

The University of Hong Kong Campus Sustainability Report 2023

MARCH 2024

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Overview

Founded in 1911, The University of Hong Kong ("The University") is the territory's oldest institute of higher learning and an internationally recognised institution which ranked 26th in the Quacquarelli Symonds (QS) World University Rankings 2024 and 2nd in the QS Asia University Rankings 2024.

Besides striving for academic excellence, the University is committed to protecting the environment, reducing its carbon footprint and providing a sustainable campus to advance teaching, learning and research.

To provide a quality and sustainable built environment, the University is dedicated to developing and implementing a robust sustainability framework, incorporating green elements and best practices in campus development, building construction and facilities management.

This report will outline the University's sustainability performance over a 12-month period (September 2022 to August 2023) and discuss its sustainability and social responsibility initiatives over the same timeframe.



Targets

The University is committed to developing and managing its activities in a manner that protects the environment, reduces its ecological footprint and supports the transition to sustainable development.

In October 2021, the Hong Kong Special Administrative Region (SAR) Government announced its Climate Action Plan 2050, which outlines strategies and targets to reduce carbon emissions by 50% before 2035 as compared to 2005 levels, and to achieve carbon neutral status before 2050. The University aims to meet these same targets and become a carbon neutral university by 2050.

To achieve the goal of carbon neutral by 2050, a range of specific initiatives have been introduced to reduce energy and resource consumption and enhance environmental protection. Amid higher societal expectations on Environmental, Social and Governance (ESG) performance, the University has made greater efforts to promote social responsibility and raise awareness of sustainability on campus.

FIGURE 1 : The University of Hong Kong's Sustainability Targets



Reducing the energy use through energy saving measuresMinimising environmental degradation and contributing to a

prioritising sustainable and recycled goods and services

- sustainable future through the conservation of natural resources
- Avoiding waste and pollution in all formsEnhancing waste management and recycling systems and



- Adopting environmentally conscious principles in the design, construction and operation of buildings and the surrounding landscape
- Selecting and using substances, articles and processes which cause the least damage to the environment
- Environmental Developing an environmentally sound transport policy
 - Protecting natural habitats and local wildlife and preserving biological diversity



Raise Awareness

- Encouraging awareness of all aspects of conservation within the University and wider community
- Promoting environmental awareness and conservation amongst members of the University through curricula, research and staff training
- Promoting a disposable plastic free campus policy
- Promoting recycling and food waste collection

Social

Protection



- Promoting zero waste awareness
- Empowering and promoting inclusion and diversity
- Providing individuals with equal employment opportunities

Responsibility



Sustainability Performance

2022/23 Highlights



Sustainability Initiatives



Modular Integrated Construction Award winning for student residences at Wong Chuk Hang



Green Building Certification

No. 3 Sassoon Road attained Provisional Platinum for BEAM Plus



District Water-cooled System

Moc Enha

Modernised Elevators Enhance energy efficiency

Green Transportation Extend EV car chargers and green fleet



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Water Saving Shower Heads in Student Halls

Waste Reduction Campaign



During 2022/23 academic year, the University experienced a 21.2% reduction in per capita carbon emission as compared to the baseline year of 2017/18. This was achieved through the consistent implementation of resource-saving and environmentally friendly practices. It is worth noting that there was a 6.5% increase in carbon emissions per capita as compared to 2021/22, but this was due to the unusually low carbon emission levels in 2021/22, which were attributed to the COVID-19 pandemic.

Electricity consumption (i.e. energy indirect emissions, Scope 2) accounted for 94% of annual carbon emissions in 2022/23. The remainder are direct emissions from combustion sources (Scope 1) and other energy indirect emissions (scope 3), accounting for 4% and 2%, respectively, of annual carbon emissions.

As part of the Hong Kong SAR government's commitment to carbon neutrality, the carbon intensity of the city's electricity grid has been decreasing. Due to the increasing use of natural gas in power generation, carbon intensity measured as an emission factor by Hong Kong Electric declined by a further of 17.0% from 0.82 kg CO2e/kWh in 2019 to 0.68 kg CO2e /kWh in 2022. This reduction has positively impacted the overall carbon footprint of the University.

*Note: Emissions can be classified into three scopes: Scope 1 – Direct emissions from operations that are owned or controlled by the University; Scope 2 - "Energy indirect" emissions resulting from the generation of purchased or acquired electricity, heating, cooling and steam consumed within the University; and Scope 3 – All other indirect emissions that occur outside the University, including both upstream and downstream emissions.

Reference period for 2020/21 onwards is revised into 1st September to 31st August.





Carbon Net Emissions per Capita (LHS) — Total Number of Student and Staff (RHS) 2022/23 Y-o-Y Percentage Change of Annual Carbon Net Emissions per Capita

As Compared With	% Change
Baseline (2017/18)	▼21.2%
Pre-COVID (2018/19)	▼18.1%
2021/22	▲ 6.5%

Electricity

The University has made significant progress towards full electrification, with electricity accounting for 94% of its total energy consumption. In the 2022/23 academic year, there was a notable 10.9% reduction in per capita electricity consumption compared to the baseline year of 2017/18. This positive trend can be attributed to the successful implementation of various energy-saving initiatives across the University. However, it is important to note that there was a slightly increase of 1.4% in per capita electricity consumption as compared to the year 2021/22, which can be attributed to the impact of the COVID-19 pandemic.

In the 2022/23 academic year, the University recorded a 10.9% decrease of per capita electricity consumption as compared with the 2017/18 baseline year. This downward trend was due to the implementation of energy-saving initiatives throughout the University. Attributed to the COVID condition, the University's per capita electricity consumption increased by 1.4% comparing to the previous year (2021/22).

During the past academic year, several projects were undertaken to contribute to energy savings. These projects included the upgrade of chiller plants to district cooling [Page 15] and the modernisation of elevators [Page 16]. These initiatives aim to enhance energy efficiency and reduce energy consumption in campus buildings.

Finally, the University is planning to adopt Artificial Intelligence (AI) for energy usage optimisation, which can achieve smart energy monitoring, energy consumption forecasting and automated energy management.

*Note: Reference period for 2020/21 onwards is revised into 1st September to 31st August.



Annual Electricity Consumption per Capita Index (Base Year 2017/18=100)



TABLE 2

2022/23 Y-o-Y Percentage Change in Annual Electricity Consumption per Capita

Compared to	% Change
Baseline (2017/18)	▼10.9%
Pre-COVID (2018/19)	▼9.4%
2021/22	▲ 1.4%

🔗 Water

As the impact of the pandemic faded, per capita water consumption increased by 7.9% y-o-y in 2022/23. However, water consumption per capita is 6.3% and 12.6% lower compared to pre-pandemic levels in 2018/19 and baseline levels in 2017/18, respectively.

The University has adopted several measures to improve water efficiency. For example, behaviour-activated showerheads [Page 18] were installed in three student residential halls (Simon KY LEE Hall, St John's College (Marden Wing) & University Hall) between February and April 2023.

At the same time, new smart meters were installed to capture water usage. A digital dashboard is being developed as a visual platform for internal stakeholders to review water usage patterns and will coincide education initiatives to encourage behavioural change and further reduce water usage.

The University continues to review its water consumption; identify areas for further improvement; and evaluate other measures to reduce the volume of water being consumed or wasted.

FIGURE 5

Annual Water Consumption per Capita Index (Base Year 2017/18=100)



TABLE 3

2020/21* Y-o-Y Percentage Change in Annual Water Consumption per Capita

Compared to	% Change
Baseline (2017/18)	▼12.6%
Pre-COVID (2018/19)	▼6.3%
2021/22	▲7.9%

🐼 Waste

The University's Estates Office aims to reduce waste at source and increase the percentage of recycling materials in total waste generation. This includes sourcing the right facilities management provider and recycling contractors for the collection of different materials.

With the campus re-opening and the resumption of classes, total general refuse per capita per day increased by 41.9% from an all time low in 2021/22, which the campus was closed under COVID-19. Nevertheless, this figure was 2.5% lower than baseline levels in 2017/18.

The University has successfully lowered consumption of waste paper, ensuring recycling of waste paper dropped by 45.8% y-o-y in 2022/23. Further to reducing waste at source and increasing the recycling rate, the University set up the "re Kiosk" and "Pilot Programme on Smart Recycling Systems" [Page 19] in 2022/23.

Additionally, the University's facilities management provider continues to monitor the amount of general waste disposed on campus and support food waste recycling for canteen operators on campus.

To prepare for the upcoming Municipal Solid Waste Charging (MSW Charging) implemented by the Hong Kong SAR government from August 1st, 2024, the University conducted two phases of comprehensive MSW Charing drills for all departments and offices in the Main Campus and the Sassoon Road Campus in June and November 2023, respectively. Waste audits were also conducted throughout the trials to study waste quantity and composition. Collected data will be used to set recycling targets and formulate a charging strategy on campus.

*Note: Reference period for 2020/21 onwards is revised into 1st September to 31st August.

FIGURE6 General Refuse per Capita per Day



TABLE 4

2022/23 Y-o-Y Percentage Change In General Refuse per Capita per day

Compared to	% Change
Baseline (2017/18)	₹2.5%
Pre-COVID (2018/19)	▲ 13.7%
2021/22	▲41.9%

TABLE 5

Annual General and Main Recycled Waste

tem	2021/22	2022/23	% Change
Naste to Landfill			
General Refuse, tons	2,975	4,478	4 1.9%
Naste to Recycle			
Naste Paper (Confidential & Non-confidential), tons	191	104	▼45.8%
Metal, tons	1.2	2.9	▲ 135%
Plastic, tons	1.8	4.3	▲ 141%
Glass, tons	7.0	1.0	▼85.5%
Food Waste, tons	55.4	72.6	▲ 31.2%
Fotal, tons	257	184	▼28.1%



Sustainability Initiatives

Sustainability Initiatives



Green Construction

The University has adopted Modular Integrated Construction to allow better material management and reduce construction material and waste.



Green Campus

With the aim of ensuring The air-cooled district the campus attains chiller plant in the Main Campus is in the process sustainability requirements, new of being upgraded to an interconnected waterbuildings will be developed according to cooled chiller plant the construction system. industry's latest environmental



Efficient Elevators

The University is modernising its elevator and escalator systems, particularly those more than 30 years old, to improve energy efficiency, reliability and passenger experience.



Green Transportation

The University supports the development of green transport by providing electric vehicle car chargers and discounts on car parking spaces for electric vehicles.



Water Usage Reduction

The University has launched water conservation initiatives and aims to reduce water consumption per capita for pilot residential halls by 5% before installation by end of August 2024.



Waste Reduction

The University launched the "re Campaign" to reduce on-campus solid waste to prepare for implementation of the Municipal Solid Waste Charing Policy and support the Waste Blueprint for Hong Kong 2035 announced by the government



The Wong Chuk Hang Student Residence project supported the development of MiC supply chain and smart MiC management systems and established various MiC standards for application in Hong Kong.



standards.

The new academic building at No. 3 Sassoon Road commenced operations in July 2022 and achieved Provisional Platinum, the highest possible grading under the BEAM Plus New Buildings V1.2.

Projects completed in the past 12 months



Replaced four air-cooled chiller plants with water-cooled plants to improve energy efficiency in Wong Chue Meng Building, Chong Yuet Ming Physics Building, K.K. Leung Building and Kadoorie Biological Sciences Building.

Chiller Plant

Upgrade



Upgraded to regenerative lifts in CYM Chemistry Building and Knowles Building.



Installed 37 new chargers in the Main, Centennial and Sassoon Road campuses.



Water saving showerheads were installed in three student halls to promote water conservation and motivate students to reduce water consumption in showers.



The large-scale, well-managed and user-friendly re Kiosk can facilitate waste reduction and recycling support for campus users.

Student Residence at Wong Chuk Hang

A recipient of four awards in the Modular integrated Construction (MiC) Achievement Ceremony 2022 (<u>link</u>), the HKU Wong Chuk Hang Student Residence is one of the selected pilot projects for adopting MiC in Hong Kong. Project features include:

- Shorter construction time: saved total construction time by an average of 30% and shortened the production period by constructing different modules in parallel in the factory
- Improved working environment and site safety: reduced risk of workers falling from height and risk of slipping and tripping of site personnel
- Sustainability and environmental friendliness: reduced dust and noise nuisance to the surrounding environment, minimised construction waste and improved construction waste management

The project was assembled with six types of modules and a total of 952 modules. The podium transfer plate and core wall were built using in-situ reinforced concrete construction. MiC was adopted for the floors above the transfer plate and the multiunit bedroom, combined with the core walls. Prefabricated polished-flooring, antimould emulsion paint walls and ceiling for each room were completed in the factory. All fixed furniture modules were installed in the factory.

The two 17-floor towers provide around 1,200 student units, living accommodation for management staff and support facilities, such as a fitness room, co-working space, games room, and multi-purpose hall. The student residence village is equipped with smart technology with its own mobile application to control door lock, AC, lighting of students' rooms and even common facilities functions such as room bookings and energy consumption monitoring.





Sustainability Target Energy & Resources Consumption **Environmental Protection** FIGURE 9 FIGURE 10 Academic Building at No. 3 Sassoon Road Sky Garden at Roof Level

While most of the current buildings in the University possess significant historical value and are challenging to retrofit with green features, the University aims for all new buildings to be completed in the coming three years to be green certified.

The No. 3 Sassoon Road project included the construction of a new eight-storey academic building, providing approximately 10,400 sq. m. of net floor area of space for the relocation of various teaching and research facilities at some old buildings under the Li Ka Shing Faculty of Medicine of the University. The building, which commenced operations in July 2022, achieved Provisional Platinum, the highest possible grading, under the BEAM Plus New Buildings V1.2.

To complement the University's commitment to green buildings, sky gardens have been carefully designed and located at the ground, fourth and roof level to enlarge the green common area and provide both herbal planting and relaxing open spaces for students and staff. Wall climbers are also planted along key facades to complement the surrounding environment.

The chiller plants serving the Main Campus have been in operation for more than two decades. Recent years have seen the emergence of a range of operational challenges including refrigerant phasing out, insufficient cooling capacity, general ageing, energy inefficiency and high maintenance costs.

The University decided to address these issues by launching a district cooling project to distribute cooling capacity in the form of chilled water from a central source to multiple buildings through a network of pipes for space and process cooling. Over the past 12 months, the following projects have been completed:

1) Replacement of chiller plant from air-cooled to water-cooled

Water-cooled chillers are typically more energy efficient than air-cooled chillers. Air-cooled chillers rely on outside air temperature, while water-cooled chillers use the temperature of the water they circulate. Since water can be cooler than air, water-cooled chillers can operate at lower temperatures and pressures, which means the compressor uses less energy. Replacement works have been performed in Wong Chue Meng Building, Chong Yuet Ming Physics Building, K.K. Leung Building and Kadoorie Biological Sciences Building.

2) Optimisation of cooling system

Being part of the district cooling project to distribute cooling capacity in the form of chilled water from a central source to multiple buildings through a network of pipes for space and process colling, a new cooling tower was installed in Haking Wong Building. Pipe connection works have also been performed to have more efficient control over the cooling system.





Smart and efficient elevator and escalator systems can improve connectivity within buildings while also promoting energy saving. As most of the University's elevator equipment has been operating since the late 1980s, a modernisation programme commenced in 2020.

Over the past twelve months, four elevators have been upgraded. Two are in CYM Chemistry Building, and the other two in Knowles Building. Steps taken included upgrading to regenerative elevators, which convert the energy generated from the elevator motor driven by gravity into electricity for other uses, and replacement of the components in machine rooms, elevator shafts and inside the elevator car.

Benefits include:

- Reduced energy consumption
- Enhanced energy savings
- Enhanced reliability of elevators
- Improved riding comfort for passengers
- Enhanced accuracy and efficiency of levelling
- Enhanced safety



Energy & Resources Consumption

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FIGURE 12

Elevator in CYM Chemistry Building



Environmental Protection

FIGURE 13

EV Passenger Car

These new additions bring to 79 the number of charging stations around the University and means that around 17% of car parking spaces now have vehicle charging facilities, compared to 6% as of September 2023.

ABLE 7

Total number of Electric Vehicle Charging Stations

Facilities	Total Number (Increment from 2021)
Main and Centennial Campuses	44 (▲7)
Sassoon Road Campus	34 (▲30)
Composite Building (Under HKE)	1 ()
Total	79 (▲37)

FIGURE 14

First EV Van of HKU



Water Usage Reduction

Funded by the Hong Kong Jockey Club Charities Trust, a total of 62 water saving showerheads were installed in three student halls to promote water conservation and motivate students to reduce water consumption in showers. By the end of August 2024, water consumption per capita for pilot residential halls is expected to be reduced by 5% before installation.

Features of water saving showerheads:

- Grade 1 water efficiency under the Water Efficiency Labelling Scheme by Water Supplies Department (WSD), which water flowrate can be as slow as 6.6 L/min.
- Showerheads are hydraulicly-powered and no electricity supply is needed. As long as there is water running through, water consumption data can be transmitted to the cloud.
- Wireless data transmission and automatic upload of data to the cloud.
- Built-in LED light system with water usage monitor, with indicator lights of the showerheads changing according to water usage. This can serve as a reminder when the water has been overused and encourage behavioural change to conserve water.



Waste Reduction

Sustainability Target



Environmental Protection

FIGURE 16 re Kiosk

re Kiosk

Located in the Run Sassoon Shaw Podium, the 24-hour access re Kiosk accepts paper, metal, plastic, tetra pak, glass bottles and rechargeable batteries as recyclable items. This provides far greater educational value compared to scattered recycling bins.

In 2022, the University started the "re Campaign" for waste reduction to promote greater environmental sustainability. The following facilities were set up on campus:

Pilot Programme on Smart Recycling Systems

Launched by the Environmental Protection Department (EPD) to promote smart city development, the programme features Smart Bins located on the Centennial Campus and Senior Staff Quarters. These bins currently accept recyclables such as paper, plastic, metal and glass bottles. Equipped with sensors, the Smart Bins monitor fill levels for efficient recyclable collection and automatically record the weight. They also support EPD's GREEN\$ Electronic Participation Incentive Scheme, where GREEN\$ earned from recycling can be redeemed for gift items under EPD's GREEN@COMMUNITY.

To optimise recycling networks and ensure effective recycling, the University's facility management provider has reorganised the location and number of litter and recycling bins. A set of recycling bins has been placed next to the litter bin under a covered area, ensuring they are visible to passers-by.

Finally, the University conducted waste audits and Municipal Solid Waste Charging (MSW Charging) trials to prepare the University community for the upcoming MSW Charging implemented by the Hong Kong SAR government from 1st August 2024.



FIGURE 17 Smart Bin at Senior Staff Quarters



FIGURE 18 Smart Bin on Centennial Campus





Community Engagement

Community Engagement

As part of its waste reduction campaign, the University has held various activities to promote waste reduction, such as the Eco Goodies Giveaway and Clothing Swap Pop-up Market.

Eco Goodies Giveaway

In December 2022, a giveaway area was set up in the re Kiosk to promote eco-friendly choices to students and staff. By using these goods, the University community can start to reduce and replace single-use plastic and other disposables both on and off campus.

Clothing Swap Pop-up Market

To raise awareness of circular fashion, the Jockey Club Sustainable Consumer Programme (JCSCCP) collected second-hand clothes from different universities in March 2023. Students and staff from the University were then invited to select some preowned clothing collected.

FIGURE 19

Eco Goodies Giveaway Poster



FIGURE 20

Clothing Swap Pop-up Market





Outlook

Outlook

Future Projects for a Greener University

The University will continue to pursue a comprehensive set of sustainability initiatives in the years ahead. For current projects under construction, including Pokfield Campus Development and High West Site Development, the University aims to obtain certification from the latest green building standards and collaborate with local stakeholders to create a green landscape embedded within the community.

Along with the enhancement of building technology, another future project in the pipeline is utilising Artificial Intelligence (AI) to optimise energy usage within the campus to drive energy efficiency and reduce waste. In addition, a pilot scheme featuring a lunchbox lending kiosk will be operated over a three-year period to lower volumes of disposable waste.



Pokfield Campus Development

Scheduled to be completed from 2025 to 2026, the threephase regeneration of the Pokfield Road area into a contemporary campus will deliver an accessible and comfortable campus environment. The new campus will blend with its surroundings by utilising designs and materials of enduring quality.

Green and Healthy Campus

The design of buildings in Pokfield Campus aspires to promote sustainability and improve the health and wellbeing of all those who use them, aligning with the United Nations' Sustainable Development Goals. Throughout the design process, elements related to user health such as daylight, surrounding environment, energy use sustainability and comfort have all been carefully considered.

Sustainability Target





Environmental Protection





The development will adopt state-of-the-art, environmentally friendly construction methods, building materials, and innovative technologies. The entire project will meet the latest environmental standards set by the construction industry. The design will provide a solid foundation for achieving BEAM Plus ratings and the WELL international standard for healthy buildings.

BEAM Plus is the most widely adopted green building standard in Hong Kong SAR. The standard covers the full life cycle of a building project and assesses a building according to criteria including integrated design and construction management, health and well-being, the sustainability of sites, material and waste management, energy use, water use. and innovation.

The WELL Building Standard (WELL) is an international assessment system for green buildings used to measure, certify, and monitor features of the built environment that impact human health and well-being. It assesses various aspects such as air, water, nourishment, light fitness, thermal comfort, acoustic environment, materials, mind, community, and innovation.

High West Site Development

Scheduled to be completed in Q2 2024, the High West Site Development project is located at 142 Pok Fu Lam Road, adjacent to the declared monument of University Hall. The project consists of two 19-storey towers on a single-storey common podium and will provide at least 938 student places including living accommodation for management staff, common space, canteen and supporting facilities.

Similar to the construction of HKU Wong Chuk Hang Student Residence, Modular Integrated Construction (MiC) has been fully utilised for the construction of all towers, which is a pilot MiC project for private residential development.

Sustainability Target





Energy & Resources Consumption

Environmental Protection



Lunchbox Lending Programme

Disposable take-away containers are a significant contributor to the overall amount of waste going to landfill from university operations.

Launched by Jockey Club Sustainable Campus Consumer Programme (JCSCCP) and supported by the eight UGC funded universities, the programme is operating a reusable lunchbox lending and return machine on the 4/F Haking Wong Building (outside student canteen) from September 2023 over a one-year period.

Students and staff can borrow lunchboxes from the lending machine with a deposit. After finished the meals, they can empty the lunchbox (no washing is needed) and return to the return machine.





Sustainability Target





Environmental Protection

Conclusion

With mainland China and Hong Kong SAR having already set clear goals to achieve carbon neutral status by 2060 and 2050, respectively, the University is recommended to set a similar target and align its sustainability masterplan accordingly. The University should take a proactive approach to benchmarking its sustainability performance against peer institutions.

As part of its masterplan, the University's priorities must include the development and implementation of a sustainability management system, which can help the usage of resources and incorporate green elements and best practices in campus development, building construction and facilities management.

To ensure sustainable practices in the construction of future buildings, the University is advised to require all new buildings to be BEAM Plus certified and compliant with the latest green building standards. Additionally, these buildings should prioritise the healthiness of their occupants, providing a productive study and work environment.

Taking advantage of technological advancements, the University is suggested to adopt new technologies, such as artificial intelligence, to control energy consumption and improve waste management. This will lead to better recycling quality and quantity.

Overall, by setting a carbon neutrality target, implementing a sustainability management system, prioritising green and well building standards and embracing technological advancements, the University can actively contribute to a sustainable future and continuously improve its sustainability performance in comparison to peer institutions.

Recommendations



Green Buildings

- Develop green buildings with enhanced energy saving, recycling and renewable energy features
- Retrofit and redevelop aged buildings
- Enhance technology to control energy consumption



Waste & Recycling

- Provide facility management staff with appropriate training and formulate relevant guidelines
- Practice smart waste management to improve recycling quality and quantity



Healthy Campus

- Advance health by setting performance standards for design interventions, operational protocols and policies
- Adopt more natural lighting in buildings for a healthy and productive study and work environment

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