

SDG.7.3.1 、 7.5.1

1. In accordance with “Energy Conservation Action Plan of government agencies and schools” issued by the Executive Yuan, NUK will reduce the annual electricity consumption by at least 1% every year. At the beginning of each year, it regularly fills in the non-production industry energy verification network reporting system and uses the system to analyze and understand the main carbon emissions of the school.
2. NUK's carbon emissions decreases yearly. Its carbon emissions are published in the annual sustainability report and on the webpage (https://ces.nuk.edu.tw/var/file/11/1011/img/2025_SustainabilityReportEN.pdf) for public viewing. The summary is as attached.

Attachment 1



Domestically, the University advanced to 13th place in Taiwan. This performance reflects the effectiveness of its strategies in three key areas: energy transition, campus ecological restoration, and social impact through University Social Responsibility (USR).

- 2. Sustainability Report Awards:** Since 2019, the University has published sustainability reports. As of 2025, it has received recognition from the Taiwan Corporate Sustainability Awards (TCSA), including three Gold Awards, one Silver Award, and three Bronze Awards.

▼ Changes in the University's Rankings in the UI GreenMetric World University Rankings over the Years

年度 (YEAR)	參與學校 (UNIVERSITIES)	參與國家 (COUNTRIES)	全球排名 (GLOBAL RANK)	PR值 (PERCENTILE)	國內排名 (DOMESTIC RANK)
2025	1,745 (+200)	98	#154 ▲124	PR 91	#13 ▲5
2024	1,477 (+256)	95	#278 ▲7	PR 81	#18 -
2023	1,183	85	#285	PR 75	#18

5.2.2 Green Energy

To implement its green energy policy, the University systematically utilizes campus space to install renewable energy systems and improve its energy self-sufficiency.

Solar Photovoltaic Deployment

- 1. Installation Capacity:** As of the end of 2025, the total installed capacity of rooftop solar photovoltaic systems across the campus reached 2,341.91 kWp.
- 2. Renewable Energy Certificates:** The solar photovoltaic systems independently installed on the Administration Building and the College of Law have obtained 90 Renewable Energy Certificates (RECs).
- 3. Power Generation:** In 2025, total solar power generation reached 2,849,687 kWh, with the Sports, Health and Recreation Building contributing more than 790,000 kWh, the highest among all campus buildings.

Other Thermal Energy and Energy Applications

- 1. Application of Heat Pump Systems:** The University's heated swimming pool has introduced a high-efficiency heat pump system, effectively replacing conventional high-energy-consuming heating methods.
- 2. Diversified Thermal Energy Applications:** Student dormitories have achieved 100% adoption of solar water heating systems, reducing dependence on fossil fuels for hot water supply.

▼ List of solar power generation equipment

Site	Yr/Mon Installed	KWp	Mode of operation	MW 2024	MW 2025
College of Law	2004/12	26.400	REC	7698.6	6176.4
Admin. BL	2013/08	10.000	REC	2367.8	2454.8
College of Engineering	2019/12	209.450	FIT	281,344	278,824
Library & Info BL	2019/12	348.395	FIT	473,268	474,624
College of Management	2019/12	93.810	FIT	117,448	118,628
1st General BL	2019/12	154.875	FIT	207,792	208,328
Admin. BL	2019/12	57.525	FIT	78,528	78,332
Student Dorm	2020/01	56.640	FIT		
Duty Accommodation	2020/01	50.445	FIT	465,084	466,380
Motor-and-Bicycle Parking Lot	2020/01	246.620	FIT		
Sport & Leisure BL	2022/06	581.060	FIT	795,100	797,800
Student Activity Center	2022/10	307.700	FIT	414,288	418,140
總計		2,142.920		2842918.4	2849687.2

FIT refers to Feed-in Tariff, a renewable electricity purchase mechanism.
REC refers to Renewable Energy Certificate, a renewable energy certificate mechanism.
The total installed capacity increased to 2,341.91 kWp in 2025.



▲ Solar Panels

5.2.3 Effectiveness of Energy Saving Measures

Management Approach for Energy-Saving Measures and Performance

Topic Attribute	GRI 302
SDGs Alignment	  
Corresponding Report Section	5.2.3 Performance of Energy-Saving Measures
Topic Materiality Description	The campus is a high-energy-use environment, where air-conditioning, lighting, information equipment, and teaching and research facilities may result in significant energy consumption and carbon emissions. In response to climate change, energy price fluctuations, and government net-zero policy requirements, continuous reduction efforts are necessary.
Major Impacts	Positive Impacts: Reduces energy costs, lowers carbon emissions, improves energy efficiency, and strengthens campus resilience. Potential Negative Impacts: Aging high-energy-consuming equipment, rising energy prices, and extreme weather may affect the stability of energy supply.
Affected Stakeholders	Students, faculty and staff, research units, government agencies, communities, suppliers
Policy and Commitment	With "building a green campus" as a core sustainability strategy, the University aligns with the government's 2050 net-zero emissions policy by promoting energy transition, energy conservation and carbon reduction, renewable energy development, and the comprehensive implementation of the ISO 50001 Energy Management System.
Management Objectives	Short-term: Continue replacing high-energy-consuming equipment, strengthen the energy monitoring system, reduce abnormal energy consumption, and ensure an annual electricity saving rate of 1%. Medium-term: Expand renewable energy installations, improve energy use efficiency, and continuously reduce campus EUI and carbon emission intensity. Long-term: Establish a low-carbon and smart energy campus, gradually moving toward net-zero emissions and an energy-resilient campus.
Responsible Units	1. Office of General Affairs 2. Administrative and Academic Units
Management Measures	1. Replacement of air-conditioning systems with high-efficiency equipment 2. LED lighting upgrades 3. Smart energy monitoring system 4. Solar photovoltaic installation 5. Abnormal electricity consumption management 6. Energy conservation education and awareness campaigns

Management Evaluation Mechanism	1. Energy use monitoring 2. Monthly / quarterly reviews 3. Tracking through University-level management and review meetings 4. Carbon inventory mechanism 5. Internal audits and data review 6. External verification
Grievance Mechanism	Office of General Affairs mailbox
Key Achievements in 2025	1. Campus EUI decreased from 58.8 kWh/m ² in 2015 to 31.4 kWh/m ² , representing a 47% reduction over ten years. 2. Passed ISO 50001 certification in the first year of implementation. 3. Completed ISO 14064-1 greenhouse gas inventory verification for the third consecutive year. 4. Solar photovoltaic power generation increased by 25% compared with 2022.5. The replacement rate of energy-saving equipment exceeded 85%.
Resources	University Endowment Fund, Ministry of Education project funding, government energy conservation subsidies
Management Policy Adjustment	Targets Achieved: Annual electricity saving rate reached 5%. Targets Not Achieved: All annual targets were achieved. Future Improvement Directions: The University will continue promoting deep energy-saving measures, expanding renewable energy installations, and strengthening campus energy resilience.

Through hardware upgrades and the introduction of digital management, the University's electricity-saving efficiency has gradually improved. According to electricity consumption data from 2015 to 2025, the University's total energy consumption decreased from 14.20 million kWh in 2015 to 11.89 million kWh in 2025, achieving electricity savings of 2.31 million kWh over the decade.

- 2015–2018: During this period, electricity consumption declined sharply from 14.20 million kWh to 12.88 million kWh, mainly due to alignment with the government's Four-Savings Policy and the initial replacement of energy-saving facilities.
- 2021–2024: In 2021, electricity consumption reached a low point of 11.29 million kWh due to factors such as



the COVID-19 pandemic. In the following years, consumption slightly rebounded as University operations returned to normal, but remained within 80% to 90% of the baseline year.

3. 2025: Electricity consumption declined again to 11.89 million kWh, representing a reduction of approximately 5% compared with 2024. This indicates that the introduction of ISO 50001, improvements in energy efficiency, replacement of low-carbon equipment, and smart energy management have generated tangible results.

Reduction in Energy Use Intensity (EUI)

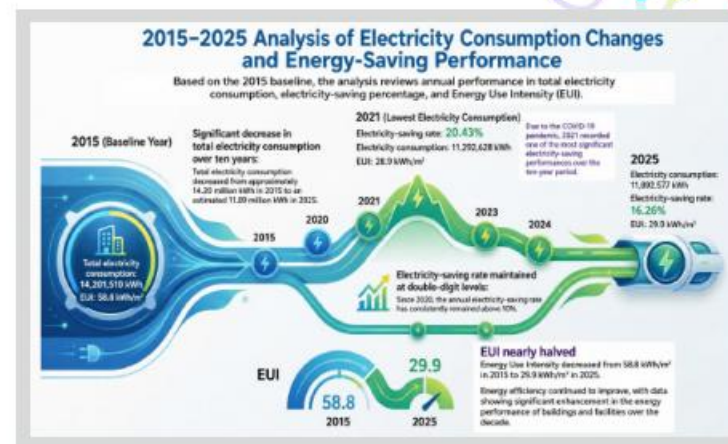
Energy Use Intensity (EUI) decreased from 58.8 kWh/m² in 2015 to 29.9 kWh/m² in 2025, representing a 50% reduction over ten years. Since the 2015 baseline year, the cumulative electricity saving rate reached 16.26% by 2025.

Electricity Consumption Statistics

Year	Total/kw	Total/GJ	Year over 2015	TOE	EUI
2015	14,201,510	51,084.57	-	1,221.9	58.8
2016	14,528,086	52,259.30	-2.27%	1,250	37.1
2017	14,090,386	50,684.84	0.81%	1,212.3	36
2018	12,884,463	46,346.99	9.27%	1,108.6	33
2019	12,970,796	46,694.89	8.67%	1,116	33.2
2020	12,733,420	45,840.31	10.28%	1,095.6	32.6
2021	11,292,628	40,620.97	20.43%	971.6	28.9
2022	11,959,686	43,020.46	15.79%	1,029	30.6
2023	12,274,980	44,154.76	13.57%	1,056.1	30.9
2024	12,520,011	45,036.17	11.84%	1,077.2	31.4
2025	11,892,577	42,813.28	16.26%	1,023.2	29.9

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.



▲ Analysis of Electricity Consumption Trends and Energy-Saving Performance (2015-2025)

Digital Monitoring and Smart Management (EMS)

1. **EMS Centralized Power Management System:** To enhance transparency in digital governance and achieve real-time, precise management, the University has established a digital electricity meter monitoring system. The system visualizes electricity data and proactively discloses energy use information through a public website: <https://reurl.cc/DbKENE>.

In 2025, campus electricity consumption decreased by more than 620,000 kWh compared with 2024, demonstrating significant energy-saving results. Through big data analysis, the University accurately identifies high-energy-consuming hotspots and implements real-time energy-saving controls and equipment optimization, demonstrating its resilience and management capacity in response to extreme climate conditions.

A. Smart Electricity Use Framework: The University has installed smart digital electricity meters in 12 campus buildings to monitor total building electricity consumption, air-conditioning electricity use, and partial zonal electricity use. Through the EMS Centralized Power Management System, digital meter data across the campus are collected, recorded, calculated, and analyzed. The system further supports the management of loading and unloading operations for central air-conditioning systems and independent air-conditioning units in each building.

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".

In recent years, the University has continued to deepen its climate actions. In addition to promoting greenhouse gas inventories and carbon reduction measures, the University has also enhanced faculty, staff, and students' understanding of climate change and natural carbon sinks through Sustainability Week activities and environmental education. For example, during the 2025 Sustainability Week, the President led all faculty and staff in making a "Sustainable Development Declaration," clearly setting out three major directions:

1. Sustainable Governance: Continue to take "SDGs × USR × ESG" as the core of action, establish a dedicated promotion unit, and regularly disclose implementation results to external stakeholders.
2. Environmental Sustainability: Introduce energy management, promote carbon inventories, green the campus, and restore ecosystems, with the goal of achieving campus carbon neutrality by 2050.
3. Social Sustainability: Deepen local engagement and international cooperation, integrate sustainability concepts into teaching and industry-academia collaboration, and build a distinctive university with international influence.



▲ Signing Net Zero 2050



With the theme of "Carbon-Sequestering Oriole Campus," the event promoted concepts related to tree carbon sinks and natural carbon sequestration through exhibitions, experiential courses, and capacity-building activities. It also integrated biodiversity conservation actions, demonstrating the campus's carbon sink and ecological value within an urban environment.

In addition, to improve energy efficiency and systematically manage energy use, the University officially introduced the ISO 50001 Energy Management System in 2025. An Energy Management Task Force was established to inventory energy use in campus buildings and facilities and propose improvement measures. Through institutionalized management, the University reduces energy consumption and carbon emissions, further advancing low-carbon campus governance.

• 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	396,7371
1.1 Stationary Combustion	Emergency generator (diesel)	4.4384
1.2 Mobile Combustion	Public Transportation Vehicle (Gasoline & Diesel)	11.8976
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)	0.0165
1.4 Fugitive emissions	Refrigerant (air conditioning, refrigeration & freezer equipment, bus air conditioning), septic tanks, fire extinguishers (dry powder, CO ₂ , foam extinguishers)	380.3845
1.5 Land Use, Land Use Change and Forestry Emissions	Nil	0.0000
Category 2. Input energy indirect GHGe	Total	5,576.9688
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	5,576.9688
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	518,5811
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, T aiwan Railway, air, and MRT only)	269.1132
Category 4. GHGe between products used by the organization	Total	1,303.4404
4.1 The organization purchases GHGe from raw material extraction, manufacturing and processing.	Procurement of electricity, water, gasoline and diesel for school	1,303.4404
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	
Category 5. Indirect GHGe derived from products of user organization	Total	395.4806
5.2 Emissions from downstream leased assets	Lease of electricity and water from outsourced operators	395.4806
Total		8,191.208

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

3. Action Plan 2: Campus Climate Action

A. Description of Current Status

a. Global climate change is one of the most critical issues facing humanity today. As a member of the green university community, the University has long promoted a low-carbon campus and smart energy management. From 2019 to 2020, the University received project funding subsidies from the Architecture and Building Research Institute, Ministry of the Interior, the Kaohsiung City Government, and other agencies. In addition to transforming student dormitories into smart energy residences, the University also established smart energy management systems and central power monitoring systems. For electricity use, digital electricity meters have been installed in campus buildings to collect electricity consumption data. The University has also developed a Power BI-based electricity information visualization webpage, enabling faculty, staff, and students to understand electricity use and encouraging energy conservation as part of their responsibility as global citizens.

b. In addition, the University introduced the ISO 50001 Energy Management System in 2025 to systematically monitor campus energy use efficiency and established an Energy Management Task Force to promote energy improvement plans. Since the University's greenhouse gas emissions mainly come from electricity use, with Scope 2 emissions accounting for more than 90%, improving energy efficiency is the core of the University's carbon reduction strategy.

c. In addition to hardware improvements and energy management, the University also integrates campus ecological conservation with climate action by promoting campus tree inventories, green coverage surveys, ecological habitat creation, carbon sink education, and environmental experiential courses. These efforts strengthen faculty, staff, and students' understanding of climate change, biodiversity, and sustainable development. Campus environmental regulations and management mechanisms should also be incorporated into climate-related issues.

B. Implementation Strategies and Specific Measures

a. University Climate Change Sustainability Response Plan: The University participates annually in the UI GreenMetric World University Rankings, focusing on energy and climate change, as well as education and research. (SDG 13)

- Revise the Sustainability Report annually and participate in sustainability rankings.
- Participate annually in the UI GreenMetric World University Rankings to review annual implementation performance.
- Inventory campus carbon emissions and formulate medium- and long-term