

Macau University of Science and Technology

Sustainability Report

(2023)



澳門科技大學
MACAU UNIVERSITY OF SCIENCE AND TECHNOLOGY

Macau University of Science and Technology Sustainability Report 2023



澳門科技大學

UNIVERSIDADE DE CIÊNCIA E TECNOLOGIA DE MACAU

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1. Overview

Established in 2000, Macau University of Science and Technology (MUST) is the first international comprehensive research university approved by the Macao SAR Government after the handover of Macao. MUST has grown rapidly to become the largest comprehensive university in Macao and has achieved excellent results in international university rankings. MUST ranks 251st-300th in the Times Higher Education (THE) World University Rankings, 35th in the Asian University Rankings, 26th in the World's Youngest Universities Rankings, 505th in the QS World University Rankings and 401st-500th in the Shanghai Ranking's Academic Ranking of World Universities (ARWU) for the year 2023.

Located on the scenic island of Taipa, Macao, MUST's campus occupies an area of about 210,000m², with more than 18 buildings (Ranging from A to R and including H, Q, and K), which provide a wide range of facilities, such as libraries, an athletic field of Olympic standard, an indoor sports hall, tennis courts, and a cinema hall, etc. (Figs. 1 and 2).

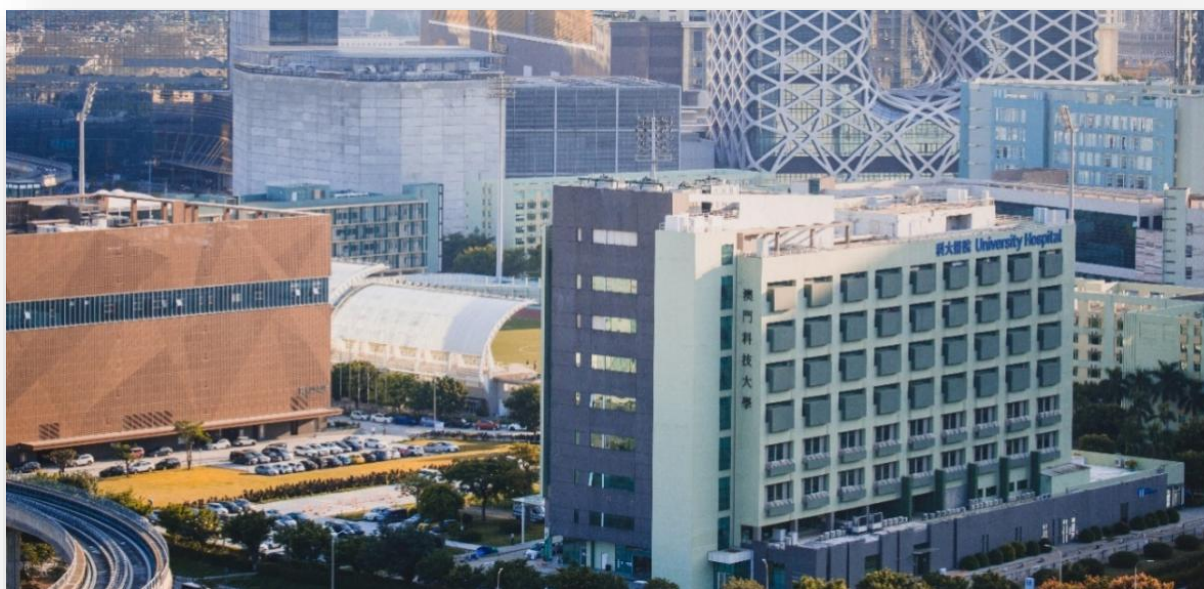


Fig. 1 Panoramic view of campus

MUST currently has nine faculties (the Faculty of Innovation Engineering, the School of Business, the Faculty of Law, the Medical Sciences Division, the Faculty of Hospitality and Tourism Management, the School of Humanities and Arts, the University International College, and the School of Liberal Arts) and a Department of General Education. In the 2021/2022 academic year, there are 2,058 faculty members, including 811 faculty members, 1,081 non-faculty members, and 166 outsourced staff. The University has over 17,000 undergraduate and postgraduate students.

MUST is committed to providing a high quality education and research environment to nurture innovative and internationally minded individuals. Through interdisciplinary and international co-operation, MUST provides students with a wide range of knowledge and career development opportunities, and contributes positively to the socio-economic development of Macau.

As an educational institution pursuing academic excellence, MUST is also committed to creating a sustainable campus environment that provides a favorable environment and conditions for teaching, learning and research. To minimize its ecological footprint, MUST has adopted a series of measures to reduce energy consumption and carbon emissions. For example, energy efficient equipment is used on campus, the use of renewable energy is promoted, and a waste separation and recycling system has been implemented. In addition, MUST focuses on the promotion of environmental education and awareness. The University organizes a number of environmental activities to enhance teachers' and students' awareness and sense of responsibility for environmental protection. Furthermore, MUST offers relevant programmes and research projects to develop students' professional knowledge and skills in the field of sustainable development.



Fig. 2 Campus map

2. Sustainability Performance



With the worsening of global environmental problems, sustainable development has become a consensus among all sectors of the society. As one of the center cities of the Guangdong-Hong Kong-Macao Greater Bay Area (GBA), Macao plays an important role in promoting the construction of a "dual-carbon" framework in the Greater Bay Area. As an important base for talent cultivation, MUST should also actively practice the concept of sustainable development and contribute to the promotion of the construction of the green campus. Since the establishment of MUST in 2000, the university has adopted measures to reduce carbon emissions and resource consumption through energy conservation, promotion of renewable energy, and construction of a green campus. At the same time, the university focuses on social responsibility and participates enthusiastically in community services and public welfare activities. Furthermore, the university supports the development of the local economy and promotes industry-academia-research co-operation, innovation and entrepreneurship. Moreover, the university emphasizes education and training to nurture sustainable talents. In addition, the school promotes innovation and technology development which providing solutions and technical support to reduce the emission.

MUST is committed to establishing and implementing a sound sustainable development framework to provide a high quality and sustainable campus environment. In order to better demonstrate MUST's efforts and achievements in sustainability and to promote the concept of sustainability in general, we have prepared this report with reference to the United Nations Sustainable Development Goals (SDGs), the Global Reporting Initiative (GRI Standards), and so on.

The report provides an overview of MUST's sustainability performance over a 12-month period (September 2021-August 2022), including green campus construction, renewable energy use, waste management, sustainable course offerings, research in sustainable directions and areas, and social low-carbon activities involving students and faculty. The report also discusses and explores the objectives, pathways and measures for the university to further promote the green and sustainable development of the campus.

2.1 Carbon emission analysis

This section summarizes the GHG emissions of MUST for the academic year 2021/2022. As the year of completion and commissioning of Block R is 2020, it is proposed to start the calculation one year after the year in which the occupants of the Building R have already moved into the building for use, thus adopting the period from September 2021 to August 2022 as the base year. The purpose of this section is to provide the GHG emission accounting for MUST in accordance with ISO 14064-I "Greenhouse Gases-Part 1: Guidelines for Quantification and Reporting of Greenhouse Gas Emissions and Removals at the Organizational Level", including Scope 1, Scope 2 and Scope 3 analyses (Figure 3). The operating boundary is based on:

Scope I (Direct GHG emissions):

(e.g. combustion emissions from boilers, furnaces, vehicles, etc.).

(MUST's statistics include gas used in classrooms and kitchens, fuel used in vehicle operations)

Scope II (Indirect GHG emissions):

Greenhouse Gas Emissions from External Electricity Consumption in school.

(For example, electricity for all buildings involved in MUST)

Scope III (Other Indirect GHG Emissions):

- School-related transport activities (e.g. transport of purchased goods, staff travel, staff commuting)

- Electricity-related activities outside Scope 2

- Leased assets

- Use of sold products and services

- Waste disposal, etc.

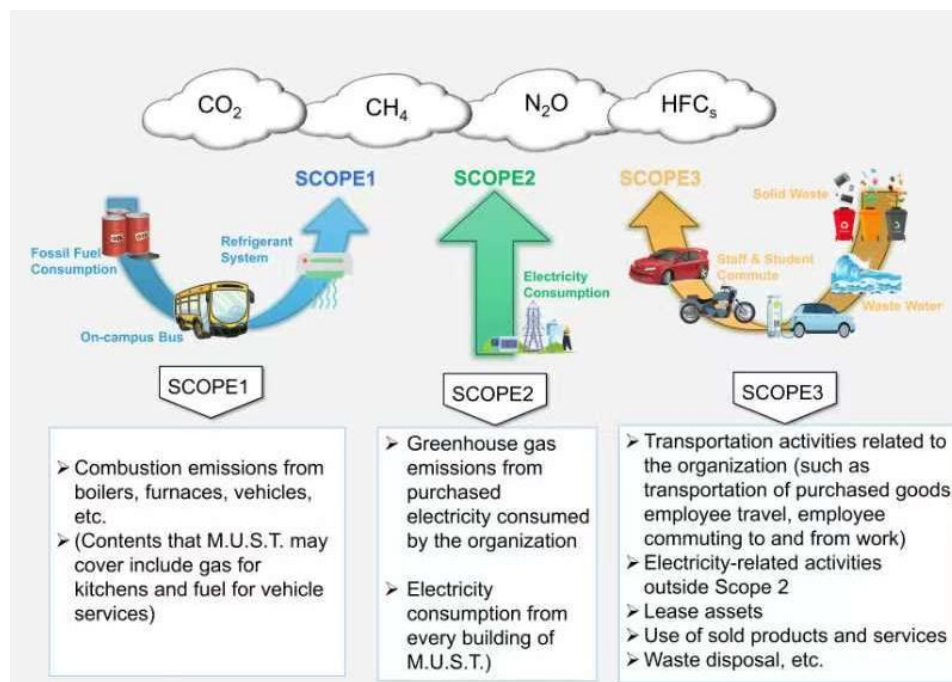


Fig. 3 Emissions in Scope 1, 2 and 3

2.1.1 Greenhouse Gas Emission Analysis

From September 2021 to August 2022, MUST generated a total of 16845.92 tCO₂-e of GHG emissions. Among them, Scope 1 generated 98.16 tCO₂-e, accounting for 0.58% of the total emissions, with petrol consumption as the main source; Scope 2 generated 16,694.15 tCO₂-e, all of which came from purchased electricity and accounted for 99% of the total emissions; and Scope 3 generated 53.61 tCO₂-e, accounting for 0.314% of the total emissions, with food and water as the main sources of emissions (Table 1 and Figure 4). Compared with the same period last year, both total and per capita emissions showed a downward trend (Figure 5).

Table 1 MUST carbon dioxide emission accounting scope (2021.9-2022.8)

	Source of carbon emissions	Consumption	Unit	Emission factor	Emission factor units	Carbon emission tCO ₂ -e	Total Carbon emission tCO ₂ -e
Scope 1	Gas	395	m ³	0.521	kgCO ₂ -e/m ³	0.21	98.16
	Petrol	35,663.16	L	2.348	kgCO ₂ -e/L	83.74	
	Diesel	5,283.15	L	2.689	kgCO ₂ -e/L	14.21	
Scope 2	Electricity	10,183.0	kWh	0.620 (2021)	kgCO ₂ -e/kWh	6,313.47	16,694.14
	Electricity	1,704,545	kWh	0.609 (2022)	kgCO ₂ -e/kWh	10,380.68	
Scope 3	Water	313,535	m ³	0.171 (2021)	kgCO ₂ -e/m ³	53.61	53.61

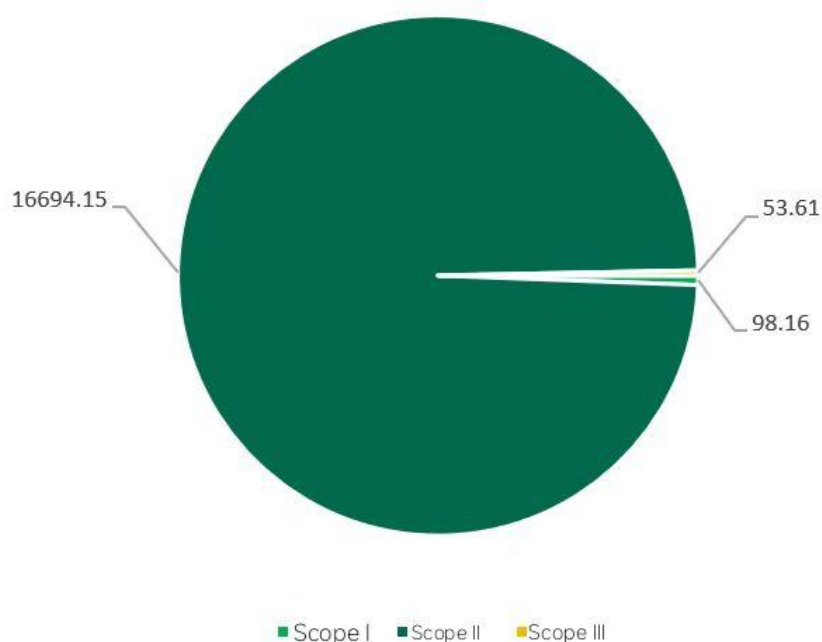


Fig.4 Distribution of scope 1, 2 and 3 emissions

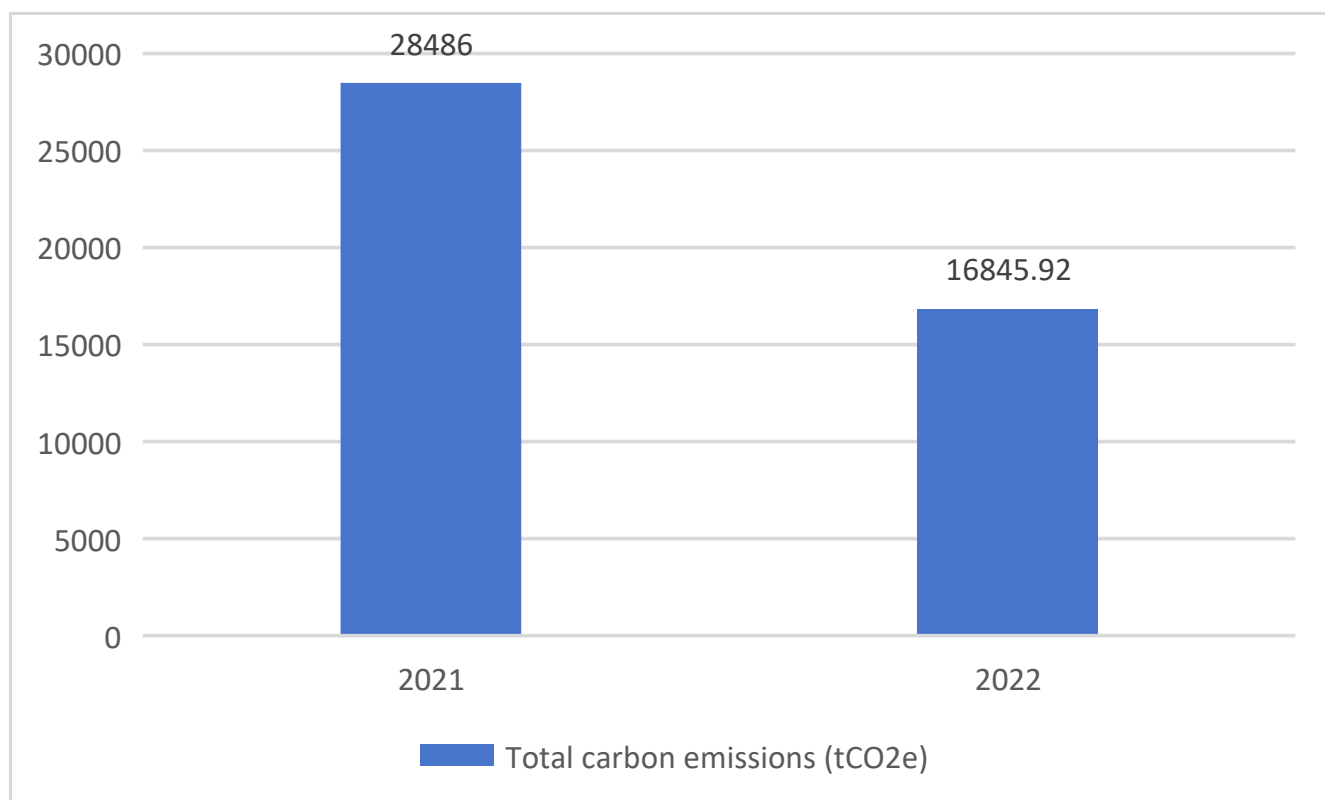


Fig.5 Carbon emission trend of MUST (2021-2022)

As electricity consumption accounts for 99% of MUST's total carbon emissions, the report further accounts for greenhouse gas emissions from electricity consumption in detail. Among all academic buildings, Block N emits the most, followed by Block O. Among all dormitories, Block P emits the most. Block R is a new building of the University, which was constructed in response to the Macao SAR government's call for a green environment, and through the installation of energy-saving appliances and the use of the Green Intelligent Campus System, its emissions per unit of floor area are lower than those of the earlier buildings, namely, Blocks N and O. (See Fig. 6 and Fig.7)



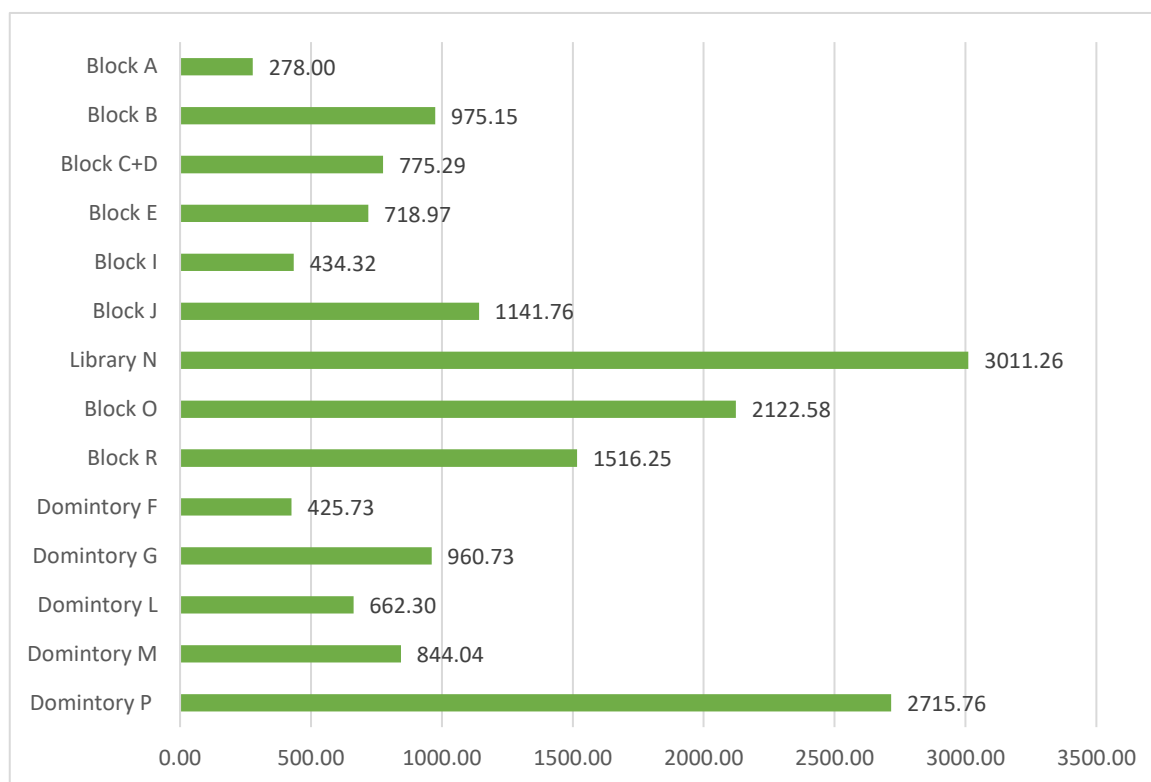


Fig. 6 Detailed greenhouse gas emissions (tCO₂e)

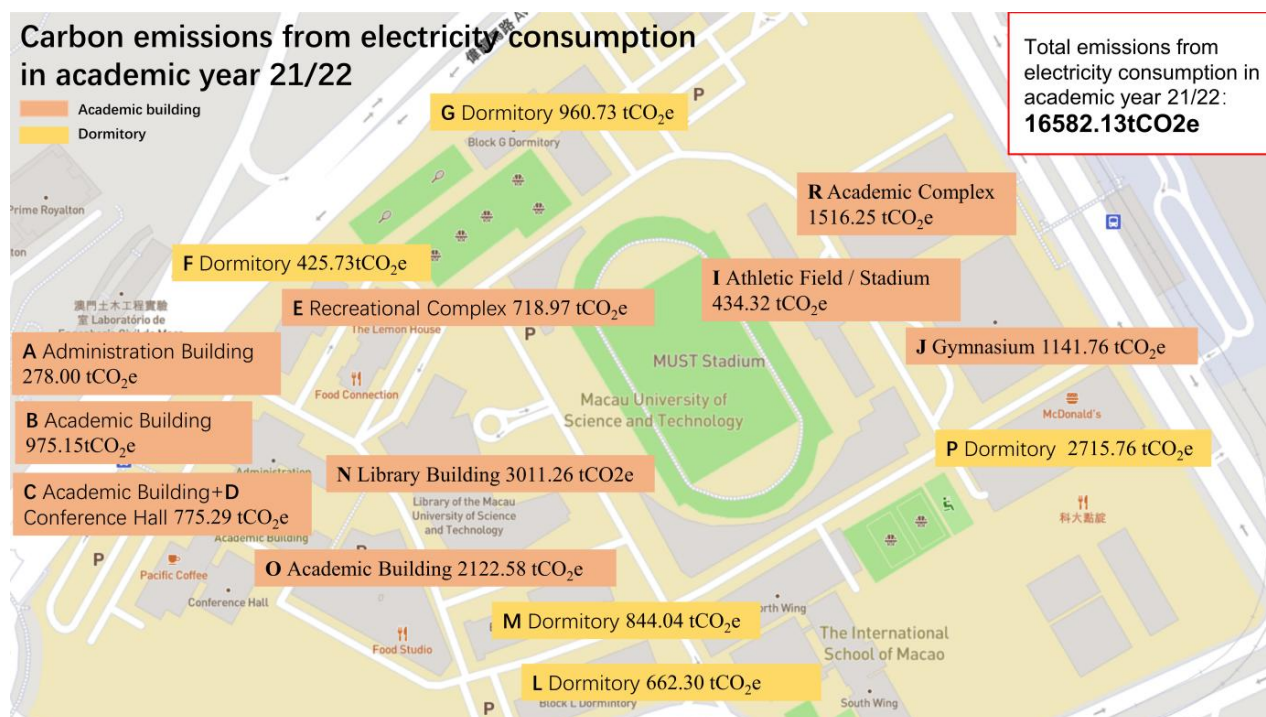


Figure 7 Distribution of GHG emissions from electricity (2021/2022)

*Note: This graph is calculated using the 2021 electricity emission factor (0.609 kgCO₂/kWh)

2.1.2 Water consumption

The on-campus water consumption during the period from September 2021 to August 2022 was 313,535 m³, which is equivalent to an emission of 53.61 tCO₂-e (emission factor 0.171 kgCO₂-e /m³). The highest water consumption was in Block P of the hostel and Block C of the academic building (Figure 8). In order to conserve water, MUST has taken a number of initiatives (Figure 9). For example, all toilets on campus are labelled with "Water Conservation" signs to cultivate a sense of rational water use and water conservation, and to advocate the concept of water resource conservation. Drinking fountains are installed in all blocks on campus and are provided free of charge to students, staff and visitors. Some facilities on campus can reduce water consumption by using sensor-activated taps, water-saving nozzles and sensor-activated urinal pads in toilets. Drought-tolerant plants are used in the botanical landscape of the campus to minimize water consumption.

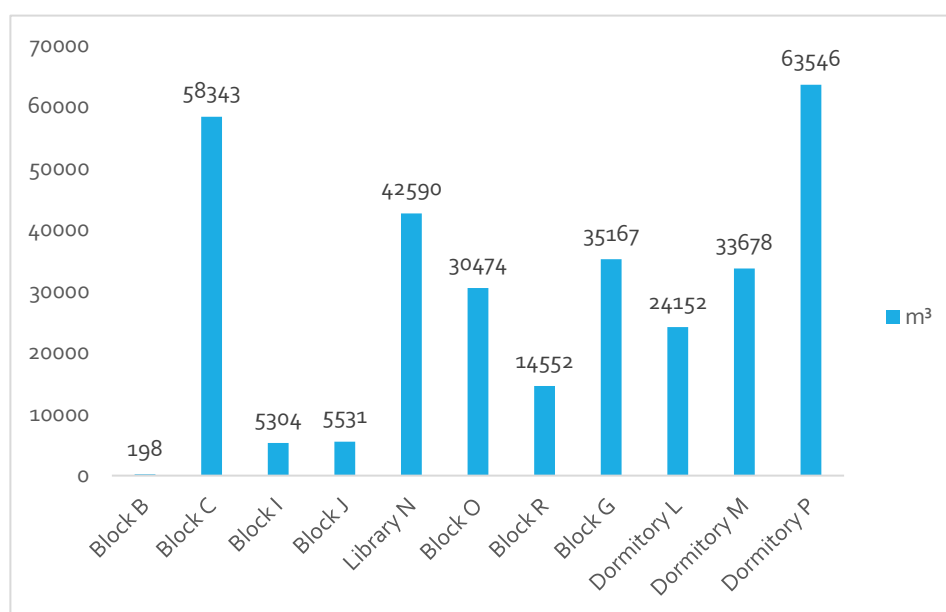


Fig. 8 Water consumption of buildings on campus (2021/2022)



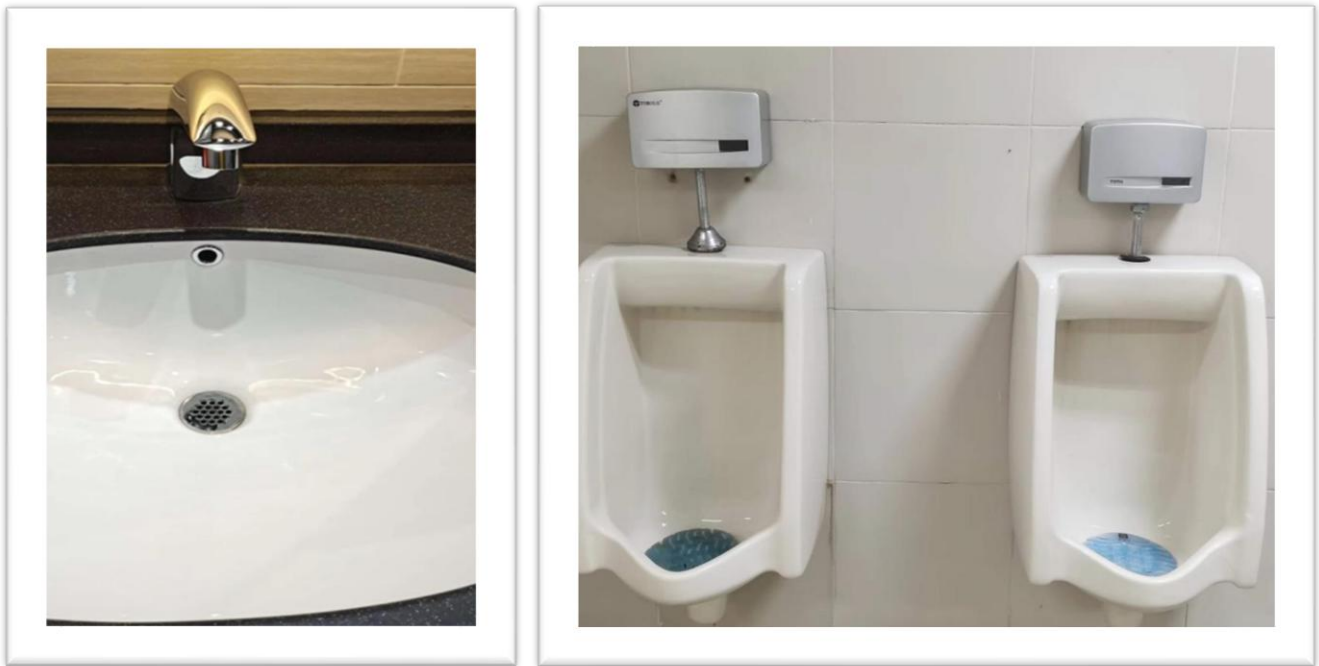


Fig. 9 Measures to reduce water consumption

2.1.3 Electricity Consumption

Between September 2021 and August 2022, the various buildings at MUST consumed a total of 2,722,8461 KWh of electricity and produced 16,694.15 tCO₂-e of greenhouse gas emissions.

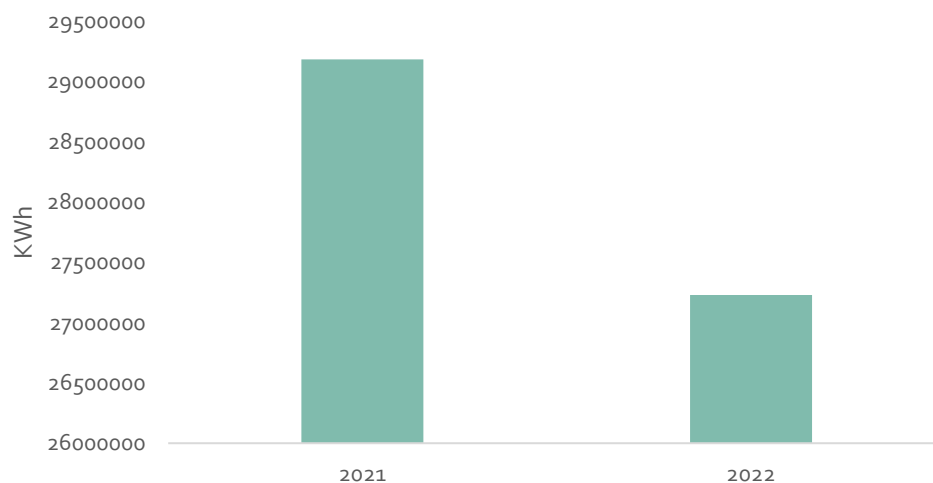


Fig. 10 Campus electricity consumption (2021/2022)

To reduce electricity consumption, the campus is gradually installing LED energy-saving lamps in place of incandescent lamps. The school has also installed solar-powered lights in outdoor areas and technologically upgraded its infrastructure to provide sustainable energy services (Figure 11).



Fig. 11 LED energy-saving lights and outdoor PV lights on campus

From September 2021 to August 2022, a total of 27,228,461 KWh of electricity was consumed in the academic buildings and hostels of the campus and a total of 16,694.15 tCO₂-e of GHG was generated. Of this amount, Library N consumed 4,944,595 KWh of electricity, accounting for the largest share (18.18%); Block P dormitory consumed 4,459,369 KWh of electricity, accounting for the second largest share (16.38%), while Block O complex consumed 3,485,350 KWh of electricity, accounting for the third largest share (12.8%) (Figure 12).

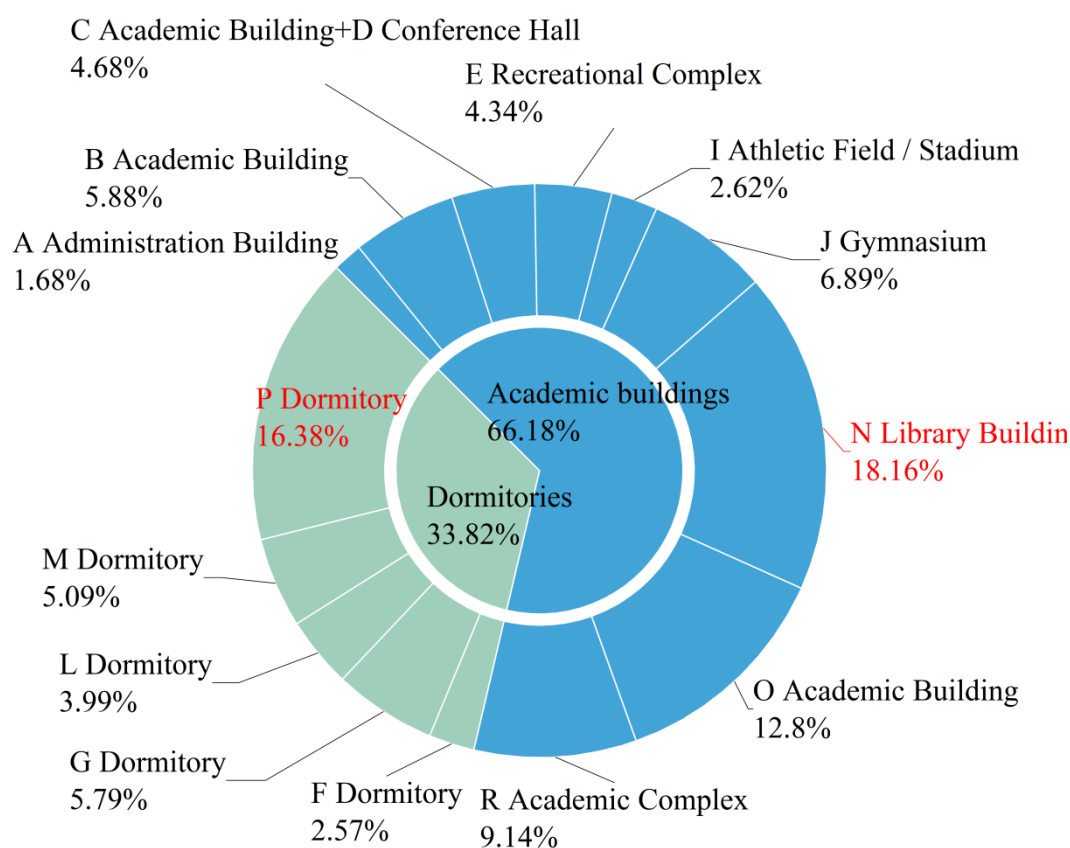


Fig. 12 Electricity consumption distribution in campus

*Note: This graph is calculated using the 2021 electricity emission factor (0.609 kgCO₂/kWh)

2.2 Sustainable Campus

A sustainable campus means that in the process of campus planning, design, construction, operation and management, full consideration is given to energy conservation, environmental protection, resource utilization and ecological benefits in order to achieve sustainable development of the campus. It not only pays attention to the ecological environment of the campus, but also focuses on cultivating teachers' and students' awareness of environmental protection and enhancing the overall quality of the campus. In order to achieve a carbon-neutral campus as soon as possible, MUST is making efforts through the use of renewable energy sources such as solar energy, waste management and the organization of low-carbon activities for the community.

2.2.1 Utilization of renewable energy sources

MUST has the largest solar carport in Macao (Figures 13 and 14). The solar PV panels are expected to produce 1,049,712.75 KWh of clean and environmentally friendly electricity per year, which is equivalent to an emission reduction of 639.28 tCO₂-e (Table 2 and Figure 15). The projected electricity generation from MUST's solar PV panels and the projected use of GHG emission reductions are shown in Figures 16 and 17.



Fig. 13 PV car park near the school gate



Fig. 14 Solar panels in Block D

Table 2 Carbon reduction of PV panels (2021.9-2022.8)

Location	Number of panels	Area (m2)	Electricity generation (kWh)	GHG reduction (tCO ₂ e)
P1	315	512.47	129701.25	80.41
P2	210	341.64	86467.50	53.61
Block D	308	501.08	126819.00	78.63
W1.1	112	182.21	45360.00	28.12
P3	145	235.90	59703.75	37.02
W1.2	330	536.87	133650.00	81.39
W2	182	296.09	73710.00	44.89
P7	160	260.30	56160.00	34.20
P4,P5,P6	270	439.26	111172.50	68.93
P8-A (305W)	125	203.36	51468.75	31.91
P8-A (260W)	190	309.11	66690.00	41.35
P8-B	310	504.33	108810.00	67.46
Total	2,657	4,322.62	1,049,712.75	639.28



PV Location

- Block A
- Block B
- Block C
- Block E
- Block F
- Block G
- Block L
- Block M
- Block N

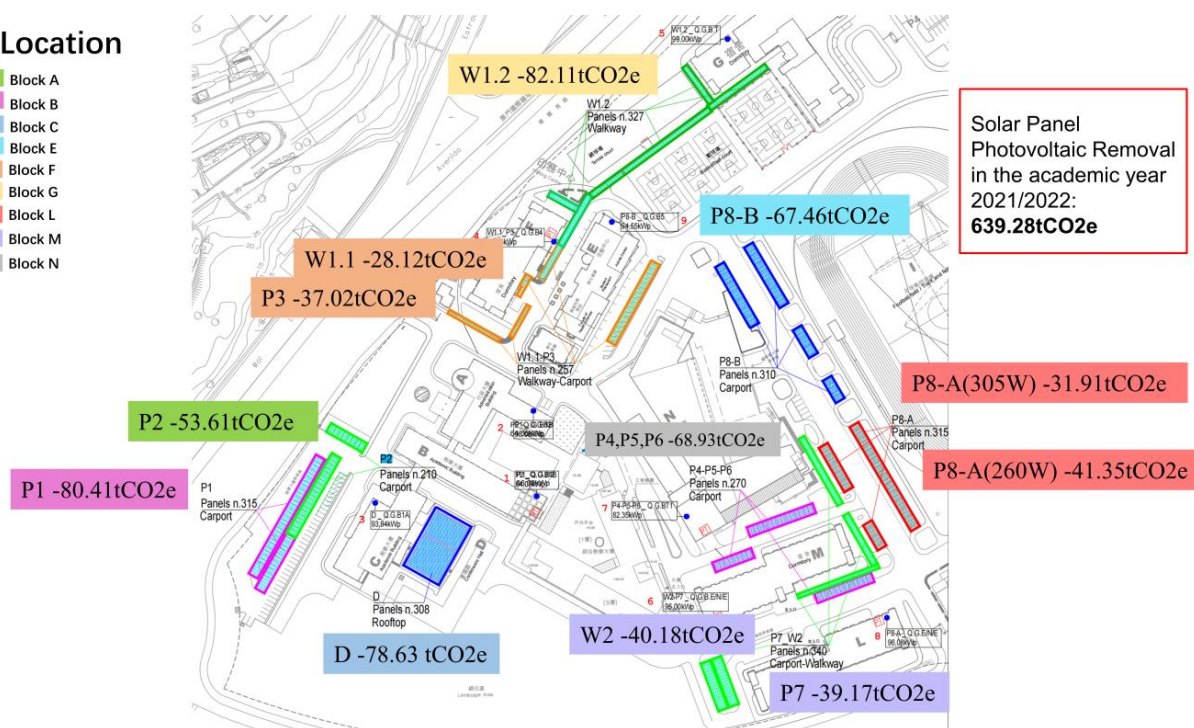


Fig. 15 Distribution of GHG emission reductions from solar photovoltaic panels (2021/2022 academic year)

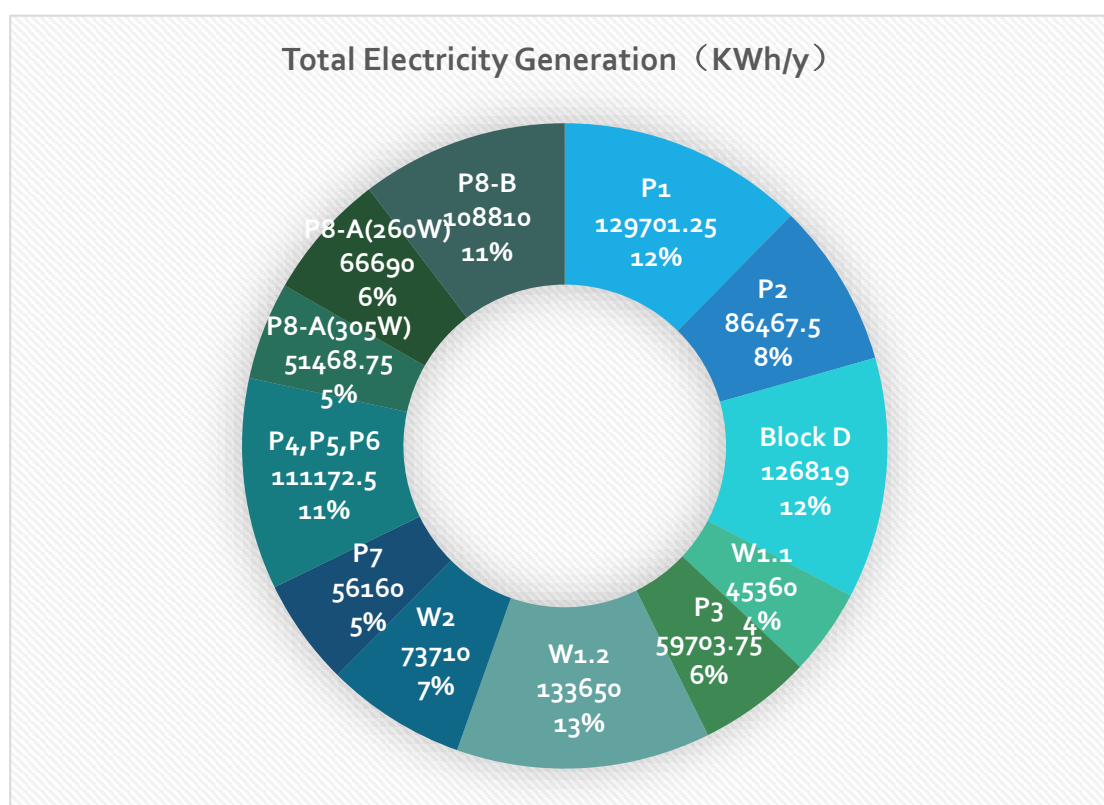


Fig. 16 Electricity generated by solar photovoltaic panels (2021/2022 academic year)

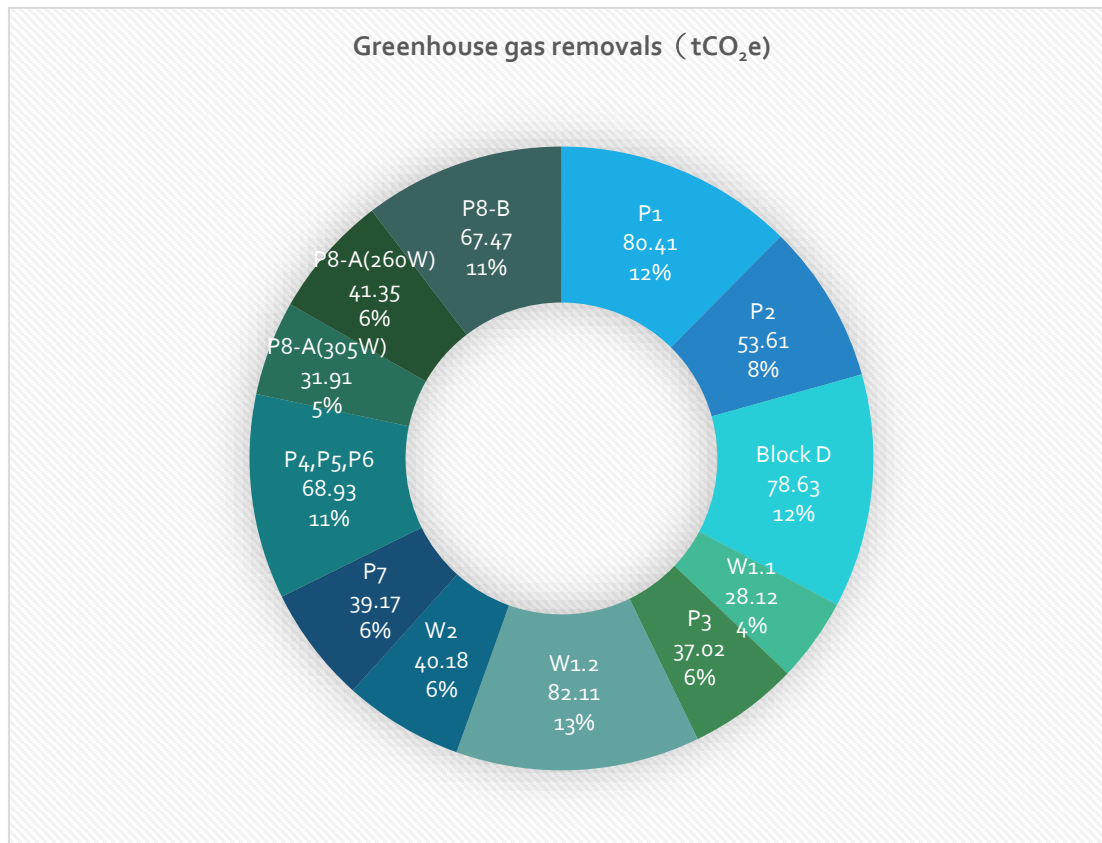


Fig. 17 Greenhouse gas emission reduction from solar photovoltaic panels (2021/2022 academic year)

2.2.2 Waste Management

In 2021/2022, MUST recycled a total of 2,353 kg of used newspapers and magazines, which reduced 6,337.5 tCO₂-e. Recycled 82,228 plastic bottles can reduce 2,466.84 kgCO₂-e. Recycling of 853 scrap products, including computer equipment, instruments, furniture, photocopiers, vehicles, etc., can reduce 52,033 kgCO₂-e. Recycled 204 toner cartridges can reduce 1,821.72 kgCO₂-e.

2.2.3 Battery Recycling

The Macao Environmental Protection Bureau always encourages the public to recycle used batteries. Battery recycling bins are located in 4th floor of Blocks F, G, L, M, N, 1st floor of the University Library and Block P (Figure 18). MUST can recycle about 0.127 tons of used batteries in a year, which can reduce greenhouse gas emissions by at least 38.08 kgCO₂-e.



Fig. 18 Battery recycling bins at the entrance of MUST Library

2.2.4 Recycling of Used Newspapers/Magazines

Recycling bins are available throughout the campus, including A113, A206, A312 and A508 in Block A, Ground Floor in Block I, N516 in Block N, O331 in Block O, and 10th Floor of the Recipients' Building (Figure 19). 2,535kg of newspapers and magazines have been recycled at the school from September 2021 to August 2022, which is equivalent to a reduction in emissions of 6.34 tCO₂-e.



Fig. 19 Paper recycling bins

2.2.5 Recycled Envelopes

MUST recycles envelopes after the Spring Festival every year for about two weeks. The locations of the recycling bins include the ground floor lobbies of Blocks A, B, C, N, O, and R (Figure 20). A total of about 4,600 red envelopes have been recycled in 2021 and 2022, which results in a reduction of 1.8308 kgCO₂-e.

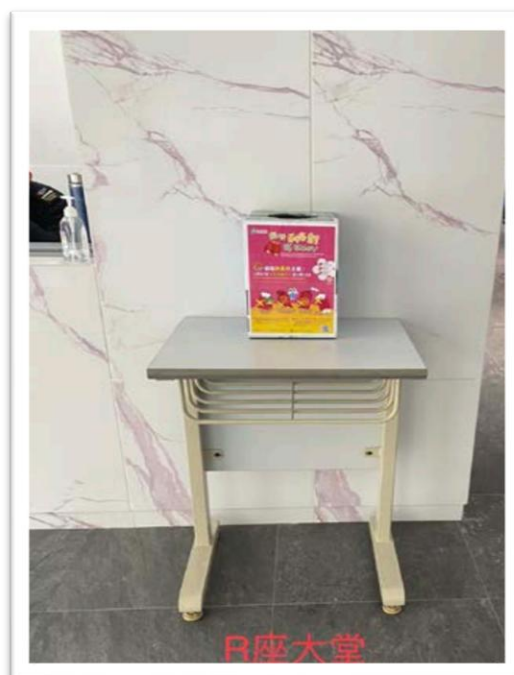


Fig. 20 Envelope recycling box

2.3 Sustainable Education

MUST attaches importance to teaching in the area of sustainable development, and has been strengthening the teaching of environment, green finance and ESG contents in its daily teaching. Apart from the Department of General Education which has set up relevant compulsory and elective courses, a number of other faculties have offered sustainability-related subjects to develop students' knowledge and competence in sustainability (Table 3). This reflects MUST's concern for environmental protection and sustainable development, and provides students with more learning and research opportunities. Regardless of their professional background, students can find sustainability-related programmes at MUST to broaden their knowledge and skills.

Table 3 List of sustainability-related programmes of MUST

Academy	Degree	Programme	Subject	Types of courses	Credit
FIE	Bachelor	Interdisciplinary (Technology and Management) Engineering	Special Topics in Social Science	Elective	2
FIE	Master	Environmental Science and Management	Environment & Sustainability	Compulsory	3
School of Business	Bachelor	Business Administration	Business Ethics and Corporate Social Responsibility	Compulsory	3
School of Business	Master	Business Administration	Corporate Social Responsibility & Ethics	Compulsory	3
School of Business	Master	Public Welfare and Social Organization Management	Social Enterprise & Social Innovation	Compulsory	3
Faculty of Law	Doctor	Law	Special Topics in Environmental and Resource Protection Law	Compulsory	3
FHTM	Bachelor	Hospitality Management	Innovation and Sustainability in the Hospitality Industry	Elective	3
FHTM	Doctor	Tourism Management	Research on the Sustainable Development of the Tourism Industry	Elective	2
FA	Bachelor	Digital Media Arts	Special Topics in Environmental Science	Elective	2
School of Liberal Arts	Bachelor	Commerce	Business Ethics and Corporate Social Responsibility	Compulsory	3
School of Liberal Arts	Bachelor	Commerce	Special Topics in Social Science	Elective	2
TISD	Doctor	Urban and Regional Economics	Special Topics in Urban and Regional Sustainable Development	Compulsory	3
TISD	Doctor	Urban and Regional Economics	Environmental and Resource Economics	Elective	3

In addition, as a young, comprehensive, research-intensive and innovative university, MUST is committed to nurturing talent and promoting social progress. Moreover, as a private university, MUST has always been at the forefront of higher education reform, pioneering and innovative, rooted in Macao, expanding into the Greater Bay Area and serving the nation. All faculties are actively launching a series of academic lectures and seminars on sustainable development. The diversified forms of activities allow students and staff to participate extensively, integrating what they have learnt in the classroom into academic research and daily practice, focusing on quality education and advocating lifelong learning.

Typical case 1:

On 28 March 2022, the inauguration ceremony of the "Macao National Field Station for Scientific Observation of Coastal Zone Ecology and Environment" was successfully held at MUST (Figure 21). The Macao Field Station is the first national field station in Hong Kong and Macao, which fully reflects that the Ministry of Science and Technology (MOST) attaches great importance to Macao's scientific and technological innovation, especially field scientific observation research. MUST will endeavor to build and develop the Macao Field Station well, and to contribute to the ecological civilization and sustainable development of the Guangdong-Hong Kong-Macao Greater Bay Area and Macao.



Fig. 21 Scene of the inauguration ceremony of the "Macao National Field Scientific Observatory for Coastal Zone Ecology" at MUST

Typical case 2 :

On 2 April 2022, the "Guangdong, Hong Kong and Macao Greater Bay Area Marine Sustainable Development Symposium", jointly organized by the Macao University of Science and Technology (MUST), the Southern Marine Laboratory (SML) and the Ocean University of China (OUC), was held in online mode with the support of the China Association for Science and Technology (CAST) (Figure 22). The symposium focused on the ecological environment of the coastal zone, comprehensive ocean governance and high-quality development of the ocean economy, with the aim of enhancing cooperation and exchanges in the ocean area between the Mainland, Hong Kong and Macao, promoting joint research and breakthroughs in key technologies and joint training of scientific talents, promoting the development of the ocean economy in the Guangdong, Hong Kong and Macao Greater Bay Area, and supporting Hong Kong and Macao to better integrate into the overall situation of the country's development.

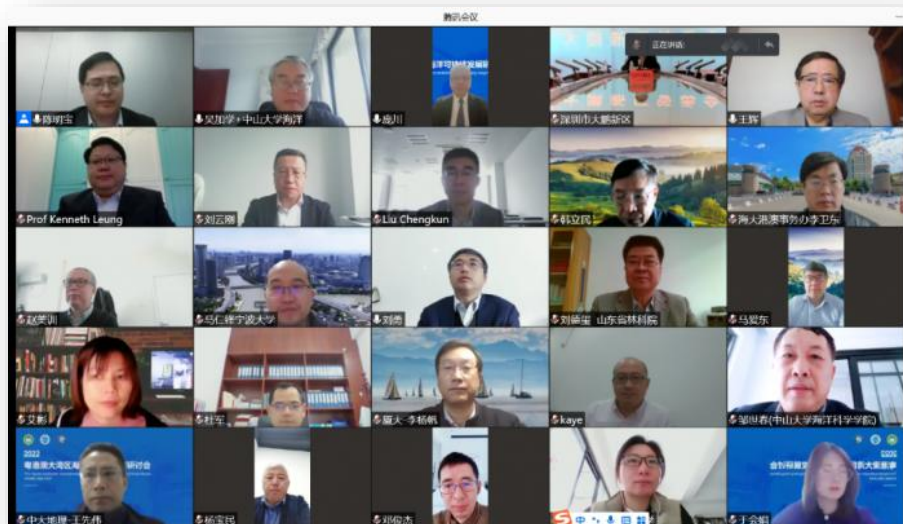


Fig. 22 "Sustainable Development of the Oceans in the Greater Bay Area of Guangdong, Hong Kong and Macao" Online Seminar

Typical case 3:

The Centre for Entrepreneurship and Career Development of the MUST regularly provides students with online seminars on "Paving Your Professional Career Path in Sustainability", mobilizing them to participate and actively providing them with relevant guidance (Figure 23). Relying on quality resources on and off campus, students can listen to and share the insights of professionals on their career paths and sustainable job prospects, so that they can have a clearer plan for their career, with a view to nurturing high-level talents in various fields for the promotion of sustainable development of the economy and society.

EPISODE 17

Paving Your Professional Career Path in Sustainability

Continue paving your sustainability career journey in our seventeenth episode!

Join us in this **one-hour interview** to hear about the sustainability career journeys, words of advice and insights on the job prospects from **seasoned sustainability practitioners**. You will have the opportunity to raise your questions and interact with the speakers.

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Fig. 23 "Paving Your Professional Career Path in Sustainability" online seminar

Typical case 4:

On the morning of 26th March 2022, in the "Innovation Engineering Academic Forum" of the 22nd Anniversary Celebration Series organized by the MUST, MUST staff, national and overseas leaders in the fields of engineering and computer science, representatives from secondary schools and colleges, research institutes, and enterprises gathered to explore the latest research news and development trends in the field of innovation engineering to seek innovations and breakthroughs in the industry. The latest research trends and developments in the field of innovative engineering were discussed, with a view to seeking innovations and breakthroughs in the industry. Among them, Prof. Tong Zhang shared the application of macro-genomic approach on "activated sludge microbiome" and "antibiotic resistance genes". He pointed out that the survival and development of human beings require the use of antibiotics, respect and kindness to other living and non-living organisms and ecosystems for the sustainable development of human society (Figure 24).



Fig. 24 Lecture by Prof Zhang Tong at the "Innovative Engineering Academic Forum

Typical case 5 :

The professional/short-term training certificate programmes offered by the MUST's School of Liberal Arts not only have a wide choice of specializations, but also have a wide variety of styles of teaching. The course duration and assessment methods are flexible and applicants are not obligated to consider race, religion, disability or gender. MUST provides an excellent learning platform for people from all walks of life. (Figure 25)

專業/短期/培訓證書課程（非高等教育課程）



Fig. 25 Training courses by School of Liberal Arts

2.4 Sustainable Research Outputs

MUST has implemented a policy of equal emphasis on teaching and research, and has continued to focus on research in the field of sustainable development. Among the articles indexed by Scopus, the University has published 729 and 984 scientific research papers on sustainability in 2021 and 2022 respectively, representing an increase of 35%, which is 2.89 times higher than that in 2018 (Figure 26).

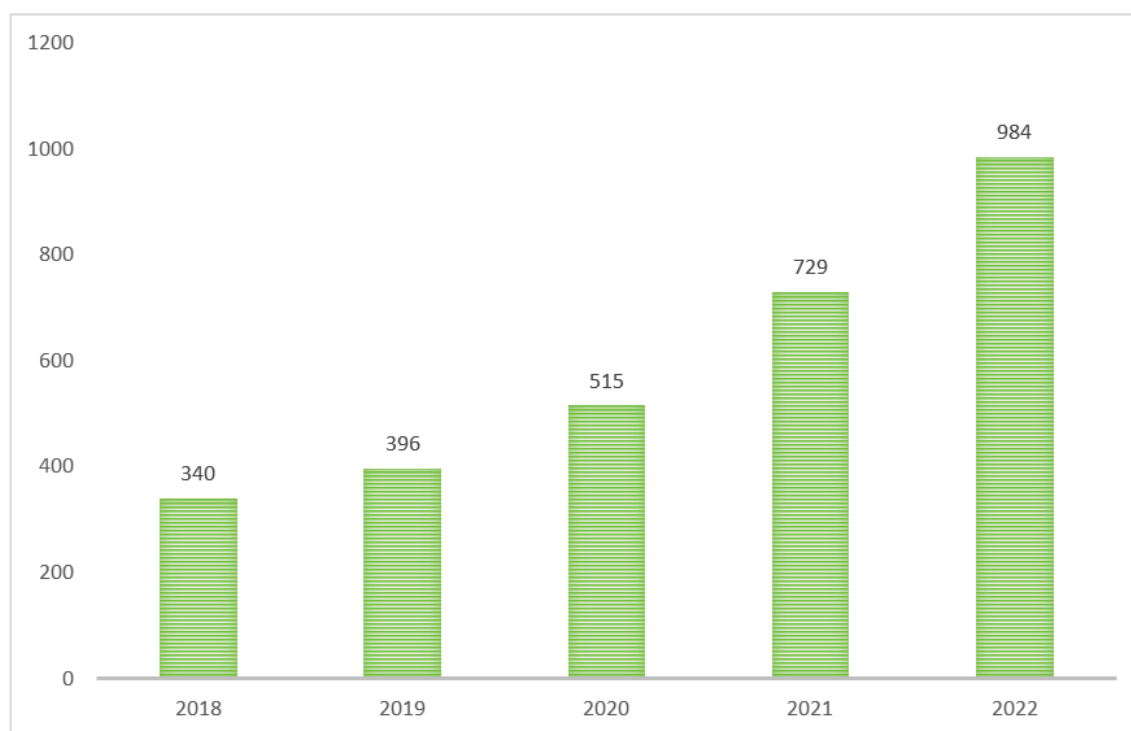


Fig. 26 Number of publications related to SDGs

MUST actively promotes multidisciplinary and cross-disciplinary integration of scientific research in areas related to sustainable development. Since 2008-2022, MUST faculty and researchers have been conducting increasingly extensive research on SDGs, with more research on SDG3-Good Health and Well-being, SDG7-Affordable and Clean Energy, SDG8-Physical Activity and Economic Growth, and SDG9-Industry, Innovation and Infrastructure. The number of research publications in the areas of SDG5-Gender Equality, SDG6-Clean Water and Sanitation, and SDG14-Underwater Organisms is a breakthrough. Overall, the number of publications in the SDGs is growing steadily (Figure 27).

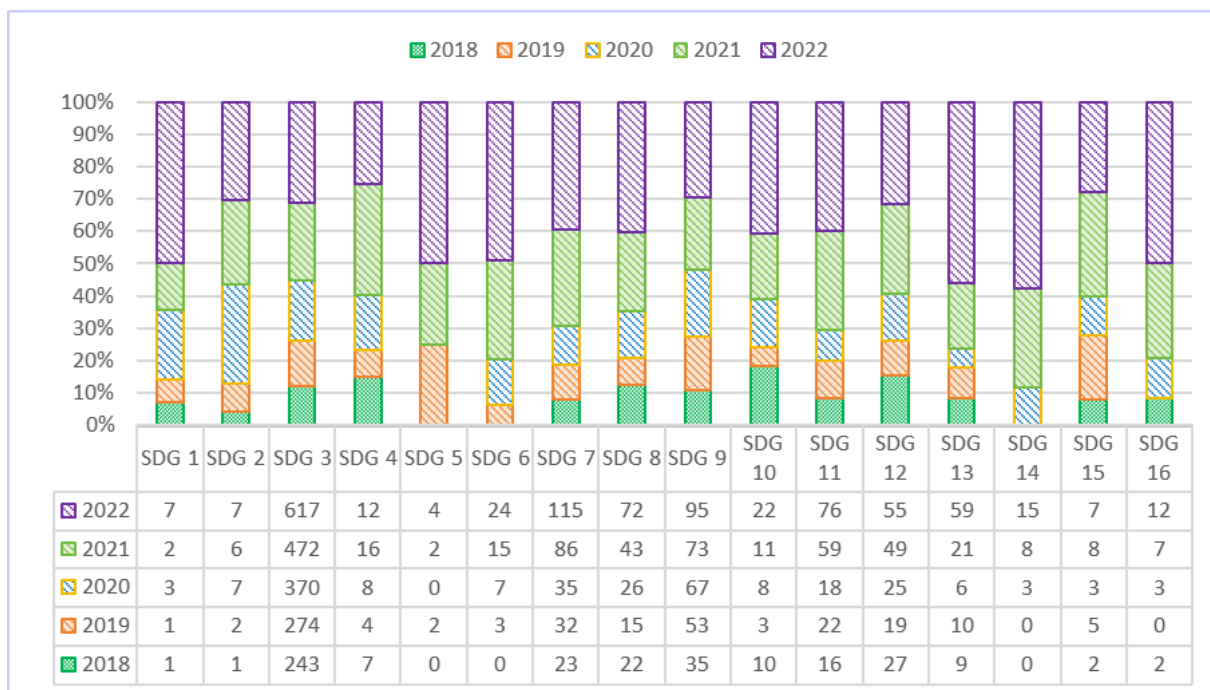


Fig. 27 Comparison of SDG articles by category (2018-2022)

Typical case 1:

In August 2022, Dr Yaping Qi, a postdoctoral researcher from the Department of Engineering Science, School of Innovation and Engineering, MUST, together with Associate Professor Yucheng Jiang from Suzhou University of Science and Technology (SUST), and the team of Professor Yong Chen, an internationally renowned physicist, published an article entitled "Recent Progress in Strain Engineering on Van der Waals 2D Materials: Tunable Electrical, Electrochemical, Magnetic and Optical Properties". The article was published online in the top international journal *Advanced Materials* (Impact Factor 30.49). The article summarizes the latest advances in the use of strain engineering to modulate the electrical, electrochemical, magnetic and optical properties of van der Waals' 2D materials, and presents the potential applications of strain engineering in functional devices and their future prospects, providing suggestions and insights for further research and applications in optical, electronic and spintronic devices (Figure 28).

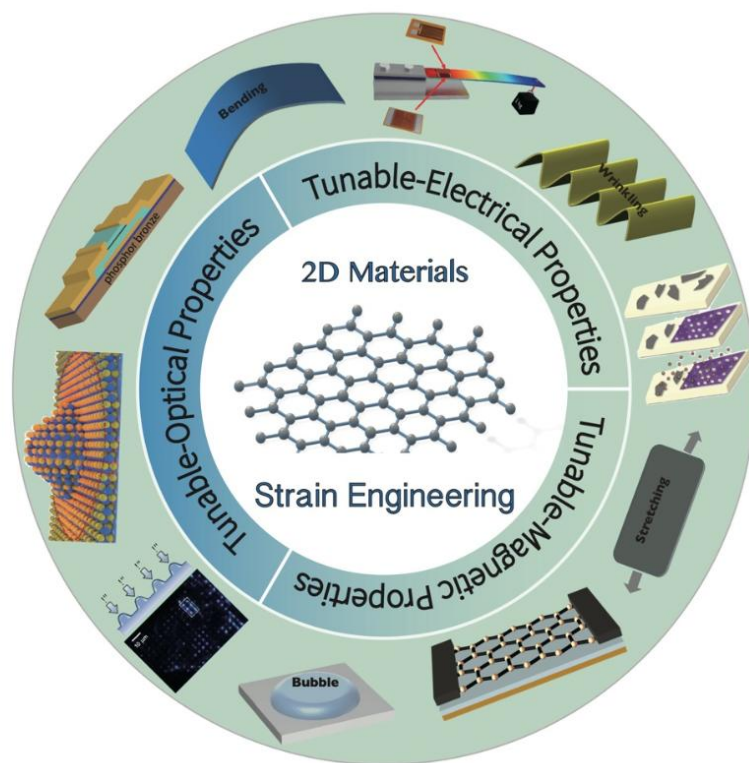


Fig. 28 Schematic illustration of the electrical, electrochemical, magnetic and optical properties of 2D materials modulated by strain engineering.

Typical case 2:

On 9 September 2021, Clarivate Analytics released the Essential Science Indicators (ESI). According to the statistics, two disciplines of MUST, namely Social Sciences (General) and Clinical Medicine, have entered the top 1% of global universities and research institutes in this discipline for the first time. This is the fourth time this year that five new disciplines have entered the top 1% of ESI for the first time, following Molecular Biology and Genetics, Pharmacology and Toxicology, and Computer Science (Figure 29). MUST's social sciences have also achieved outstanding results in international subject rankings: Hospitality & Tourism Management is ranked 51-75 in the 2021 SHANGHAI RANKING Global Ranking of Academic Subjects; Hospitality & Leisure Management is ranked 51-100 in the 2021 QS World University Rankings by Subject; and MUST has created the first medical school in Macao. Hospitality & Leisure Management is ranked 51-100 in the QS World University Rankings by Subject in 2021. In addition, MUST has created the first medical school in Macao with the "Bachelor of Medicine in Internal and External General Practice" programme. In addition, MUST has established the first Faculty of Medicine and "Bachelor of Medicine and Surgery" programme in Macao, filling the gap of clinical medicine in Macao's higher education, and has achieved fruitful results in the construction and development of its academic disciplines: Clinical and Health Studies is ranked 301st in 2021 QS World University Rankings by Subject, and the Department of Health Studies is ranked 301st in 2021 QS World University Rankings by Subject. Clinical and Health Studies (Clinical and Health) is ranked 301-400 in the World University Rankings by THE in 2021; Human Biological Sciences (Basic Medicine) is ranked 301-400 in the Global Ranking of Academic Subjects in 2021; Social Sciences (Integrated) and Clinical Medicine (Integrated) are ranked 301-400 in the World University Rankings by THE in 2021. (The rapid development of the social sciences (integrated) and clinical medicine is an important step towards the realization of the ESG goals.

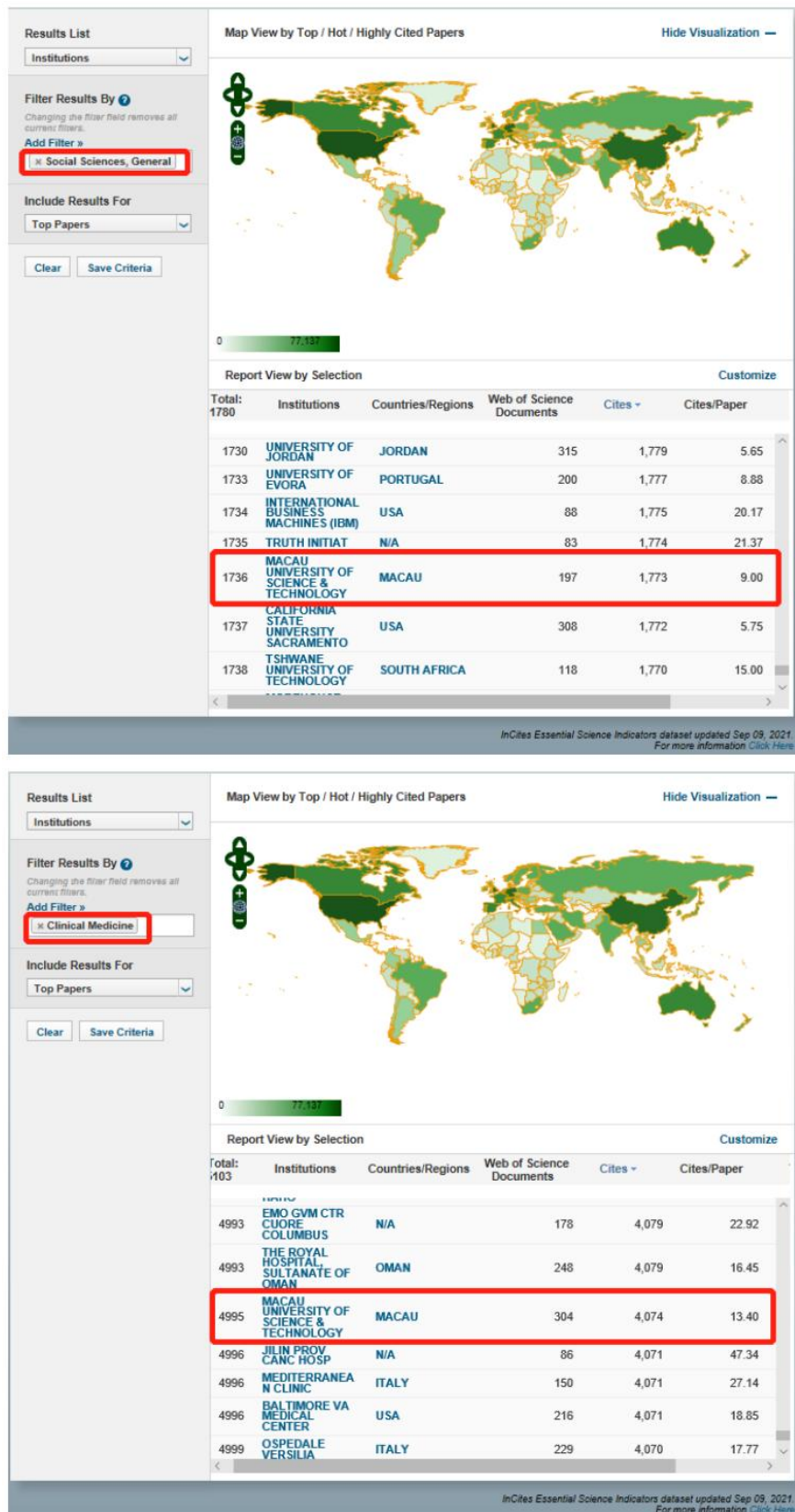


Fig. 29 MUST's social sciences and clinical medicine disciplines ranked in the top 1% of ESI worldwide

2.5 Staff and Student Care

2.5.1 Gender Equality

In recent years, MUST has adhered to the principle of gender equality in its admission process, with women accounting for about 55% of the total intake (Table 4). Since 2008, MUST has established the Teaching Excellence Award to commend teachers for their commitment to excellence in teaching and to contribute to the continuous improvement of teaching and quality in the University. Meanwhile, this award as well as motivates and inspires new recruits to the teaching profession. In August 2022, MUST presented the “Teaching Excellence Award” for the academic year 2021/2022 to four teachers, two of whom are female (Figure 30), in recognition of their outstanding teaching performance.

Table 4 Proportion of undergraduate enrolment in MUST

Academic Year	Female	Male	Total	Proportion of Female
2021/2022	1760	1474	3234	54.42%
2020/2021	1463	1104	2567	56.99%
2019/2020	1319	977	2296	57.45%
2018/2019	1204	866	2070	58.16%
2017/2018	1217	898	2115	57.54%



Fig. 30 Recipients of the "Teaching Excellence Award for the Academic Year" (2021/2022)

2.5.2 Eliminating Hunger and Improving Nutrition for Teachers and Students

The school offers a meal programme for residential students. Residential students can use vouchers at designated restaurants, some of which offer special set menus that are updated regularly. The Student Cafeteria provides healthy and affordable meals for all students and staff, allowing stakeholders to sample a wide variety of national and regional cuisines, vegetarian dishes, etc. The Student Cafeteria also serves breakfast, lunch, afternoon tea, and dinner. In addition to serving breakfast, lunch, afternoon tea and dinner, the cafeteria also provides retail drinks and snacks. Pantries are provided in schools and hostels to meet the drinking water needs of students and staff (Figure 31). The Cuisine Restaurant and Seasonal Restaurant on the MUST campus were established with the aim of teaching students the importance of food sustainability, as well as the use and conservation of ingredients (Figures 32 and 33). As a teaching restaurant, The Seasons provides students with a real-life restaurant environment where they can put their knowledge into practice and understand the real needs of consumers. The Seasons offers a variety of food options, including vegetarian and vegan.



Fig. 31 Pantry on campus



Fig. 32 Food Studio of MUST



Fig. 33 The Seasons MUST Training Restaurant

2.5.3 Concern for students' mental and physical health

The University has set up a special Psychological Counselling and Guidance Unit, which provides services in the areas of campus adjustment, academic stress, family relationships, romantic relationships, mental distress, interpersonal relationships, self-exploration, career planning, stress management, and emotion management, etc. Individual counselling and growth group services are provided to our students and the information provided is strictly confidential. The information provided is strictly confidential and provides support for the mental health of students. In addition, the school abides by the Macao SAR "System for the Prevention and Control of Smoking" and smoking is strictly prohibited in the campus, with signs posted and smoking is only allowed in designated smoking areas (Figure 34).



Fig. 34 Smoking area and no-smoking signs

2.5.4 Caring for the Disadvantaged

MUST provides necessary support to students with mental and physical disabilities. The Student Affairs Office (SAO) provides mental health services to all students and helps those in need to resolve their problems. 70 students were diagnosed with depression, anxiety, obsessive-compulsive disorder, bi-directional affective disorder, psychiatric disorder, and 4 students with physical disabilities in the 2021/2022 academic year. The University provides individual counselling services for these students, mainly focusing on their psychological disturbances, learning and adaptation difficulties, personal growth and interpersonal relationship problems, and provides appropriate psychological counselling to help students have a successful university life. In addition, the campus is equipped with 53 small ramps and wheelchair accessible entrances, 27 lifts and 6 escalators, 55 toilets for the disabled, 3 hostel rooms for the disabled and 7 parking areas for the disabled.

2.6 Low Carbon and Sustainable Development Activities

By 2022, MUST has supported the World Environment Day series of activities organized by the Environmental Protection Bureau of the Macao SAR for the 15th consecutive year (Figures 35 and 36). As one of the co-organizers, MUST staff and faculty members responded to the activities of "Convenient Summer Clothing, Energy Saving" and "Lights Out, One Hour" to save energy and reduce emissions, and to continue to support Macau's low-carbon development, promote environmental protection, and create a sustainable and green campus culture. The campus has a green campus culture. The temperature of the indoor air-conditioning system on campus is also adjusted to maintain a temperature of not less than 25°C. MUST staff can wear light clothing to work without affecting their professional image, so as to jointly advocate environmental protection concepts such as energy saving and emission reduction. 4,188.57 kgCO₂-e of greenhouse gas emissions reduced by the "Lights Out for One Hour" campaign in 2021, which means that 67 tCO₂-e of greenhouse gas emissions will be reduced in the next 15 years. The "One Hour Lights Off" campaign in 2021 has reduced 4,188.57 kgCO₂-e, a total reduction of 67 tCO₂-e in greenhouse gas emissions over the past 15 years.

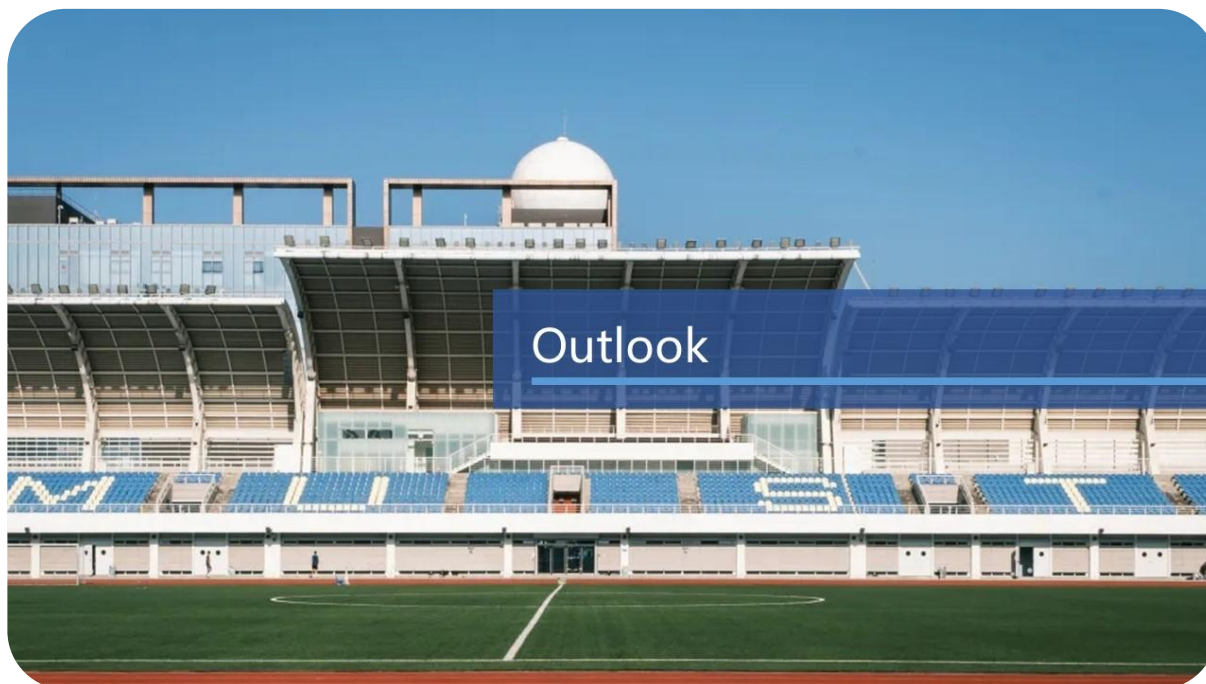


Fig. 35 MUST teachers and students participate in the World Environment Day series of activities (2021/2022)

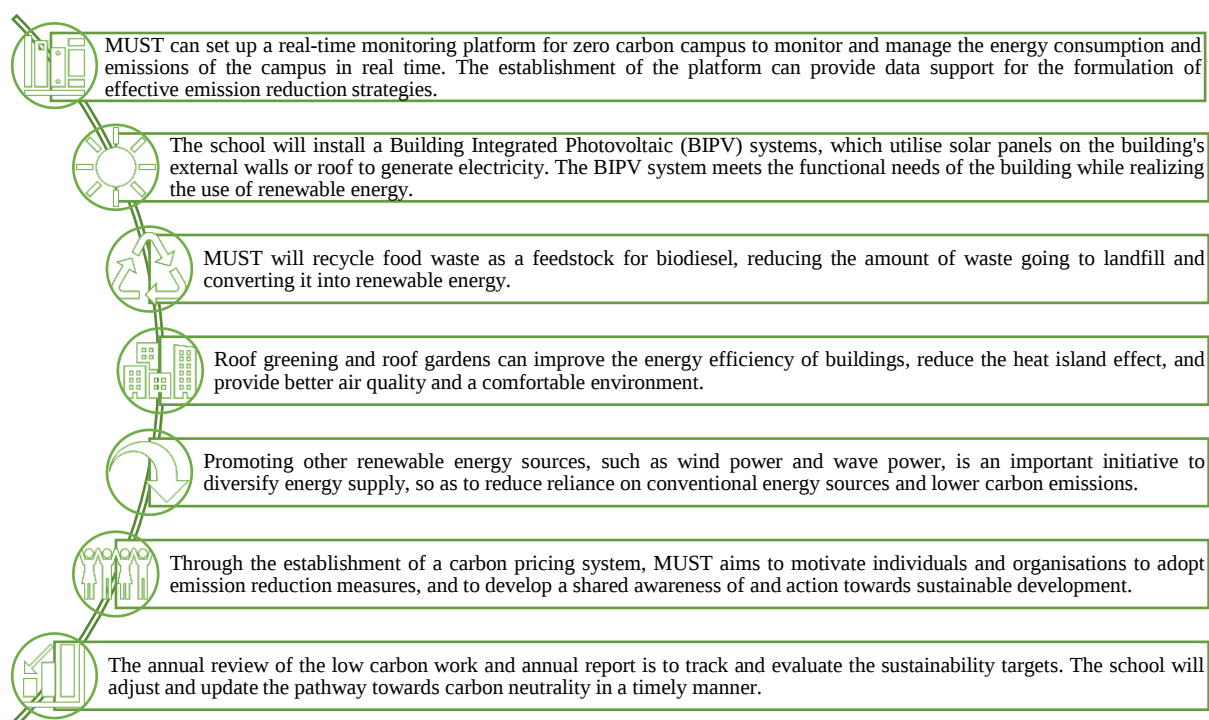


Fig. 36 Students and teachers of MUST participate in the activity of "Convenient Summer Clothing, Energy Saving".

3. Outlook



MUST is progressively developing into a zero-carbon and sustainable campus. The pathway to a zero-carbon campus is being thoroughly researched, and a carbon neutral roadmap for MUST will be presented in a joint effort by different university departments and faculties. Looking ahead, MUST's sustainability initiatives include the following:



4. Conclusion & Recommendation



As Mainland China and the Macao SRA have set clear targets for achieving carbon neutrality by 2060 and 2050 respectively, it is proposed that MUST's own sustainability planning be aligned with the national level initiatives. Going forward, MUST will be more proactive in evaluating its sustainability performance on an ongoing basis and comparing it with peer organizations.

As such, priority will be given to the development and implementation of a sustainability management system that allocates resources for efficient use and incorporates green elements in campus development, building construction and facilities management to achieve best practices in sustainable campus goals.

Green Building

Promote energy-saving and environmentally friendly technologies: Adopt environmentally friendly equipment such as energy-saving lamps and water-saving appliances to reduce energy consumption on campus. At the same time, renewable energy technologies such as solar energy and wind energy are promoted to reduce the campus' reliance on traditional energy sources.

Strengthening the recycling of resources: implementing a waste classification system, collecting recyclables in separate categories and treating them in a uniform manner. Establishment of a sewage treatment system to achieve recycling of wastewater and reduce wastage of water resources.

Enhance the standard of greening: Increase the area of green space on campus and plant a wide variety of plants to create a beautiful campus environment. Enhance the maintenance and management of green facilities such as lawns and flowerbeds to ensure that the effect of greening is sustained.

Sustainable Transport System Development

MUST encourages its staff and students to use low-carbon travelling modes such as public transport, cycling or walking, and at the same time provide convenient public transport facilities and bicycle parking spaces to reduce car usage and traffic congestion.

Promoting Circular Economy

The MUST can introduce the concept of circular economy to encourage the reuse and recycling of resources. For example, it can establish a waste separation and recycling system and promote the reuse of recyclables to reduce the generation of waste and its impact on the environment.

Enhancing Environmental Education and Awareness Cultivation

The School can launch environmental education programmes to raise the environmental protection awareness of its staff and students, and to develop their ability to think and act in a sustainable manner. Lectures, seminars, publicity activities, etc. can be organized to enhance the popularization and publicity of environmental protection knowledge.

Collaboration and Sharing

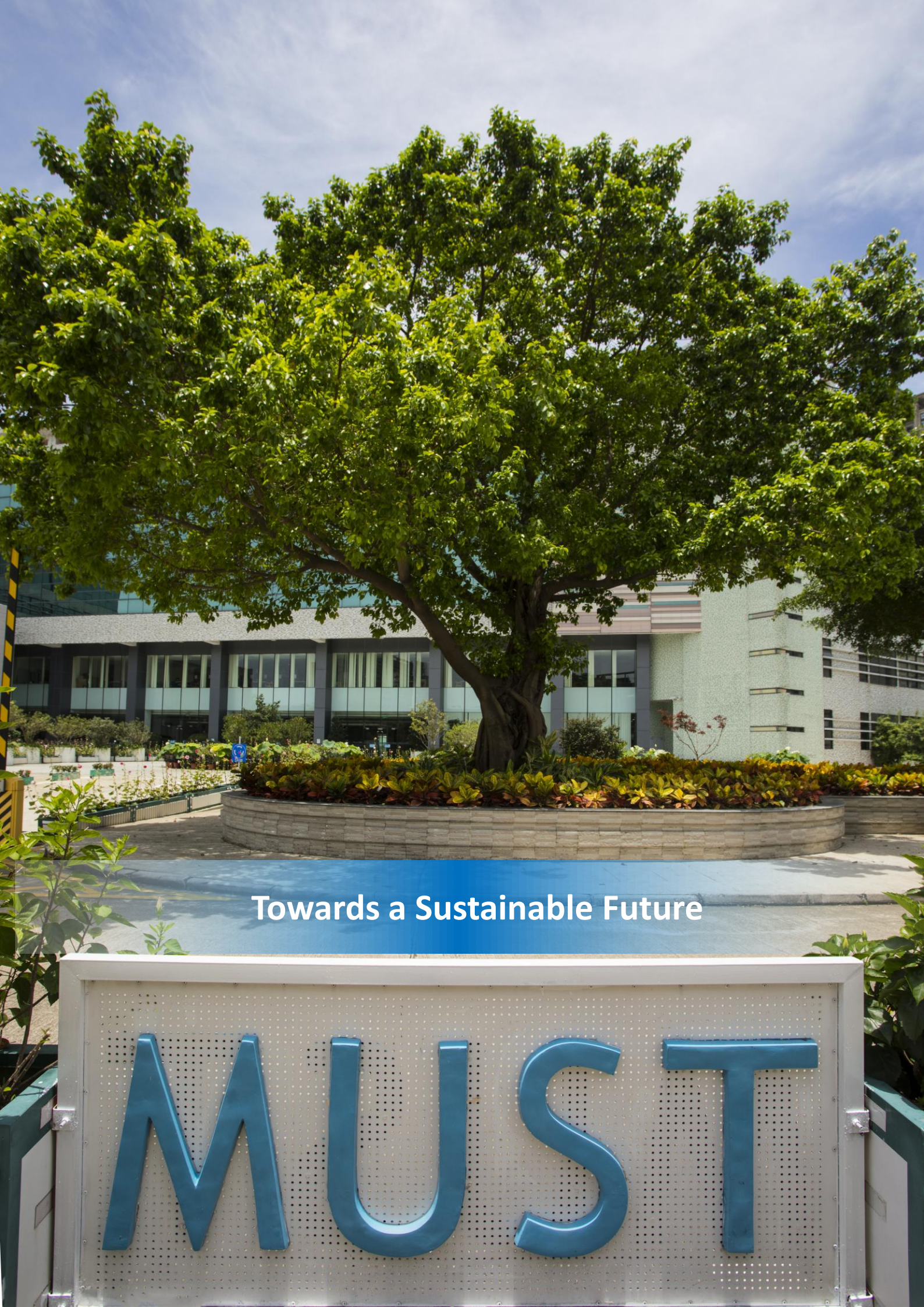
MUST can collaborate with other schools, businesses and communities to share resources and experience and to take forward collaborative sustainable development projects. Collaborative partnerships can be established to develop research, innovation and practice to jointly advance the goals of zero carbon and sustainable development (Figure 37).



Fig. 37 United Nations Sustainable Development Goals (SDGs)

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Towards a Sustainable Future

MUST