

## SDG 17.3.12

NUK's efforts in SDG12 are as follows:

1. It continues to promote and implement green procurement and restricting the use of single-use plastics.
2. Since 2019, a sustainability report has been issued every year to explain the results of SDG12 planning and implementation: various measures to ensure sustainable consumption and production models.2. See the website . (<https://sustainability.nuk.edu.tw/>)
3. **The attachment** is the summary of SDG12 in 2021.

- ⑤ The Laboratory Animal Care and Use Committee: to supervise the management and use of laboratory animals in accordance with Article 16 Paragraph 1 of the Animal Protection Law, with English title “Nation University of Kaohsiung Animal Care and Use Committee (NUKACUC)”.
- ⑥ 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”.
- ⑦ The Public Art Selection Panel: to handle the selection and installation site of public art projects.
- ⑧ The Public Art Appraisal Panel: to conduct appraisal after public art is installed.

#### 4.2.2 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

### 4-3 Environmental Status and Management

#### 4-3.1 Air Quality Status and Management

- ① Laboratory gas emission control  
NUK has 94 laboratories equipped with forced air extraction equipment for exhaust cabinets: 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 the “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

Data of Regular Inspection of Indoor Air Quality in the Library

test item	unit	test data	legal standard
CO2	ppm	504	1,000
CH2O	ppm	<0.06	0.08
PM10	μ g/m3	31	75
Bacteria	CFU/ m3	564	1,500



Indoor air quality real-time monitoring panel



Good indoor air quality certificate

#### 4-3.2 Water Resource Management

- ① 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. Since 2010, NUK has cooperated with government agencies and implemented the Four-Saving Plan. Although the Plan ended in 2015, NUK has continued to implement water-saving measures. The annual water consumption will be reduced by 2% compared with the previous year. NUK intends 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.

- 1 Reclaimed water system: The water treated by the NUK 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.
- 2 Rainwater recovery system: The rainwater storage and reuse system set at College of Humanities and Social Sciences is mainly to replenish the artificial lake nearby as an ecological water system.
- 3 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.
- 4 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 based on 2015	Water recovery volume	Water recovery PCT
2015	11/19/2014 11/23/2015	163,032	-	-	-
2016	11/24/2015 11/22/2016	188,022	-15.33%	117,309	62.39%
2017	11/23/2016 11/21/2017	176,309	-8.14%	111,621	63.31%
2018	11/22/2017 11/21/2018	203,490	-24.82%	171,938	84.49%
2019	11/22/2018 11/21/2019	204,291	-25.30%	179,294	87.76%
2020	2019/11/22 2020/11/21	152,389	9.53%	141,934	90.00%
2021	11/22/2020 11/21/2021	139,024	8.77%	128,551	92%

NUK internal water cycle system



Campus sewage treatment flow chart

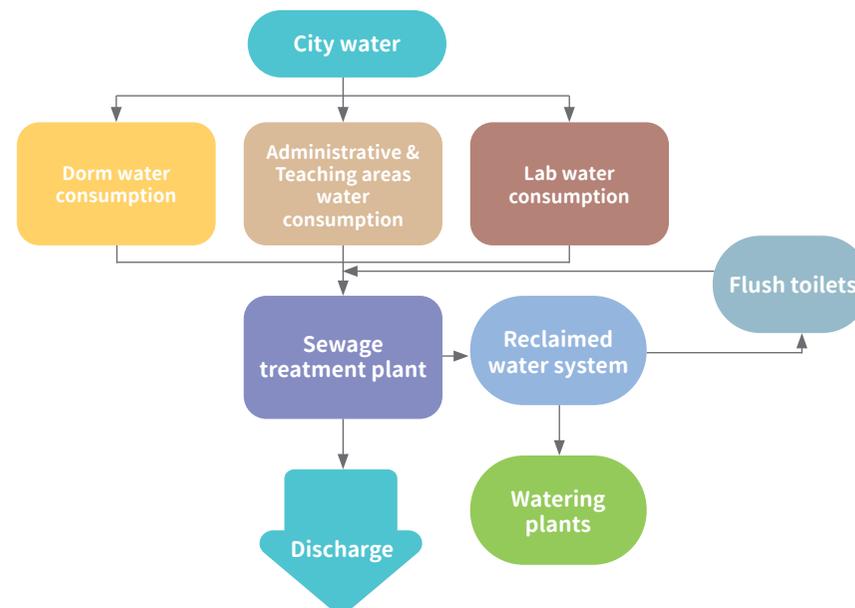


Chart of Water Consumption

Management of water resource		Volume (Million liters)
Discharge divided by end point		
Water withdrawal (Divided by source)	(1) Surface water + ground water + sea water	0
	(2) Produced water (total)	0
	(3) Third-party water (total)	152.389
	<b>Total water withdrawal</b>	<b>152.389<sup>(*)</sup></b>
Discharge (Divided by end point)	(1) Surface water + ground water + sea water	0
	(2) Third-party water used by other organization	0
	(3) Third-party water (total)	14.883
	<b>Total discharge</b>	<b>14.883</b>
<b>Total water consumption<sup>(**)</sup></b>		<b>137.506</b>

\*1: All fresh water ( $\leq 1,000\text{mg/L}$  Total dissolved solids)

\*2: Total water consumption = total water withdrawal - total discharge

## 2 Sewage treatment

NUK sewage sources include laboratory washing waste, dormitory and office sewage, which are collected through pipelines and sent to the sewage treatment plant for treatment. The reclaimed water is mainly used as supplementary water for grass sprinkler and ecological waterways. When there is excessive displaced water, it will be discharged to the drain on the north side of the campus and eventually into the Dian-bao River. In addition to the traditional two-level biological treatment, the NUK sewage treatment plant is added with three-level treatment of filtering and ozone sterilization. The quality of the discharged water meets the discharged water standard revised on April 29, 2019. The discharged water standard is based on Article 7 Paragraph 2 of the Pollution Prevention and Control Law.

List of removal rates of sewage treatment plant

Water quality standard	Removal rate
BOD	66.3%
COD	54.8%
SS	67.5%
Escherichia coli	98.0%

Discharge water quality test data and discharge water volume

Test Item	2019	2020	2021	Discharge standard
BOD(mg/l)	10.3	6.55	10.45	30
COD(mg/l)	42.7	31.9	39.9	100
SS(mg/l)	9.4	6.6	7.55	30
Escherichia coli (CFU/100mL)	28,850	34,250	23,988	200,000
Grease (mg/l)	0.88	1.55	0.7	10
Water temperature (oC)	26.9	27.3	28.7	35
PH	7.7	7.5	7.6	6-9
Discharge volume (CMD)	20,586	19,187		-

## 3 Drinking water

NUK 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.

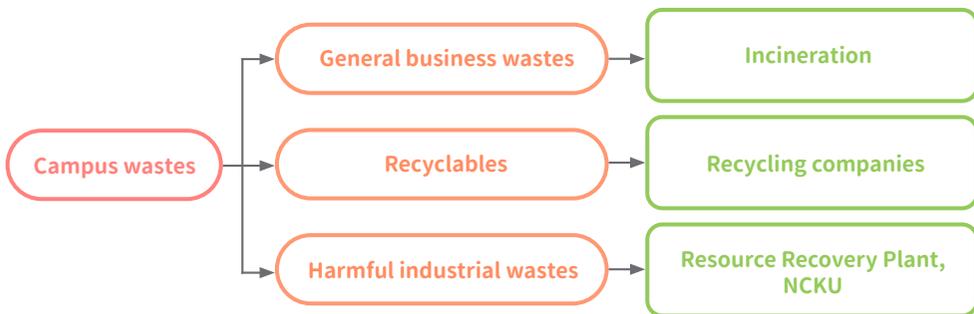
Test results of drinking fountains

Year	2019	2020	2021	Standard
Escherichia coli CFU/100mL	< 1	< 1	< 1	6
Total plate count CFU/mL	< 1	< 1	< 1	Nil

### 4-3.3 Waste Management

KU waste output can be roughly divided into general business waste and recyclables generated in the dormitory and office, and hazardous business waste generated in the laboratory. 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.

Waste treatment flow chart



List of general industrial waste disposal 2021

Industrial waste component	Hazardous waste		Non-hazardous waste		Note
	On-site	Off-site	On-site	Off-site	
Direct treatment					
Incineration (incl. recycling)	59	-	298.95	-	
Landfill	-	-	-	-	
Others	-	-	14.55	-	Recycling
Subtotal	59	-	313.5	-	
total	59		313.5		
sum	372.5				
Temporary storage	-				
Total waste	372.5				

- 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.

### 4-3.4 Occupational Safety and Health Management

#### 1 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.



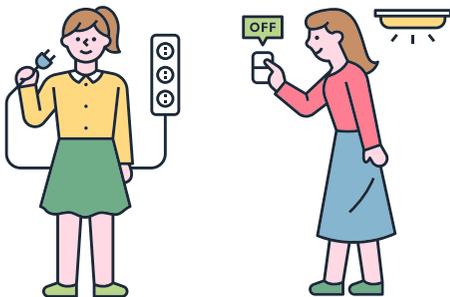
**(1) Management organization**

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 Law, 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.

1. NKU occupational disaster statistics are regularly compiled by 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 2021.

**Statistical analysis of accidental injuries**

Status	Faculty		Staff		University hired	
	M	F	M	F	M	F
Gender						
Employee Disabling Frequency Rate (FR)	0	0	0	0	0	0
Employee Disabling Severity Rate (SR)	0	0	0	0	0	0
Incidence rate	0	0	0	0	0	0
Absenteeism rate	0%	0%	0%	0%	0%	3%
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

2. 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.
3. The Environment Safety and Health Center 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 <sup>nd</sup> pressure vessel*1	danger	1
Nano-Optoelectronic Lab	2 <sup>nd</sup> pressure vessel*1	danger	1
Microbial Biochemistry Lab	Autoclave*1	danger	1
Plant Biochemical Lab	Small pressure vessel*1	danger	1

學生餐廳、便利商店宣導限制塑膠袋與一次性(拋棄式)用品的減量政策

