



KMUTT's SDG policy: Carbon Neutrality 2040

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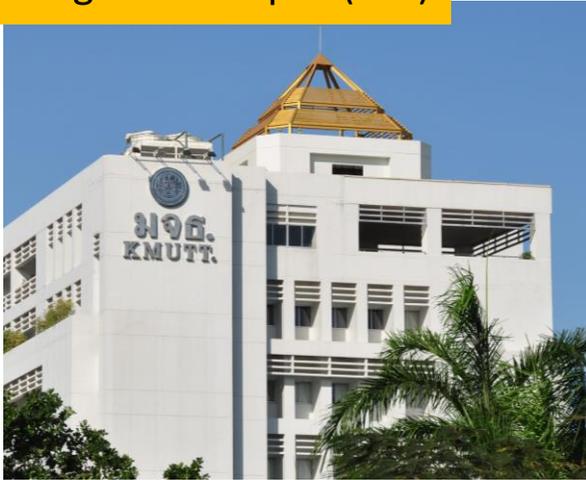
Visit by delegations from REGIONAL HIGHER EDUCATION FORUM

Higher Education of the Future: Leading Digital and Green Transformations through Collaboration

12 May 2023 | KMUTT Bangmod

KMUTT at a glance

Bangmod Campus (BM)



Bangkhunthien Campus (BKT)



Residential College, Ratchaburi Campus (RB)



KX



15,424

Undergraduate and postgraduate students

2,580

Staff

11

Academic faculties

50

Regular and International programs

1st

Country rank in Engineering and Technology (2018-2020)

54th

World rank in SDG (2021)

1st

World rank in SDG7 (2021)

*as of 2019 unless indicated otherwise

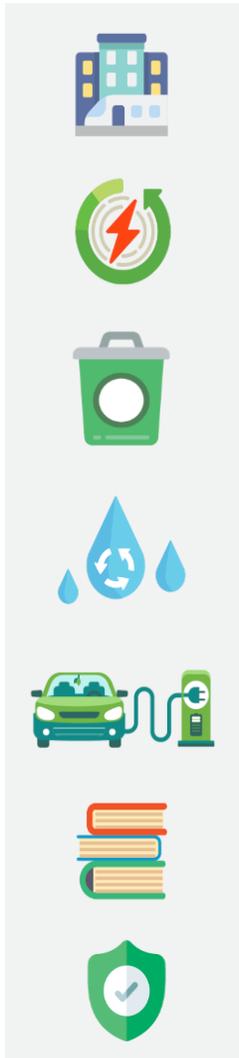
KMUTT Sustainability Policy



- To be Green and Sustainable Entrepreneurial University
- To foster the development of “Social Change Agent”



Sustainability Indicators, Targets & Achievements



Infrastructure

Energy & Climate

Waste

Water

Transportation

Education & research

Health & Safety

ENERGY & CLIMATE



27.7%

reduction on energy usage
(/capita/year) compared to 2003
[Target: 40% by 2024]

2.4%

renewable energy usage of total
final electricity consumption
[Target: 10% by 2024]

87.6%

of appliances are energy-
efficient appliances
[Target: 100% by 2024]

51.2%

reduction in CO₂ emission
compared to 2003
[Target: 50% by 2024]

Source: KMUTT Sustainability Report 2020

Sustainability Indicators, Targets & Achievements

WASTE



46%

of municipal solid waste reduces, compared to 2006
[Target: 40% by 2024]

17.1%

of municipal solid waste are reused and recycled
[Target: 70% by 2024]

100%

of food waste are completed to biogas and fertilizer
[Target: 100% by 2024]

23.1%

of hazardous waste reduces, compared to 2007
[Target: 70% by 2024]



Student and staff engagement

Ratio of courses related to “Environment and Sustainability” to total courses



Plastic waste reduction



Food waste reduction



Innovation from students

Student and staff engagement



Repair  Café
ช่างอาสา แลกเปลี่ยน เรียนรู้
สอนซ่อม ลดขยะอย่างยั่งยืน


กิจกรรมจักรยานเก่า ฟื้นคืนชีพ



Repair services for electrical appliances and bicycles by skilled students and staff

Student and staff engagement



Disseminate knowledge and good practices to schools in local areas

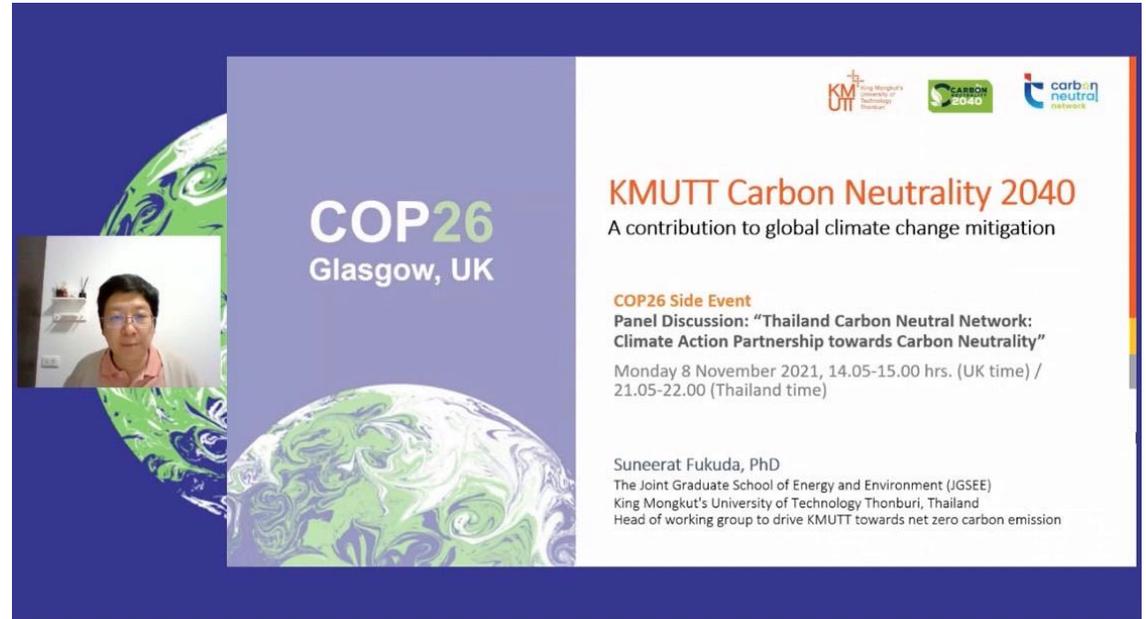


Green heart students



Network and Partnership

KMUTT has been involved in various initiatives and intuition at the international and national level, including International Sustainable Campus Network (ISCN), ASEAN Smart Cities Network (ASCN) and Sustainable University Network of Thailand (SUN).



KMUTT Carbon Neutrality 2040
A contribution to global climate change mitigation

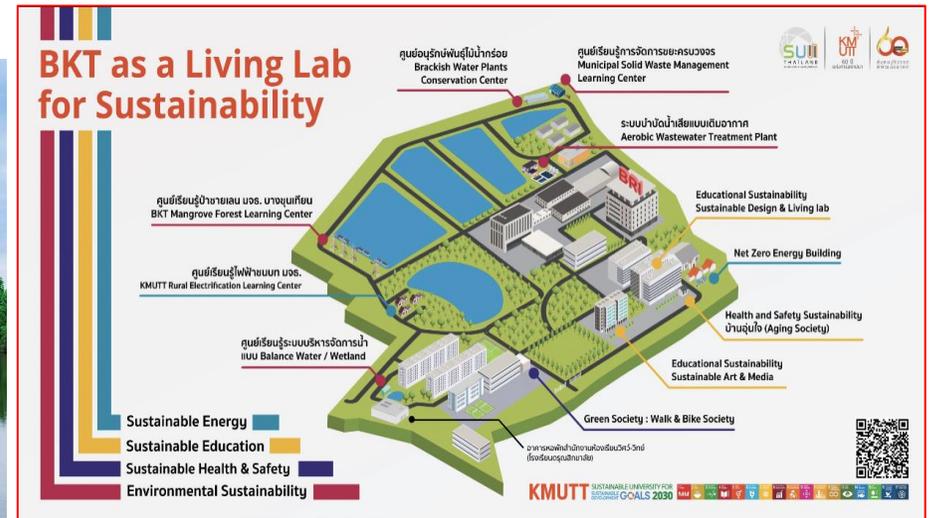
COP26 Side Event
Panel Discussion: "Thailand Carbon Neutral Network: Climate Action Partnership towards Carbon Neutrality"
Monday 8 November 2021, 14.05-15.00 hrs. (UK time) / 21.05-22.00 (Thailand time)

Suneerat Fukuda, PhD
The Joint Graduate School of Energy and Environment (JGSEE)
King Mongkut's University of Technology Thonburi, Thailand
Head of working group to drive KMUTT towards net zero carbon emission

KMUTT Contribution @COP26 Side Event

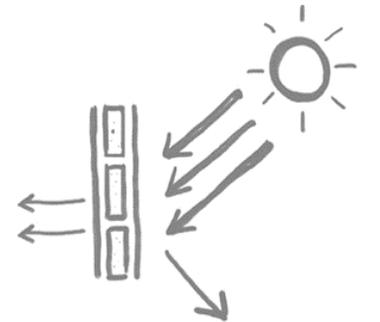
Achievements and activities in the pipeline

- Platinum Green Building as living lab for energy sustainability
- Online monitoring for energy usage (smart meter) to conduct demand side management
- BKT (Bangkhuntien Campus) as a living lab for sustainability
- 2.5 MW solar roof installation
- **KMUTT Carbon Neutrality Initiative**

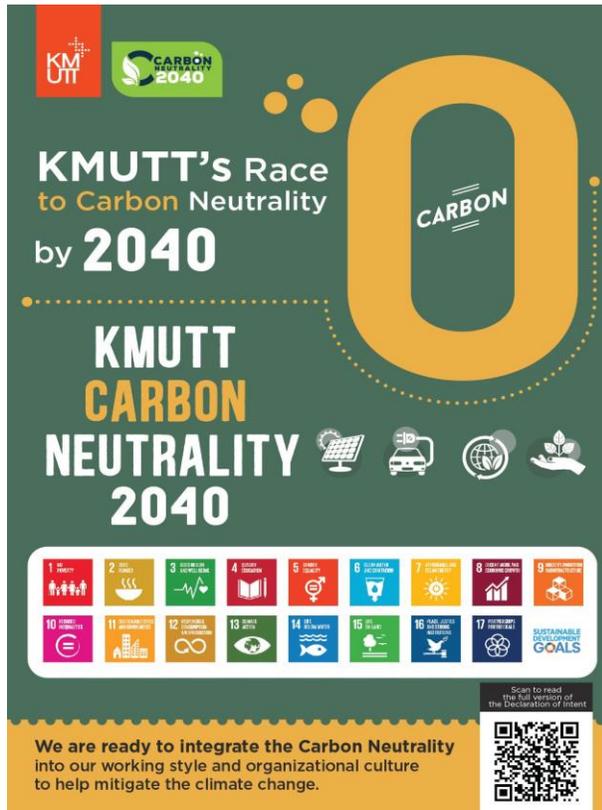


Highlight features of sustainable building technology:

- Install 39 kWp (output capacities) solar roof PV panel
- Promote natural light to reduce energy use and increase the quality of lighting in occupied spaces
- Use LED lighting in all areas of the building
- Use high performance (VRV or VRF) air conditioning system
- Promote natural ventilation in open space and common area
- Use insulated glazing unit around air conditioning area
- Introduce Building Automation System (BAS) for center of energy efficiency management
- Use Low-VOC paint and coating
- Increased total water use efficiency by >45% compared to standard buildings
- Use as much as possible of local, recycled and green building materials/products
- Provide prioritized parking space for bicycles, carpool, EV and hybrid cars



KMUTT's Race to Carbon Neutrality by 2040 Initiative



Setting Carbon Neutrality is another KMUTT strategic goal

▼

A special taskforce to drive KMUTT to net zero carbon emissions

▼

Declaration of Intent 'KMUTT's Race to Carbon Neutrality by 2040'

▼

KMUTT is a member of Thailand Carbon Neutral Network (TCNN)

▼

KMUTT signed up for 'Race to Zero' Campaign

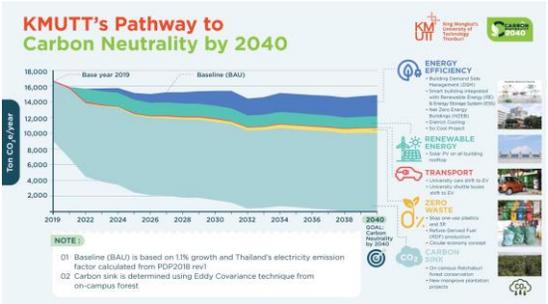
▼

KMUTT announced Pathway's to Carbon Neutrality by 2040



The three-pillar working plan to achieve KMUTT Carbon Neutrality by 2040

1. Reduction of GHGs emission (including carbon sink) to achieve carbon neutrality

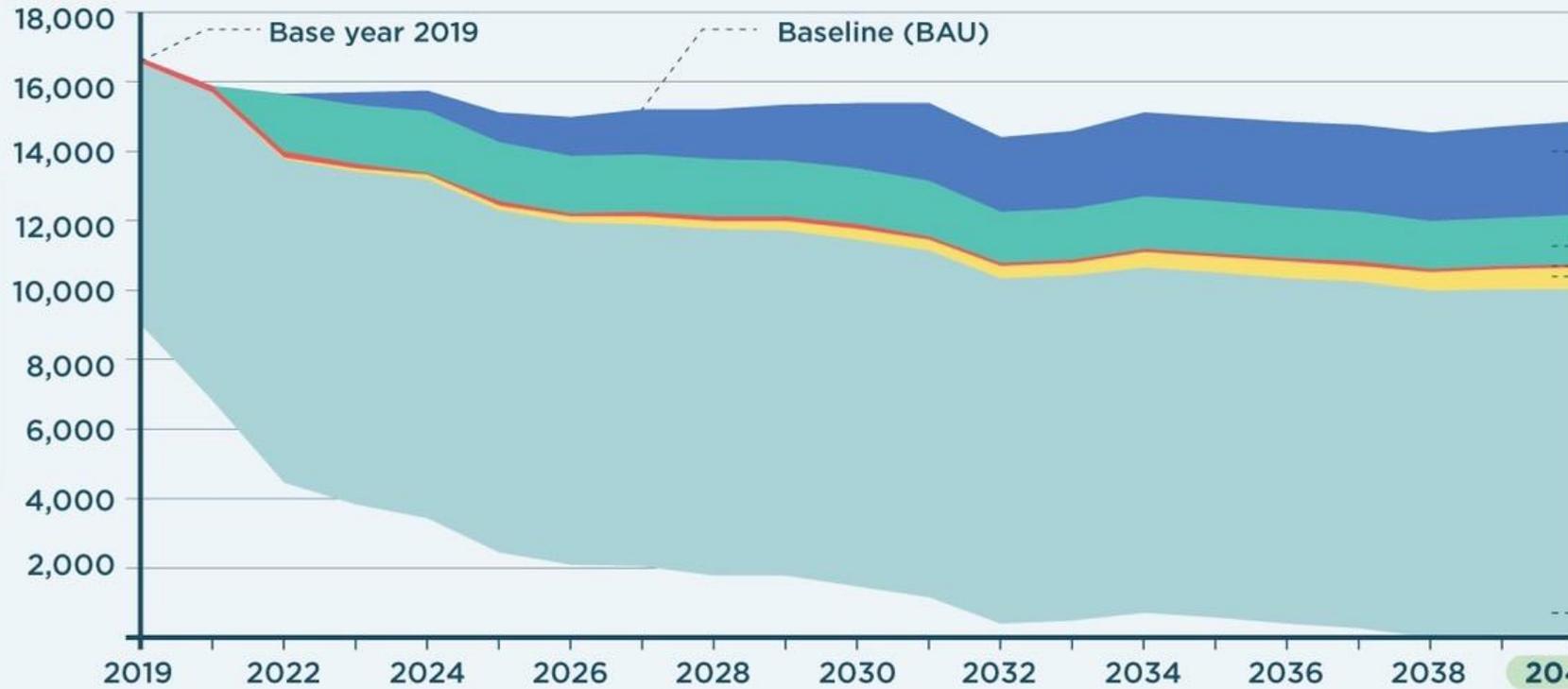


2. Knowledge, awareness and engagement

3. Integrating Carbon Neutrality with other KMUTT strategic goals



KMUTT's Pathway to Carbon Neutrality by 2040



ENERGY EFFICIENCY

- Building Demand Side Management (DSM)
- Smart building integrated with Renewable Energy (RE) & Energy Storage System (ESS)
- Net Zero Energy Buildings (NZEB)
- District Cooling
- So Cool Project



RENEWABLE ENERGY

- Solar PV on all building rooftop



TRANSPORT

- University cars shift to EV
- University shuttle buses shift to EV



ZERO WASTE

- Stop one-use plastics and 3R
- Refuse-Derived Fuel (RDF) production
- Circular economy concept



2040 GOAL:
Carbon Neutrality by 2040



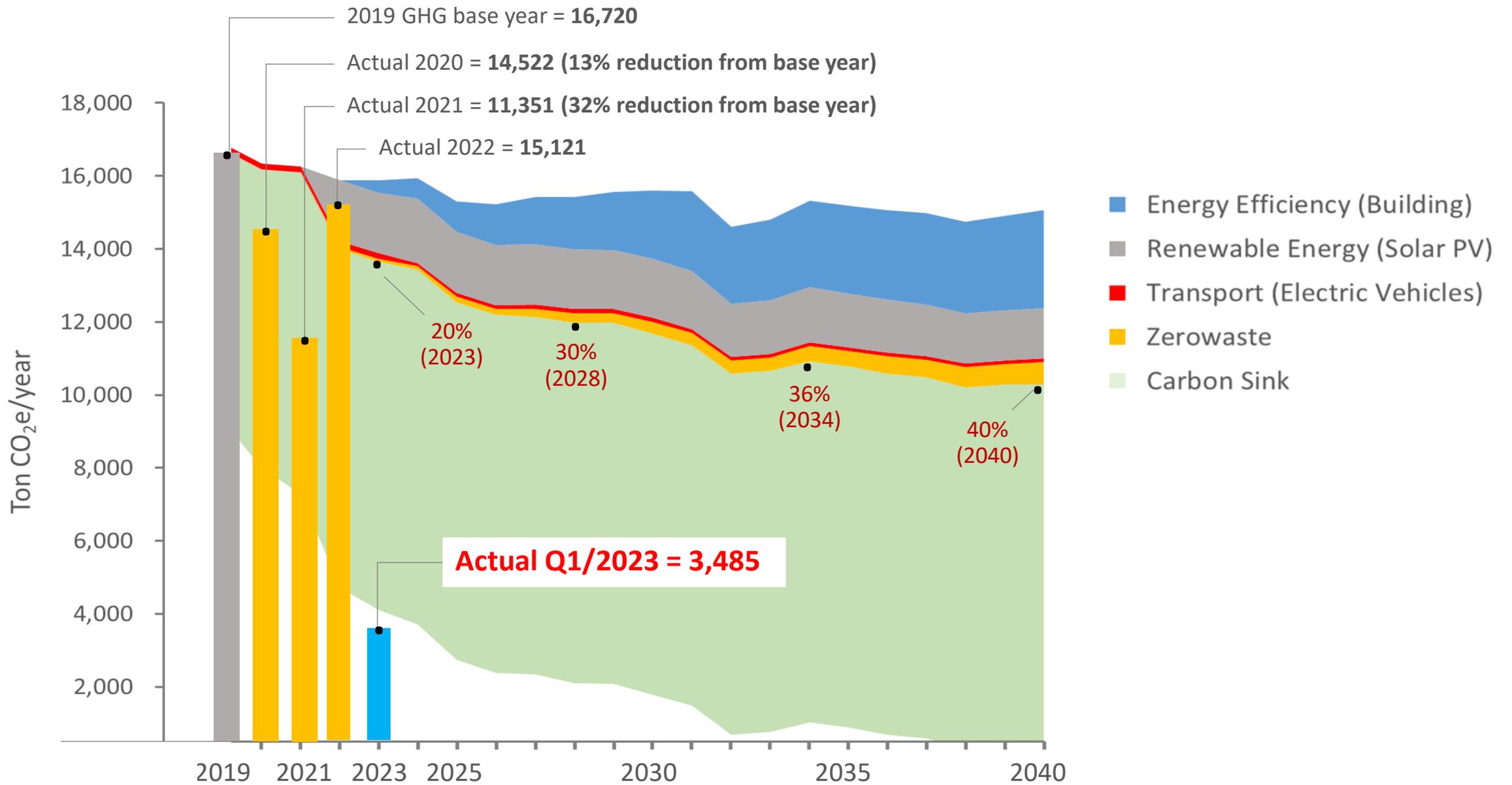
CARBON SINK

- On-campus Ratchaburi forest conservation
- New mangrove plantation projects



NOTE :

- 01 Baseline (BAU) is based on 1.1% growth and Thailand's electricity emission factor calculated from PDP2018 rev1
- 02 Carbon sink is determined using Eddy Covariance technique from on-campus forest



% = estimated carbon reduction by 4 main measures from 2019 base year

Scope	การปล่อยก๊าซเรือนกระจกขององค์กร (CO _{2,eq})					
	2019		2020	2021	2022	Q1/2023
Scope 1 ^a	282	1.7%	322	186	193	19 ^b
Scope 2	15,744	94.2%	13,772	10,878	14,420	3,396
Scope 3	690	4.1%	428	287	508	70 ^c
Total	16,720	100%	14,522	11,351	15,121	3,485

Remarks

^a Others: CO₂ emission from refrigerant (R22) is reported separately and not included here

^b Based on some data of fuel used for mobile source

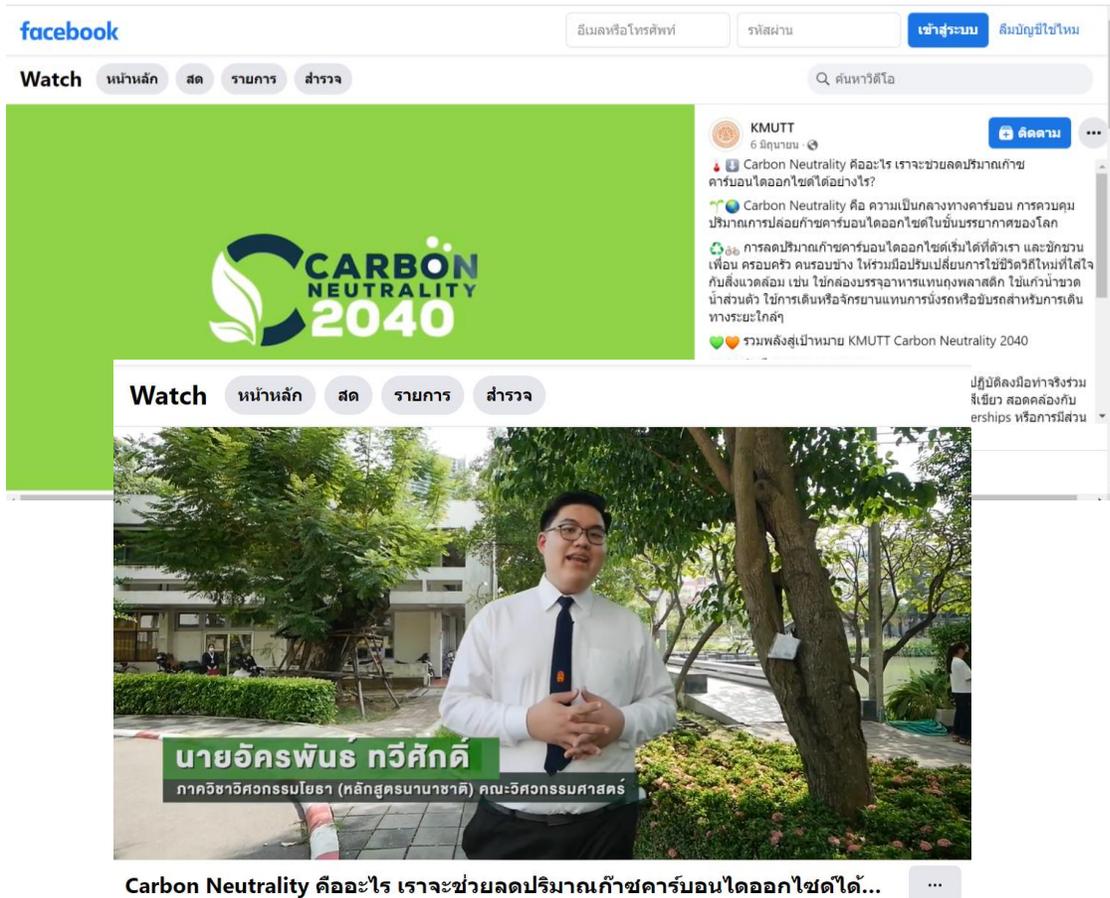
^c Scope 3 includes only water use

What is next in 2023?

- RE & EE measures including installation of 2.5 MW PV rooftop, building energy use reduction, FS of centralized cooling
- Launching of new EV charging stations/EV car sharing
- Zero waste scheme: waste sorting and recycle
- Mangrove plantation
- Complete the data in Scope 3
- Internal verification



Knowledge management & Raising awareness



Green heart student activities



KMUTT Carbon Neutrality Webinar Series by guest speakers from in and outside KMUTT

What are we doing and what is next in 2023?

- Activities through Zero waste scheme, energy conservation and mangrove plantation
- KMUTT Carbon Neutrality 2040 Webinar series by invited KMUTT staff and outside to give knowledge or sharing experience in sustainability and net zero emission policy and best practices
- Public relation
 - Content: GHG reduction activities in organisation, education, research and services to industry and community
 - Inside KMUTT for students and staff
 - Public

KMUTT Carbon Neutrality 2040
Webinar Series ครั้งที่ 1/2023
หัวข้อ: แนวทางดำเนินการและผลสำเร็จของมาตรการลดการใช้พลังงานและการจัดการพลังงานของมหาวิทยาลัย

KMUTT Carbon Neutrality 2040
Webinar Series ครั้งที่ 2/2023
หัวข้อ: การดำเนินงานให้บรรลุเป้าหมาย Zero Waste @ KMUTT อดีต ปัจจุบัน และอนาคต

ดร. ดร.จรรณรัตน์ แก้วประเสริฐ
หัวหน้าสาขาวิชาวิศวกรรมอุตสาหการและพลังงาน
และประธานชมรมพลังงานสีเขียวพลังงาน การจัดการพลังงานของมหาวิทยาลัย คณะวิศวกรรมศาสตร์

ดร. ดร.สุวิรัตน์ พุกศรี
อธิบดีกรมส่งเสริมการค้าระหว่างประเทศ (SSEI)
และประธานชมรมพลังงานสีเขียว
สำนักงานส่งเสริมการค้าในต่างประเทศ
สิงคโปร์ (Carbon Neutrality) พว. กรุงเทพฯ

ดร. สุธาดา ไชยสวัสดิ์
รักษาการผู้อำนวยการศูนย์ EESH พว.

สัมมนาออนไลน์ผ่านระบบ Zoom (บรรยายเป็นภาษาไทย)
ติดต่อสอบถามเพิ่มเติม
นายปรีชา อากาศ
โทร. 0-2470-8271, 086-377-6179
Email: preecha.ara@kmutt.ac.th

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ลงทะเบียนได้ที่
<https://www.eesh.com/Thailand2023>



Integrating Carbon Neutrality with other KMUTT strategic goals



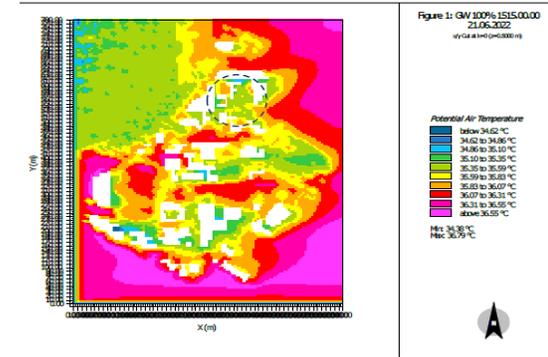
- Increase content/ no. of courses with sustainability issues and extra curricula
- Promote research related to sustainability and carbon mitigation and support with impact to industry and community as well as living labs
- Engagement with community for resilient society
- Sustainable and green infrastructure
- Sustainable management and engagement of staff

Research & Innovation

Clean and Low Carbon Energy



Sustainable bioenergy for industrial decarbonization



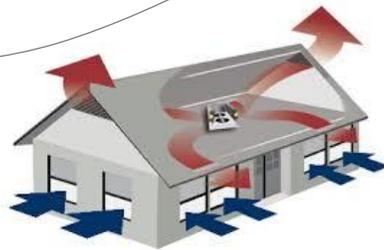
“So Cool” Reducing urban heat island



Smart energy system



Sustainable mobility



Near zero energy building

Support to industry

MOU Signing Ceremony for Establishment of the Thai Livestock Technical Consortium for Climate Neutrality



Supporting SMEs to reduce carbon emission through consultation on improved and green process by BCG Model



Waste utilization - recover eggshells for valued products



Improvement of egg separation process



Better efficiency refrigeration system

Support to community

Clean energy for rural areas

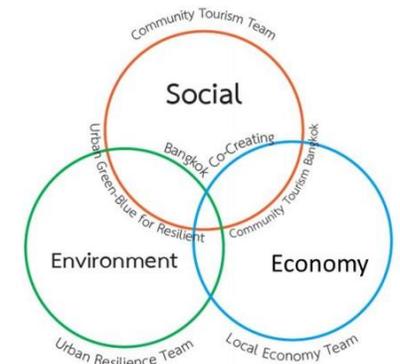
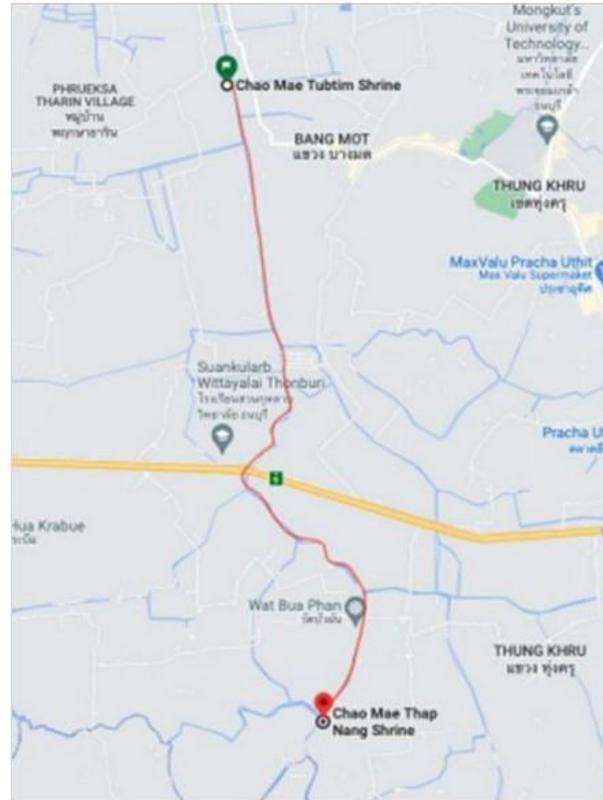


Solar-wind hybrid system @Phukradueng, Petchabun



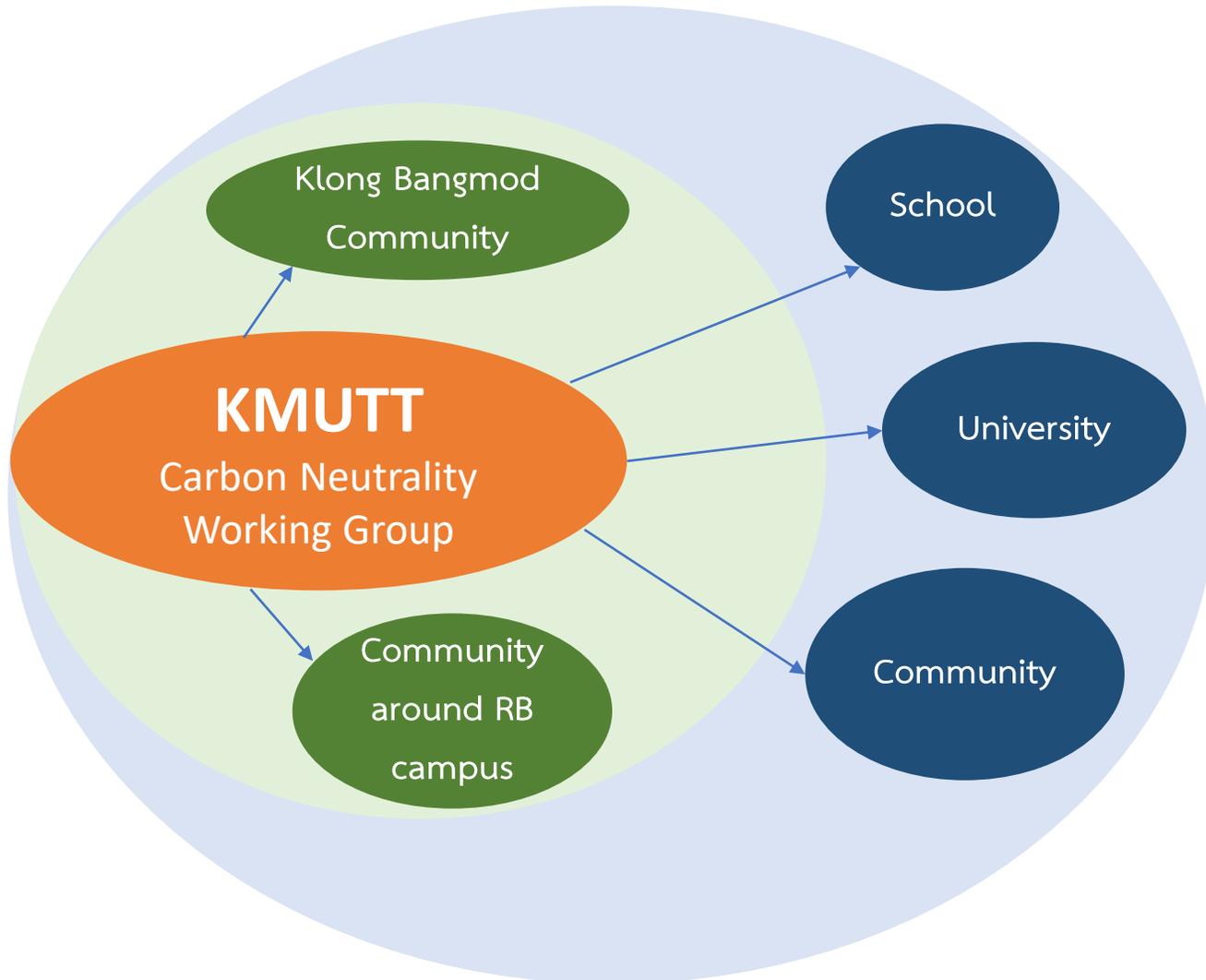
Small hydrokinetic turbine @Tarutao National Park, Satul

Bangmod Co-creating Urban Green-Blue Community Tourism for Resilient Bangkok



SAFETist Farm

KMUTT as university best practice for sustainability and carbon neutrality



Net Zero University

- KMUTT as university best practice for carbon neutrality
- Living laboratory for RE, EE, ...
- Organizational culture
- Creating change agent

Low carbon city

- Use knowledge and technology from university to create solution for community
- Community engagement to work together to become carbon neutral and sustainable community

National level

- Transfer knowledge/technology and replicate the best practice to other schools/universities/communities



For more information, please contact Dr. Suneerat Fukuda at suneerat.pip@kmutt.ac.th