

SDG 17.3.11

NUK's efforts in SDG11 are as follows:

1. NUK takes the construction of a sustainable and ecological green campus as its founding philosophy. In addition to dividing levels of maintenance and management areas according to ecological diversity, an ecological pond absorbs reclaimed water and is functioned as effluent disposal, and flood control. It functions as drainage, while providing habitat for water birds. Motorcycles are forbidden on campus, and public bicycles are widely set up to create a safe and comfortable space.
2. Since 2019, a sustainability report has been issued every year to illustrate the results of SDG 11 planning and implementation: measures to promote inclusiveness, safety, resilience and sustainability of cities and human settlements. See the website (<https://ces.nuk.edu.tw/p/412-1011-5978.php?Lang=zh-tw>)
3. **The attachment** is the summary of SDG11 in 2024.

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5.1 Green, Smart and Sustainable Campus

In response to the United Nations' goal of sustainable development, integrate sustainable development affairs and resources across administrative and academic units, and implement the spirit of SDGs, ESG, and CSR in all aspects of the University, the 193rd NUK University Council approved the establishment of the National University of Kaohsiung Sustainable Development Promotion Committee on March 10, 2023, with the president as the convener and the vice presidents as the vice conveners. Under the committee, there are four sections: "University Governance Section", "Curriculum, Teaching, and Social Responsibility Section", "Campus Environment Section", and "Research, Industry, and Academic Resources Section" to integrate resources, regularly supervise the achievements of cross-unit work teams, and review the implementation of annual plans.

5.1.1 Sustainable Campus Environment Management

Organizations Related to Campus Environment

1. The Campus Environmental Safety and Health Section: Its duties include safety and health, environmental protection and campus planning.
2. 9 Committees
 - A. Campus Sustainable Development Promotion Committee: The committee was established to respond to the United Nations' goal of sustainable development and to integrate sustainable development issues and resources across administrative and academic units.
 - B. The Campus Sustainable Development and Planning Committee: to review and implement the ideals of environmental development and establish a mechanism for sustainable development of the campus.
 - C. The Environmental Protection, Safety and Health Committee: to maintain the quality of the campus environment and ensure the safety of the laboratory operations of faculty-staff and students in accordance with relevant laws and regulations such as environmental protection and labor safety and health.
 - D. The Energy Conservation Committee: to strengthen the management

of energy and promote the rational and effective use of energy in accordance with the provisions of Article 6 Paragraph 1 of the Enforcement Rules of Energy Administration Act.

- E. The Biological Experiment Safety Committee: to ensure the experimental safety of faculty and researchers engaged in genetic recombination-related research in accordance with "Genetic Recombination Experimental Code" of MST.
- F. The Laboratory Animal Care and Use Committee: to supervise the management and use of laboratory animals in accordance with Article 16 Paragraph 1 of Animal Protection Act, with English title "Nation University of Kaohsiung Animal Care and Use Committee".
- G. The Public Art Executive Panel: to budget public art funds and implement public art projects in accordance with "Regulations Governing the Installation of Public Artwork".
- H. The Public Art Selection Panel: to handle the selection and installation site of public art projects.
- I. The Public Art Appraisal Panel: to conduct appraisal after public art is installed.

University Self-defined Regulations

NUK currently has six regulations on campus environmental safety and health.

1. NUK Environmental Safety and Health Policy
2. NUK Safety and Health Management Regulations
3. NUK Code of Practice for Laboratory Safety and Hygiene
4. NUK Waste Disposal Act
5. NUK Measures for the Establishment of the Environmental Protection, Occupational Safety and Health Committee
6. NUK Measures for Establishment of the Environmental Safety and Health Center



Air Quality Status and Management

1. Air quality status and management: NUK has 94 laboratories equipped with forced air extraction equipment for exhaust cabinets: There are 55 in the College of Engineering and 39 in the College of Science. The gases are collected and discharged by a common pipeline in the activated carbon adsorption facility on the top floor of the buildings.
2. Indoor air quality management: "Indoor Air Quality Management Act" was implemented in 2012, and the first sites needing compliance with "Act" were announced in 2014. The University Library was on top of the list for management. In order to protect the health of faculty, staff, students and the public, priority is given to installing a set of fixed-point continuous detection modules in the Library lobby on the second floor of the building in 2016 which was rated as a site with good indoor air quality in 2021. Table 5-1 shows that all of the 2023 test data meets national standards, and because a good site has been obtained, the frequency of testing is every three years, and indoor air quality will continue to be maintained to meet the next test.

▼ Data of Regular Inspection of Indoor Air Quality in the Library 2023

test item	unit	test data	legal standard
CO2	ppm	454	1,000
CH2O	ppm	0.02	0.08
PM10	µg/m3	6	75
Bacteria	CFU/ m3	59	1,500



▲ Indoor air quality real-time monitoring panel



▲ Good indoor air quality certificate

Occupational Safety and Health Management System

In order to ensure the safety of the faculty and students of NUK, in accordance with the occupational safety and health laws and regulations and the NUK's applicable workplace safety and health code, the laboratory safety and health and campus inspections are regularly implemented, following the authority and the MOE's management and inspections to ensure the safety of all faculty members and reduce the occurrence of disasters. In addition, NUK cooperated with MOE and the Labor Inspection Office of the Kaohsiung City Government to implement the campus safety and health guidelines for the Southern Alliance of Colleges and Universities.

1. **Management organization:** In order to integrate the management of workplace safety and health, toxic chemicals, radiation, and fire protection, NKU set up an Environmental Protection and Safety and Health Committee in accordance with relevant laws and regulations. The president-chair presides over the quarterly discussions on major environmental safety policies and topics which are recorded and compiled for future reference. The Committee includes the president as the chairperson, 3 administrative heads, 7 faculty representatives, 1 staff representative, 1 student representative and 1 occupational safety and health nurse, totaling 13 members.
2. **Establishment of occupational safety and health management system:** Establish and implement occupational safety and health management plans based on the Occupational Safety and Health Law, including management of machinery and equipment, marking and general knowledge of hazardous and harmful materials, planning and measurement of sampling strategies for hazardous working environments, and safety and health education and training. Formulate safety and health policies to announce to faculty, staff, students and all contractors. In addition, NKU Safety and Health Work Code was formulated in accordance with the Occupational Safety and Health Act, and was revised and approved by the administrative meeting on December 9, 2018, and reported to the Labor Inspection Division of the Labor Bureau of Kaohsiung City Government for reference.



A. NKU occupational disaster statistics are regularly compiled by the Environmental Safety and Health Center on the Internet to report the monthly occupational disaster statistics, and keep records for the authority in charge to check. No accidents occurred in 2024.

▼ Statistical analysis of accidental injuries 2024

	Faculty		Staff		University hired	
	M 	F 	M 	F 	M 	F 
Employee Disabling Frequency Rate (FR)	0	0	0	0	0	0
Employee Disabling Severity Rate (SR)	0	0	0	0	0	0
Occupational Disease Incidence Rate	0	0	0	0	0	0
Absenteeism rate	0%	0%	0%	0%	2.24%	1.2%
Total death	0	0	0	0	0	0

Note:
FR & SR do not include traffic
accidents in commute

1. FR= number of disabling injuries/Number of man-hours worked
2. SR = days lost in a year due to accidents x 1000,000/number of man-hours worked
3. Absenteeism: Occupational Sickness Leave + Sick leave/total period (yearly work day x number of the gender) x 100%
4. The total working hours are accumulated based on the monthly working hours data of Personnel Office

B. Regularly and occasionally conduct environmental safety inspections of experimental sites, assist in the improvement of laboratory shortcomings and review the progress of improvement for unqualified items, and cooperate with the Laboratory Safety and Health Certification System promoted by MOE.

C. The Environment Safety and Health Section regularly cooperates with MOE to declare the number of dangerous machinery and equipment in NKU practice (study) sites in April and October yearly.

▼ Statistics of dangerous machinery and equipment

Lab name	Equipment	Type	No. of room
Wood & Bamboo Design Studio	Grinding machine *1	danger	1
Wood & Bamboo Design Studio	Circular saw for wood *1	danger	1
Magnetism Semiconductor Lab	2 nd pressure vessel*1	danger	1
Nano-Optoelectronic Lab	2 nd pressure vessel*1	danger	1
Microbial Biochemistry Lab	Autoclave*1	danger	1
Plant Biochemical Lab	Small pressure vessel*1	danger	1

D. For machinery, equipment or appliances specified by laws and regulations, it is required to gradually improve appropriate protective facilities, and to post standard operating procedures, where the machinery and equipment are clearly visible to comply with the regulations.

E. The mechanical equipment and appliances used in the contracted project are stipulated in the contract that the contractor must meet the legal standards and regulations, and the contractor will control the usage; otherwise, they will not be allowed to enter the site.

3. Implement the management of hazardous and harmful materials

A. The chemicals in the laboratory shall be classified and labeled according to "Regulations for the Labeling and Hazard Communication of Hazardous Chemicals" and "NKU Hazardous and Harmful Substances General Knowledge Plan", implementing "Globally Harmonized System of Classification and Labeling of Chemicals (GHS)". The University adopts laboratory supervising, educational training, and requires drug suppliers to cooperate in improving chemical labeling, so that the NKU drug management can gradually comply with the regulations of GHS.



B. The University labs list hazardous chemicals and safety data sheets for the reference of lab personnel. The storage of hazardous and harmful materials is managed by the guidance of a supervisory laboratory according to the attributes of the drugs. In environmental safety inspection, they have to confirm the records are regularly renewed in compliance with laws and regulations. In addition, hazard warning signs are set up in controlled areas in accordance with laws and regulations for special hazardous workplaces.

C. Lab refrigerator storage cabinets clearly prohibit the storage of food in accordance with laboratory rules, and no eating or drinking is allowed in the laboratory.



4. Management of Toxic Chemical Substances

- A. The school applies for permits for use of all toxic chemicals from the Environmental Protection Bureau of Kaohsiung City Government in accordance with laws and regulations. There are currently 80 kinds in total. In order to control the purchase of toxic chemical substances, records are filed and kept in accordance with regulations. The information is compiled and reported to the Environmental Safety and Health Committee in session.
- B. In order to integrate and manage the safety and health, toxic chemicals, and radiation at the laboratories, the Environmental Protection and Safety and Health Committee is set up in accordance with statutory regulations, and meets quarterly.
- C. The Campus Environmental Safety and Health Center regularly visits the operating sites of toxic chemical substances to understand the actual operating conditions of the laboratories to provide guidance and make improvements.

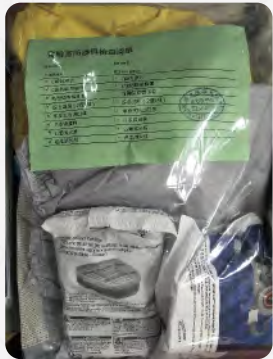
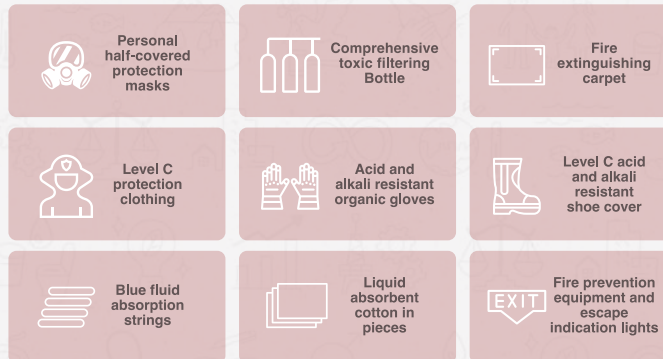
5. Hazardous work safety and health management

- A. Before assessing hazard risk in the experiment performed by every lab, each lab should first check the experimental conditions, and then the staff of the Environmental Safety and Health Center will assist in completing in records according to the assessed hazard level. Afterwards, it will evaluate whether construction improvement or personnel improvement is needed. The Environmental Safety and Health Center will assist completing the necessary improvement.
- B. Formulate standard operating procedures for various environmental safety and health services, and publish them on the website of Environmental Safety and Health Center for enquiries and follow-up by faculty, staff and students.
- C. Implement lab work environment measurement in April and October yearly. The types, dosages and frequencies of hazardous substances in each lab are used to evaluate laboratory hazard exposures and be used as sampling points for the work environment. If the results or work environment measurement are not in compliance with laws and regulations, the deficiency will be immediately improved to meet the permissible concentration standard of harmful substances

6. Occupational disaster prevention measures

- A. Regularly test the radiation of the working environment.
- B. Fire safety management
 - a. A fire protection plan is established and implemented in accordance with "Fire Services Act".
 - b. The fire prevention facility is entrusted to the fire prevention equipment company to carry out inspection, maintenance and supervision monthly. When any malfunction occurs, it will be immediately repaired to maintain normal functions.
 - c. The school fire safety equipment is regularly inspected, maintained and repaired, and a fire safety inspection report is prepared.
- C. Distribution, labeling and management of protective gear
 - a. The school is equipped with protective items and emergency equipment, including chemical absorbent cotton, protective clothing, emergency oxygen supply devices, and gas masks, which are placed in accessible locations according to regulations and clearly labeled.
 - b. The laboratories are equipped with sufficient personal protective equipment, first aid kits and fire extinguishers, and the laboratory rules are required to clearly stipulate that appropriate protective equipment should be put on when entering the laboratory.
 - c. Emergency shower and eyewash equipment are installed outside the lab, which the Campus Environmental Safety and Health Center regularly inspects and repairs. When malfunction occurs, the lab will immediately ask a professional company to repair it.
 - d. Personal protective equipment and fire prevention facilities in the lab should be managed by the lab itself for maintenance and self-inspection; the first aid kits should be replaced by the lab itself.





▲ List of lab protective gear

D. Accident investigation: When an accident occurs in school, the person who finds it must report to the department supervisor and immediately report to the Environmental Safety and Health Unit in the General Affairs Office. The department supervisor should take response and handle in accordance with the relevant emergency response procedures. After the accident is handled, the Environmental Safety and Health Unit convenes relevant departments to investigate, analyze and confirm the circumstances and causes of the incident, and submit "School Disaster Accident Report" to the management representative for confirmation, review and improvement. If necessary, the report is submitted to the Environmental Protection and Safety and Health Committee for explanation.

7. Safety and health education and training

A. For freshman education and training, the Safety and Health Center hires experts and scholars in the field of occupational safety to schedule 3 hours of related courses every academic year. In addition, 3 hours of safety and health education and training are scheduled for lab personnel to strengthen the implementation of lab safety and health. In addition, lab instructors are invited to promote the safety and health rules of each lab for students in the first week of the lab course.

B. Ionizing radiation education and training are regularly held once a year for 3 hours. All faculty, staff and students who use radiation equipment must attend.



8. Occupational safety management of contractors

A. accordance with Article 26 of the Occupational Safety and Health Act, when all or part of the University business is handed over to contractor, the contractor shall be informed in advance of the working environment, hazards, and safety and health requirements to take necessary measures. Before each outsourcing work is delivered to the contractor, both parties must jointly sign a contract. During the contract period, in addition to complying with the provisions of the contracted project, they must abide by the government's occupational safety and health, environmental protection, and fire protection laws and other relevant laws and regulations.

B. The school also requires the contractor to designate the person in charge of the contracted project in the design phase and before the construction of each project phase for the public construction project in the school, and to act as command, supervision and coordination work. According to its design planning, construction method or operation type, reports on hazard identification, risk assessment, and control measures taken based on the assessment results are submitted, and the formal construction can be carried out after the school's contracting unit has reviewed and confirmed it. In 2024, there was no occupational accident in the contracting of on-campus projects.



5.1.2 Green Smart Campus and Buildings

Every new school building has been awarded the Green Building Label since 2012, and the Student Activity Center in 2022 has been awarded the Smart Building Label in addition to the Green Building Label.



▼ List of green buildings

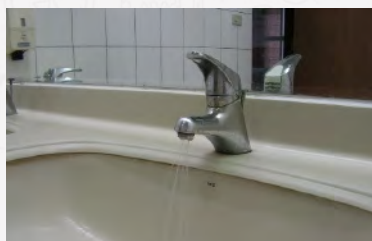
Building	Date	Award
College of Humanities and Social Sciences Building	Oct. 2012	9 indicators of Gold Label Green Building
	2013	Participated in the Kaohsiung Green Building Award and won Public Building Award and Rainwater Storage Facilities and Reuse Award
Administration Building	Sept. 2014	9 indicators of Bronze Label Green Building
Second Student Dormitory	April 2016	Qualified Green Building Label for Dormitory
Student Activity Center	July 2022	Basic Type of Qualified Green Building Label
	Dec. 2022	Smart Building Label

5.1.3 Water Resource Management

Water resource treatment system

The main source of water for NUK comes from the tap water provided by District 7 of Taiwan Water Supply Company. The main source of water comes from the Gao-ping River, which is not significantly affected by the water intake.

Starting from 2010, the school cooperated with government agencies and implemented the Four-Saving Plan. Although the Plan ended in 2015, it has continued to implement water-saving measures and intended to reduce the annual water consumption by 2% compared with the previous year. It aims to review the annual water conservation goals, but in recent years, the weather has been hot, and water consumption increases year after year. Due to the pandemic in 2020-2021, online teaching was adopted. Since the faculty and students were not on campus, the consumption of water decreased significantly.



Reclaimed water system :

The water treated by the school sewage treatment plant meets the discharge water standard. Except for heavy rain, 100% is recycled and stored in the middle tank of the sewage treatment plant and used as the campus ecological water system, irrigation, and plants to use.



Rainwater recovery system :

The rainwater storage and reuse system set at the College of Humanities and Social Sciences is mainly to replenish the artificial lake nearby as an ecological water system.



Water-saving facilities :

Budgets are made year by year to replace the urinals and toilets of male and female toilets and the taps on each floor to water-saving equipment.



Specific improvement measures for water saving in toilets include the widespread installment of two-stage flushing toilets or water-saving toilets

▼ Statistics of water consumption

Year	Billing interval	Meter unit	Water saving rate calculated	Water recovery volume	Water recovery PCT
2015	2014/11/19~2015/11/23	163.032	—	—	—
2016	2015/11/24~2016/11/22	188.022	-15.33%	117.309	62.39%
2017	2016/11/23~2017/11/21	176.309	6.23%	111.621	63.31%
2018	2017/11/22~2018/11/21	203.49	-15.42%	171.938	84.49%
2019	2018/11/22~2019/11/21	204.291	0.00%	179.294	87.76%
2020	2019/11/22~2020/11/21	152.389	25.41%	141.934	90.00%
2021	2020/11/22~2021/11/21	139.024	8.77%	128.551	92.47%
2022	2021/11/22~2022/11/21	182.021	-34.70%	172,489	94.76%
2023	2022/11/22~2023/11/21	161.823	11.10%	149,416	92.33%
2024	2023/11/22~2024/11/21	160.073	1.08%	147,735	90.78%

*Water conservation rate = (last year's tap water use - current year's water use) / last year's water use

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▼ Discharge water quality test data and discharge water volume

Test Item	2021	2022	2023	2024	Discharge standard
BOD(mg/l)	10.5	15.5	12.4	7.5	30
COD(mg/l)	39.9	58.1	48.7	29.5	100
SS(mg/l)	7.55	8.2	6.7	8.5	30
Escherichia coli(CFU/100mL)	23,988	33,900	58,250	164,000	-
Grease(mg/l)	0.7	1	0.85	0.5	10
Water temperature(oC)	28.7	27.9	26.6	27.2	35
PH	7.6	7.7	7.7	7.6	6-9
Discharge volume(CMD)	9,813	14,818	22,100	14,959	-

▼ Drinking water

NKU has a total of 135 drinking fountains, and outsources regular monthly maintenance and regular replacement of filter materials, tank cleaning and disinfection. In accordance with the current drinking water laws and regulations, at least 1/8 of drinking fountains are inspected quarterly, i.e., 17 units, but the actual number inspected is 18 units. Water quality testing is based on the principle of sampling at least two drinking fountains in each building and once a quarter.

▼ Drinking Fountain Test Results

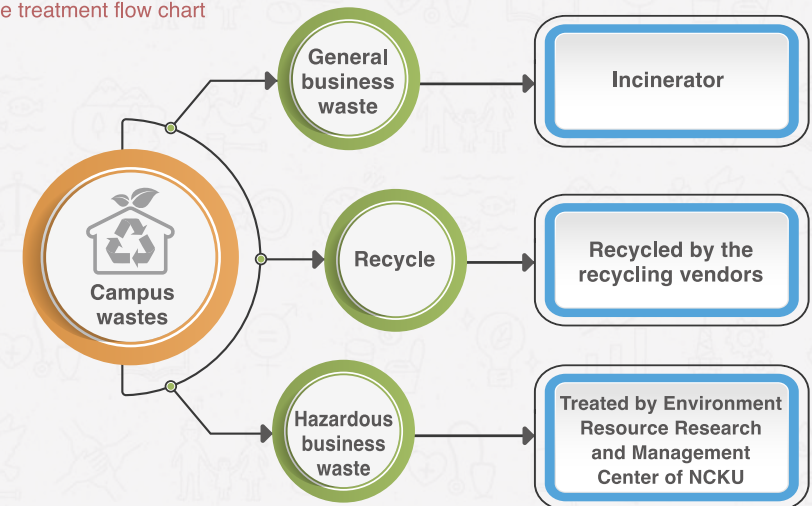
Test Item	2022	2023	2024	Standard
Escherichia coliCFU/100mL	<1	<1	<1	6

5.1.4 Waste Management

The University waste output can be roughly divided into general business waste and recyclables generated in the dormitories and offices, and hazardous business waste generated in the laboratories. General business waste is entrusted to the manufacturer to be transported to the incineration plant for incineration; the harmful industrial wastes are cleaned and transported by qualified cleaning and transportation companies to Resource Recovery Plant of Environmental Resources Research and Management Center, National Cheng Kung University for disposal. In 2024, the amount of recycled resources was 13.19 tons, and the total amount of general garbage was 302.21 tons, with a

total recycling ratio of 4.36%, which fell short of the target of 10%. The reason for this may be due to the increase in the amount of foreign garbage and the way in which the garbage is handled during certain periods of time, resulting in a decrease in the recycling ratio. The University will continue to strengthen its efforts to reduce the amount of foreign garbage, enhance the separation of garbage, and handle garbage during certain periods of time.

▼ Waste treatment flow chart



▼ List of general industrial waste disposal 2024

Hazardous waste			Non-hazardous waste		
Treatment	On-site	Off-site	Treatment	On-site	Off-site
Incineration (incl. recycling)	-	7.17	Incineration (incl. recycling)	-	289.02
Landfill	-	-	Landfill	-	-
Others	-	-	Others	-	13.19
Subtotal	-	7.17	Subtotal	-	302.21
total		7.17	total		302.21
Total waste			309.38		

Note: 1. Waste weights are in metric tons.

2. "On-site" is within the physical boundaries or administrative control of NUK; "off-site" is outside NUK's physical boundaries or administrative control.

3. All industrial wastes are sent to the entrusted manufacturer for disposal.

4. NUK has no transfer during disposal.

5.1.5 Strategy of Zero Emission Vehicles (ZEV)

Install 10 U-Bike stations and the 30 minutes are free for students.

1. Starting from 2020, the school has introduced the Kaohsiung City Government's resources to set up U-BIKE Smile Bikes on campus, and in August 2021, the 1000th Kaohsiung U-BIKE Celebration was held at the school.

A. 10 stations are on campus, located throughout the academic buildings and student dormitories, with over 200 bicycles available for use by students, faculty, staff, and visitors. All stations are equipped with bicycle racks. Students can borrow bikes for 30 minutes for free with the student ID.

B. Weblinks:

a. Celebrating U-BIKE's 1,000th Station News Website:

<https://www.nuk.edu.tw/p/404-1000-48183.php?Lang=zh-tw>

b. On campus UBIKE website:

<https://ga.nuk.edu.tw/p/406-1010-67835,r63.php?Lang=zh-tw>

c. Kaohsiung City Government promotes ZEV discount website:

<https://www.men-go.tw/#/MProductList>

2. Help publicize incentives for riding buses, rapid transit, light rail, and public bicycles.

In line with the Kaohsiung City Government and Kaohsiung Rapid Transit Corporation's low-fare policy, faculty, staff and students are encouraged to use public transportation more often.

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B. Weblink: <https://www.men-go.tw/#/MProductList>

4. Promote Taxi-Sharing System

A. In line with the policy of the Kaohsiung City Government's Transportation Bureau, the school offers discounted fares to encourage students and faculty-staff to switch to public transportation after sharing a taxi ride in order to reduce the use of private transportation. There are five transportation locations in the School of Management, the School of

Science, the School of Humanities and Social Science, the student dormitories, and the General Building.

B. Supporting Information (News)

<https://www.nuk.edu.tw/p/406-1000-14986,r77.php?Lang=zh-tw>

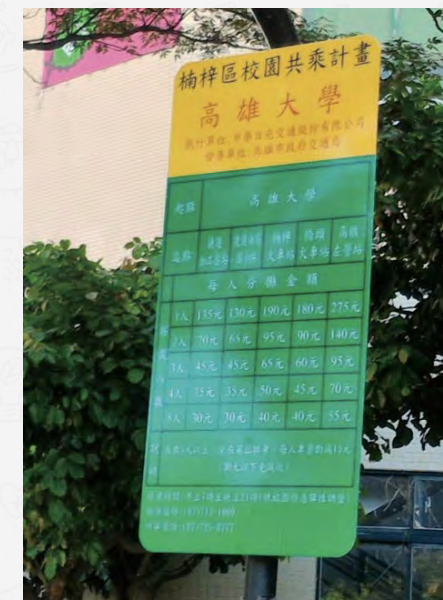
▼ 10 U-Bike stations are installed on campus to share with the public



▲ U-Bikes at Student Activity Ctr



▲ U-BIKE at Administrative Bldg



▲ Taxi Sharing Plan



5.2 Energy and Climate Action

5.2.1 Climate Change Response Strategies

In response to global climate change and in line with the direction of the national energy and emissions reduction policy, NUK signed "2050 Net Zero Emissions" declaration and goal in 2022 Sustainability Week. In addition to strengthening the concept of a sustainable university and the mutual support of curriculum, teaching, and administrative systems to implement campus climate action, specific details are being implemented in the 2023-2026 mid-term plan. Therefore, in 2024, the response strategy was to review the current status of the sustainable campus through a detailed inventory, which are divided into two major parts, namely the campus environment and the SDGs related courses.

Construct Sustainable Campus Environment

The University is committed to practicing the SDGs spirit and a green university with friendly campus. Therefore, the current environmental inventory of the campus can be divided into external feedback, energy equipment, smart monitoring system, and water-saving facilities. The description is as follows.

1. External feedback: After many years of effort, the school has been recognized with the Green Building Label, the Local National Important Wetlands, and awards for quality of construction in the areas of buildings, health, and animal and plant habitats. We have also participated in national and international competitions to learn what we can do to strengthen and learn from other schools' efforts on sustainability issues. The following is a description of the school.

A. Participate in the Sustainability Report and participate in judging: Starting from 2019, we have published a sustainability report for the previous year's sustainability environment, and so far, we have received 3 gold and 1 silver medals in the Corporate Sustainability Reporting category of the TCSA Taiwan Corporate Sustainability Award, and the sustainability report to be published in 2024 is posted on the university's website (<https://ces.nuk.edu.tw/>) and has been recognized by TCSA Taiwan Corporate Sustainability Award in the category of Sustainability Reporting with Bronze Medal.

B. Participation in UI Green Metric World University Rankings: The results

of the 2024 UI Green Metric World University Ranking were announced on December 18, 2024. 1,477 institutions from 95 countries participated in the competition, and we were ranked 278th, which is in the top 18% of the world's universities. Compared to 2023, when 1,183 institutions participated in the competition and the University was ranked 285 out of 24% of the world's universities, this is a significant improvement. It also proves that our efforts and direction in promoting green and sustainable campuses have been recognized. Among them, our infrastructure and transportation projects are the best. The following is a description.

a. Ranked 8th among the participating universities in Taiwan in "Infrastructure" category. The reason for this recognition includes the signing of the Talloires Declaration on June 5, 2004 at the beginning of the school's founding, making it the first green university in Taiwan. The 82.5 hectares of campus land, former farmland and fish farms, was acquired by the Kaohsiung City Government, and after a series of environmental restoration, the forest and vegetation area of the campus has reached 51.64%.

b. In addition, the campus has created an ecological pond, East Lake, ecological watercourse, and water-friendly spaces, plus 10 public art displays such as "Happy Together" located in various locations. It is combined with more than 300 hectares of off-campus periphery into a university community to carry out environmental education and management based on the concept of "lungs of the community", and to attract the public to recreation, and furthermore the school holds outdoor teaching at the National Taiwan Education end to realize the spirit of commonwealth.

c. "Transportation" program: In the top 88.89% of global rankings, the program was recognized for controlling the entry of motorcycles into the campus, so that except for delivery and official vehicles, all motorcycles belonging to faculty, staff and students must be parked in designated parking areas. In cooperation with the Kaohsiung City Government and YouBike, the University has set up 10 parking stations on campus to facilitate the movement of faculty, staff, students, and the general public. In addition, the University controls



the number of vehicles entering the campus through a fare collection mechanism, and plans for five locations for sharing taxi rides in student dormitories and other places, and then transfers them to public transportation to reduce the use of private transportation.

- d. "Water Resource Management" project: ranked in the top 95% in the world because the University's wastewater is collected through the pipeline and treated at the wastewater treatment plant, and mainly discharged to the campus water system for lawn sprinkler irrigation and eco-waterway supplemental water, and then discharged to the first major drainage ditch at the north side of the bridge of the University, and then finally into Dien Bao Creek. In addition to the traditional secondary biological treatment, the wastewater treatment plant also provides tertiary treatment with screening and ozone sterilization, and the quality of the discharged water meets the April 29, 2019 revised discharge standards.

2. Energy Equipment: In line with the school's policy of creating green energy, the school has inventoried the available roofs of the school to install solar photovoltaic panels, each with 2,142.920kWp, including bartering and applying for green energy certificates.



► Solar Panels

3. Build a Smart Power Monitoring System: EMS Central Power Management System

- A. Smart Power Consumption Framework: All 12 buildings in the university are equipped with smart digital meters to monitor the total power consumption, air-conditioning power consumption, and power consumption in some areas of the



▲ 1st Student Dorm & General Dorm installed with 266 digital meters

buildings. The EMS central power management system collects, records, calculates, and analyzes data from digital meters across the campus, and further manages the loading and unloading of central air conditioners and stand-alone air conditioners in each building.

- B. Smart Electricity Management and Tariff Billing System: Used in the management of electricity consumption in student accommodation, the system can provide users with a systematic history of electricity consumption, alert notifications, achieve the goal of energy-saving smart living, and implement user billing. Optimize the electricity billing process to enhance the convenience of life.



- Electricity consumption in dormitories
- Calculation of Electricity Charges for Residential Students
- Tariff Maintenance
- Check-out Billing
- End-of-period billing
- Electricity Saving Notice Maintenance
- Payment Status Inquiry



▲ Smart Electricity Management and Tariff Billing System

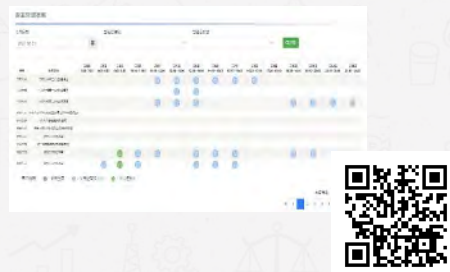
- C. Multi-payment system: Combine the digital student ID card with the multi-payment system to notify students of the amount of electricity bills due and information on electricity consumption, saving labor management and billing costs.



- D. Smart Cloud Management System: Use meter data to analyze the electricity consumption of dormitories and draw visualized charts. The administrator can send out real-time power consumption alerts in accordance with the energy-saving policy to urge students to adjust their power consumption.
- E. Classroom Air Conditioning Control System: In accordance with class schedule of each semester, the air conditioning system delivers and cuts off power according to whether the classroom is in session or not, so as to avoid wasting power when the air conditioning is on but the class is not in session.



▲ Smart Cloud Management System Webpage



▲ Classroom Air Conditioning System Website

5.2.2 Green Energy

1. The Administration Building and the Law College set up their own solar panels to generate electricity with a total capacity of 36.4kwp and applied for 15 renewable energy certificates.
2. In conjunction with the Million Rooftop PUs Project, the entire school building rooftops are equipped with solar power generation system bid lease, with a total of 2,142.960kwp and generated about 2.74 million kWh in 2024

1. Replacement and installation of energy efficient equipment: The University has been budgeting for the replacement of traditional appliances with energy efficient equipment since 2018. Compared to the base period in 2015, the average energy-saving appliances have been improved by over 81%, over 75%: and the electricity bill has been saved by over \$2.55 million per year. In 2024, depending on the annual funding budget, the following are completed:

- A. Replacement of power-saving air-conditioning \$2,289: 10 buildings have completed more than 9 air-conditioning using inverter-type installations (10/13=77%).
- B. Replacement of LED lighting fixtures \$184,000: over 85% of the lighting fixtures in the school buildings and roads around the school have been replaced with energy-saving LED lighting fixtures.
- C. The improvement of the average energy-saving electrical appliances has exceeded $(85+77)/2=81\%$, which is more than 75%

▼ List of solar power generation equipment

Site	Yr/Mon Installed	KWp	Mode of operation	MW 2023	MW 2024
College of Law	2004/12	26.400	REC	8,185	7,968.6
Admin. BL	2013/08	10.000	REC	2,917	2,367.8
College of Engineering	2019/12	209.450	FIT	282,144	279,352
Library & Info BL	2019/12	348.395	FIT	482,184	472,284
College of Management	2019/12	93.810	FIT	120,116	116,876
1st General BL	2019/12	154.875	FIT	209,696	206,344
Admin. BL	2019/12	57.525	FIT	78,716	78,292
Student Dorm	2020/01	56.640	FIT		
Duty Accommodation	2020/01	50.445	FIT	467,532	461,088
Motor-and-Bicycle Parking Lot	2020/01	246.620	FIT		
Sport & Leisure BL	2022/06	581.060	FIT	797,650	784,050
Student Activity Center	2022/10	307.700	FIT	401,460	332,454
Total		2,142.920		2,850,599	2,740,806

FIT : Feed-in Tariff REC : Renewable Energy Certificate



◀ Solar Panels



5.2.3 Effectiveness of Energy Saving Measures

In order to implement campus energy management and energy saving measures, energy saving strategies such as energy saving control management, retirement and replacement of power-consuming equipment, and utilization of renewable energy, as well as various action plans such as centralized power monitoring system, retirement and replacement of old air-conditioning system, and solar power system, have been formulated. From 2015 to 2024, the electricity saving rate reached 11.84%, and the EUI indicator will be reduced from 58.8 to 31.4.

Construct Sustainable Campus Environment

The major strategies and actions of electricity conservation measures are listed in the table below:

	Action plan	Description
Energy-saving control and management	Central electricity monitoring system	Network function of digital electricity gauge was used to conduct on-line monitoring and controls on the electricity usage of each buildings.
	Implement self-management on spaces	Self-management system on electricity bills will be implemented for each buildings in order to conduct "users pay" policies and save energy.
	Installation of electricity gauge in independent units and outdoor court	Independent electricity gauge will be set up to monitor the electricity usage of independent units and outdoor courts for the affiliated units to conduct electricity calculations and controls.
	Adjustment on the starting and stopping time of air conditioning	Implement the rules that air conditioning will not be supplied for administration building and general classroom during winter season (from December to March next year).
	Adjustment on opening hours of the library and information center	Different opening hours will be established for each space regarding its function and usage frequency. Those spaces will not be opened during Weekends of Winter and Summer Vacations.
	Participate in the demand-based price competition measures of taiwan power company	Participate in the demand-based price competition measures of Taiwan Power Company to save energy and electricity bills
Replace old electricity consumption equipment with new ones	Implementation of intelligent classroom step-by-step	For the project, we applied network cloud technology and used low carbon and energy-saving as our focus to implement intelligent air conditioning schedule management in teaching spaces such as general classrooms and seminar rooms at the 6 teaching buildings of the school. Users may send in real time through course arrangement system and space borrowing system, organize air condition monitoring and database management and implement comprehensive fully automatic air conditioning schedule control, temperature monitoring and the on off procedure control to enhance the correctness and liability in the management of air conditioning for classrooms, reaching the objectives of facilitating sustainable development of environment and enhancing the quality of learning environment.
	Replacing old Air conditioning system with new ones	Budgets were prepared to replace the old air conditioning system with frequency-conversion air conditioner system. Replacements have been completed in College of Science and College of Engineering.
	Replacing lightings with LEDs	Budgets were prepared to replace old light bulbs with LEDs. Replacements have been completed in campus circulating roads, streetlights at the parking lots and the classrooms of each buildings and seminar rooms.
Utilization of renewable energy	Replacing old air conditioning system with new ones	Student dorms adopts solar power hot water system 100% to provide hot water.
	Replacing lightings with LEDs	1. Administration building and College of Law installed solar power panels for electricity generation themselves. The total electricity generated was 36.4 kwp. In addition, they have applied for 15 renewable energy certificates. 2. To cooperate with the "million sun road" plan, we have installed standard solar power generator system on the roof of all the school buildings. In total, 2217.02 kwp was installed.

Electricity Consumption Statistics

Year	Total/kw	Total/GJ	Year over 2015	TOE	EUI
2015	14,201,510	51,084.57	-	1221.9	58.8
2016	14,528,086	52,259.30	-2.27%	1250	37.1
2017	14,090,386	50,684.84	0.81%	1212.3	36
2018	12,884,463	46,346.99	9.27%	1108.6	33
2019	12,970,796	46,694.89	8.67%	1116	33.2
2020	12,733,420	45,840.31	10.28%	1095.6	32.6
2021	11,292,628	40,620.97	20.43%	971.6	28.9
2022	11,959,686	43,020.46	15.79%	1029	30.6
2023	12,274,980	44,154.76	13.57%	1056.1	30.9
2024	12,520,011	45,036.17	11.84%	1077.2	31.4

EUI = Total electricity used (kWh)/NUK Total floor area
2015 was selected as the base year for the implementation of the Central Four-Saving plan.

Fuel Saving Measures

Two measures are taken to save fuel: a. Regular maintenance and inspection of the school's official vehicles are carried out to maintain efficiency and to save fuels; b. When replacing aged official vehicles, the purchase priority is given to the ones with high efficiency and low fuel consumption. The total fuel consumption in 2024 is 5102.56 liters, which represents a fuel saving of 17.69% compared to the base year 2019. However, if compared with 2023, an increase of 2.59% occurred due to the use of diesel fuel on campus for tree pruning equipment and vehicles in result of more natural disasters. In 2024, however, there were more natural climate disasters, resulting in an increase in usage.

Statistics on Fuel Consumption

Year	Gasoline/L	Diesel/L	Ttl Fuel Consumption/L	TOE	Fuel saving (%)
2019	5,227.26	880.41	6,107.67	4.8	-
2020	4,774.51	1,424.93	6,199.44	4.9	-1.50%
2021	5,690.06	847.16	6,537.22	5.2	-5.45%
2022	4,492.70	432.82	4,925.52	3.9	24.65%
2023	4,418.62	554.88	4,973.50	3.9	18.57%
2024	4,524.55	578.01	5,102.56	4.0	17.69%



5.2.4 Disaster Emergency Response on Campus

Crisis management is divided into three parts: crisis prevention, crisis management and recovery. Financial risks are minimized through prudent budgeting, proper allocation, and implementation of early warning.

Crisis prevention

1. Define the key points of the emergency response operation and the handling process: In accordance with the Ministry of Education's crisis handling regulations, "Key Points of the Campus Disaster Emergency Response Operation" and "Campus Emergency Response Flow Chart" to determine the procedure and responsibility; the Emergency Response Team is set up, with the Vice-President of Administration acting as the convenor, to convene the relevant units to form a team in the event of a major crisis on campus.
2. Establish a spokesperson system: The Vice President of Academic Affairs will serve as the spokesperson for the University. A press release or statement will be drafted by the Secretariat, compiling information from each unit, and then approved according to the procedures, and then the spokesperson will make a unified statement.
3. Establish a notification system and an emergency network: The University has set up an "Emergency Contact Center" in the campus police station, and a 24-hour emergency contact number on the homepage of the University's official website is available 24 hours a day to receive emergencies and report them to the University Security Center in a sequential manner.
4. Educational training, awareness-raising, and drills: Through various assemblies and electronic media, all faculty, staff and students of the university are educated, and crisis simulation drills are organized regularly to enhance the crisis awareness and crisis management of the entire university.
5. Improve campus environment and equipment: Regular inspections and repairs of campus space, facilities, and equipment are conducted; in addition, current technology is supplemented with the construction of a campus safety net to strengthen safety facilities to prevent accidents.

6. Establish a self-audit mechanism and divide the work according to authority and responsibility: coordinate with the Ministry of Education's Campus Safety Audit Form and organize coordination and division of labor meetings, according to the authority and responsibility of each office, to ensure the management of campus risks in order to avoid crises.
7. Prudent preparation of the annual budget and proper allocation of school funds: In accordance with Article 30 of "Regulations on the Management and Supervision of the National University Fund," the annual budget is prepared prudently and the budget allocation meeting is held to allocate funds to each business, so as to minimize the financial risk of possible financial shortfalls in the final accounts.

Crisis Management

According to the eight categories of campus safety notification, the school will use "Campus Disaster Emergency Response Practice Points" to minimize the damage and eliminate the crisis. In addition, in the event of a financial crisis, the Comptroller's Office will activate cost-saving measures to minimize the financial crisis.

Post-incident recovery

When the crisis is over, normal operation is resumed to learn, review and improve from it.

1. Accelerate the recovery work: After the crisis is handled, restore all aspects of the school's work promptly so that it can operate properly.
2. Follow-up counseling: The school will continue to provide care and counseling to those affected by the crisis to ensure that members of the school community receive assistance from the school to maintain a safe and healthy life.
3. Revise and review plan: Review and revise the crisis response plan to make up for deficiencies in staffing, support systems, and public communication during the crisis, so that the future response will be more comprehensive.



Effectiveness of Crisis Management in the School

1. Crisis Prevention

A. Continuously organize various educational training and awareness-raising activities: organize awareness-raising on crisis management cases through assemblies, such as class advisor camps, and promote students' awareness of crisis during Freshman Week. In addition, the school also publicizes crisis management issues to staff through electronic media, such as the monthly personnel service newsletter. In addition, regular crisis drills are organized, including the 921 National Disaster Prevention Day Disaster Prevention Drill and the annual dormitory Earthquake Drill, in order to enhance crisis awareness and resilience.

▼ Annual Earthquake and Disaster Prevention Drills

Category	Place	Time	Office in charge
Lab Safety Maintenance Training	Assembly Hall	Fresh Week	Gen. Affairs
Fire drill	Dormitories	After freshmen move in	Students Affair, Gen. Affairs
Archives emergency response drill	Files & Documents Section	Yearly	Gen. Affairs, Library

B. Mental health promotion for faculty, staff and students: Counselors, teachers, and roommates play a key role in depression prevention and treatment, so that they can understand the issues and help fight crises. First aid training is promoted every year, and "CPR+AED First Aid Promotion Activity" and other related injury and illness management courses are also organized.

C. Improve the campus environment and facilities: The University conducts regular inspections and repairs of the various spaces, facilities and equipment on campus to reduce the risk factor in the environment in order to comply with the benchmarking requirements of the facilities and equipment.

2. Crisis management

A. Activate the Emergency Response Team: In response to the Covid Pandemic, the Ministry of Education convened a meeting with university representatives on February 3, 2020 and announced the principles for handling the situation. The University immediately activated the Emergency Response Team, and at the meeting of faculty, staff, and student representatives on February 4, it was resolved that the start of the second semester of the 2019 academic year would be postponed to February 25 in order to minimize the risk of a mass clustering of students and to gain time to get ready to prevent epidemics before the start of the academic year. In order to quickly communicate the instructions from the Central Epidemic Command Center and the Ministry of Education, "NUK Epidemic Prevention Action" LINE group was set up on May 19, 2021, and is still in operation.

B. Emergency response by the relevant units: Based on the principle of immediate handling and honesty at the initial stage, notification and implementation of control and prevention of expansion are reported in accordance with the law.

3. Disaster recovery and maintenance of campus safety facilities

A. Post-disaster recovery program: After the disaster of August 23, 2018, and after Typhoon Krathon hit Kaohsiung on October 3, 2024, the University actively sought funds from the Ministry of Education for repairs and maintenance.

B. Campus Safety Facilities Maintenance Program.

a. In 2021, we received funding support from the Ministry of Education's "360-degree Safety Protection Network Enhancement Program for Sustainable Campus". We were also supported by fundraising in 2022.

b. From 2019 to 2025, in addition to the school's budget for the maintenance of campus safety facilities, the school will also actively seek a budget from the Ministry of Education for strengthening.





▼ Campus Safety Maintenance Funding and Utilization Results 2018-2024

Project	Year	Item	Total Funds	Result
823 Rainstorm Damage Recovery and Repair	2018-2019	Repair of school buildings and campus facilities	11,281,104	Handle emergency recovery from heavy rains and typhoons, as well as restoration of safety-related items.
	2024-2025	Recovery Plan for Krathon Typhoon	7,100,000	
360° Safety Protection Network	2021	Reinforce safety of campus facilities	11,710,000	Complete the safety facilities in dangerous areas, multi-dimensional distress system, and interface with the police reporting APP
Books & Equipment	2019-2025	Improve safety of campus facilities	21,498,845	Improve emergency response, access control, and driveway access control facilities at all buildings.
		Fire safety	12,579,000	Improve smoke detectors, emergency lighting, firefighting piping, broadcast blackout and zone control modules.
		Lab & campus safety		Improve laboratory environmental sanitation system, extraction system, personal protection, centralized double sinks.
Total			64,168,949	



5.2.5 Disaster Prevention and Relief Planning in Cooperation with the Government

Building Disaster-Proof Communities and Promoting Resilient Cities

The project is hosted by Prof. Ming-hao Wu of the Department of Civil and Environmental Engineering, who dedicates himself to promoting resilient community disaster prevention by utilizing his professionalism and influence. The goal of the project is to support the Kaohsiung City Government in conducting scientific research on disaster prevention and relief, analyzing potential areas for various types of disasters, formulating disaster prevention and relief plans, implementing and integrating resources, counseling the community to prevent disasters on their own,

and planning for micro-storage pools. The project is aimed at realizing "SDG11 Sustainable Cities" and "SDG13 Climate Action" through on-site investigations and integrating various resources in the community. Students are led to participate in disaster prevention and rescue drills and autonomous disaster prevention community observation activities to promote the goal of "SDG4 Education Quality"; and the Kaohsiung City Government's Bureau of Water Resources co-organized educational training and drills on new temporary flood prevention equipment, and students who passed the test obtained the qualification of Ministry of the Interior's Disaster Prevention Officer. It improves the capacity of the community's disaster prevention and rescue organization and helps the community operate as a resilient community.

Disaster Awareness Courses

Based on the types of disasters that each community is dealing with, and in conjunction with each type of disaster management, the courses are planned and designed for students and community residents. Through "Special Theory of Urban Disaster Prevention", "Disaster Prevention Officer Training Course", "Application of GIS in Resilient Cities", "Disaster Prevention Technology", and "Intelligent Disaster Prevention Workshops", students can participate in the course activities; during the counseling period at the community sites, education and training or publicity will be conducted according to the needs of each community's disaster management, teaching and learning of disaster prevention mapping, disaster prevention and rescue drill planning, and the writing of disaster prevention and rescue plans for resilient communities, so that the courses can be localized to train disaster prevention personnel and enhance the professional knowledge of residents in the community on disaster prevention and rescue, and to assist the community in promoting disaster prevention in response to the UN's sustainable development goals such as SDG4 Quality Education, SDG11 Sustainable Cities and Communities, and SDG13 Climate Action in order to improve the capacity of the community's disaster prevention and rescue organization and assist the community in developing into a resilient community.

5.2.6 Carbon Neutral Commitments and Emission Reduction Programs

"As a citizen of the world, everyone has the responsibility to slow down the pace of global climate change and avoid damaging the natural environment." At the opening ceremony of the 2022 Sustainability Week, the President of the University signed "Net Zero 2050". NUK follows the national policy of actively linking industries and society, cooperates with the government to promote energy transformation, and simultaneously takes stock of the six major directions of "Green University", "Campus Carbon Neutrality", "Low-Carbon Transportation", "Green Building", "Zero Waste and Low-Carbon Diet", and "Citizen Participation".



▲ Signing Net Zero 2050

In response to global climate action, the Taiwan 2050 Net Zero Carbon Emission Pathway Plan, and the cultivation of globally sustainable human resources, NUK has been promoting campus climate action since 2022 from the perspectives of campus environmental organization and regulations, environmental management, energy-saving strategies, and environmental education.

The University has integrated UN Sustainable Development Goals into the organization and operation of the University, and has formulated a carbon neutral plan, which aims to utilize the University's professional knowledge and scientific research capabilities to actively reduce the environmental carbon footprint of the campus, and to gradually achieve carbon neutrality of the campus. Specific practices are described below:

Action Plan 1: Campus Carbon Inventory

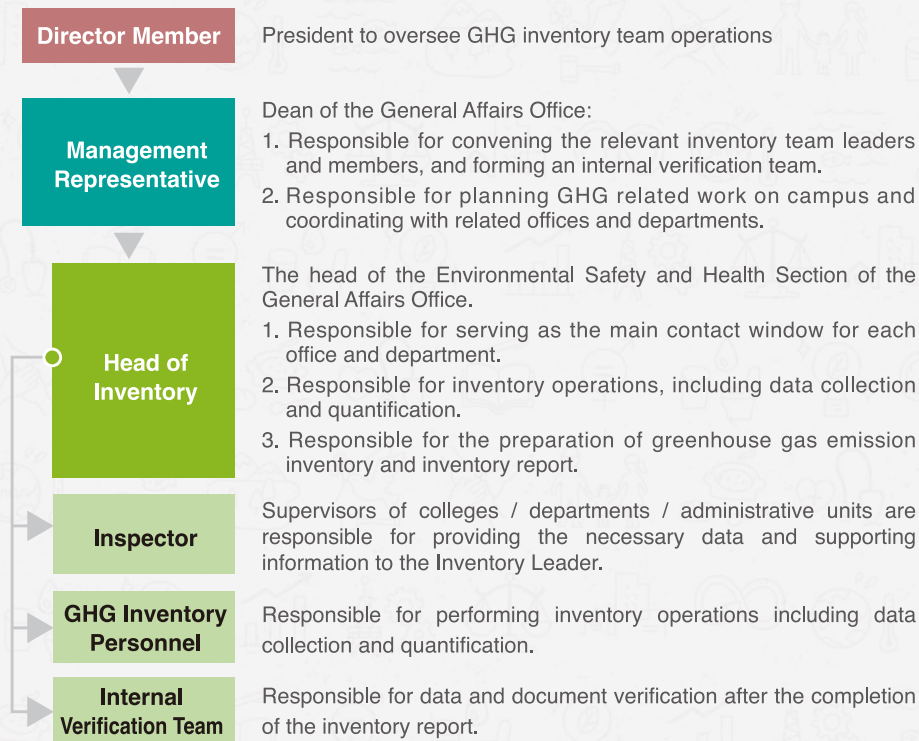
- 1. Description of Current Status:** At the opening ceremony of the Sustainable Development Week on May 23, 2022, the President of the University announced and signed "2050 Net Zero Carbon Emissions" declaration, which aims to achieve carbon neutrality and move towards the goal of net zero emissions by 2050 gradually.

- 2. Implementation Strategies and Practices:** In order to understand the carbon emissions of the school, a carbon inventory is expected to be conducted from 2023 to 2026 to calculate the greenhouse gases emitted directly or indirectly by the school in all aspects of administration, teaching, research, and student learning, so as to further develop appropriate measures to reduce the emissions of the school.

- A. Carbon inventory will be conducted annually and the results of the inventory will be made public.
 - a. Annual carbon inventory conducted by a professional consultant.
 - b. Carbon check certified by a third-party impartial organization
- B. Setting up emission reduction measures based on the results of inventory and verification to gradually move towards carbon neutrality (SDG 7, SDG 13)
 - a. Develop and review a campus-wide reduction plan based on the results of the current year's inventory.

- 3. Implementation results in 2024:** The school conducted the first 2022 GHG inventory in 2023 and therefore set 2022 as the base year for the inventory. In 2024, the school continued to conduct the 2023 GHG inventory.

- A. Organization of the inventory : The University has 13 administrative units; academic units include the Colleges of Humanities and Social Sciences, Law, Management, Science, and Engineering, and the Center for General Education, as well as 21 university departments and 2 independent research institutes. The program emphasizes cross-disciplinary integration and the cultivation of talents to meet the needs of industry and academia in Southern Taiwan. This inventory is organized according to ISO 14064-1, the greenhouse gas inventory team of the University. The composition of the team and their responsibilities are as follows.
- B. Boundary of the report : In accordance with the ISO 14064-1 standard, the University defines the organizational boundaries of our inventory as follows in accordance with the Law of Control Rights:



Note: GHG inventory personnel should receive 3 hours of GHG inventory training or obtain a certificate of completion of external training in accordance with "Education and Training Procedures" in order to be qualified for the position.

a. Organizational boundary

- Teaching, research, and activities in the Administration Building, Library and Information Building, the Colleges of Humanities and Social Sciences, Law, Management, Science, and Engineering, staff Student Activity Center, Hong Sze-Chuen Sports Dome, First General Building, the Kinesiology, Health and Leisure Building, and Student Dormitories I and II.



● Scope of exclusion: Duty accommodation



▲ NUK Floor Plan Configuration (Excl Boundary in red)

b. Report Boundary:

- Inventory of greenhouse gas types: CO₂, CH₄, N₂O, HFCs, PFCs, SF₆, NF₃
- Identification of GHG Emission Sources: According to categories 1, 2, 3, 4, 5, and 6, each emission source in the organization boundary is listed separately.
- Direct and indirect GHG emission sources are covered in Table 5-20.

c. Total GHG Emissions: This report is prepared, produced, and provided with information by the University's Greenhouse Gas Inventory Team, and is published annually on a regular basis. The inventory is based on all greenhouse gases generated within the reporting boundary from January 1 to December 31, 2023, and it is hoped that the results of the greenhouse gas inventory will provide an important reference for the subsequent planning of greenhouse gas mitigation measures, and at the same time, to ensure that the content of the school's GHG inventory maintains the same quality and consistency, so as to facilitate the subsequent implementation of the internal and external verification needs. The following are the requirements for the internal and external verification.

In compliance with the requirements of ISO14064-1: 2018 and with reference to the EPA's operational guidelines for GHG emissions reporting, the exclusion thresholds are that the emissions from each single-emitting emission facility or operation account for less than 0.5% of the total emissions and are cumulatively lower than less than 5.0% of the total emissions, and that the University did not exclude any significant sources of GHG during the 2022 GHG inventory process.



d. Our greenhouse gas emissions are as follows.

GHG Inventory Category	GHG Emission Source	MTCO ₂ e/Yr
Category 1, Direct GHG Emissions and Removals	Total	149.7564
1.1 Stationary Combustion	Emergency generator (diesel)	9.6745
1.2 Mobile Combustion	Public Transportation Vehicle (Gasoline & Diesel)	12.1790
1.3 Industrial process emissions (direct process emissions from school operations)	Lab alcohol for Combustion (Methanol, Ethanol, Others), Lab Specific Gas Cylinders (CO ₂ , N ₂ O, Gas, Acetylene), Lawnmowers (Diesel)	2.4904
1.4 Fugitive emissions	Refrigerant (air conditioning, refrigeration & freezer equipment, bus air conditioning), septic tanks, fire extinguishers (dry powder, CO ₂ , foam extinguishers)	125.4125
1.5 Land Use, Land Use Change and Forestry Emissions	Nil	0
Category 2, Input energy indirect GHGe	Total	5,776.3739
2.1 Indirect emissions from imported electricity, including GHGe from the production and consumption of imported electricity by the related organization.	School Electricity - Purchased Electricity	5,776.3739
2.2 Indirect emissions from energy inputs, incl. GHGe from energy consumption (steam, heat, cooling and compressed air) of the organization's production through the physical network, except for emissions from electricity.	Nil	0.0000
Category 3, Indirect GHGe from transportation	Total	562.2858
3.3 Emissions from employee commuting	Employee commuting	249.4679
3.5 Emissions from business or employee travel and transportation	Faculty/staff/student travel (by high-speed rail, Taiwan Railway, air, and MRT only)	312.8179
Category 4, GHGe between products used by the organization	Total	1,291.3295
4.1 The organization purchases GHGe from raw material extraction, manufacturing and processing.	Procurement of electricity, water, gasoline and diesel for school	1,176.4162
4.3 Disposal of emissions from solid and liquid wastes depend on the characteristics of the waste and its treatment. Typical treatment types are landfill, incineration, biological treatment or recycling processes.	Waste incineration, waste removal and transportation	114.9133
Category 5, Indirect GHGe derived from products of user organization	Total	362.9148
5.2 Emissions from downstream leased assets	Outsourced manufacturers lease electricity, tap water, and natural gas	362.9148
Total		8,142.660

* The latest version of the announced GWP value is the IPCC 6th Assessment Report (2021),
so the IPCC 6th Assessment Report (2021) is used.

▲ NUK Inventory of GHG Emissions, 2023 (Base Year)

Action Plan 2: Campus Climate Action

1. Description of Current Status:

A. Global climate change is a critical issue for mankind, and we are a member of the Green University and one of the participants in global environmental protection. In 2019-2020, the University received funding from the Architectural Research Institute of the Ministry of the Interior and the Kaohsiung City Government to renovate the student dormitories into smart-energy residences, and to install a smart-energy management system and a centralized power monitoring system. For electricity usage, digital meters are installed in each building on campus to collect data on electricity usage in each building, and a "Power-BI" webpage has been built to provide students and faculty with information on electricity usage and remind them to conserve energy in order to fulfill their responsibilities as citizens of the earth.

B. In addition to the improvement of hardware and equipment, the environmental regulations and management of the University should also be included in climate issues. In response to the SDGs: 6, 13, 15 and UI Green Metric World University Rankings, the University intends to take stock of the current status of environmental and climate-related issues and regulations during 2023-2026, and to examine the potential risks in management in order to take measures to effectively reduce and eliminate them.

2. Implementation Strategies and Practices

A. The University's Sustainable Climate Change Program, which participates annually in UI Green Metric World University Rankings - Energy Climate Change, Education and Research (SDG 13).

a. Revise the Chinese and English sustainability reports annually and participate in the evaluation.

b. Participate in UI Green Metric World University Rankings annually to review annual implementation.

c. Inventory campus carbon emissions and develop medium- and long-term options for reducing emissions.

d. Annually review the appropriateness of the school's administrative rules and regulations.

B. Enhance smart power and introduce water management system to participate in UI Green Metric World University Rankings - Water Resources (SDG 6, SDG 15).

- Utilize smart power system monitoring to reduce electricity waste year by year.
- Water saving installations and water management.
- Sewage recycling.

3. Carbon emission : Using 2015 as the base year, the school estimates its own GHG emissions every year to get a complete picture of the current situation of GHG emissions. Total carbon emissions in 2024 was reduced by a total of 16.33% from 2015 levels, mainly due to the implementation of energy-saving measures such as the replacement of old air-conditioners and the use of energy-saving light bulbs.

▼ Carbon Emission Statistics by Year

Year	Carbon Emissions (MT CO ₂ e)	Savings over 2015 (%)	Carbon emissions per capita (MT CO ₂ e/capita)
2015	7,400.63	-	1.41
2016	7,617.74	-2.93%	1.23
2017	7,438.98	-0.52%	1.17
2018	6,754.27	8.73%	1.06
2019	7,090.45	4.19%	1.10
2020	6,786.91	8.29%	1.07
2021	5,732.90	22.54%	0.85
2022	6,041.62	18.36%	0.89
2023	6,173.00	16.59%	0.89
2024	6,191.99	16.33%	0.89

*Carbon emissions are quoted from electricity bills; per capita carbon emissions are self-estimated.

5.3 Sustainable Supply Chain

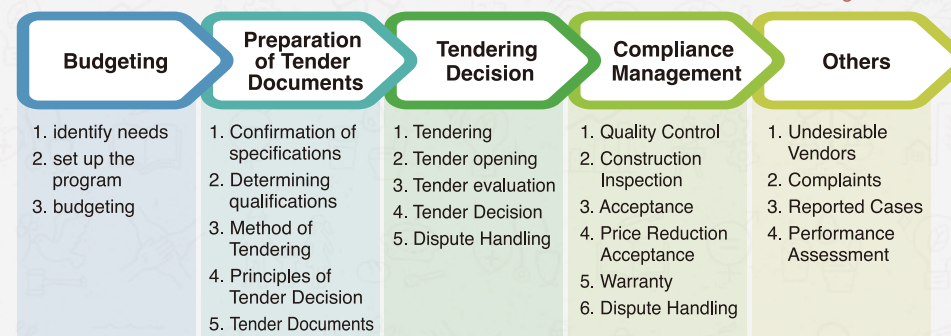
5.3.1 Green Procurement and Priority Purchasing

The services provided by the vendors mainly include business equipment, instrumentation, construction and cleaning services. As a public organization, the school is required to comply with the Government Procurement Act as stipulated by the Public Works Committee of the Executive Yuan, and to conduct open procurement for purchases exceeding NT\$150,000 according to the different amounts of the purchases, as well as to conduct performance management in accordance with the contract.

Scale of Procurement	Large Procurement	Checked Amount	Announced amount	Falling short of the declared amount and exceeding one-tenth of the declared amount	Small amount
Nature of Procurement	Project Property Labor	200 million 100 million 20 million	50 million 50 million 10 million	1.5 million	More than \$150,000 and less than one-tenth of \$1.5 million Less than \$150,000
Tendering / Awarding of Tenders	1. Open tender (Article 19) 2. Selective tendering (Article 20 , 21) 3. Restricted tenders (Article 22: in accordance with Article 22, item 1, paragraphs 1 to 16) Principles of Tender Award The lowest bid, the most beneficial bid (article 52), award of bid with fixed rate (fee)			Article 23: Measures for Tendering Unannounced Amounts of Purchases by Central Authorities" Article 2: 1. 22-1-1~15 2. 22-1-16 Restricted tendering 3. Publicly soliciting written quotations or business plans from vendors (openly available)	Article 23: "Measures for the Central Authorities' Procurement of Unannounced Amounts" Article 5: The Central Authorities may directly contact manufacturers for procurement without going through the announcement procedure, and may be exempted from providing quotations or business plans.

▲ List of Scale of Procurement and Method of Tendering

▼ Purchasing Flowchart



- Determining funding sources and purchase amounts
- Signing and filling out requisitions and purchasing specifications

- Purchase under a joint supply contract
- Decide on the best way to tender



Budget Amount Acceptance	Under \$100,000	Over \$100,000 to \$150,000	More than \$150,000 Less than \$1,000,000	Above \$1,000,000 but less than \$1,500,000	More than \$1.5 million
Procurement Approval	Requesting Unit Supervisor	Chief Secretary	Vice President	Vice President	President
Tender Document Approval	—	—	Chief Secretary	Chief Secretary	Administrative VP
Reserve Price Approval	—	—	Dean, General Affairs	Administrative VP	President
Lead Tender Opener	—	—	Chief of Construction & Maintenance or General Affairs or other appropriate officer as assigned	Dean, General Affairs or other appropriate officer as assigned	Administrative VP or other appropriate officer as assigned
Lead Inspector	Requesting Unit's own staff	Staff from requesting unit	Dean General Affairs or other appropriate officer as assigned	Dean, General Affairs or other appropriate officer as assigned	Administrative VP or other appropriate officer as assigned
Payment & Expenditure Voucher Approval	Requesting nit Supervisor	Dean, General Affairs	Chief Secretary	Chief Secretary	Administrative VP

Note:

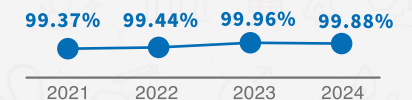
▲ Procurement process hierarchical accountability

1. All budget amounts above (below) are inclusive.
2. Listed personnel applicable duty agent
3. Tender opening officer who conducts the tender opening process and is responsible for the handling of the tender opening site and related decisions.
4. The chief inspector will preside over the acceptance procedures and conduct random checks to verify whether the vendor's performance results are not in conformity with the requirements of the contract, plans or samples, and to decide on the disposal of any non-conformities.
5. The most junior staff member handling the procurement case shall not be the principal inspector of the procurement or the inspector of samples and materials.
6. It is inappropriate for a mechanic, journeyman, administrative or program assistant to preside over the opening and deciding of tenders and to preside over the initial inspection and acceptance of tenders.
7. For procurement cases with a purchase amount of more than \$1,500,000 and the most favorable bid, the members of the procurement evaluation committee and the members of the working group should be established prior to the bidding process and be responsible for the approval according to the hierarchical level of "Approval of Purchase Cases".
8. For procurement cases with a purchase amount of less than \$1.5 million, the Administrative Vice President shall approve the members of the Purchasing Evaluation Team that should be set up prior to the bidding process if the bidding spirit is the most favorable to the bidder and the bidding decision is made by selecting the one that best meets the needs; the Administrative Vice President may waive the need to set up a working group.
9. For procurement cases under \$150,000, the requisition for expenditure should be sent to the General Affairs Office for endorsement.

In accordance with "Measures for Priority Procurement of Environmentally Friendly Products by Organizations" and "Measures for Evaluating the Performance of Green Procurement by Organizations", the achievement rate of green procurement has reached more than 99%. In addition, the University has implemented priority procurement in accordance with "Measures for Priority Procurement of Goods and Services Produced by Welfare Institutions for the Physically and Mentally Handicapped or Sheltered Workshops".

Green Purchasing Policy:

1. The University will conduct environmentally friendly green procurement in accordance with "Regulations on Priority Procurement of Environmentally Friendly Products by Institutions" and "Scoring Methods for Green Procurement Evaluation by Institutions" formulated by the Environmental Protection Administration (EPA).
2. The University actively promotes the green procurement of official supplies, especially the first category of products with environmental labels. Products or raw materials whose manufacture, use, and waste disposal comply with the requirements of recycled materials, recyclability, low pollution, or energy saving are considered as Category II products. These are all within the scope of green procurement under the Government Procurement Act.
3. According to the statistics, the achievement rate of the designated green procurement items in 2024 is 99.88%, which is increasing year by year. Purchased items include: computers and other electronic products, printers, copiers, shredders, refrigerators, lighting fixtures, air conditioners, and drinking fountains.



▲ List of Achievement Rates of Green Procurement Designated Items

Priority procurement policy

In accordance with Article 69 of "People with Disabilities Rights Protection Act" and "Regulations on Preferred Procurement for Products and Services Produced in Disability Welfare Care Facilities and Institutions and Sheltered Workshops," the University has implemented priority procurement. In 2023, the achievement rate of priority procurement was 5.99%. In 2024, it increased to 8.16%, which was in compliance with the 5% requirement stipulated in Article 3 of the above-mentioned Act and Regulations. It also demonstrates the school's social responsibility in purchasing.

5.3.2 Catering Hygiene Management Mechanism

1. Food safety for students : In order to provide teachers and students with satisfactory food quality and safety, the University has employed a part-time dietitian, who, together with a nurse of the Health Protection Section of Student Affairs Office and colleagues from the Environmental Safety and Sanitation Section of General Affairs Office, and representatives of the Student Association, will regularly implement various food and beverage sanitation tests, organize educational training for kitchen staff every semester, and, in accordance with the regulations of the Ministry of Health and Welfare, and the Ministry of Education, will provide counseling to vendors on the management of the place of origin and the registration of the food ingredients. This will help control the source of food materials on campus and quickly remove problematic foods from the shelves. In addition, the General Affairs Office has set up "Contracted Vendor Performance Evaluation Meeting", which is held every year.
2. Healthy food options : The school puts up large colorful posters such as "Diet Yellow-Red-Green Lights" in the kitchens of the student dormitories, the stairway to the cafeteria and dining hall on the first floor of the General Building, to teach faculty, staff and students about healthy dietary choices and to promote healthy food. It organizes weight control classes, and designs videos and activities to promote healthy diet.

During the semester, the school organizes food and hygiene education training, and adds relevant contents to encourage manufacturers to produce healthy food for faculty and students. In addition, "My Plate, Eat Smart, Nutrition Will Follow" placemat is designed and distributed to teachers and students during the program as a reference for healthy food options.



▲ Food Color Chart poster



▲ Placemat: My Plate, Eat Smart



5.4 Civic Engagement on Sustainable Environmental Education

5.4.1 Ecosystem Support Strategies

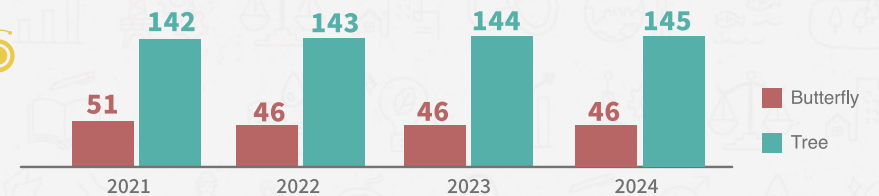
Cultivate the ecological awareness of faculty, staff and students.

1. Training of faculty and staff : In 2024, through the environmental education and training programs such as "National Parks Wild View Film Festival – Living on Our Planet", "Going to the South Pole" and "Carbon Emissions Trading System", the school aimed to enhance the colleagues' understanding of the environment and to maintain a balanced environment and ecology in order to achieve sustainable development.
2. Foster Students' Environmental Awareness : Through the environmental education in General Education Curriculum, the school conveys the basic concepts of nature conservation, the impact of global warming on natural resources, an overview of Taiwan's natural resources, the current state of conservation, and related laws and regulations.
3. Create Environmentally Diverse Habitats : Although the University does not have protected or restored habitats, it is committed to creating a sustainable ecological environment. 51.6% of the campus is covered by greenery, with 145 tree species, and an eco pond, a man-made wetland, has been the most important campus attraction since the founding of the University.



The University has recorded a total of 68 species of birds in 36 families over the years. In recent years, 59 species in 30 families are regularly sighted, including the rare second-class protected species, crested goshawk, black-winged kite, yellow oriole, and the third-class protected species red-tailed shrike. Since 2021, NUK and Kaohsiung Wild Bird Society have been monitoring the conservation of orioles and conducting monthly surveys.

▼ Number of butterfly and tree species



Build animal-friendly campus

Since August 1, 2015, the Environmental Safety and Health Section has cooperated with the Student Pet Research Society to solve the problem of stray dogs on campus. The faculty and students seek help and guidance from different animal protection groups, such as Dogs Lover and Heart of Taiwan Animal Care to treat the stray dogs more friendly and humanely. When the dogs become tame and controllable, they are given sterilization and vaccines and then are listed for control and regularly receive heartworm medicine, rabies vaccine and other medical attention. The school has also adopted the strategy to use the tamed campus dogs to keep the new stray ones out. In addition, a kennel was set up to care for the injured and sick dogs waiting for adoption. A website is constructed to report about the dogs and educate the faculty, staff and students, and announce adoption information in order to create a canine-friendly campus.



▼ No. Rescued dogs on campus

	2021	2022	2023	2024
Stray caught	3	3	2	0
Altered	3	2	3	0
Adoption meeting	2	1	1	1
adoption	2	5	0	0
Rabies vaxxed	19	17	16	17



Promote Farming in School to Reduce Food Carbon Footprints

Recently, the awareness of food safety has been on the rise, and in view of the growing popularity of the concept of homegrown food, in order to satisfy the needs of teachers and students for teaching or experimental farming on campus, the school has provided space on campus for teachers and students, or dependents of faculty and staff to achieve the functions of teaching, food and farming, and recreation, and has made available 10 allotments for practice in the open space opposite the 2nd Student Dormitory (the old nursery area), with the area of each allotment averaging 26 square meters to be used for a period of 4 months. 177 people have participated in the program so far.

5.4.2 Eco-Environment Volunteer and Community Partnership Program

Train Community Volunteers for Ecological Conservation

Since 2014, the University has formed an eco-guard volunteer team with teachers, students and residents from the surrounding communities to carry out ecological monitoring, explanation, butterfly restoration and other projects. By opening up opportunities for environmental creation in the school campus, it has encouraged the community's senior citizens as volunteers in their capacity, and has also organized professional training courses and environmental enrichment courses to enhance the participants' knowledge of environment; it has also designed environmental courses for primary and secondary schools that can be carried out on their school grounds. The volunteers also help to lead eco-tours, so as to pass down the experience. The service-learning students have participated in the construction of environmental education sites, and carried out habitat maintenance for the butterfly trail, so as to advance the butterfly trail from 250 meters to 300 meters. It is hoped that through the creative venues and the promotion of teaching, young people and the elderly will have the opportunity to participate in and serve as seed soldiers for environmental education, or as an extension of the environmental education program in the national education system, in order to achieve the goal of "SDG3 Good Health and Social Welfare," which is to promote the health and well-being of

all ages, and to implement the goal of "SDG4 Quality Education" to provide high-quality environmental education content in primary and secondary schools.



▼ Eco-Environmental Conservation Education Achievements

	2022	2023	2024
Butterfly trail length (m)	300	300	300
No. tree planted	69	60	118
No. Campus eco volunteer	90	90	98
No. Volunteer training session	2	2	2
Experiential envir. class for primary and secondary schools	6	6	6
No. Participant	200	181	173

Combine resources from different sectors to organize sustainable activities

Since NUK signed "Talloires Declaration" in 2004, it has organized a series of "Sustainable Week" activities every year. It has become a school tradition to promote sustainable education. Through different topics and activities, faculty, staff, students, community members, and teachers and students in primary and secondary schools are able to obtain comprehensive environmental information and establish environmental ethics. In the early days, NUK held action dramas, road running competitions, several second-hand book and article sales, energy-saving workshops, and film



appreciations to enhance the environmental awareness, and to conduct laboratory or fire drills. Electric vehicles were also displayed to encourage the use of green energy. Faculty and students can acquire the integrated knowledge of sustainable development and environmental protection in all aspects. Since 2021, complying with the national policy, NUK has used the rich ecological resources on campus to conduct various environmental education. In 2021, signing a working partnership with Kaohsiung City Wild Bird Society, NUK began to conserve orioles. Through the workshops and a series of activities in Sustainability Week, the faculty, students and the general public not only gained a better understanding of avian conservations but participated in monitoring and guarding the birds' nests. In recent years, the school has continued to promote the theme and encourage participation of the Environmental Sustainability Week.



▼ List of activities of the Sustainability Week in recent years

	Activity	No. Participant
2021	1. Sign Oriole Conservation Partnership in March Co-hold "Oriole Environmental Education Series" (50 participants) 2. Hold Sustainability Week environmental education series in October A. "Special exhibition of oriole ecology and conservation in NUK" (approx 100 participants) B. Online lecture, "The Difficulties and Opportunities of Bird Conservation" (173 participants) C. "NUK Oriole Environmental Education Volunteer training workshop" (31 participants)	354
2022	Sustainability Week opened on May 23 with the President leading the administrators in declaring the university's 2050 Net Zero Carbon Emissions, which includes commitments to a green university, campus carbon neutrality, low-carbon transportation, green buildings, zero-waste, low-carbon diet, and civic participation. "Art and Plants for You" Art and Ecology Exhibition, which will be on display from May 23rd to May 27th, includes a macro photo exhibition of plants taken by ecology volunteers and an exhibition of botanical transfer dyeing and printing works by artist Song Meirong.	200
2023	1. Sustainability Week, May 22-26, public art and tree carbon storage activities on the theme of beautiful green life, the first day of "Memory of Public Art on Campus" lecture and activities (42 participants from on-campus, 3 off-campus) 2. Artists-in-Residence Lin Li-ren and Huang Yu-rong Exhibition (32 participants on campus and 26 off campus). 3. Artist-in-Residence Recycle Stone-Carving Workshop with 12 sessions (45 participants on campus and 84 off campus) 4. Tree Carbon Storage Environmental Education Workshop (21 participants on campus and 39 off campus)	292
2024	1. 5/18-5/24, a series of activities under the theme of "Bugs' Happy Return", including volunteers' back-to-school day, a special exhibition of the 10-year achievements of the Butterfly Trail, and environmental education experiential activities. 5/20, "Bugs' Happy Return" kick-off ceremony and environmental education experiential activities (59 students from inside the school, 10 students from outside the school). 2. 5/18 Volunteer Back-to-School Day & Environmental Education Enrichment Activity (4 on-campus, 29 off-campus) 3. 5/21-5/23 organized 6 "Bugs' Happy Return" environmental education experiential activities for primary and secondary school participants (23 in-school, 173 outside) 4. 5/24: 2 sessions of "Bugs' Happy Return" environmental education activities for teachers, students and the general public (10 in-school and 33 outside the school)	341

