energy efficiency.

Delivering Smart and Sustainable Ventilation for Laboratories

In 2028, researchers at MD6 of the NUS Yong Loo Lin School of Medicine will work in Singapore's first laboratory with a dynamic ventilation control system. Instead of operating on a fixed schedule regardless of conditions in the room, airflow rates will automatically be reduced when the air quality is at safe levels or when the room is unoccupied.

It will also ramp up when needed, especially when concentrations of airborne chemicals and pollutants rise. This safeguards researchers' safety, well-being, and productivity, while reaping around 15 per cent in energy savings for the building.

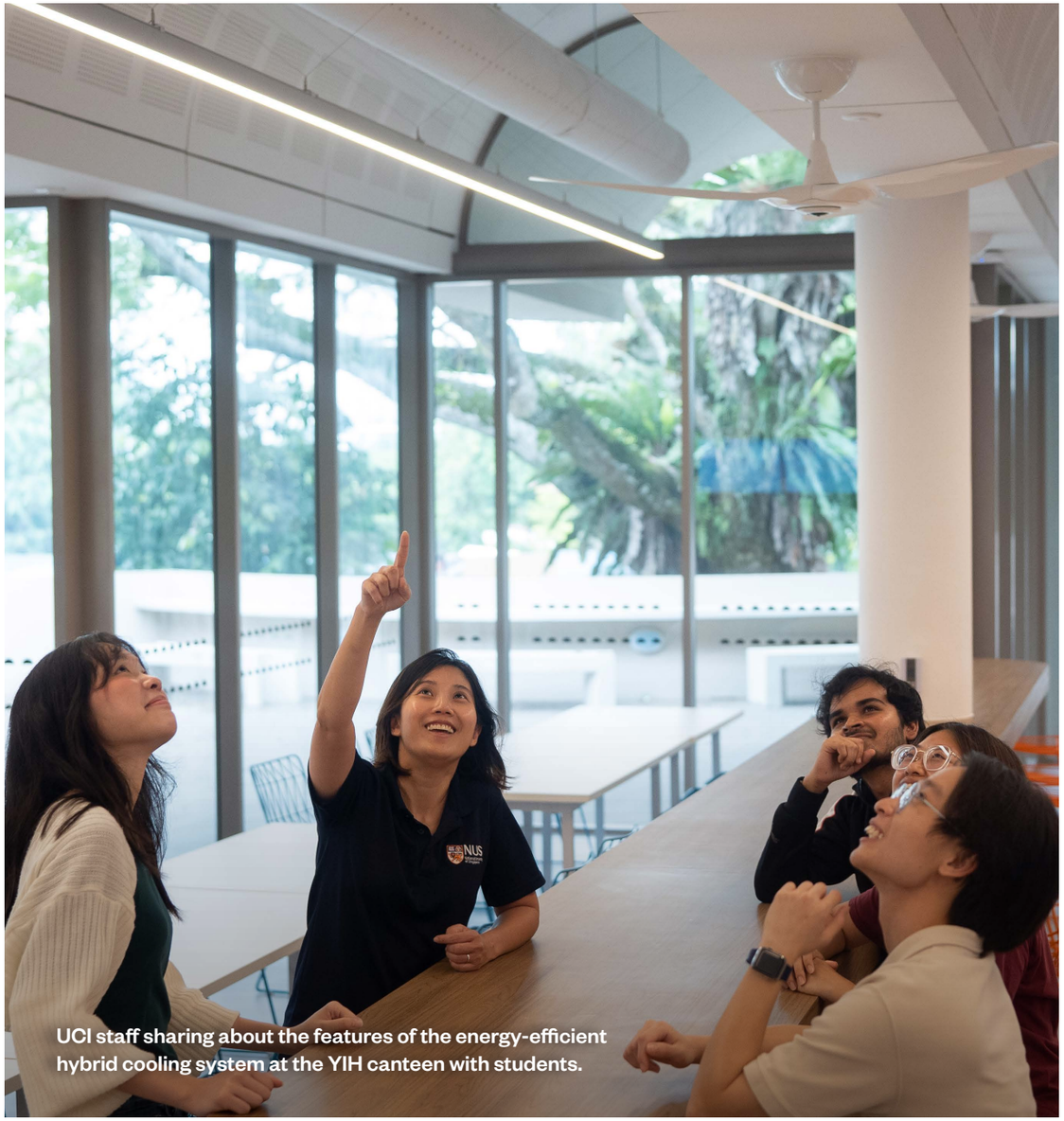
To achieve this, UCI completed an energy modelling study in 2025 to determine the optimal base ventilation levels for laboratories. This will be applied in a trial to a laboratory at MD6. To allow the system to dynamically control ventilation levels, NUS will be installing a variety of sensors. These will monitor occupancy, air quality, and volatile organic compounds to deliver ventilation in real time, based on how much is needed and when.

When fully implemented across MD6 between 2028 and 2029, this dynamic optimisation will enable MD6 to exceed its 20 per cent energy reduction target — it has achieved 12 per cent of energy reduction to-date. This technology will save 4.5 gigawatt-hour (GWh) of electricity yearly, equivalent to powering 1,060 four-room HDB flats for a year. This is also four times the energy savings that was previously achieved through manual optimisation of fixed ventilation levels. If successful, this dynamic ventilation system will be applied to new laboratory buildings in NUS in the push for best-in-class energy efficiency.

Similar dynamic ventilation systems are already in use at other settings on campus, such as lecture theatres and seminar rooms, following a successful pilot in 2025.

Energy-efficient indoor ventilation systems are key for decarbonisation, as they are usually one of the largest energy guzzlers in research intensive buildings — some can account for 50 per cent to 70 per cent of energy use.

But as such systems gain traction, users will need to adapt to indoor environments with dynamic cooling. For example, a space may take a few minutes to cool to a comfortable level when the occupancy sensor is triggered. Accepting this is an important shift towards the long-term success of operating sustainable buildings.



UCI staff sharing about the features of the energy-efficient hybrid cooling system at the YIH canteen with students.

Embedding Sustainable Practices into Campus Life

Across campus, NUS is advancing building designs and operational systems that reduce energy and material use while maintaining functional spaces. At Yusof Ishak House (YIH), a hybrid cooling system is combined with naturally ventilated common areas and surrounding greenery to enhance thermal comfort, while reducing reliance on full air-conditioning.

These design features are paired with behavioural nudges and community engagement to bring sustainable practices into campus life. An accessible reuse scheme at the canteens, for instance, makes it easier for students and staff to choose reusable options. Together, they demonstrate how infrastructure and human behaviour must work in tandem — embedding sustainability into campus life and fostering a campus culture where low-impact choices become the norm.

Prior to its revamp in 2022, YIH's annual electricity consumption was approximately 2.2 gigawatt-hour (GWh). In FY2025, YIH recorded an energy consumption of 1.3 GWh — a 41 per cent reduction from before the building's adaptive retrofit. This is equivalent to the annual energy consumption of 209 four-room HDB flats.

These energy savings have been achieved while balancing occupant comfort. A thermal comfort survey conducted found that 73 per cent of building occupants were satisfied with the thermal environment at the YIH canteen.

In parallel, a scheme to encourage the adoption of reusables has supported more resource-conscious practices. The YIH canteen's support of the Bring-Your-Own campaign — through a 30-cent discount for reusable drinkware and a 20-cent charge for disposable cups — has led to a reuse rate of 54 per cent, approaching the campus average of 73 per cent.

Looking ahead, these principles will guide both new developments and the adaptive retrofit of existing buildings on campus, with future projects designed to deliver energy efficiency while actively shaping user behaviour. In the coming year, NUS will launch a programme aimed at hostelites to encourage resource conservation behaviours.

Mobilising Momentum

LEADERSHIP

Leading Change in Sustainability

Across its community, NUS is advancing sustainability through leadership — shaping mindsets, influencing systems, and inspiring action.

At the forefront are individuals like Associate Professor Simon Tay, whose work bridges academia and policy, demonstrating how thought leadership can translate into real-world impact, from regional environmental cooperation to classroom learning.

This spirit extends to students Nadya Heryanto and Ivan Neo, young changemakers recognised for their leadership in driving sustainability initiatives and engaging the wider community, and a growing ecosystem of environmental student groups tackling climate challenges from multiple angles, from data-driven analysis to hands-on conservation and sustainable finance.

The university's flagship environmental festival, NUS Sustainability CONNECT, also ran its third edition, organising close to 40 events over four weeks — including panels, symposiums, and tours. Most of the events were oversubscribed, and involved 32 partners including new participants such as NUS Libraries, NUS College, the SingHealth Duke-NUS Global Health Institute, and the Lee Kong Chian Natural History Museum.

Beyond campus, NUS is shaping national and global agendas. Its role in Singapore's first comprehensive healthcare emissions assessment shows how academic expertise can inform policy and enable system-wide transformation, while offering a model for other countries.

The university also convenes global thought leaders through platforms like its Distinguished Speaker series, bringing leading experts to challenge and inspire its community, and reinforcing its role as a hub for climate dialogue and action.

Together, these stories reflect how NUS is cultivating leadership that will shape a more sustainable future.

Assoc Prof Simon Tay: Champion for the Environment

When haze shrouded Singapore in the 1990s, Associate Law Professor Simon Tay knew something had to be done. It was a problem that had emerged in the 1970s and was progressively worsening.

In 1998, he made his first bold step, mooting the first parliamentary motion on transboundary haze as a Nominated Member of Parliament. That same year, he also chaired the inaugural regional dialogue on the cross-border crisis with Indonesian and Malaysian experts.

Since then, he has become a leading haze expert. As Chairman of the National Environment Agency from 2002 to 2008 and current Chairman of the Singapore Institute of International Affairs (SIIA), he played an instrumental role in addressing transboundary haze pollution and building regional collaborations that have created significant impact both locally and in the region.

He has written extensively on the problem in academic publications and even travelled with colleagues at SIIA and NUS to Riau province, one of the most fire prone areas in Indonesia, to see how communities and companies cope with the fire issue first-hand.

For his contributions to the country, he was awarded the prestigious President's Award for the Environment (PAE) on 2 October 2025, the highest environmental accolade in Singapore.

The PAE is organised by the Ministry of Sustainability and the Environment, and is conferred biennially upon individuals, organisations, and education institutions to honour the sustained contributions by environmental champions.

Assoc Prof Tay graduated from the Faculty of Law in 1986, before joining it in 1995. His contributions to the school include pioneering the course on International Environmental Law, which he continues to teach today. He also regularly appears on news platforms such as Bloomberg and BBC, and publishes commentaries in leading newspapers and academic journals.

Assoc Prof Tay received the President's Award for the Environment 2025. (Source: Ministry for Sustainability and the Environment)

"I believe in the importance of praxis linking practice and theory, academic knowledge to how things are and could be. The practicality of trying to address the haze and other issues also broadens my understanding of how law interacts with politics, economic policy, markets and society. I hope I have brought those experiences and perspectives into the classroom for my students and gone beyond textbook answers."

Associate Professor Simon Tay
NUS Faculty of Law

Eco-warriors Win Awards for Spreading Green Message

Saving the environment sometimes involves getting your hands dirty. Just ask conservation researcher Ivan Neo, an environmental studies graduate from NUS.

The 25-year-old runs public engagement initiatives like nature walks through social enterprises and student groups, where he explores green spaces to highlight less charismatic species and native habitats for participants, often capturing them on camera. He then showcases these rare sightings on his Instagram account, @neo.wildlife, and publishes species records in scientific journals to raise awareness of lesser-known species in Singapore.

Meanwhile, final-year accounting student Nadya Heryanto works to spread the green message on campus. She led both NUS SAVE (Students' Association for Visions of the Earth), a campus-wide environmental group, and Green CAPTains, which promotes sustainable practices at the College of Alice & Peter Tan (CAPT), her residential college.

For their efforts, the two eco-warriors were recognised at the 2026 HSBC NYAA Youth Environmental Awards. The initiative, supported by the National Youth Achievement Award (NYAA) Council, returned after an eight-year hiatus, and celebrates the contributions of youth leaders to environmental conservation.

Nadya, who won the HSBC NYAA Youth Environmental Award, has spearheaded campus initiatives, including reviving the NUS SAVE Sustainability Fund, which had been dormant for the past few years, and developing a new standard operating procedure for overall fund governance and disbursement, thereby enabling support for ground-up green initiatives around NUS.

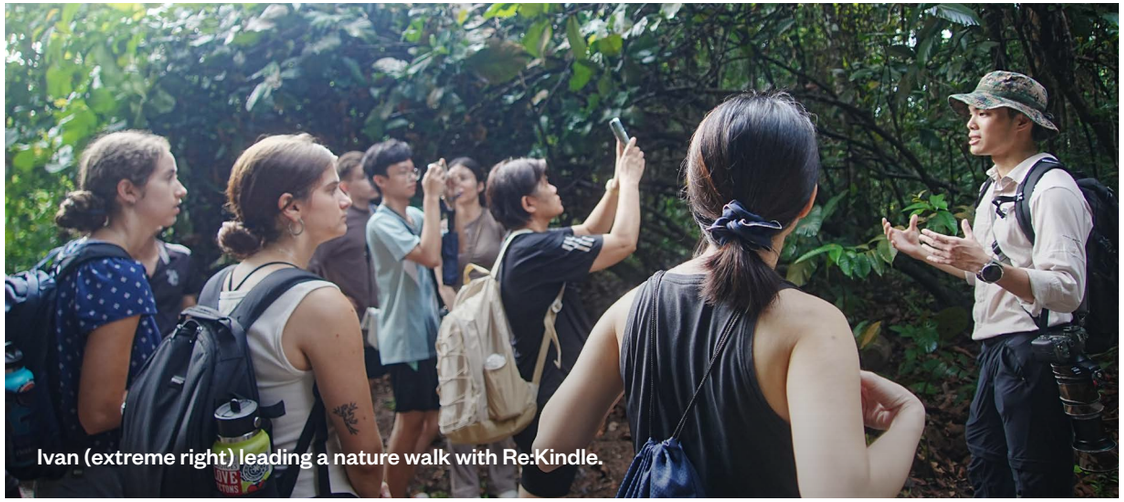
She also set up bins with vermicompost — a nutrient-rich organic fertiliser produced by earthworms — to manage food waste at CAPT. The 22-year-old also holds globally recognised credentials in environmental, social, and governance analysis and investing, which she believes will be transferable in any sector, even beyond sustainability.

Environmental preservation is more than just muddy work — to her, environmental awareness extends beyond a niche field and becomes embedded in everything, from daily life to broader industries like finance and engineering.

"Sustainability is like a side dish," she said. "I want people to understand that it shouldn't be a thing on its own. It's connected to everything we do."

This was also what motivated Ivan, who received the Merit Prize, to co-found Re:Kindle in 2024. The social enterprise focused on delivering nature experiences to less privileged groups, organising nature walks and outdoor experiences that blend ecological education with mental wellness. By making nature walks and experiences more accessible and affordable, Ivan aims to inspire a deeper appreciation of nature in Singaporeans.

Nadya (fourth from left) overseeing an event in support of World Water Day 2025. (Source: PUB)


Ivan (extreme right) leading a nature walk with Re:Kindle.

Student Environmental Groups Grow in Strength

NUS Seafarers on a trip to Ketam Island, located next to Pulau Ubin.

From ploughing through environmental data to cleaning up the seas, three new environmental student groups emerged this year, each tackling the climate challenge from a unique angle. There are currently over 20 such groups in NUS.

In a world of complex green claims, the NUS Climate Analytics and Technology (CAT) Club is dedicated to scrutinising the data behind everyday choices and large-scale solutions. Founded in October 2025, it organises webinars, life cycle assessment bootcamps, visits to cutting-edge facilities, and engagements with climate technology firms. Through these, the club empowers its community to separate fact from fiction and build solutions on a foundation of robust science.

> "NUS CAT strongly believes that sustainability impact and strategy should be justified with science without qualitative vague claims. Our events are open to all disciplines as we aim to conduct technical sharing in layman's terms."
>
> **Ratana Lok**
> Co-founder of NUS CAT Club

Meanwhile, NUS Seafarers takes students to the sea. Since June 2025, the club has not only been teaching students to sail, but also helping them discover the ocean's fragility through direct experience with it. Witnessing plastic pollution and shifting weather patterns firsthand fuels their commitment to protecting the seas. In 2025, the club conducted two coastal cleanups at Ketam Island, located next to Pulau Ubin. It plans to run similar cleanups once every semester, along with workshops that cover topics like upcycling old sails.

Lastly, bridging the gap between capital and climate action is the NUS Sustainable Finance Club (NUSSFC). Founded in 2024 by students from political science and finance, the club fosters an interdisciplinary dialogue where finance meets environmental policy, focusing on research, industry engagement, and investment themes to drive impact. In 2025, it hosted an impact investing seminar with student group 1.5degreeNUS, and fireside chats with industry leaders.

"At NUSSFC, we believe that the future of finance should achieve triple bottom line results: financial return, social impact, and environmental impact," said Karen Lie, co-president of NUSSFC.

The group aims to channel investments towards sustainable and impactful ventures through official registration soon.

When it comes to sustainability, student-led ingenuity plays an important role at NUS in advancing the movement.

The NUS-MOH study is the first-ever comprehensive national emissions report for Singapore's healthcare sector.

NUS Helps Drive Singapore's First National Healthcare Emissions Assessment

The Centre for Sustainable Medicine (CoSM) at NUS' Yong Loo Lin School of Medicine played a key role in conducting Singapore's first comprehensive healthcare emissions assessment published by Singapore's Ministry of Health (MOH).

The NUS-MOH study marked a significant milestone for Southeast Asia. It revealed that the Republic's healthcare system performed 18 per cent better than previously estimated, delivering world-class care at 20 per cent lower carbon intensity, compared to other advanced economies.

The assessment puts Singapore's healthcare carbon footprint at 4.1 million tonnes of carbon dioxide equivalent annually, around the same as powering all 1.4 million households in Singapore for over a year.

> "With data and contributions ranging from every hospital and every cluster through to national procurement and emergency services, the study's system-wide approach enables a whole-of-healthcare response to the health emergency of climate change."
>
> **Professor Nick Watts**
> Director of CoSM, who led the research and modelling

The report drew on data from across Singapore's entire healthcare system, representing a year-long collaborative effort involving MOH, MOH Holdings, and its subsidiaries including NHG Health, National University Health System, Singapore Health Services, and the Agency for Logistics and Procurement Services.

Launched at the inaugural Western Pacific Action Forum on Climate-Resilient and Sustainable Health Systems by Senior Minister of State Tan Kiat How on 17 August 2025, the report supports Singapore's commitment to achieve net-zero emissions by 2050.

By mapping its entire healthcare carbon footprint, Singapore joins countries such as Australia, France, and the United Kingdom in advancing sustainable medicine. The methodology provides a replicable framework for other countries seeking to understand and reduce their healthcare emissions.

CoSM's impact also extends internationally through its role in developing guidance on health system carbon baselining via the Greenhouse Gas Protocol, and in leading the 2025 United Nations Climate Change Conference (COP30) Special Report on Health and Climate Change, a core component of the Belém Health Action Plan.

Nobel laureate and former US Secretary of Energy Professor Steven Chu speaking during his NUS120 Distinguished Speaker Series lecture.

NUS Invites World's Leading Climate Experts to Share Insights

For individuals to become active contributors to climate action, they must first understand the gravity of the crisis and be empowered with the knowledge to tackle it. And who better to learn from and be inspired by than the world's leading scientists.

In celebration of NUS' 120th anniversary in 2025, the university started the NUS120 Distinguished Speaker series. Among its line-up of renowned academics were leading Swedish scientist Professor Johan Rockström and Nobel laureate Professor Steven Chu.

At his lecture to over 650 attendees, Prof Rockström, the pioneering director of the Potsdam Institute for Climate Impact Research, revealed that seven of the planet's nine critical life-support systems have been breached. This, he warned, pushes the planet into a danger zone where even a complete phase-out of fossil fuels might not be enough to meet climate targets.

But it is not all doom and gloom. Prof Rockström pinpointed a path back to safety through the rapid transformation of global energy and food systems, a vision he is now advancing through a new research partnership between his institute and NUS.

Building on Prof Rockström's sobering reminder, Prof Chu, a 1997 Nobel Prize laureate in physics and former US Secretary of Energy, framed the crisis with a different analogy. In a separate lecture, he likened humanity's current trajectory to the Titanic heading for an iceberg, warning that global emissions have not yet slowed. He detailed the "baked-in" warming from ocean heat and the looming threat of hundreds of millions of climate refugees by 2050.

Yet, his lecture was equally focused on the technological solutions available, from China's massive wind turbines to California's grid-scale batteries and next-generation small nuclear reactors. He urged the audience, including students and leaders, to embrace bold scientific exploration to discover breakthroughs like the nitrogen-fixing microbes his Stanford lab is developing.

The lectures underscored NUS' role in advancing sustainability by serving as a platform for the world's leading climate experts to share their insights.

Climate scientist Johan Rockström with NUS Vice President (Sustainability and Resilience) Professor Koh Lian Pin during a discussion as part of the NUS120 Distinguished Speaker Series.

Looking Ahead

As climate change accelerates, adaptation is becoming as important as mitigation. Singapore's designation of 2026 as the Year of Climate Adaptation reflects the growing need to strengthen resilience across cities, infrastructure, ecosystems, and communities.

Across NUS, researchers are contributing to the movement by developing solutions to address rising temperatures, coastal vulnerability, biodiversity loss, and the increasing frequency of extreme weather events.

Through initiatives such as Integrative Urban Solutions, researchers examine how climate change, urban planning, and economic disparities impact population health, while projects under Initiatives for Climate, Oceans and Nature are improving understanding of ecosystems and nature-based solutions that can help communities adapt to a changing climate.

Looking ahead, sustainability will continue to be a key pillar under Singapore's Research, Innovation and Enterprise 2030 plan. NUS will play an active role in supporting the nation's sustainability ambitions through its involvement in major national research initiatives.

They include the Climate and Weather Research Alliance Singapore, which aims to advance tropical climate and weather research through next-generation climate models for instance, as well as the National Institute for Marine and Ocean Sciences (NIMOS). Led by the National Parks Board and NUS, NIMOS will consolidate capabilities to accelerate the growth of the marine science ecosystem, grow local capabilities in marine science, and support regional collaboration through shared data and marine health assessments across Southeast Asia.

By advancing knowledge, nurturing talent, and developing innovations, NUS remains committed to forging a more sustainable, resilient, and climate-ready future for Singapore and the region.

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sustainability.nus.edu.sg/report

Editorial & design
The Nutgraf

Published by
Sustainability & Resilience Unit
Office of the Deputy President
(Research and Technology)

With contributions from
Sustainability Strategy Unit
University Campus Infrastructure

21 Lower Kent Ridge Road
Singapore 119077

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