# KING MONGKUT'S UNIVERSITY OF TECHNOLOGY NORTH BANGKOK

# SUSTAINABILITY REPORT

## 2022-2023

Invention to Innovation for a Sustainability World

# TABLE OF CONTENTS

# TABLE OF CONTENTS

# MESSAGE FROM THE KMUTNB PRESIDENT

At King Mongkut's University of Technology North Bangkok (KMUTNB), we firmly believe that our role extends beyond academic excellence and must also be stewards of our planet. Sustainability is a fundamental value that guides our actions and decisions. Here, I would like to take a moment to emphasize our unwavering KMUTNB commitment to sustainability.

We are immensely proud of the strides we have made in our sustainability efforts. This achievement has placed KMUTNB to be ranked in THE impact university ranking since 2020. Since sustainability is not merely a concept, it is a core value that defines our commitment to both our immediate community and the broader global landscape. We recognize that our actions today profoundly impact the world we leave for future generations. It is with this profound understanding that we take significant steps towards a more sustainable and responsible future. In the coming year, we will intensify our sustainability initiatives. We will focus on Carbon Neutrality, Education and Awareness, Research and Innovation, Community Engagement and Diversity and Inclusion.

I invite each one of you to join us in this vital journey towards a more sustainable future. Together, please remember that sustainability is not a choice but is an imperative. Our decisions today will shape the world of tomorrow. As members of the KMUTNB community, let us be the change-makers, the innovators, and the leaders who leave a lasting legacy of sustainability. Thank you for your commitment to this critical cause. Together, we can create a brighter, greener, and more sustainable future for all.

Prof. Dr. -Ing. habil. Suchart Siengchin

KMUTNB President

# ABOUT KMUTNB

Since its establishment in 1959, King Mongkut's University of Technology North Bangkok has grown from a small and single campus to a leading national university of technology, with more than 30,000 students across three campuses located in Bangkok, Prachinburi and Rayong province. Founded by the collaboration between the German Government and the Royal Thai Government, KMUTNB has adopted the German model of education, which emphasizes on hands-on and practical experience. KMUTNB offers 185 Thai and English programs in certificate, undergraduate, graduate and doctorate levels. More than six decades, the university has succeeded to develop career-ready and highly skilled graduates who are both knowledgeable, experienced and well prepared for rapidly changing workforce needs. We endeavor to foster excellent teaching and researches that address the community's significant challenges and tackle pressing issues in society. Integrating into our communities and industries, we work with them to enhances the quality of life and build better society.

In 2022, KMUTNB climbed in to the world university ranking, which reflects that we are internationally recognized as one of the Thailand's top ten leading university. This reflects the university's success to make difference through outstanding and innovative research with global and real-world impact. Locally focused, our university contribute to drive Thailand's economic growth and help the nation to transition in an era of technological disruption. Globally engaged, we have a wide network of international academic partners and formal agreements with universities in China, Japan, South Korea, Singapore, Malaysia, The Philippines, Indonesia, South Africa, Germany, France, Denmark, Sweden, U.K., U.S.A. and etc. KMUTNB always welcome and seek opportunities to collaborate with new academic partners.
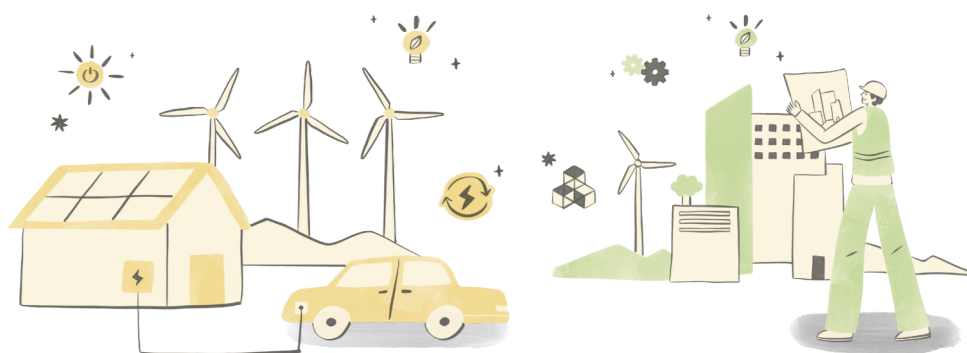
# KMUTNB POLICY ON SUSTAINABILITY

The nature and environment play an important part of learning process; whereas "universities" become one of the most essential sources of learning opportunities. The natural surroundings and environment play a significant role in the learning process, providing ample resources to create a nourishing educational setting. Universities are recognized for their pivotal role in nurturing graduates with the necessary knowledge and skills. Clearly, fostering a conducive and constructive learning atmosphere is essential for the entire educational journey. Being aware of environmental sustainability, conservation and sustainable use of natural resources, KMUTNB has constantly promoted education for sustainable development through research opportunities, sustainability-related courses, curriculums and activities. The practices aim to raise environmental awareness in staff and students, thus instilling personal responsibility of an individual in conservation and preservation of natural resources.

Since 2011 KMUTNB has been committed to transforming KMUTNB into a green and sustainable campus. The concept leads to KMUTNB's integrated sustainability strategy, which lays emphasis on the 4Es (Environment, Economic, Equity and Education aspects). KMUTNB is a member of Sustainable University Network of Thailand, which supports the UN's Sustainable Development Goals. In collaboration with public-private community partnership including Bangsue District Office, Bangkok, Thailand and local community groups e.g. Nonthaburi, Prachinburi and Rayong, KMUTNB has organized various green activities for the promotion of local and global environmental conservation. KMUTNB received funding assistance from the Department of Alternative Energy Development and Efficiency, Ministry of Energy. The main goal of the support is to reform equipment for effective management of campus energy consumption and energy saving. In addition, KMUTNB Rayong has issued a master plan that incorporate sustainability of the environment and to render KMUTNB an outstanding, green institution. As a result, agencies showed interest and paid a visit to KMUTNB Rayong Campus to examine its operations of environmental sustainability. Later on, KMUTNB Rayong was assigned by the Sustainable University Network of Thailand to host the 2018 meeting of the roaming working group.

# KMUTNB POLICY ON SUSTAINABILITY

KMUTNB has aimed to engage in "Sustainable Development Goal (SDG)" due to our awareness as global citizen to the global warming situation. This target co-aligns with the National policy of Thailand to the international actions leading by United Nations during 26th Conference of the Parties (COP26) meeting to achieve the 17 SDGs. To become a driving player and motivator to society to achieve the sustainable goal, KMUTNB set up for vision, mission, policy and strategy for SDGs in 2019 to integrate our activities in academic, research, academic service and community engagement.

## KMUTNB SUSTAINABLE VISION:

KMUTNB is a leading university in invention and innovation for sustainable society

## KMUTNB SUSTAINABLE MISSION:

- Raise awareness and cultivating knowledge about SDG to university staffs and students, and extending to communities in local, regional, national and international level
- Integrate academic, research and academic service activities to sustainable innovation
- Utilize university and society resources in effective manner to minimize the negative impact to environment and community

# KMUTNB POLICY ON SUSTAINABILITY

## KMUTNB SUSTAINABLE POLICY:

1. Corporate governance and Social responsibility

KMUTNB maintain rigorous ethical standards, transparent financial practices, and a diverse, inclusive workplace. We strive for sustainability, engage with local communities, and hold our suppliers to high ethical standards. Compliance with laws and regulations is non-negotiable, and we regularly report on our performance to ensure accountability. We recognize the dynamic nature of these responsibilities and are dedicated to continuous improvement, aligning our practices with evolving best standards to positively impact society.

2. Human right and Personnel Health and Wellness

KMUTNB hold human rights and the well-being of our academic and administrative staffs and students in the highest regard. We are committed to upholding the fundamental principles of human rights in all aspects of our operations, respecting the dignity, equality, and freedom of every individual. We provide a safe and healthy work environment, prioritizing the physical and mental well-being of our employees. Our policies and practices are designed to foster an inclusive, respectful, and supportive workplace that values diversity, prohibits discrimination, and encourages a work-life balance.

3. Environment sustainability

KMUTNB recognize the critical importance of protecting our planet's resources and mitigating environmental impacts. Our motivation strives to minimize its carbon emission, reduce waste, and conserve natural resources. We adhere to environmentally responsible practices in our operations, from sourcing materials to energy-efficient processes. Additionally, we invest in eco-friendly technologies and encourage our employees to contribute to our sustainability efforts. We continuously monitor and improve our environmental practices to uphold our responsibility to future generations and the global environment.

4. Diversity and equality

KMUTNB are committed to fostering an inclusive environment where every individual is valued, respected, and provided with equal opportunities, regardless of their race, gender, age, religion, sexual orientation, disability, or background. We actively promote diversity in recruitment, career development, and leadership positions, recognizing that a diverse workforce leads to innovation and better decision-making. We have zero tolerance for discrimination, harassment, or bias of any kind.

# KMUTNB AND THE SDGS

# SDG1 NO POVERTY

This goal serves as a compass for KMUTNB commitment to addressing one of the most pressing global challenges: poverty eradication. Our approaches to SDG 1 revolves around three pillars: education, research, and community engagement. KMUTNB is dedicated to providing affordable, quality education and scholarships to underprivileged students. Through financial assistance programs and mentorship initiatives, we empower economically disadvantaged individuals to access education and break the cycle of poverty.

During 2021-2022, KMUTNB provided financial aid to students who specially has low income, in the various ways e.g. financial aid, student dorm, and scholarship for Thai students and international students (especially from lower-middle income countries like Laos, Burma, Nepal, Pakistan). We counterpart with many partners from business sectors, NGOs, International institutes and Thai government provided the scholarships to students, such as DAAD, Bangchak, Her Royal Highness Princess Maha Chakri Sirindhorn Projects.



Her Royal Highness Princess Maha Chakri Sirindhorn Scholarship Projects.

Our faculties have collaborations with KMUTNB alumni to set up the scholarship to students with lower income with good study performance. These scholarships support either tuition fee or allowance, or both. Furthermore, temporary job position for bachelor and graduate students are available in various sectors in university such as research unit, research laboratory, and university administrative to alleviate the financial scarcity of lower income students.

KMUTNB partners with Department of Treasury to set up low-interest loaning to low income students to achieve support both tuition fee, housing and allowance. We also have flea market once a week to allow students and staffs to rent and set up the booth for selling their products to get more income. KMUTNB Co-op set up the program for low-interest loaning for housing finance to and emergency loaning KMUTNB staffs as a channel to alleviate the finance burden to our people.

# SDG1 NO POVERTY



Scholarship from various faculties in KMUTNB



Various types of loans for students and staffs

These efforts contribute to evidence-based approaches for poverty reduction both locally and globally. KMUTNB partner with local communities to develop sustainable livelihood programs, vocational training, and micro-business support. By engaging directly with impoverished communities, we aim to create opportunities for economic self-sufficiency. Through these initiatives, we believe that education and research can be powerful tools to lift individuals and communities out of poverty, providing hope and pathways to a better future. While challenges remain, we remain committed to SDG 1 and will continue to work tirelessly to ensure that no one is left behind in our pursuit of a more equitable and poverty-free world. By addressing the root causes of poverty and promoting sustainable development, we move closer to realizing the vision of SDG 1.

# SDG2 ZERO HUNGER

This critical goal aligns with KMUTNB mission to address global food security and promote sustainable agricultural practices. Our commitment to SDG 2 is reflected in various approaches. KMUTNB researchers and students are at the forefront of agricultural innovation. Through sustainable farming techniques, crop improvement, and agroecological research, we are developing solutions to enhance food production and reduce food waste. KMUTNB collaborates with local communities to establish community gardens, educational programs, and sustainable farming initiatives. These partnerships empower communities to grow their food and improve access to nutritious, locally sourced products. We integrate food sustainability and nutrition into our curriculum, ensuring that our students are well-versed in the complexities of global food systems and the importance of reducing food insecurity. Advocacy for Hunger Relief: KMUTNB university actively advocates for policies that address food insecurity and support the most vulnerable populations. We engage with governmental bodies and non-governmental organizations to promote food justice and equitable access to nutrition.

KMUTNB faculties have collaborations with KMUTNB alumni to support the scholarship to students with lower income with good study performance for their tuition fee or allowance, or both. Furthermore, temporary job positions for bachelor and graduate students are available in various sectors in university such as research unit, research laboratory, and university administrative to alleviate the financial scarcity of lower income students.

In all campuses, we have low-price food shop to support students and staffs. The giveaway food banks are placed in the campus to provide free foods for our people. We also respect variety of dietary preferences of all students and staffs, therefore we have quota slots for vegetarian and vegan food and halal food shops.

Scholarship for students and job position availability

# SDG2 ZERO HUNGER



Halal food shops in KMUTNB and project to sharing foods to students

Furthermore, KMUTNB have campaigns to donate foods and supplies to various places, such as Bang ka pom school at Samutsongkram province with supports from President bakery Co. Ltd. and Thai President Food Co. Ltd.

To support the communities of KMUTNB to achieve the goals of food security and sustainable agriculture, KMUTNB collaborates with various local and regional farmers, to improve their production and marketing. Agritech and Innovation Center (AIC) (https://www.facebook.com/AICNONTHABURI/) is established in KMUTNB to collaborate to farmer Co-op in Nonthaburi province provide technical service such as analyze properties of agricultural products and chemical residues in the products before selling in the markets. Also series of seminars and workshops both online and on site, both non-degree and certificates are provided to students, staffs, business and farmers with paid or free courses.



Campaigns to donate foods and supplies to various places



Series of seminars and workshops are provided to students, staffs, business and farmers

# SDG2 ZERO HUNGER

While challenges persist in achieving zero hunger, KMUTNB remains dedicated to contributing to this critical global agenda. By advancing research, fostering community engagement, and educating the next generation of leaders, we are committed to a world where no one goes to bed hungry, as envisioned by SDG 2. Together, we work toward a future where food security is a universal reality.

# SDG 3 GOOD HEALTH AND WELL-BEING

KMUTNB commitment to SDG3 reflects our dedication to the promotion of health, well-being, and equitable access to healthcare. As we work towards SDG 3, KMUTNB is committed to the vision of good health and well-being for all. While health disparities persist, our resolve to reduce them remains unwavering. We aim to contribute to a world where every individual can enjoy good health and well-being. We are driving progress in the realm of SDG 3 through several strategic initiatives. Although KMUTNB does not have medical faculty, we have science and engineering focus on medical instruments and engineering. Our medical-related programs prioritize comprehensive education, equipping professionals with the knowledge and skills needed to address health disparities and provide quality healthcare. We collaborate with local healthcare facilities, various NGOs, and governmental agencies to enhance community health projects. Our aim is to improve healthcare access, provide preventative services, and facilitate health education. Recognizing the importance of mental health, we promote mental well-being through awareness campaigns and support services for our students and local communities.

Our first priority to achieve this goal, KMUTNB announced and implement our campus to be a smoke-free campus and this guideline is included in student's handbook. To progressively promote health of our people, we have free-access gyms, football fields, tracks, and other sport facilities to students, staffs, and communities. We hold various campaign to attract our people to have more exercise, such as marathon campaign, triathlon, and all incomes we received from these campaigns were donated to health centers of KMUTNB local communities.
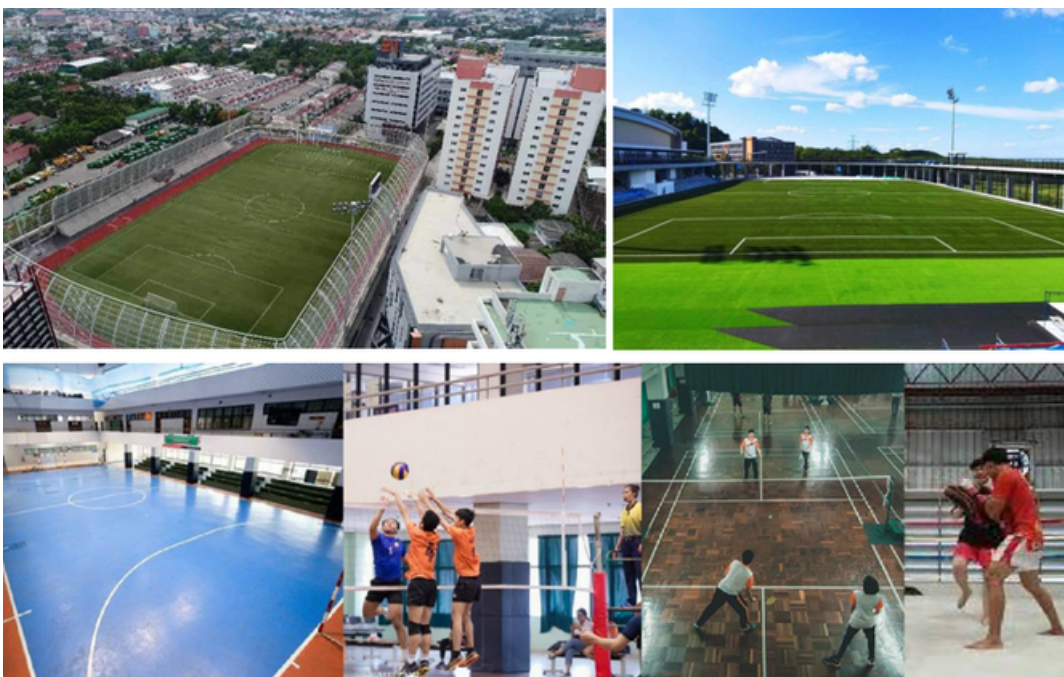


Sport facilities in KMUTNB campuses

# SDG 3 GOOD HEALTH AND WELL-BEING

All campuses in KMUTNB have medical centers to provide health services to all students and staffs. Medical doctors and nurses are on services everyday, and specialist, such as psychiatry and consultant for reproductive system are available on appointments. Telemedicine and online consultant are available for free. Emergency vans are on service in campus 24/7. KMUTNB also provide free health accident insurance to all staffs and partially support health insurances for students and staffs.



Student sport clubs and activities
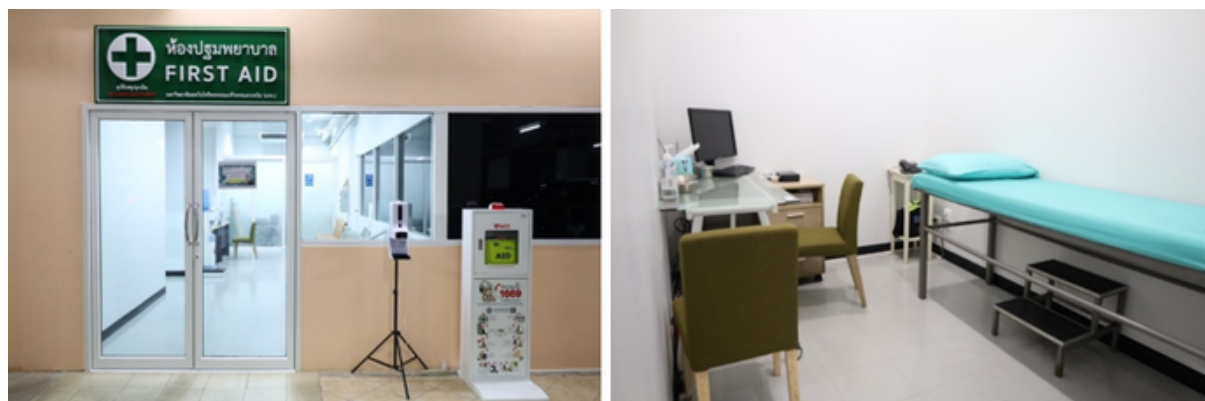


Medical center in KMUTNB

KMUTNB have various seminar series and workshops to transfer the knowledge about healthcare to communities, government and business sector (such as CPR first aid demonstration). Furthermore, KMUTNB researchers and students conduct R&D projects to develop medical instruments, such as automated robots for spraying sanitizer, UV exposure, Oxygen Gas Station and robot to distribute medical drugs to patients in hospitals. These examples of projects got donations from KMUTNB alumni and open donation from Thai people. The products were donated for free to various hospitals and community centers.

# SDG 3 GOOD HEALTH AND WELL-BEING



Various R&D projects and seminar series related to SDG3 in KMUTNB

# SDG 4 QUALITY EDUCATION

We believe that education is the bedrock of sustainable development, a powerful tool for personal empowerment, and a catalyst for societal progress. Our commitment to SDG 4 is exemplified through a comprehensive approach. KMUTNB is dedicated to providing equitable access to quality education. Scholarships, financial aid, and online learning platforms are just a few of the initiatives that we employ to break down barriers to education. We prioritize innovative teaching methods and technologies to enhance the learning experience. Our curriculum is designed to foster critical thinking, problem-solving, and skills relevant to a rapidly changing world. Beyond our campus, we engage with local schools and communities to extend educational opportunities. We offer mentorship programs, tutoring services, and educational resources to bridge gaps in access to quality education. We encourage global perspectives and intercultural understanding through international exchange programs, study abroad opportunities, and the inclusion of global issues in our curriculum.

KMUTNB has various campaign to knowledge transfer to local and regional communities such as Brain- based Learning to primary school students in Petchburi province (https://bid.kmutnb.ac.th/13135/) and Training English Speaking for Taxi Drivers (https://arts.kmutnb.ac.th/en/album/detail/123508).



Knowledge transfer to community by KMUTNB

During big transformation for Covid-19 pandemic, teaching format of KMUTNB turns to be online to allow continuous teaching to all students. After, the Covid-19 relieve, teaching formats are back to on-site and still online courses to increase accessibility to all students and remote students. KMUTNB provided access and licensed softwares, such as Microsoft teams, webex, zoom etc to support online classes to KMUTNB lecturers and students (https://kmutnb.ac.th/kmutnb-online-learning.aspx). Furthermore, to support students with low income, KMUTNB lend notebooks and finnancially support mobile packages to students. Our IT centers provide various free softwares that are necessary for technical classes such as Adobe, Microsoft office, Matlab, SPSS, Turnitin etc (https://software.kmutnb.ac.th/).

# SDG 4 QUALITY EDUCATION



Tools and softwares for online learning for KMUTNB staffs and students

Our commitment to SDG 4 is unwavering, as we believe that education is the key to fostering sustainable development. By expanding access, enhancing quality, and fostering global perspectives, KMUTNB is contributing to a future where education is a right for all, not a privilege for a few. Together, we work towards a world where the transformative power of education empowers individuals and communities to reach their full potential.

# SDG 5 GENDER EQUALITY

We firmly believe that gender equality is not only a fundamental human right but also a critical driver of sustainable development. Our approach to SDG 5 is reflected in our comprehensive efforts to empower and promote gender equality. KMUTNB is committed to fostering an inclusive campus culture that celebrates diversity and gender equity. We have established gender-neutral facilities, awareness programs, and support services to create a safe and welcoming environment for all. KMUTNB actively encourage and support women's participation in leadership roles, from faculty and staff to student organizations. This commitment to representation at all levels is vital in breaking gender barriers.

To prevent discrimination for woman in KMUTNB, we announced university policy of sexual harassment on university website, student handbooks (https://tggs.kmutnb.ac.th/wp-content/uploads/2020/07/The-2011-Regulations-for-Student-Discipline-at-King-Mongkut%E2%80%99s-University-of-Technology-North-Bangkok.pdf), staff do&don't list. We also have appeal box to allow women who have harassment case to report directly to KMUTNB president. KMUTNB host seminar series to emphasize the gender equality in human resource workshops. We also announce policy to transgender equality to university website and student handbook to allow them to wear student attires based on their preferences. We have facilities to accept variation in genders such as restroom for LGBTQ+. To cultivate globalization norm and equality to all staffs and students, we therefore hold an international events to gather all people from international nations in KMUTNB to have sport competition, party and tourist visiting without restriction in gender.



Training of KMUTNB staff and poster to prevent sexual harassment

# SDG 5 GENDER EQUALITY

Furthermore, KMUTNB promote the female staffs to work as management teams from low to high level of university up to vice-president and university council without sexual discriminations. We have tracking system to monitor entrance rate and student status of students in all sexes. For faculty and staff promotion, we also monitor the ratio of female staffs for every promotion, especially professorship promotion. For staff and student pregnancy, we do not have any restriction for their works and studies in KMUTNB. We also provide maternal leave for KMUTNB staffs for 90 days with salary payment as normal and money gift from KMUTNB Co-op. Our office is also friendly to staffs who have babies and kids by allowing them to stay in canteen room during working hours of their parents. KMUTNB recognizes that the path to gender equality is ongoing and dynamic. Our mission is to contribute to a world where gender-based discrimination and violence are eliminated, and all individuals can thrive, irrespective of their gender.



Welfare regulation provided by KMUTNB Co-op

# SDG 6 CLEAN WATER AND SANITATION

KMUTNB commitment to SDG6 reflects our dedication to preserving water resources and ensuring equitable access to clean water and sanitation for all. Our approach to SDG 6 encompasses a wide range of initiatives and strategies. KMUTNB is committed to responsible water management. We have implemented water-saving technologies, rainwater harvesting systems, and educational campaigns to promote water conservation within our campus. Our researchers work on projects related to water purification, wastewater treatment, and sustainable water resource management. This research informs policies and practices aimed at improving water quality and access. We collaborate with local communities to improve access to clean water and sanitation facilities. We support initiatives for clean water infrastructure, hygiene education, and safe sanitation practices, especially in underserved areas.

KMUTNB is actively engaged in advocating for clean water and sanitation on a global scale. We partner with NGOs, governmental bodies, and international organizations to address water-related challenges worldwide. We understand the urgency of safeguarding our most precious resource - clean water. We are committed to reducing water wastage, improving water quality, and ensuring that no one is left without access to clean water and sanitation. Through education, research, and community engagement, we strive to create a world where water is clean, accessible, and abundant for all, in alignment with the aspirations of SDG 6.

Most of the buildings approximately 85% of all campuses are used Water Efficient Appliances with Automatic Sensors for water taps, toilet flush, urinal flush, etc. This includes most of existing buildings (even in the restrooms for Auditorium) that replaced with the water efficient appliances The eco water flushing systems are utilized for the toilet seats and faucets of most of the buildings. Some areas were designed using the automatic pumping/watering system for the garden with the solar power source.
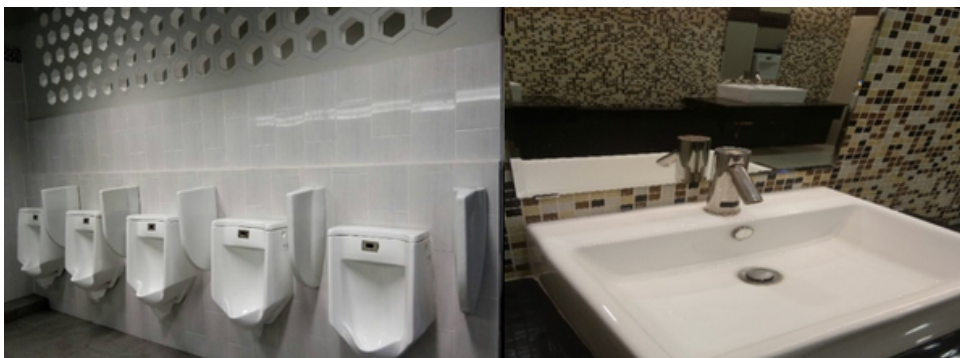


Automated restroom for saving water

# SDG 6 CLEAN WATER AND SANITATION

All campuses have reserved rainfall waters for gardening and some buildings have extensive rainfall water storage tanks on the upper deck. The water is used for toilet flushing system and roof gardening. The main campus has medium size of pond (50m x 20m x 2m) for tree gardening. Rayong and Prachinburi campus have large ponds for gardening and Eco-system as well.



Rainfall water storage tanks on the upper deck level

All buildings in KMUTNB have an individual septic tanks treatment for the water disposal, the automatic waste water treatment is used for the canteen building. KMUTNB Rayong campus has used the centralized treatment before disposal. Additional water treatment includes using of the mobile water treatment truck, solar cell water treatment, and a program for re-waste water treatment for gardening and toilets (https://www.facebook.com/media/set/?set=oa.1534342219944166&type=3).



Main combine sewerage pond at KMUTNB Bangkok Campus with the solar power turbine



Main combine sewerage pond at KMUTNB Rayong Campus (with solar power fountain)



Waste Water Treatment Learning Center (Bangkok Campus)

# SDG 6 CLEAN WATER AND SANITATION

To support the daily living and working of KMUTNB staffs and students, KMUTNB provide the free-access clean water tanks and coolers in almost 90% of floors and buildings. The quality of drinking water is schedulely quaranteed by the standard quality of ISO, Thai FAO, and NSF. To prevent the loss without use of water supplies in KMUTNB, we have maintenance schedule in every faculties and building every months such as faucet, toilet, water pump etc. Also the quality of water for both drinking and washing grades in university is regularly sampling and test to ensure safety of our people.



Maintenance of water system to prevent loss and free-access drinking water

To extend our partnership to achieve SDG 6 of KMUTNB with various partners, we set up initiative projects to transfer our knowledge to various stakeholders. For example, Faculty of Applied Science Environment and Energy holds the seminar about the technology to automatically monitor the quality of water for agricultural activities to local farmers in Rayong province (https://www.facebook.com/photo/?fbid=1184555511158757&set=a.109678645369777). Furthermore, Faculty of Applied Science and Faculty of Applied Science Environment and Energy offer several courses related to water quality and water conservation to degree students. To intensively promote research activities about SDG, there is an expertise research unit for "Water engineering and infrastructure" (https://stri.kmutnb.ac.th/new/index.php/research-group/864-center-for-water-engineering-and-infrastructures-cweir). To set up the policy for country level, our KMUTNB staffs engaged in policy planning of Rayong Province with the mayor for the wastewater treatment system in urban community (https://shorturl.at/nFHTV).

# SDG 6 CLEAN WATER AND SANITATION



KMUTNB takes part as policy planning for Rayong province
in the wastewater management project

# SDG 7 AFFORDABLE AND CLEAN ENERGY

We understand the pivotal role that access to affordable and clean energy plays in achieving a sustainable future. KMUTNB is committed to reducing our carbon footprint. We have invested in renewable energy sources, energy-efficient infrastructure, and waste-to-energy systems on our campus, ensuring our operations align with the principles of clean energy. Our academic programs and research activities prioritize renewable energy technologies, energy efficiency, and sustainable power sources. We aim to educate the next generation of leaders in the field of clean energy. KMUTNB collaborate with local communities and energy providers to advance the adoption of clean and affordable energy solutions. Our initiatives focus on improving access to sustainable energy for marginalized populations. We actively advocates for renewable energy policies at the local, regional, and national levels. We work with governmental bodies and non-governmental organizations to promote the transition to clean energy sources. KMUTNB acknowledges the vital role that affordable and clean energy plays in mitigating climate change and fostering economic growth. Our mission is to contribute to a world where clean energy is accessible, affordable, and environmentally sustainable for all. Through education, research, community engagement, and advocacy, we are dedicated to achieving a sustainable future driven by clean and renewable energy sources, in alignment with the vision of SDG 7.

From top to bottom, KMUTNB has various policies to achieve SDG7. We have policy in action to do all renovations, new building and new construction to follow energy efficiency standards. In Thailand, we have Thai standard "Green office" as one of this standard and since 2020, KMUTNB has adopted this standard to get the guarantee mark (https://shorturl.at/quyZ0). We further have policy to invest in various forms of renewable energy including solar energy, biogas, and heat energy from waste incinerator to partially supply energy consumption in all campuses. Our university has set up the policy to monitor energy consumption every month and we set the goal to reduce consumption for the whole university. Therefore, several campaigns have been launched for the whole year to cultivate mindset of our people, both staffs and students, to reduce the unnecessary use of electricity. According to Thai's government plea to UN during the COP26 meeting that Thailand will reach zero emission in 2050, therefore KMUTNB set the policy to reduce carbon emission. Starting from 2022, we monitor the total annual carbon footprint 147.14 metric ton for all campuses.

# SDG 7 AFFORDABLE AND CLEAN ENERGY
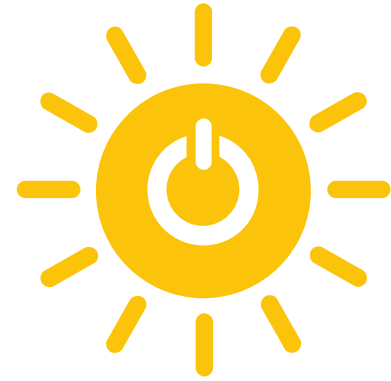


KMUTNB received award for energy-efficient building from Department of Alternative Energy, Thailand.

Many renewable energy projects on all three campuses were implemented since 2021.

- Solar farm power, Solar rooftop, Solar cover way, Solar pumping system for campus watering – this can generate about 2,160 kwhr/day. The solar farm was also built at the Rayong campus, where the power was used for the walkway lighting and the electric shuttle bus service inside the campus.

- Incinerator from the zero waste project also produced the renewable energy to the campus system more than 20 kwhr/round

- Other sources such as Biodiesel / Biogas / Biomass was implemented for the pilot study in the continuity Zero Waste project since 2017, which also produced energy reversing for using inside the Rayong campus. The project is still running on the test, which would expect to produce the renewable power more than 100 kwhr/round.



Solar Panel on cover way and rooftop on Faculty of Science, Environment and Energy building that reduce the release of carbon about 22.55 ton/year (https://sciee.kmutnb.ac.th/vdo.php)

# SDG 7 AFFORDABLE AND CLEAN ENERGY



Clean Biomass Gasification



Combine Heat and Power from the Eco-Friendly Waste Incinerator



Solar Roof top of President Building, Smart Solar Farm & Shuttle Station
around the KMUTNB Rayong Campus

Most parts of existing energy efficient appliances are still in good conditions such as LED lighting, A/C units, ventilation etc. However, KMUNTB has recognize how to keep energy saving by maintenance on schedule (every 3 months). Additional smart energy saver appliances were installed according to the digital university plan such as smart power monitoring (installed per individual building), smart classrooms, and smart security system, etc to save energy consumption. Other efficient appliances usage for smart university has been implemented to all campuses such as Solar power roof, LED signage, etc.

25

# SDG 7 AFFORDABLE AND CLEAN ENERGY



Example of Energy Efficient Appliances Usage: Smart classroom (LED TV), LED lighting



Solar power Motor Generator for Classroom, lighting, Pumping system
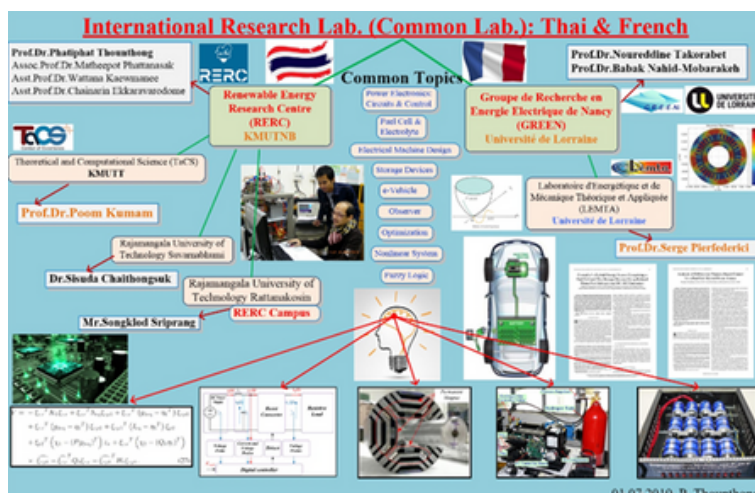


Research overview of Renewable Energy Research Center

As energy research is an important topic for global interest, KMUTNB researchers and students have many research focused on renewable energy, smart grid, and energy converter. We have partnership to work on the R&D projects with Electricity Generating Authority of Thailand, and Department of Alternative Energy, Thailand, etc. that are Thai's government units responsible for energy production, maintenance and distribution for Thailand. We have research unit such as Renewable Energy Research Center (RERC, https://rerc2010.wordpress.com/home/) that collaborates with "Green research unit" of Université de Lorraine, France. This collaboration received financial supports from Thai and France governments to promote R&D activities for energy production and distribution.

The project "Cleaning Robot for Floating Solar Panels" aims to develop robots for the cleaning and maintenance of floating solar panels, specifically designed to work on water surfaces in Hydro-Floating Solar Hybrid power plant located in Ubon Ratchathani province. This initiative is led by KMUTNB and is the first of its kind in Thailand. It is developed using research and development funding from the Provincial Electricity Authority (PEA) and the National Science and Technology Development Agency (NSTDA) for the fiscal year 2021.

# SDG 7 AFFORDABLE AND CLEAN ENERGY

This power plant boasts the world's largest floating solar panel installation with a total capacity of 81 megawatts, combining 45 megawatts of solar panels on water and 36 megawatts from the Sirindhorn Dam hydroelectric power plant. Solar panels installed on the water's surface, due to lower operating temperatures and reduced light reflection from the water's surface, are gaining popularity. However, these panels require regular cleaning to maintain their efficiency as they are prone to dust and other contaminants that can impact electricity production. The use of robots for solar panel cleaning offers advantages over manual labor, including improved speed and efficiency, reduced maintenance costs, and cleaning tasks performed within a shorter timeframe. This research project aims to develop two prototypes: an autonomous robot for cleaning solar panels and a semi-autonomous cleaning brush for panels where human labor is still needed. These prototypes are designed to accommodate the unique challenges of cleaning solar panels on the water's surface, where the motion of the panels due to water currents and wind requires a high degree of flexibility and adaptability. This project is a pioneering effort in Thailand to use robots for the cleaning and maintenance of solar panels, contributing to energy sustainability and environmental friendliness (https://www.green.kmutnb.ac.th/news/view?id=111).



Cleaning Robot for Floating Solar Panels

KMUTNB have partnership to various segments, government, business and NGO to transfer our knowledge to communities in local and country levels. Faculty of Engineering have MOU and activities with Department of Alternative Energy, Thailand to work on the project to prepare energy policy for Thai government (https://shorturl.at/xBET1). We set up seminar and workshop series to cultivate and sharing our knowledge for energy saving to school and communities. Many courses related to energy production, energy efficiency and energy saving, etc. are available in various faculties in KMUTNB, especially Engineering, Applied Science, etc. to produce our graduates to be ready to enter labor markets in various industrial sector in Thailand and other countries.

# SDG 7 AFFORDABLE AND CLEAN ENERGY



MOU signing between Faculty of Engineering and Department of Alternative Energy, Thailand



Seminar to promote energy saving to school

# SDG 8 DECENT WORK AND ECONOMIC GROWTH

Our commitment to this goal reflects our dedication to fostering sustainable economic development and promoting quality employment opportunities. KMUTNB equips our students with the skills and knowledge necessary to enter the job market. Our programs focus on entrepreneurship, job-readiness, and adaptability in a changing workforce (life-long learning skill). We foster a culture of innovation and entrepreneurship, encouraging students to create their businesses and drive economic growth. Incubators, business competitions, and startup support are integral to our ecosystem (KMUTNB start-up, https://www.facebook.com/startup.kmutnb/?locale=th_TH, KMUTNB technopark, http://technopark.kmutnb.ac.th/). KMUTNB collaborates with local businesses and organizations to enhance economic development in our region. We provide resources, expertise, and support to stimulate economic growth in our local community. Our researchers conduct research projects on economic development and job creation, with a focus on sustainable practices. Our researchers aim to identify and promote strategies for inclusive economic growth. As we work towards SDG 8, KMUTNB understands the importance of economic growth that provides decent work for all. Our mission is to contribute to a world where economic growth is sustainable, inclusive, and supportive of decent employment opportunities. Through education, entrepreneurship, community engagement, and research, we strive to create an environment where economic growth is not an end but a means to improve the quality of life for all, aligning with the objectives of SDG 8.

KMUTNB announced policy on against all discrimination (in terms of religion, gender, age) and sexual harassment in co-aligned with policy from Ministry of Higher Education, Science, Research and Innovation. This policy is also included in student handbooks and staff's do&don't list. Our policy includes protection of human right by against forced labor, child labor and human trafficking. KMUTNB attends the evaluation of integrity by Office of The National Anti - Corruption Commission (NACC). The university has presented a report on the progress of its operations, which has met the selection criteria outlined by NACC (https://www.nacc.go.th/category/20180831184638647/list?). The purpose of this project is to enhance transparency in Thailand, as well as to inspire and encourage honor and excellence in government agencies, state enterprises, and private sector businesses. Among these organizations, KMUTNB is the sole university in the country to receive an award in this instance. This reflects the university's commitment to transparent governance and its ability to be scrutinized, guided by ethical principles. This reflects the university's significant commitment to elevating transparency in Thailand for the betterment of society, promoting ethical governance, professionalism, and social responsibility, ultimately contributing to Thailand's global transparency efforts.

# SDG 8 DECENT WORK AND ECONOMIC GROWTH

To encourage our staffs for working, KMUTNB provide seminar to all staffs regularly, especially newcomers, to understand labor laws, rights and KMUTNB supports. We have a department of welfare (https://welfare.kmutnb.ac.th/) to be the labor union for the staffs to claim for their welfare supports. To prevent discrimination in gender in work promotion, KMUTNB human resource department (https://shorturl.at/myJNW) monitor the progress of career and salary and report to management team to regulate the equality based on performance and experience of staffs. To ensure sufficient living wage, we monitor average living expense in Bangkok, Rayong and Prachinburi, where our campuses located. We have wage scale for all staffs based on government wage scale bars and more than average living expense. Our university also has co-op to financially support our staffs both current and retired members with higher-rate interest saving, and pension (https://www.ppn-scc.com/). The emergency loan is also available with lower-rate interest to help our staffs to relieve the financial stress. Low-rate loan for housing is also available for co-op members to ensure the good-living of our staffs.



KMUTNB received NACC integrity awards

# SDG 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

KMUTNB commitment to this goal is a testament to our dedication to advancing sustainable development through technological progress and infrastructure development. KMUTNB fosters a culture of innovation and research. Our academic programs focus on engineering, technology, and innovation, equipping students with the skills necessary to drive technological advancements. We actively encourage entrepreneurship and the development of innovative startups (https://www.facebook.com/startup.kmutnb/?locale=th_TH). Our university provides resources, incubators, and mentorship programs to support students and community members in bringing their innovative ideas to fruition. We collaborate with local communities and stakeholders to support infrastructure development projects that improve living conditions and foster economic growth. This includes sustainable transportation, energy, and communication infrastructure. KMUTNB collaborates with government and industry partners to promote research and development, technology transfer, and sustainable industrial practices through the Technopark (http://technopark.kmutnb.ac.th/) and Science and Technology Research Institute (STRI, https://stri.kmutnb.ac.th/new/). We created the partnership with national and international partners and collected our MOUs in the database (https://mou.kmutnb.ac.th/). As we work towards SDG 9, we recognize the pivotal role of industry, innovation, and infrastructure in fostering sustainable development. Our mission is to contribute to a world where technological advancements and infrastructure development are drivers of positive change, while being ecologically sustainable and socially inclusive. Through education, innovation, community engagement, and partnerships, we strive to create a future where industry, innovation, and infrastructure are catalysts for progress, aligning with the principles of SDG 9.

The university has established a research network both domestically and internationally, such as cooperation with the Hong Kong Trade Development Council, the Department of Science and Technology of Guangdong, SMS Corporation, SENECA Technology Limited, and B.Grimm Power Public Company Limited (PCL), and has received support from the private sector in setting up research laboratories, including rapid prototyping laboratories, measurement and instrumentation laboratories, automated production system laboratories, drive technology laboratories, PLC-controlled laboratories, and innovation centers for design and engineering for production. As the leading university in Thailand in Science, Technology and Engineering, KMUTNB research policy focuses on three main themes including aerospace engineering, railway transportation, robot and automation.

# SDG 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Our students, representing Thailand, won the championship at the World RoboCup Rescue 2023 competition, along with two other awards: BEST IN CLASS MOBILITY (for outstanding global mobility innovation in robot movement) and BEST IN CLASS MAPPING (for exceptional global-level map creation). In the competition, the team iRAP ROBOT, representing Thailand, emerged as the world champions for the ninth time. The RoboCup 2023 Robotics Championship was held in Bordeaux, France, from July 4 to July 10, 2023. It featured various competitions, including RoboCup Rescue, RoboCup Soccer, RoboCup HOME, RoboCup INDUSTRY, and more. A total of 17 rescue robot teams from different countries worldwide participated, including the United States, Germany, Japan, China, Mexico, Bangladesh, South Korea, Austria, France, Turkey, and Thailand. Team iRAP ROBOT, which achieved the highest score among all finalists, securing the world championship title in this edition of the competition (https://shorturl.at/FISTU).



Team iRAP ROBOT emerged as the world champions for the ninth time

To promote our students to have experiences with workplace and business, our technopark hold the seminar about cooperative education that allow students to do research projects in business and factory to let them having hand-on experience. This format of project allow students to realize the needed skill for their future career. Futhermore, KMUTNB offers several classes to promote entrepreneurship to students via various projects, such as Design thinking and pitching day that collaborate with Government funding agency, Thailand's National Innovation Agency (NIA, https://www.nia.or.th/) to all students to create inventions and innovations and attend the contest for pitching for start-up and business (https://arts.kmutnb.ac.th/en/album/detail/123505, https://arts.kmutnb.ac.th/en/album/detail/123506). Additionally, Faculty of Science, Environment and Energy hosts the annual event for student conference to present their thesis research. This event partners with various businesses, like BMW, Shell and Aeroflex to provide opportunity for our students to practice their presentation skills and have discussion with peer-researcher and industries (https://sciee.kmutnb.ac.th/news_research_detail.php?id=384).

32

# SDG 10 REDUCED INEQUALITIES

KMUTNB recognize that addressing inequalities is not only a matter of social justice but is also integral to sustainable development. We are committed to providing equal access to quality education. We offer scholarships and financial aid programs to reduce educational inequalities, especially to lower-income students, and handicapped students and ensure that students from diverse backgrounds have the opportunity to thrive. We respect diversity and promote inclusion throughout our campus. Initiatives include providing accessible facilities and fostering an inclusive culture. Our university actively collaborates with local organizations and communities to address socio-economic disparities. These partnerships aim to empower marginalized populations through education, job training, and community development. As we work towards SDG 10, KMUTNB is dedicated to addressing inequalities and creating a more equitable society. We believe that reducing inequalities is not just an aspiration but a necessity for sustainable development. Through education, community engagement, and research, we strive to contribute to a world where all individuals, regardless of their background, can enjoy equal opportunities, social justice, and a higher quality of life in line with the principles of SDG 10.

To achieve SDG10, KMUTNB announced policy from management team from university council to prevent discriminations in every forms; gender, income, religion, nationality, age and handicap. This policy is co-aligned with policy from Ministry of Higher Education, Science, Research and Innovation, Thailand (MHESI). This prevention program of discrimination and sexual harassment are included in student's handbook and staff's handbook. KMUTNB provided financial aid to students who specially has low income or handicap, in various ways e.g. financial aid, student dorm, and scholarship for Thai students and international students (especially from lower-middle income countries like Laos, Burma, Nepal, Pakistan). We counterpart with many partners from business sectors, NGOs, International institutes and Thai government provided the scholarships to students, such as DAAD, Bangchak, Her Royal Highness Princess Maha Chakri Sirindhorn Projects. Our faculties have collaborations with KMUTNB alumni to set up the scholarship to students with lower income with good study performance. These scholarships support either tuition fee or allowance, or both.
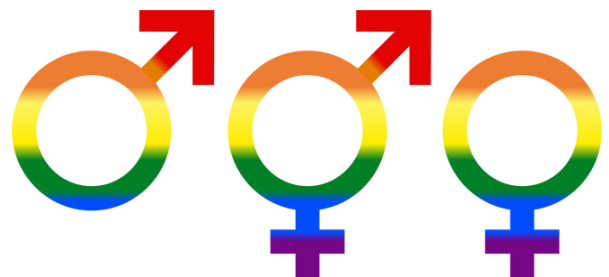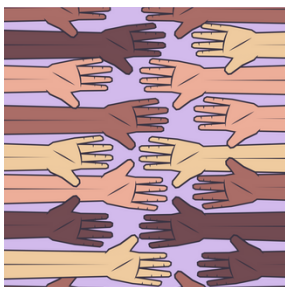
# SDG 10 REDUCED INEQUALITIES

    KMUTNB has the channel to report the case of discrimination and harassment directly to university president and university council by direct mail or walk-in. To make sure non-discrimination admission to university, academic affair monitor student profiles, including gender, family income, age, handicap status, nationality, religion, as well as home location. We announced the guideline to select students and staffs to enter the program to prohibit all discriminations. Therefore, we have various genders for KMUTNB students and staffs. We have healthcare center to be the center to allow students to have mental consultant with professional and specialist doctors by appointment in all campuses. With respect to all variety of people, KMUTNB provides restroom for all gender, or LGBTQ+, as well as handicapped people. We do welcome all religion members in our campuses, therefore we have Muslim prayer room and halal and vegan food shops.



Lady Recovery Room in medical center



Parking lots and for automatic sensors of water taps for handicapped person



Muslim student club, muslim prayer room, and halal food shop



Pedestrians paveways provided with disabled-friendly

34

# SDG 11 SUSTAINABLE CITIES AND COMMUNITIES

KMUTNB commitment to this goal reflects our dedication to fostering urban sustainability and building resilient communities for the future. We serve as a model for sustainable urban living. We have implemented green infrastructure, renewable energy sources, and eco-friendly transportation options to reduce our environmental footprint in all campuses. Our academic programs encompass urban planning, sustainable architecture, and community development. We educate our students to address the challenges of urbanization and foster sustainable cities. Our university collaborates with local municipalities and community groups to enhance urban sustainability. We support initiatives for green spaces, public transportation, waste reduction, and affordable housing to improve the quality of life in our city. Our researchers and students conducts research that addresses urban challenges and proposes sustainable solutions. Our research informs policies and practices that aim to build resilient and sustainable communities. As we work towards SDG 11, KMUTNB recognizes the vital role that sustainable cities and communities play in creating a better future. Our mission is to contribute to a world where urban areas are characterized by sustainability, inclusivity, and resilience. Through campus sustainability, education, community engagement, and research, we aim to build a future where cities and communities thrive in harmony with the environment, aligned with the vision of SDG 11.

KMUTNB targets to reduce carbon emission to follow Thailand's government policy toward the sustainable goal announced during COP26 event to reach zero emission in 2050. Therefore, we give priority to green commuting and construction. We provide public transportation on campus, such as shuttle bus, shuttle van, public bike, which some of them using renewable energy such as EV car. We provide parking spots for drop-off private car to send the message to promote the use of public transportation to our campuses. The main campus of KMUTNB has a limited space, therefore large shuttle services are not practical, but small shuttle cars are available. On the other hand, the sidewalk and cover way are available in most areas. The other campuses, Prachinburi and Rayong, have shuttle karts and buses including electric type and gas type available hourly (15-minute during rush hours) for free of charge. All campuses have bicycle and pedestrian policy and most of students are participating in the services. To monitor the need of using public transportation, we monitor the numbers of parking cars in all campuses and we encourage all staffs and students to use public transportation to reduce traffic jam, especially when we have festival or special event on campus that have high numbers of participants. For Prachinburi and Rayong campuses, both bicycle and pedestrian are a majority transportation for students. In addition, in year 2020-2021, KMUTNB (Bangkok campus) has launched the new EV charging station available inside the campus to persuade and motivate staffs and students using zero emission vehicles.

# SDG 11 SUSTAINABLE CITIES AND COMMUNITIES



Small shuttle cars with EV supply are on service in Bangkok campus



Shuttle bus are available for free of charge (15-minute during rush hours) in Rayong and Prachinbuti campuses



Bicycle Parking & Bike sharing program with ofo, a KMUTNB business partner



Pedestrian Cover-way: Bangkok, Prachinburi and Rayong campus

KMUTNB has policy of Smart University. Most of the buildings in KMUTNB (all campuses) including existing and new design or construction have automatic Fire Alarm sensor systems, automatic door sensor systems for the front entrance in order to conserve the energy from A/C units, automatic lighting sensors in the public restrooms, toilets and public hallways. We have internet and intranet access available for all staffs and students to promote online class activities, which subsequently reduce commuting of our people to campuses. IT center of KMUTNB provides various online class tools (https://kmutnb.ac.th/kmutnb-online-learning.aspx, http://authen.eduroam.kmutnb.ac.th/) and softwares (https://software.kmutnb.ac.th/) and have notebook for lending to home to reduce the working hour on site.

KMUTNB have continuously developed database and online administrative websites to provide service to staffs and students to reduce on-site activities, such as registration, payment, library, insurance, human resource and welfare (https://kmutnb.ac.th/it-service.aspx).

# SDG 11 SUSTAINABLE CITIES AND COMMUNITIES
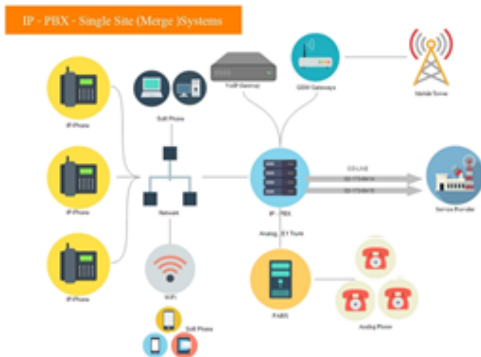


Diagram of telephone and network system in KMUTNB



KMUTNB received three awards building conserve energy for the building design label from theDepartment of Alternative Energy Development and Efficiency

All new construction buildings of KMUTNB have been designed with the energy conservative concepts according to the government regulation for energy conservation, such as

- The panel to be designed for natural air-flow and ventilation
- The roof to be designed with solar cell and some designed with the sky-lighting panel
- The wall texture to be designed with the light shape colors, and some designed with insulated panels or low density concrete block in order to lower heat absorption and transferring inside the building
- New and existing buildings were monitoring control for energy conservation by building managers.
- Green building concepts were applied to majority parts of all campuses.

In addition, some of existing buildings were also renovated using new energy conserved materials such as CMU wall, insulated roofing, etc. and also integrated with energy efficient appliances such as solar power instruments, lighting, motion sensors, etc. Moreover, in this year 2022, KMUTNB received three awards building conserve energy (Very Good, Very Good, and Good Efficiency Labels) for the building design label for the year 2020, according to the project supervision and support the enforcement of the Energy Building Standards (BEC) from the Government Department of Alternative Energy Development and Efficiency.

To ensure affordable housing for employees and students, KMUTNB provides on-campus dorms to students (https://dorm.kmutnb.ac.th/) and employee housing with low-rate renting with full-equipped furniture and security (with security guard and cctv). To promote students and staffs working and living lifestyles, we have library, co-working spaces, and cafeteria on service everyday, and also allow people from KMUTNB community to use these facilities.

# SDG 11 SUSTAINABLE CITIES AND COMMUNITIES

To promote living with natural resources, KMUTNB has total forest area including all three campuses in approximately 1,970,620 m2. The largest forest zones are inside Prachinburi campus with the total forest area of 1,932,828 m2. The other forest area is located in Bangkok campus of 3,843 m2, and in Rayong campuses of 33,949 m2 (including a new Research & Training Center at Mabtaput district). Furthermore, we starts to build "Ring of Knowledge" in Rayong campus to have man-made orchard with variety of plantations to allow our people to have recreation place. In Bangkok campus, vertical plantations with automatic watering system are installed in different locations as a model of water-saving plantations (https://green.kmutnb.ac.th/news/view?id=70).



Student dorms and employee housing on campuses



Cafeterias in different locations in KMUTNB

# SDG 11 SUSTAINABLE CITIES AND COMMUNITIES



Central library of KMUTNB



Co-working spaces in different locations on campuses



Total Forest Area of KMUTNB Prachinburi Campus



Vertical garden in KMUTNB to save water

KMUTNB is steadfast in its commitment to nurturing cultural, art, and heritage activities on its campus. Pop-up art galleries showcase a wide array of artistic works, from student creations to those by external artists, fostering creativity and artistic expression are set up annually both on campus and offsite (https://shorturl.asia/9ejR0, https://shorturl.asia/i9gsh). Furthermore, KMUTNB offers a range of academic programs and courses dedicated to cultural and heritage studies, educating students while actively engaging them in the preservation of cultural legacies. We go beyond the confines of its campus through a variety of events and festivals. Cultural festivals celebrating diverse traditions, as well as art exhibitions, musical performances, theater productions, and dance shows, are regular occurrences, allowing students and the community to experience various art forms. Collaborative initiatives with local cultural institutions, artists, and heritage organizations create a synergy that benefits both the university and the wider community, resulting in joint events, exhibitions, and educational initiatives. Lastly, the institution places a strong focus on student engagement through various clubs and organizations, scholarships, and grants, all of which contribute to fostering a vibrant cultural, art, and heritage ecosystem that enriches the academic experience and preserves regional traditions.

# SDG 11 SUSTAINABLE CITIES AND COMMUNITIES



Pop-up art gallery organized by Department of Architecture with free access to public



Pop-up design gallery and on-campus gallery organized by Department of Architecture with free access to public



Various student activities in KMUTNB from heritage dance of southern culture of Thailand, Thai new year festival (Songkran day) and Thai folk song contest

# SDG 12 RESPONSIBLE CONSUMPTION AND PRODUCTION

KMUTNB understand that achieving this goal is paramount to achieving a sustainable future. Our policy dedicated to minimizing its environmental footprint. We have implemented waste reduction strategies, sustainable sourcing, and eco-friendly practices across our campus, reducing resource consumption and waste generation. Our academic programs emphasize responsible consumption and production. We educate our students about sustainable lifestyles, ethical consumerism, and eco-friendly production techniques, preparing them to be conscious consumers and producers. We actively collaborate with local communities and businesses to promote sustainable consumption and production practices. Our initiatives include waste reduction campaigns, supporting sustainable local businesses, and encouraging responsible resource use. KMUTNB conducts research on sustainable consumption and production, seeking innovative solutions and promoting best practices. We engage with industry partners and policymakers to advocate for sustainable policies. As we work towards SDG 12, KMUTNB recognizes the urgent need to shift towards responsible consumption and production patterns. Our mission is to contribute to a world where resource use is efficient, waste is minimized, and products are designed for longevity and sustainability. Through sustainable campus practices, education, community engagement, and research, we aim to inspire responsible choices and promote a circular economy, aligning with the principles of SDG 12.

To drive the action plan and activities, KMUTNB's plan and policy committee announce policy to promote SDG12. The minimizing the uses of disposable items, such as officeware, plastic, paper, etc. and turns to use reusable items if applicable. We have policy to monitor waste production, management and recycling and allocate budget to build up the facilities for this activity. As research university, we have laboratory activities that produce chemical waste and hazardous materials, thus we raise awareness and knowledge on standard method to handle and dispose these waste through series of seminars and workshops. Furthermore, we move forward to enforce researchers in our university to submit and register the chemical lab standard of procedure (SOP) to meet with ESPReL before application of any research funding (https://researchdb.eat.kmutnb.ac.th/main/?page_id=3269). As we adopted the integrity and ethical policy from Integrity and Transparency Assessment National Anti-Corruption Commission, Thailand (ITA, https://itas.nacc.go.th/), we therefore strictly to avoid unethical foods and supplies on campuses, for example the supplier with underage labor.

# SDG 12 RESPONSIBLE CONSUMPTION AND PRODUCTION

KMUTNB has expanded Zero Waste management project incorporate with the Rayong provincial government to the other campuses and the public sectors around the campus. KMUTNB main campus has begun the Up-cycling and refuse station for initiating the concept to surrounding communities. Sewerage recycling program was also initiated to all the faculties inside the main campus. In addition, all KMUTNB campuses have continually run the Eco-Friendly Invention Contest, which has been promoted to all staffs and students to attend this event every year. KMUTNB is continuing the waste management program to lead the staffs and students for various programs such as Green@heart, ZeroWaste, Green Library, SayNoPlasticbags, etc (http://green.kmutnb.ac.th/news/index?n_type_id=3). The program includes the following works:

1.  How to manage and separate different types of waste: indicate by 4-color waste bin spread around the campus (shown in the map) – some faculties have more than 4-type of waste especially for Recycle waste such as Plastic bottles, Aluminum cans, etc.

2.  Green culture by using reusable bags – KMUTNB has donated more than 1,000 bags for staffs and students to return the bags spread around the campus

3.KMUTNB has continue corporative programs with some private sectors around the campus such as restaurant, food services, coffee shop, etc. to develop the campaign for reducing the plastic bag inside the campus.

KMUTNB has also declared the public policy for reusing the plastic bags, reusing the two-side paper, and starting energy conservative program



KMUTNB Towards Policy of Zero Waste from Water Recycling Project

# SDG 12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Approximately 2 tons (fresh weight) per month of plant matter, which was obtained from the maintenance of green areas in a university campus, was used as the raw material in the Organic Waste Composting System. The plant matter was crushed to achieve a particle size of 5 cm and mixed with cow manure, which used as an inoculum, at the optimum ratio. To maintain the aerobic condition required for the composting process without the energy consumption, the mixture was passively composted for two months in the mesh reactor instead of aerator. During the 60-day of composting process, tap water and wastewater from the process were applied to maintain the optimum moisture content of the composting materials. Finally, the finished compost was used as a soil conditioner in the green areas of a university campus. This year KMUTNB has the new up cycling waste treatment from canteen turn to mixed microbial residue fertilizer. Also, other the waste management programs are still running, especially the organic waste treatment by using the method of Bio-gas & Bio-mass development with organic waste from the canteen (mainly) and green organic.



Waste Water Treatment Learning Center at Center Canteen of KMUTNB



REFUSE and Upcycling station at KMUTNB, Bangkok



Upcycling waste treatment to microbial residue fertilizer



MOU agreement for reducing Single use plastic & for Hazard waste management

# SDG 12 RESPONSIBLE CONSUMPTION AND PRODUCTION



Low carbon society events to reduce waste & production



Zero Waste Management Project at KMUTNB Rayong Campus since 2017 and still contributed to all communities for all campuses

KMUTNB continues the waste management program with 4-coloring of trash bins: Green = Organic waste, Blue = Inorganic & General waste, Yellow = Recycle waste including plastic, paper, metal etc., and Red = Toxic waste. In addition, this year KMUTNB has corporate with AIS corporation began the project for Electronic waste recycling program Electronic Wastes Project Different recycle bins were initiated by most faculties for all campuses. KMUTNB has managed toxic waste especially for the toxic substances by using the outsource company to carry over. The substances will be keeping in the safe zone/rooms and in the laboratory containment. For other toxic wastes, KMUTNB has incorporated with Bangkok Metropolitan agency to handle all toxic wastes outside the university (http://www.green.kmutnb.ac.th/news/view?id=55).

# SDG 12 RESPONSIBLE CONSUMPTION AND PRODUCTION



E-waste and 4-color bins for waste management in KMUTNB campuses



Infectious waste incinerator was invented KMUTNB research team



Toxic Waste Containment & Laboratory Treatment



Toxic Substances Contain in the Laboratory Containers & Zoning for Outsource Company to Carry Over

KMUTNB monitors the usage of office supplies especially papers and promotes campaign to all stuffs and students to reduce usage. Each paper is used for both sides and regular meeting is turn to online meeting or "no paper" on site meeting. The central administrative office, so called office of president of KMUTNB, can reduce the usage of paper about 10.77%. To ensure proper management and safety of chemical use in R&D activities, STRI, KMUTNB research institute, hold series of seminars and workshops of ESPReL standard (http://esprel.labsafety.nrct.go.th/home.asp) to KMUTNB researchers both online and on-site and open for public attendees (https://shorturl.asia/hq7I8). KMUTNB also requests food and drink shops on campuses to promote reductions of plastic bag and cup uses. These shops have campaign to discount the selling prices to motivate consumers, staffs and students, to use reusable plastic bags and cups. Furthermore series of seminars were hosted to transfer the knowledge about waste management, reuse and recycle to communities such as Rayong province by using application, Green2Get, that aims to reduce the waste left on natural beach (https://shorturl.asia/Fdo0Y).

# SDG 12 RESPONSIBLE CONSUMPTION AND PRODUCTION



Student Projects to Recycle program of Plastic bottles



Corporative programs with private sectors for campaign / promotion
to reduce the use of plastic bags and one-time use containers

# SDG 13 CLIMATE ACTION

We understand the paramount importance of addressing climate change and its profound impact on our planet and future generations. KMUTNB has implemented renewable energy sources, energy-efficient infrastructure, and waste reduction strategies across our campus to reduce our carbon footprint. Starting from 2022, we monitor the total annual carbon footprint 147.14 metric ton for all campuses.

Our academic programs prioritize climate science, environmental policy, and sustainable practices to cultivate student mindset to have awareness for global warming situation. KMUTNB also offers specific courses and degree in action to response and prevent climate change such as Faculty of Applied Science, Environment and Energy and Faculty of Applied Science. We educate our students to be future leaders who can address the challenges of climate change through various activities such as plantations and natural conservation in Mangrove forest (https://shorturl.asia/1pimz). Due to the commitment of Thai government during COP26 meeting, we follow this policy to reduce greenhouse effect by aiming to have zero emission in 2050.

We collaborate with local communities and environmental organizations to promote climate resilience and mitigation. Our initiatives include tree planting, climate education, and supporting local renewable energy projects. KMUTNB conducts cutting-edge research on climate change, seeking innovative solutions and influencing policies. We actively engage with governmental bodies and international organizations to advocate for climate action for example the MOU signing and collaboration between Faculty of Science, Environment and Energy with the Department of Energy, Rayong for planning the development of energy policy and research (https://shorturl.asia/tcF2r). We recognize the urgent need to combat climate change. Our mission is to contribute to a world where climate action is paramount, and we work tirelessly to reduce greenhouse gas emissions, educate future leaders, and inspire climate resilience in communities. Through sustainable campus practices, education, community engagement, and research, we aim to create a future where climate change is addressed comprehensively, aligning with the vision of SDG 13.
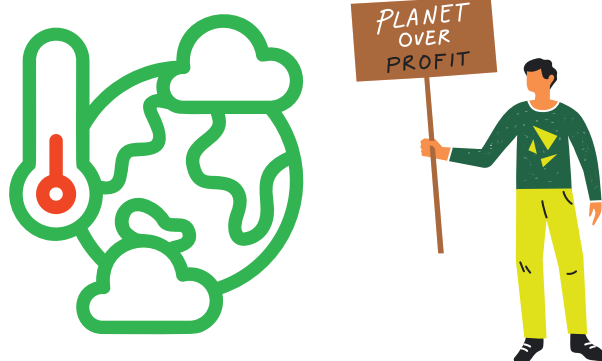
# SDG 13 CLIMATE ACTION

Over a thousand people joined together to plant trees as part of the "KMUTNB's Forest Restoration Project: Returning a Billion Tons of Carbon to the Khao Yai Forest." This initiative aims to pay homage to His Majesty King Maha Vajiralongkorn Bodindradebayavarangkun, King Rama X, and to collaborate with the Electricity Generating Authority of Thailand and companies within the SCG group. The project aimed to strengthen and contribute to the campaign to combat climate change by increasing the number of forested areas that can capture as much carbon as possible. This, in turn, helps us replenish the necessary oxygen while following the path to achieving Net Zero Carbon for Thailand and the world. Our society's ambitious goal is to return a billion tons of carbon to the forest, and we have continuous plans to prepare seedlings in collaboration with the Royal Forest Department, aiming to plant over 30,000 trees each year in suitable areas (https://alumni.kmutnb.ac.th/web/association-activities/2597/).



Student and staff activities for plantations in mangrove forest in Rayong province and Khaoyai forest in Nakhonnayok province.

KMUTNB researchers works on various projects to monitor and prevent climate change occurrence. For example, the work of analyzing data on climate change and preparing for adaptation to future climate changes to minimize the impacts of potential damage is crucial for Thailand. This can be achieved by creating climate change scenarios based on mathematical models that simulate global climate conditions, known as General Circulation Models (GCMs). However, GCMs provide a broad view of global climate events and are not suitable for studying the sensitivity and adaptation to climate change, which requires detailed spatial and temporal data (downscaling).

The results of global climate models can be obtained using a statistical downscaling (SD) process. This is one method that can be used to generate climate data for specific local areas, and the results can be applied in various impact assessment models such as crop models, forest models, vegetation dynamic models, and the spread of disease-carrying insects like mosquitoes, affecting public health, such as malaria and dengue fever.

# SDG 13 CLIMATE ACTION

These findings can inform strategies, measures, and policies for preventing and mitigating the impacts that may occur in the future (https://cpre.eng.kmutnb.ac.th/climate-change). Furthermore, the knowledge and experience to achieve SDG13 was shared with our communities in local, national and international level. For example, our research unit about "Water engineering and infrastructure" hold a seminar series in the topic of "Flood Risk Management during Crisis due to Climate Change by KMUTNB and DHI" with collaboration with Nakhonsawan province governer and DHI, Denmark (https://shorturl.asia/Yd4yQ).
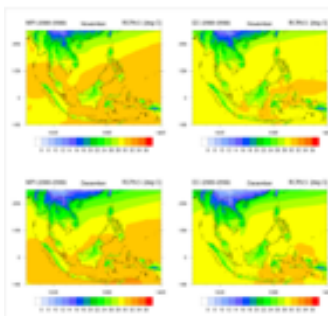


Climate change research and seminar series by KMUTNB researchers and partners

To reduce the consumption of fossil fuel and electricity that help to decrease climate change occurrence, KMUTNB allocates the budget to construct and implement various renewable energy on campuses and monitors the use of these sources of green energy, including solar energy, biogas plant and thermal power from waste incinerator. Solar farm power, Solar rooftop, Solar cover way, Solar pumping system for campus watering – this can generate about 2,160 kwhr/day. The solar farm was also built at the Rayong campus, where the power was used for the walkway lighting and the electric shuttle bus service inside the campus. Incinerator from the zero waste project also produced the renewable energy to the campus system more than 20 kwhr/round. Other sources such as Biodiesel / Biogas / Biomass was implemented for the pilot study in the continuity Zero Waste project since 2017, which also produced energy reversing for using inside the Rayong campus. The project is still running on the test, which would expect to produce the renewable power more than 100 kwhr/round.



Solar Panel on cover way and rooftop on Faculty of Science, Environment and Energy building



Clean Biomass Gasification

# SDG 13 CLIMATE ACTION



Combine Heat and Power from the Eco-Friendly Waste Incinerator



Biogas plant project in collaborations of KMUTNB researchers and Nonthaburi Provincial Livestock Office

KMUTNB have partnership to various segments, government, business and NGO to transfer our knowledge to communities in local and country levels. Faculty of Engineering have MOU and activities with Department of Alternative Energy, Thailand to work on the project to prepare energy policy for Thai government (https://shorturl.at/xBET1). We also integrate our research activities about green energy production and transfer our knowledge to communities. For example, a project about biogas production in husbandry farms in Nonthaburi province with cooperations of Nonthaburi Provincial Livestock Office to support financially and technically to local farmers to construct biogas plants for energy production and animal waste management.

# SDG 14 LIFE BELOW WATER

Our commitment to SDG14 reflects our dedication to the conservation and sustainable use of the oceans, seas, and marine resources. KMUTNB educate the next generation about the importance of preserving life below water and the sustainable use of marine resources by various campaigns for our staffs and students to have a project for water and forest conservations in different locations nearby our communities (for example https://shorturl.asia/1pimz). We collaborate with local communities in fostering awareness of the significance of the natural water resources and encouraging sustainable tourism practices. We conduct research on pollution, and sustainable water management. Our researchers work with local communities and governmental bodies to influence conservation policies. KMUTNB recognizes the urgency of protecting life below water. Our mission is to contribute to a world where water ecosystems are preserved, and continue to thrive as a vital source of life and resources.

The university is implementing a project to upgrade the wastewater treatment system of the central cafeteria at KMUTNB Bangkok, with the aim of establishing an environmental learning center that serves as a model for wastewater treatment from the cafeteria. This facility has been designed as a laboratory for the Faculty of Applied Science and is capable of treating cafeteria wastewater to meet environmental standards. It can transform the effluent from the treatment system into fertilizer, and the treated water can be used to feed ornamental fish (https://green.kmutnb.ac.th/news/view?id=56).



Wastewater treatment from the main cafeteria in Bangkok campus

KMUTNB in collaboration with the University of Technology, Rajamangala Lanna, organized a training program for the maintenance and development of the Hydro Pure mobile drinking water production system, as per the academic cooperation agreement. The aim of the program is to educate academic staff at the University of Technology, Rajamangala Lanna to establish a collaborative network for student development towards becoming "graduates who utilize technology." The program promotes joint research and innovation for the benefit of education and industry in Thailand, serving the mission of both universities. This training program focused on repairing, maintaining, and enhancing the mobile Hydro Pure water production system using membrane process technology to filter wastewater into clean water for consumption.

# SDG 14 LIFE BELOW WATER

This initiative aimed to provide a better quality of life to consumers and the community as a whole. After completing the project, the KMUTNB team will return the Hydro Pure drinking water production system to the University of Technology, Rajamangala Lanna, for continued service to the community and society (https://green.kmutnb.ac.th/news/view?id=124). Furthermore, we have various programs for our students visiting the government facility for water control to learn and experience the operation and design. For example, the visiting program at the Nongkhaem Water Quality Control Plant in Bangkok, which is managed by the UB-A, a leader in comprehensive water and wastewater management. During this visit, the expert engineering team from UB-A provided insights into the operation of the large-scale water quality control plant and answered various questions (https://www.uba.co.th/index.php/uba-news-kmutnb.html).



Hydro Pure mobile drinking water production system in collaboration with the University of Technology, Rajamangala Lanna

Hydro Pure mobile drinking water in operation in Bangkok campus

KMUTNB also contribute in action to water management policy of our community in local and national level. The Provincial Waterworks Authority (PWA) and the KMUTNB team for the wastewater management are in action to the planning and policy of development in Wastewater Treatment System Rehabilitation Committee, Rayong province. During the meeting, they received reports on the quality of surface water, evaluations of the wastewater treatment system's efficiency, and progress in the wastewater treatment system within Rayong province. Additionally, a draft community wastewater management plan for Rayong province was considered. In the meeting, it was resolved to task KMUTNB with collecting observations and recommendations from the committee for incorporation into the community wastewater management plan for Rayong province, which would then be presented to the committee for further review (https://shorturl.asia/cq3SN). Furthermore, KMUTNB offer both free and paid courses to train the industries and community manager to understand the protocol of wastewater treatment and water resource management. Through these traning, we build up a team of expertise of water management and operation to our society.

# SDG 14 LIFE BELOW WATER



Planning for Wastewater Treatment System Rehabilitation project with Provincial Waterworks Authority (PWA)



Water and forest conservation campaigns by KMUTNB students and staffs

# SDG 15 LIFE ON LAND

Our commitment to this goal reflects our dedication to protecting terrestrial ecosystems and promoting the responsible management of natural resources. KMUTNB actively supports biodiversity conservation through partnerships with local and international conservation organizations. We engage in reforestation, wildlife habitat restoration, and initiatives to protect endangered species. Our academic programs focus on ecology, conservation biology, and sustainable land management. We educate our students to be informed environmental stewards who understand the importance of preserving life on land, both plants and animals. We collaborate with local communities to promote sustainable land use practices, responsible agriculture, and afforestation efforts. Our initiatives aim to enhance biodiversity, improve soil health, and promote sustainable forestry. KMUTNB conducts research on land degradation and sustainable land use practices. As we work towards SDG 15, KMUTNB recognizes the pressing need to protect life on land. Our mission is to contribute to a world where terrestrial ecosystems are conserved, and the balance of nature is maintained. Through biodiversity conservation, education, community engagement, and research, we strive to create a future where life on land thrives in harmony with human development, aligning with the vision of SDG 15.

KMUTNB management team and planning and policy committee announce various policies in response to reach SDG15. We aim to ensure the conservation and sustainable use of terrestrial ecosystems associated with the university and communities. As mentioned in previous SDG, we have policy to reduce the use of disposable items such as officeware and plasticware on campuses. To protect our environment and ecosystem, we have policy to strictly prohibit waste disposal directly to environment, including wastewater treatment, garbage and solid waste treatment, food waste, chemical waste and hazardous waste.

To motivate our students and staffs to participate the SDG15 activities, we have the "Low Carbon" project involving "Air-Purifying Trees" and the presentation of the development policy for green offices, as announced by the central office regarding the promotion of physical and environmental management for the year 2021, were held. The event concluded with the presentation of "Air-Purifying Trees," including Ficus benjamina, Money Tree, Silver Spoon, Heart of the Virgin, and Golden Pothos. The "Low Carbon" project is an integration of the university's projects as certified in the annual budget. It is also part of the initiatives of the Office of the President, overseen by the Green Office Development Committee, which plays a role in promoting physical and environmental management, actively implementing policies, and encouraging participation in environmental conservation and energy efficiency.

# SDG 15 LIFE ON LAND

These initiatives aim to manage resources efficiently and promote energy and environmental conservation throughout the university (https://www.inventor.in.th/home/kmutnb-news-210628/). Another project is Tree Planting Activity in the "Sustainable Tree Planting Project" in celebration of the auspicious Royal Coronation Ceremony was carried out. As part of this initiative, 1,000 trees were planted along the central island of Phibun Songkram Road, starting from Klong Bang Khen Mai and extending to the front of KMUTNB. The purpose of this activity was to increase green areas and create a more vibrant and beautiful environment in the Bang Sue district, Bangkok. The project received support from SCG, a leading private petrochemicals, which contributed trees to be planted in the area (https://shorturl.asia/b2fHT).

KMUTNB has been involved in conservation of Nonthaburi Durian fruit and a last group of Psittacula eupatria bird located nearby KMUTNB Bangkok campus. The activity was cooperated by KMUTNB, Electricity Generating Authority of Thailand (EGAT), and Suan Yai community temple. Now Nonthaburi Durian fruit is the most expensive durian in Thailand because the climate change affects to local durian especially Nonthaburi Durian. Consequently, KMUTNB and EGAT move forward to conserve the Nonthaburi Durian in order to Nonthaburi Province has been a center for durian farming in Thailand for over 300 years. Farmers in this region have been honing their technique for generations, using their resources and skill to grow the highest-quality durians possible. One of the resources they depend on is the Chao Phraya River, which flows through Nonthaburi and fertilizes the soil.



KMUTNB and EGAT move forward to conserve the Nonthaburi Durian fruit

A last group of Psittacula eupatria bird located nearby KMUTNB Bangkok campus is conserve by KMUTNB, EGAT, and Suan Yai community temple. There were about 100 Psittacula eupatria birds living on 2 big rubber trees, but now 20 to 30 live regularly because the area around the temple is a food source for the birds. However, the land use from urban society has been changed to a housing development. And the big trees that serve as a habitat for the birds have been lost. This is cause some of the Psittacula eupatria birds migrates to other places throughout Nonthaburi province. Consequently, KMUTNB created artificial bird's nest for a last group of Psittacula eupatria birds at Suan Yai community temple.

# SDG 15 LIFE ON LAND

KMUTNB and EGAT move forward to conserve the Psittacula eupatria birds living at Suan Yai community temple



Student volumteer activities for plantations in Bangkok campus and surrounding areas

# SDG 16 PEACE, JUSTICE AND STRONG INSTITUTIONS

Our commitment to this goal underscores our dedication to fostering a just, peaceful, and accountable society. KMUTNB offers academic programs in peace and conflict studies, human rights, and governance. We educate our students to become advocates for peace and justice, equipping them with the knowledge and skills to address social issues. We actively engage with local communities and civil society organizations to promote peace, justice, and strong institutions. Our initiatives aim to empower marginalized groups, promote access to justice, and strengthen democratic institutions. We advocate for human rights and accountable governance at local and international levels. KMUTNB collaborates with governmental bodies, non-governmental organizations, and international institutions to support peace and justice initiatives. As we work towards SDG 16, KMUTNB recognizes the vital role of peace, justice, and strong institutions in achieving sustainable development. Our mission is to contribute to a world where societies are characterized by justice, accountability, and the peaceful resolution of conflicts. Through education, community engagement, research, and advocacy, we strive to create a future where peace, justice, and strong institutions prevail, aligning with the principles of SDG 16.

KMUTNB announces anti-corruption policy in university website, staffs and students handbooks. We also set an online channel to report cases (https://www.kmutnb.ac.th/about/clue-reporting.aspx) and no gift policy (https://shorturl.asia/dr2M5). We support academic freedom for academic staffs to choose areas of research and to speak and teach publicly about the area of their research. We have transparency policy for university budget and expense (https://www.planning.kmutnb.ac.th/document/index?dep_id=3) and procurement (http://procurement.kmutnb.ac.th/), which have channel to report suspect cases directly to management committee of KMUTNB.



Ethical do and don't list and no gift policy of KMUTNB

# SDG 16 PEACE, JUSTICE AND STRONG INSTITUTIONS

KMUTNB participated in the "Integrity & Transparency Assessment (ITA)" of government agencies for the year 2022, conducted by the National Anti-Corruption Commission (NACC) (https://itas.nacc.go.th/). KMUTNB received a score of 86.31 in the "Educational" category, successfully passing the assessment. This achievement demonstrates KMUTNB's commitment to transparency and integrity in its operations. The evaluation process aims to provide government agencies across the country with insights into their status and challenges related to integrity and transparency. The results help organizations improve their efficiency, service quality, and compliance with national anti-corruption and ethical standards. We acknowledges the significance of a robust ethical framework and transparent operations, ensuring that the university remains free from corruption. This evaluation process showcases KMUTNB commitment to maintaining transparency and integrity in its administrative and operational functions. As a result, the university received an "A" rating (https://shorturl.asia/LW65A).



ITA evaluation result of KMUTNB

To keep up all staffs in the same pace for ethical practice in KMUTNB, the training program for the course "Enhancing Ethical Values, Moral Integrity, Good Governance, Anti-Corruption, and Ethical Behavior" was inaugurated. The program was an honor to have Mr. Uthit Buasri, Deputy Secretary-General of the National Anti-Corruption Commission (NACC), as a lecturer. The purpose of this training program was to impart knowledge and understanding of ethical values, moral integrity, discipline, and the maintenance of discipline to the staff of the Office of Industrial Technology Development, Legal Division, Planning Division, Human Resources Management Division, and Technology Park of KMUTNB (https://www.facebook.com/media/set/?vanity=itdi.kmutnb.ac.th&set=a.808897687907466)

# SDG 16 PEACE, JUSTICE AND STRONG INSTITUTIONS

We recognize KMUTNB student councils (https://www.smoengineer.com/news/3975, https://www.facebook.com/smoic.kmutnb/) and allocate budget to support for their activities, such as sport days, cultural activities, etc. The president of KMUTNB student councils is elected by voting. The members of student councils can submit their opinion and request directly to assistant to president for student affair, such as concerns related to academic schedule and welfare. KMUTNB nourishes the democracy on campuses from student clubs, faculty level, co-op, university president, and university council. The election process is transparency and it is announced on website, flyer and other online media (https://shorturl.asia/QW37C, https://www.facebook.com/Electioncommission.KMUTNB/).



The training program for the course "Enhancing Ethical Values, Moral Integrity, Good Governance, Anti-Corruption, and Ethical Behavior"



Election flyer for president of KMUTNB student council

# SDG 17 PARTNERSHIPS FOR THE GOALS

KMUTNB acknowledges the pivotal role of SDG 17, "Partnerships for the Goals." At the heart of this SDG is the recognition that achieving all other SDGs is a collective endeavor. We take pride in our commitment to fostering partnerships, a core element of SDG 17. We understand that achieving the ambitious targets set by the SDGs requires collaboration at multiple levels. We are actively engaged in various partnerships, spanning NGOs, government bodies, the private sector, and the local community. Our collaboration with non-governmental organizations has allowed us to leverage their expertise and resources to amplify the impact of our initiatives. We initiate strong bonds with government agencies to influence policy changes that align with the SDGs. Moreover, our relationships with local businesses and community groups contribute to a shared vision of sustainability that goes beyond the university campus. Through these partnerships, we aim to drive innovation, share knowledge, and create a lasting legacy of sustainability. SDG 17 is not merely a goal but a guiding principle, and KMUTNB is fully committed to championing this spirit of collaboration for the betterment of our world. Together, we strive to build a more inclusive, equitable, and sustainable future for all, in line with the spirit of SDG 17.

KMUTNB planning and policy committee announce SDG policy and action plan for KMUTNB. Our budget allocation is revised annually to correspond to fiscal year budget. Therefore, we revise SDG policy in 2023 in September. Then the policy is transferred to all sectors in KMUTNB, including faculty, department, staffs and students. KMUTNB has engaged in various activities/events related to environment and sustainability such as the event & seminars & campaign "SayNoPlastic", Save Water, Innovative from Recycle materials, Earthhour60+, World Environmental Day, etc. All events have been widely spread around all three campuses – some event has corporative programs with other partnerships such as Department of Energy, Department of Pollution Control, Provincial office (Bangkok, Prachinburi, and Rayong province), etc. These campaign motivate and raise awareness all KMUTNB memebers to understand significance of SDG and have mindset to contribute to make our world more beautiful and peaceful.



KMUTNB meeting for SDG policy revision in 2023



Design of 65th Anniversary of KMUTNB with the concept of sustainability

60

# SDG 17 PARTNERSHIPS FOR THE GOALS

KMUTNB is a member of the Annual Network Meeting of Sustainable Universities in Thailand (SUN Thailand). In 2022, this meeting involved lectures, knowledge sharing, and case studies from the network for Sustainable Economic Value Creation (U2T BCG). The activities included presentations on the concepts and strategies to drive sustainable businesses, field visits within the learning areas, such as the Organic Vegetable Seed Production Learning Center, the Natural Agriculture Research and Development Center, the Rubber Industry Research and Development Center, the Agricultural Research and Academic Promotion Office, and Campus Tour. The tour featured areas for innovative aquaculture, new agricultural theories (https://www.green.kmutnb.ac.th/news/view?id=149).


Events Related to Sustainability on KMUTNB campuses

We have various campaigns throughout the whole year to attract our KMUTNB staffs and students to participate in SDG project. The Office of the President held a Big Cleaning Day event under the theme "Beautiful and Serene KMUTNB Campus and Office in Harmony with the Sustainable Culture." During the event, Assistant to the President for Environmental and Physical Development reported on the Sustainable Culture development policy. The event involved trimming the vegetation along the roadside, starting from the new Bang Khen Canal area, and planting air-purifying and auspicious trees in pots (https://www.green.kmutnb.ac.th/news/view?id=127).


Big cleaning event in KMUTNB and Pracha Ratt Sankhasuk temple

KMUTNB signed a MOU to collaborate on the project "Pracha Ratt Sankhasuk temple: The People's Temple of Happiness" with 13 organizations. The objective of this collaboration is to establish a system for the temple to serve as a spiritual and meditation center for Buddhists. The project will be guided by the principles of the 5S approach, aiming to enhance the physical aspects of the temple and its environmental management to promote health and well-being in the community. It also seeks to foster strong connections and positive relationships between the temple and the community, ensuring the temple's stability and the community's resilience for the future (https://www.green.kmutnb.ac.th/news/view?id=83).

# SDG 17 PARTNERSHIPS FOR THE GOALS

As part of community, students and staff from KMUTNB participated in volunteer activities. These activities included collective waste collection in the canals and riverside areas, weed and water hyacinth removal in the water sources and canal banks, and the promotion of waste reduction in water bodies. A significant number of organizations, students, and community members took part in these activities. https://www.green.kmutnb.ac.th/news/view?id=128

KMUTNB also engages and partners with various sectors in national and international level. We attended the Sustainability Expo 2022, titled "Sufficiency for Sustainability: Thriving for the World 2022," organized by the Thai Beverage Public Company Limited (ThaiBev) in collaboration with the Thailand Supply Chain Network (TSCN) under the theme of "Sufficiency for Sustainability.". The event's objective is to promote the principles of the sufficiency economy philosophy initiated by His Majesty King Bhumibol Adulyadej the Great. It aims to raise public awareness regarding the significance of sustainable development, encourage collaborative efforts among leading organizations from various sectors, and drive the creation of cooperative networks that result in genuine, meaningful actions. The expo took place from September 26 to October 2, 2022. KMUTNB participated in the expo and presented a research project focused on developing efficient and environmentally friendly cremation ovens in collaboration with the community. Dr. Piyalak Petcharengan, a researcher from the project, and Mr. Silachai Onoi, and their students representing the community, showcased their research results. This attracted considerable interest from the public, demonstrating the significance of the project and the support it received from the Provincial Electricity Authority (https://www.green.kmutnb.ac.th/news/view?id=119)



KMUTNB research showcase in Sustainability Expo 2022



GLOBAL TREND OF SUSTAINABILITY event

# SDG 17 PARTNERSHIPS FOR THE GOALS

Our staffs shared knowledge to achieve SDG in various occasions. The special presentation titled "Caring for the World: Combating Global Warming" as part of the Green Building online format, focused on "GLOBAL TREND OF SUSTAINABILITY." It featured two topics: "Green Building in Action" presented by Ms. Sittichai Neamcharoen, Chief Executive Officer of SCG Building & Living Care Consulting Co., Ltd., and "Global Trend of Sustainability" by Ms. Nisada Phusatchiwakul, Associate Director: Building Certification at SCG Building & Living Care Consulting Co., Ltd. This project is an integration of the university's projects according to its annual budget plan for the fiscal year 2022, organized by the KMUTNB Office of the President and the University's Green Office Committee as part of their efforts to promote physical and environmental management. These activities aim to drive green innovations, create awareness, understanding, and consciousness about reducing energy consumption and enhancing environmental responsibility, with a focus on preserving valuable resources. It aligns with the 13th Higher Education Development Plan (2023-2027) and the University's 20-Year Strategic Plan (2018-2037), which have established indicators for the Green Office Certification to support and promote comprehensive environmental management, efficient management systems, and an emphasis on performance outcomes, environment-friendliness, and convenient working environments (https://www.green.kmutnb.ac.th/news/view?id=136).



Seminars to promote SDG by KMUTNB with our partners in various sectors

# SDG 17 PARTNERSHIPS FOR THE GOALS

KMUTNB researchers also conduct many SDG projects with their partners. The project "Community Unity: Restoring Clear Water to the Land" aims to carry out a joint effort to restore and maintain water quality in the Om Noi Canal, Bang Kruai Canal, and Bangkok Noi Canal, which are all part of the cultural heritage area within the Chao Phraya River Basin. This initiative is led by Nonthaburi Province in collaboration with the Pollution Control Department, the Department of Environmental Quality Promotion, and 14 local administrative organizations. It involves participation from local communities, temples, schools, and educational institutions to restore the water quality of these three canals, promoting an improved environmental ecosystem, enhancing overall health, and elevating the quality of life. The activity involves knowledge sharing and online teaching in agricultural and food processing for community enterprises. This initiative is part of the "Development of Quality Education and Local Development" project, with the guidance of an educational institution network for local development in the fiscal year 2022. On September 24, 2022, a demonstration was conducted using online media through a self-learning platform on Google Sites under the topic "Online Classroom for Food Processing and Agricultural Industry." Participants in the training program were given access to online learning systems to assess their learning in food processing and agricultural industry topics. The training program covered three instructional media, namely instant powder beverage products from noni extract, mushroom-based products, and salted herbal garlic egg products. Practical training in food processing and agricultural industry for these three products was also provided. As a result of this project, prototype teachers and students equipped with knowledge in food processing and the agricultural industry were created. The online teaching materials developed will enable learners who have completed the training to gain knowledge and understanding in food processing. This will enable them to further develop their expertise and potentially create future careers and income opportunities in this field (https://www.green.kmutnb.ac.th/news/view?id=120).



Knowledge and technical transfer to local community to reach SDGs

# SDG 17 PARTNERSHIPS FOR THE GOALS

The KMUTNB Central Library Office organized a sustainable Green Library project under the Energy and Environmental Management Committee. The project involved community engagement by creating green corners within school libraries. It aimed to provide knowledge about energy conservation, water conservation, waste separation, and offered activities such as quizzes with prizes. Additionally, it included educating about waste management based on the principles of 3Rs (Reuse, Reduce, Recycle) and organizing related events to reinforce awareness of energy and environmental conservation. This initiative promoted knowledge sharing at three schools: Wat Paknam School (Pibulsongkram), Wat Fang School in Mueang district, Nakhon Pathom province, and Kok Sawang School in Pak Phli district, Nakhon Nayok province (https://www.green.kmutnb.ac.th/news/view?id=147)



Conservative tourism to Nonthaburi heritage area by KMUTNB staffs and students



Community service to community temple by KMUTNB students



Green library for Sustainability By Central Library

# Contributors

Advisor: Suchart Siengchin

Editor: Malinee Sriariyanun

Content creator and design:

Malinee Sriariyanun

Krissachai Sriboonma

Nattapong Makaratat

Sumet Umchid

Sarawut Suebyaem

Kanjana Ngampojjan

Krida Charassrisakul