Stellenbosch
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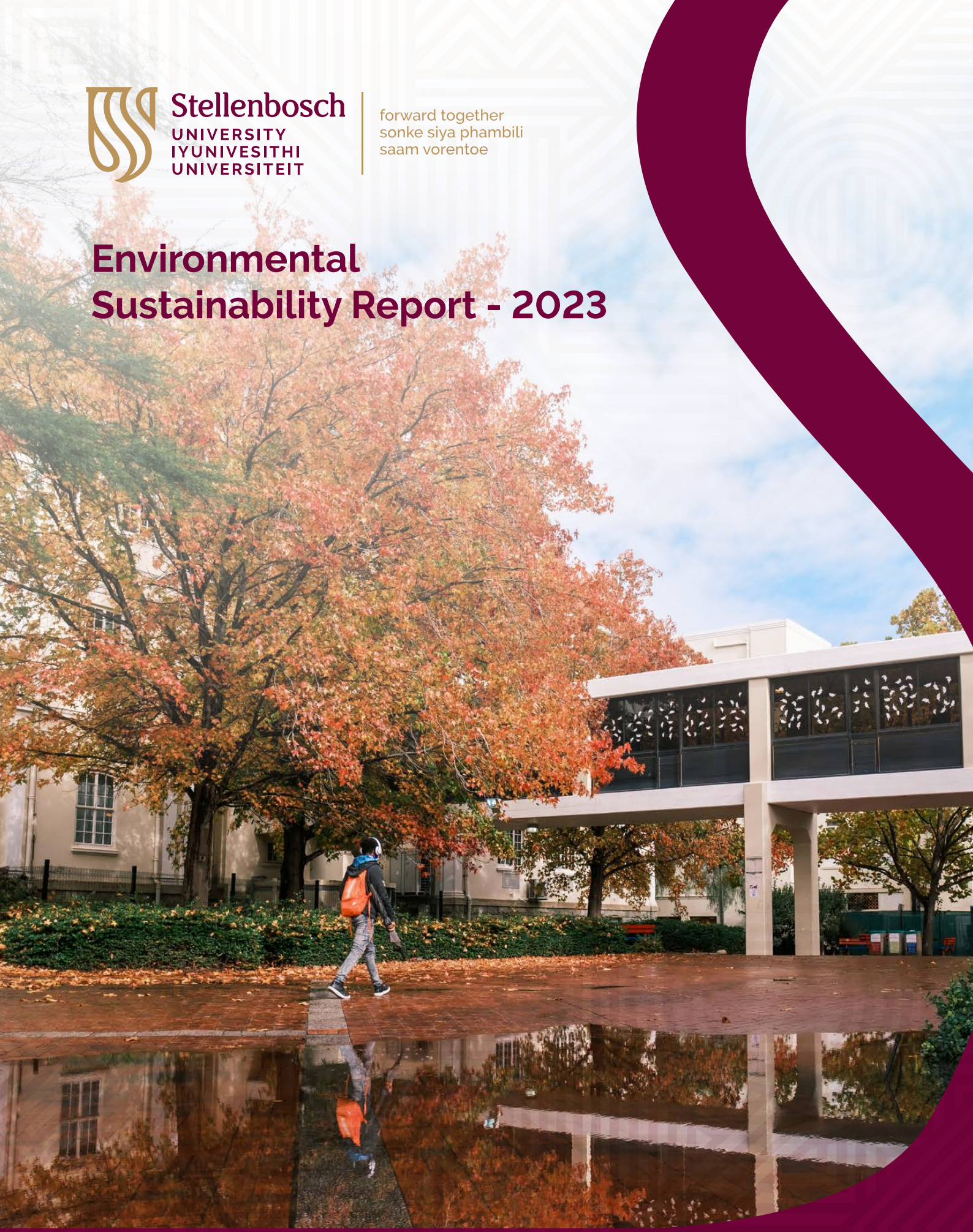
forward together
sonke siya phambili
saam vorentoe

Environmental Sustainability Report - 2023



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ABBREVIATIONS

SU – Stellenbosch University

ESP - Environmental Sustainability Plan

GSM – Gross square metres

tCO2e – Tonnes of carbon dioxide equivalent

GRI – Global Reporting Initiative

JSE – Johannesburg Stock Exchange

SDG – Sustainable Development Goals

% – Percent

GBCSA – Green Building Council South Africa

EPC – Energy performance certificates

kWp – Kilowatt peak/power

LED – Light-emitting diode

HVAC – Heating, ventilation, and air conditioning

MV – Megavolt

GHG – Greenhouse gases

kWh – Kilowatt-hour

m2 – Metres squared/square metres

BMS – Building management system

COD – Chemical oxygen demand

KL – Kilolitre

RO – Reverse osmosis

DCD – Design criteria document

GIS – Geographic information system

WHO – World Health Organization

SOP – Standard operating procedures

GEOSS – Global Earth Observation System of Systems

DWS – Department of Water and Sanitation

FSC – Forest Stewardship Council

SUD – Sustainable urban drainage

IUCN – International Union for Conservation of Nature

SUFM – Stellenbosch University Facilities Management

L – Litres

LPG – Liquefied petroleum gas

EMP – Environmental management plan

T&D – Transmission and distribution

ODS – Ozone-depleting substances

NOx – Nitrogen oxides

SOx – Sulphur oxides

CFCs – Chlorofluorocarbons

CTC – Carbon tetrachloride

TCA – 1,1,1-trichloroethane

HCFCs – Hydrochlorofluorocarbons

HBFCs – Hydrobromofluorocarbons

BCM - Bromochloromethane

MB – Methyl bromide

MC – Methyl chloride

EB – Ethyl bromide

TFIM – Trifluoroiodomethane

n-PB – n-Propyl bromide

MURF – Materials recovery facility

CRDC – Center for Regenerative Design and Collaboration

FTE – Full-time equivalent (employees)

MRF – Materials recovery facility

WULA – Water-use licence application

EDMS – Environmental Data Management Systems

PSO – Private Student Organisation

SRC – Student Representative Council

KG – Kilogram

Ton – Tonnes

CO2 – Carbon dioxide

MWh – Megawatt-hour

EBP – Existing building performance

DFFE – Department of Forestry, Fisheries and the Environment

EXECUTIVE SUMMARY

Stellenbosch University is on a journey to embed environmental sustainability in all its areas of responsibility, as supported by the key attributes, pursuit of systemic sustainability, parts of Vision 2040 and its Strategic Framework. This commitment makes a positive contribution through outstanding environmental sustainability performance, using the SU Environmental Sustainability Plan (ESP) as a guideline.

Stellenbosch University has five campuses, namely Stellenbosch, Tygerberg, Bellville, Worcester and Saldanha with a personal and student compliment of 37 397 and a portfolio of 487 SU buildings. The buildings have a gross square metreage (GSM) of 801 399 m2 and contribute 78% to the University's carbon footprint of 85 241 tCO2e (tonnes of carbon dioxide equivalent).

Change in the climate has caused devastating droughts, wildfires, floods, heat waves and loss of species at an alarming frequency. As a university it is important to continue to investigate and research the risks and opportunities that are related to climate change and environmental impact to minimise the institution's contribution. With environmental sustainability embedded in the University, it constantly reviews its operations, research and teaching by considering both the potential for a positive impact and risk mitigation to implement solutions and build resilience into the systems.

The Environmental Sustainability Plan (ESP) of the University sets out that, for the institution to be environmentally sustainable, it should be managed in a manner that respects ecological thresholds and enhances both society and the natural environment. This should be done in a manner that avoids the depletion or degradation of natural resources and ensures diverse, resilient and productive ecosystems for current and future generations, along with a transition to carbon neutrality and net zero emissions.

The University plays a significant role in creating a more sustainable and inclusive future for its campuses and communities, thereby contributing to a more sustainable planet. Individuals can take small but effective steps toward a more sustainable lifestyle, using resources more wisely. This can include using less water and energy and switching to reusable products and materials. By doing this, everyone helps create a living environment that does not waste and deplete natural resources. This report highlights some of the efforts achieved in the year 2023 and the progress made towards SU's sustainability ambitions and goals, defined by the eight foundation elements in the ESP. It also includes activities in which the campus engages with its stakeholders and encourages them to reduce the University's emissions and contribute to the decarbonisation of its campuses.

The success achieved in 2023 is revealed in the many environmental sustainability awards received by SU. Among these were the leadership award, for recognised leaders, that have contributed towards market transformation in the existing building space through sustainable management. Nineteen buildings on campus are certified as green buildings using the GBCSA certification process. Visual Arts building was the 1000th building to be certified receiving six stars. The Tygerberg Campus received a 5-star rating, while the Bellville Park Campus received a three-star water rating from COC as a water intermediatory for the effective management of water resources.

The University uses the Global Reporting Initiative (GRI) and the Johannesburg Stock Exchange (JSE) framework to evaluate and report on the environmental impact of its activities. The materiality in the GRI and JSE standards requires that the report cover topics that reflect the university significant

economic, environmental, social impacts and report its progress with greater clarity and transparency using accepted global standards. This report also considers the Sustainable Development Goals (SDG) with the greatest relevance to the University and demonstrates how the activities it undertakes support the achievement of specific SDG targets and sub-targets. SU also uses the global protocols for calculating and reporting greenhouse gasses, measuring the University's business environmentally. The environmental sustainability reporting standards provide the framework for measuring, managing and reporting SU's environmental impact and climate-related risks.

ENERGY

Background and boundaries

Energy is a vital resource for the University, as most of its services and operations demand a form of energy. This includes energy from electricity, LPG gas and fuel. Eskom is still the main supplier of energy to the University through the municipality, with 98% of this supply generated by fossil fuels. The institution's energy use therefore also is the main contributor to its greenhouse gas emissions and a driver of its direct emissions. Reducing energy use from fossil fuels will minimise emissions, reduce the University's contribution to the greenhouse effect and influence climate change. Managing energy also contributes to a reduction in resources and costs and improves energy efficiency in SU's operations.

Approach and targets

Energy is the most significant contributor to the University's scope 1, 2 and 3 emissions, and its approach to energy is a critical element of the overall decarbonisation strategy and plans. SU is focused on reducing energy consumption and moving to cleaner renewable energy on all its campuses. The ESP outlines SU's commitment to a 10% reduction in municipal electricity consumption by 2024 compared to 2016, excluding self-generation, to reduce scope 1 vehicle emissions by 30% by 2026 compared to 2019 values, and to reduce scope 2 electricity consumption emissions from fossil fuels by 20% by 2029 compared to 2019, including self-generation from solar. It also includes implementing a minimum standard for the University's buildings based on four-star GBCSA principles (Green Building Council South Africa) for new construction and refurbishments. This is done by ensuring green star-rated portfolio certification of selected precincts, performance-rated audits of the top 50 energy-consumption buildings and obtaining a minimum four-star GBCSA rating for certain new developments.

The approach to managing energy is to reduce demand, consumption and costs to ensure continuity of supply. Energy is measured by installing meters on the megavolt (MV) ring and on the low-voltage (LV) lines at buildings, with data being displayed on a dashboard. Tsebo Solutions has been appointed to manage the energy metering of utilities, which includes data capturing and monitoring and identifying opportunities for energy reduction. The data is c0mpared against the baseline of 2016. The methodology that is followed is to measure and reduce kWh and demand by conservation, efficiencies, infrastructure changes, initiatives, and behavioural change. SU also focuses on ensuring low energy intensity in new, upgraded and existing buildings. Specialist service providers are used to conduct energy assessments and audits across the campuses, using the CILLAR building performance audit and rating of buildings, the portfolio certification of buildings, and energy performance certificates (EPCs).

In its action to reduce energy consumption and emissions, SU strives to increase the share of energy that is generated from renewable sources. At present, 393-kilowatt peak power (kWp) of solar generation has been installed at the Neelsie, 22 kWp at the Knowledge Centre, 57 kWp at Mariendahl, and 100 kWp at the Decanting Building, totalling 500 kWp of the 10 MWp programme. Programmes for energy efficiency have also been implemented, and include light-emitting diodes (LED), conservation and interventions, centralised heating, ventilation and air conditioning (HVAC), optimising warm water, electrical infrastructure, and a portion of a smart MV microgrid. GHG emissions as part of SU's carbon footprint are focused on as part of the decarbonisation strategy.
Challenges exist with loadshedding, where diesel generators are used to reduce the risk and provide security of supply for business to continue. The use of diesel escalates SU's energy costs and emissions and, due to exceeding the limit of 10 MW, the University is liable for carbon tax. A working group governs and manages the process of providing security of supply of energy to the institution.

Measurement and evaluation

Facilities Management takes the lead in the ongoing monitoring and evaluation of energy across campuses and works closely with relevant stakeholders on measures to improve overall energy efficiency. There are also meetings and workshops that are coordinated in collaboration with various departments and local government to identify and generate innovative ideas to achieve the 2025 targets in the ESP. In addition, there are internal working groups in which the academics, operations managers, municipal personnel and other relevant stakeholders of the University implement the strategies and discuss recommendations for energy. The University also reports detailed information on its energy activities per building to NERSA by way of energy performance certificates (EPC), energy audits to the Green Building Council South Africa (GBCSA), energy verification using the GHG protocol, and reports to the Department of Higher Education.

Energy consumption within the organisation

In 2023, 60 393 680 kWh of the electricity used came from direct electricity purchases, 9 249 769 kWh from other non-renewable sources (Diesel generator and LPG), and 693 529 kWh from renewable energy from solar panels.

Table 1: *Stellenbosch University's total energy consumption in kWh*

	2022	2023
Total energy consumption by the university – kWh	67 493 859	70 336 977
Total energy consumption by the university - in gigajoules	242 977,89	253 213,12

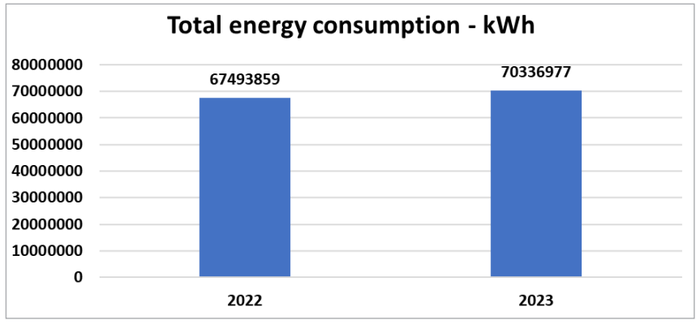


Figure 1: *Total energy consumption in 2022 and 2023*

Energy consumption outside of the organisation

Energy consumption outside of the organisation is energy defined under scope 3 and is not yet compulsory to declare. Therefore, SU does not yet measure this category.

Energy intensity

The energy intensity ratio is presented per employee (where the number of employees was 36 036 for 2022 and 37 397 in 2023), and per square metre, where the total space was 790 780 m² in 2022 and 801 399 m² in 2023). To calculate the two energy-intensity ratios below, the municipal electricity consumed was considered.

Reduction in energy consumption

There was a 19% reduction in energy consumption by the University in 2023 compared to the 2016 base year in terms of purchased electricity (kWh). A portion of this was due to loadshedding, as generator power is not included in the calculation.

Table 2: *Stellenbosch University's energy-intensity ratios against full-time equivalent (FTE) employees and m² in 2022 and 2023*

Stellenbosch University	2022	2023
Energy intensity (kWh/employee)	1 768,14	1 614,93
Energy intensity (kWh/m²)	80,57	75,37

Table 3: *Stellenbosch University's energy reduction in kWh between years*

Reporting year – Electricity	2016 Base year	2017	2018	2019	2020	2021	2022	2023
Total electricity consumption - in kWh	75 010 754	73 388 569	71 524 280	68 128 511	51 926 302	62 672 828	63 716 564	60 393 679
Total electricity consumption - in gigajoules	270 038,71	264 198,85	257 487,41	245 262,64	186 934,69	225 622,18	229 379,63	217 417,24
Energy variation and improvement		**2%**	**5%**	**9%**	**31%**	**16%**	**15%**	**19%**

2020 – minimal loadshedding, but Covid-19
2021 – minimal loadshedding, but only 50% of students
2022 – large amount of loadshedding

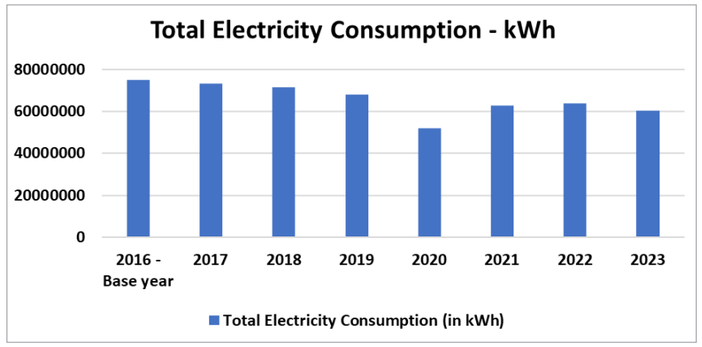


Figure 2: *Total electricity consumption*

Reduction in energy requirements of products and services

Energy requirements in buildings and spaces are prescribed by the new building regulations, SANS 10400 parts X and XA, which are incorporated as a minimum into all new infrastructure and infrastructure upgrades. Stricter bylaws on energy by the City of Cape Town and Stellenbosch Municipality, and the energy targets of the Environmental Sustainability Plan, are all incorporated in an effort to reduce energy demand.

HVAC in buildings is the biggest consumer of energy on campus, and therefore there is a big drive to change to more efficient precinct water-cooled plants.

ENERGY INITIATIVES

Energy reduction initiatives

Energy reductions were achieved through the implementation of energy-efficient technologies and infrastructure, with changes in behaviour contributing to energy conservation and improvements in energy management practices. The goal is to reduce energy consumption and demand by minimising energy waste, resulting in a reduced environmental effect, fewer emissions, lower operational costs and a smaller carbon footprint. Many energy audits were conducted, and areas of energy inefficiency were identified in buildings, industrial processes, and systems in the larger consumer buildings. Infrastructural changes include the implementation of an internal MV grid with links, reducing the municipal supply points, nominal demand, and costs. Electrical equipment and appliances are switched off over holidays and when not needed to prevent energy wastage. The scheduling of classroom size to class size contributes to efficiencies. Efficiencies were also improved in new buildings and upgrading of buildings by designing for low energy intensity, focusing on improving the insulation of buildings and following a process of process optimisation, all reducing the need for heating and cooling.

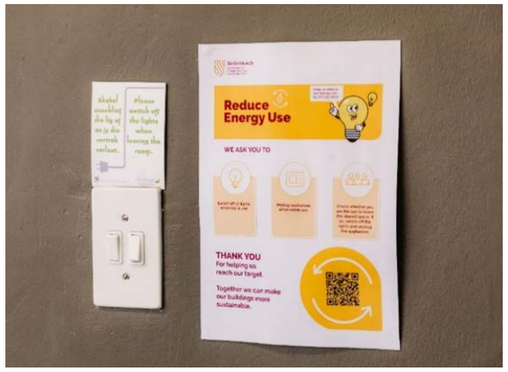


Photo: *Signage to encourage point of action behaviour change.*

Energy efficiency/conservation

Implementing energy-efficient HVAC systems, appliances, lighting and machinery helped reduce consumption. Smaller HVAC systems were replaced by much bigger, centralised plants for water cooling and heating. At present, 231 915 m² are serviced by these plants. On the Business School campus, the cold temperature of water from the deep-water lake is used to provide cooling of the campus. Geysers have been replaced with much more efficient heat pumps at residences, and solar geysers have been installed at houses, while three old lifts have been replaced with new, energy-efficient and functional ones.

The LED Lighting Project is a programme for replacing older bulbs with Orbit X LED lights, fittings and sensors in six buildings. Approximately 2 000 lights have been replaced. Special outdoor lights with solar panels provide light for parking and pathways during loadshedding. Sport lights were replaced with energy-efficient lights.

Providing training programmes for employees on energy-efficient practices and the importance of encouraging energy conservation practices among the campus community has included workshops, awareness programmes, social media and training courses with faculties, service providers and students. These not only focus on using energy-efficient equipment, but also turning off lights and electronics when not in use.

Photo: *Centralised HVAC System*

Electricity smart metering and building management system (BMS)

Implementing advanced energy management systems to monitor, control, and optimise energy consumption in real time is done by using the services of a newly appointed utility service provider. In 2023. ± 480 electricity metres were installed and the data is displayed on a dashboard. At present, the philosophy is to measure the main MV incomers and the LV line at building level. The strategy is to roll out a programme of submetering within buildings.

The footprint of the BMS in the existing portfolio of buildings was increased to measure and provide data, alarms, and action interventions as a tool to reduce the utility consumption and costs.

Smart building systems in newly constructed buildings, such as the Biomedical Research Institute, are used for better control and the optimisation of energy use, including automated lighting, heating and cooling systems using automated sensors.

Photo: *Energy meters*

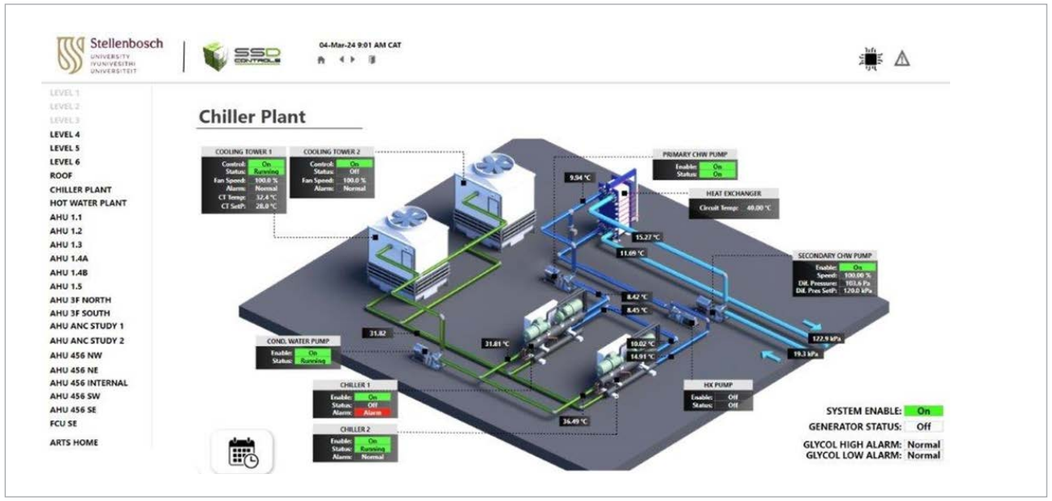


Photo: *BMS system.*

Photo: *Energy metering*

Renewable energy

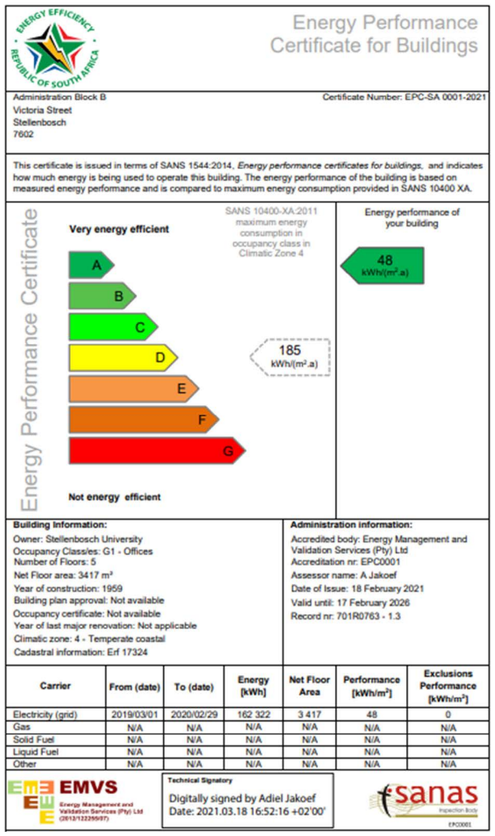
A programme of cleaner renewable energy sources is being implemented, such as solar to supplement fossil fuel energy sources. It is a clean and sustainable alternative to traditional fossil fuels, offering numerous environmental and economic benefits compared to energy supplied by the municipality from coal and diesel generators. The transition reduces carbon emissions and addresses the challenges of climate change. At present, 500 kWp are installed, generating 382 203 kWh per annum. Feasibility investigations were conducted and a total of 4 700 kWp will be installed in the next four years, as rooftop solar photovoltaic (PV) cells on four campuses, and possibly 14 000 kWp as ground-mounted systems. Tenders for 1,1 MWp were received in 2023, and construction starts in 2024.

Photo: *Solar photovoltaic installation on the roof of the Neelsie Student Centre.*

Photo: *Invertors at Neelsie Solar Photovoltaic installation*

Energy performance certificates

Complying with and adopting energy efficiency standards and certifications set by regulatory bodies helps to formally audit and make the energy consumption of buildings larger than 2 000 m² publicly available. Fifty-one buildings at SU were audited, rated, and registered. The buildings were rated from A to G, where A represents low energy consumption per square metre and G high energy consumption per square metre.



Energy Performance Certificate for Buildings

Administration Block B
Victoria Street
Stellenbosch
7602

Certificate Number: EPC-SA 0001-2021

This certificate is issued in terms of SANS 1544:2014, *Energy performance certificates for buildings*, and indicates how much energy is being used to operate this building. The energy performance of the building is based on measured energy performance and is compared to maximum energy consumption provided in SANS 10400 XA.

Energy Performance Certificate

Very energy efficient

A
B
C
D
E
F
G

Not energy efficient

SANS 10400-XA:2011 maximum energy consumption in occupancy class in Climatic Zone 4: 185 kWh/(m².a)

Energy performance of your building: 48 kWh/(m².a)

Building Information:
Owner: Stellenbosch University
Occupancy Class/es: G1 - Offices
Number of Floors: 5
Net Floor area: 3417 m²
Year of construction: 1959
Building plan approval: Not available
Occupancy certificate: Not available
Year of last major renovation: Not applicable
Climatic zone: 4 - Temperate coastal
Cadastral information: Erf 17324

Administration information:
Accredited body: Energy Management and Validation Services (Pty) Ltd
Accreditation nr: EPC0001
Assessor name: A Jakoef
Date of Issue: 18 February 2021
Valid until: 17 February 2026
Record nr: 701R0763 - 1.3

Carrier	From (date)	To (date)	Energy [kWh]	Net Floor Area	Performance [kWh/m²]	Exclusions Performance [kWh/m²]
Electricity (grid)	2019/03/01	2020/02/29	162 322	3 417	48	0
Gas	N/A	N/A	N/A	N/A	N/A	N/A
Solid Fuel	N/A	N/A	N/A	N/A	N/A	N/A
Liquid Fuel	N/A	N/A	N/A	N/A	N/A	N/A
Other	N/A	N/A	N/A	N/A	N/A	N/A

EMVS Energy Management and Validation Services (Pty) Ltd (2013/122295/07)

Technical Signatory
Digitally signed by Adiel Jakoef
Date: 2021.03.18 16:52:16 +02'00'

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WATER AND EFFLUENT

Background and boundaries

Climate change leads to higher temperatures and more extreme and frequent weather events, increasing the risk of droughts and flooding globally. Given the growing demand for water at the University for daily use, it is essential that water resources are used sparingly and efficiently. Protecting water sources and ensuring equitable access to water for all users within the institution is a priority. Water resources consist of filtered water from the municipality, and river, dam, lake, ground, storm, and rainwater used for drinking, hygiene and irrigation. Most campuses are in water-stressed areas where the available water is limited. The University has introduced many initiatives aimed at reducing water consumption through efficiencies and has implemented water reuse through greywater plants for the flushing of toilets, and rainwater and stormwater for irrigation purposes. Actions that increase water efficiency, ensure proper water management and address potential risks are aligned with SDG 6.

Approach and targets

Water is earth's most precious natural resource. Living in a water-scarce region means it is important to use water wisely.

The ESP sets out the University's environmental sustainability targets across key areas, which include, but are not limited to, water management. The target for water usage is a 40% reduction in potable water use (kl) compared to the 2015 baseline, a 50%

Photo: *Irrigation storage dam*

reduction in per-capita potable water use (kl) (staff and students) compared to the 2015 baseline, a 30% reduction in irrigation water consumption when using primary freshwater resources, and a 10% reduction in the concentration of chemical oxygen demand (COD) in water effluent from specified facilities compared to the 2019 baseline.

Given the uneven distribution of water resources, some of the campuses are potentially more vulnerable to water risk and we continue to review SU's water footprint. Water is measured through the installation of meters at building level and the readings are displayed electronically on a dashboard. The data is used to identify opportunities for reduction compared against the baseline of 2015. The methodology is to measure and reduce consumption by conservation, efficiency, infrastructure changes, technology initiatives, and behavioural changes. Identifying and fixing water leaks is an essential part of reducing water consumption and costs. The focus is on introducing GBCSA four-star principles into new and upgraded buildings by implementing water efficiencies in buildings, thereby resulting in lower water consumption.

Compliance with relevant water standards is tracked and monitored on all the University's campuses on an ongoing basis. Water-related activities are also being reviewed, including through the use of independent assessments and audits to monitor and report on water sources, impacts, and opportunities for improvement. Making progress towards this has contributed towards meeting the sub-targets for SDG 6.

Measurement and evaluation

The University has an Environmental Sustainability Plan (ESP) with clear targets for resource savings to manage its water consumption. Facilities Management takes the lead in ongoing monitoring and evaluation of water and wastewater performance across all campuses, and the team holds meetings and workshops with relevant stakeholders in the University on measures to improve overall water efficiency and to identify and generate new ideas for achieving the targets of the ESP. The participants in these meetings and working groups are academics, engineers, operations managers, municipal personnel, and other relevant stakeholders from the University who are involved in implementing the strategies.

Water resources and quality supply

Stellenbosch University uses water for its day-to-day operations, such as drinking, cleaning and sanitation, education, research, irrigation, fire suppression, etc. The water comes from the local municipalities, dams, rivers, and groundwater resources. The role of the water reuse system includes two on-site greywater reuse systems for flushing toilets, and the collection of surface water such as from rainwater, dams and rivers for landscape and sport irrigation. Groundwater is used at three sites that provide water to three filtration plants that filter water to SANS241 drinking standards. At Belville Park, water from the deepwater lake is treated using a reverse osmosis (RO) process, providing 2 051 Kl per month. The lake is also used for the cooling and heating of campus. Detailed water management plans, with regular audits and reports, address water-related impacts to ensure compliance and minimise environmental impact and risks.

Photo: *Inside the reverse osmosis plant at Bellville Park campus*

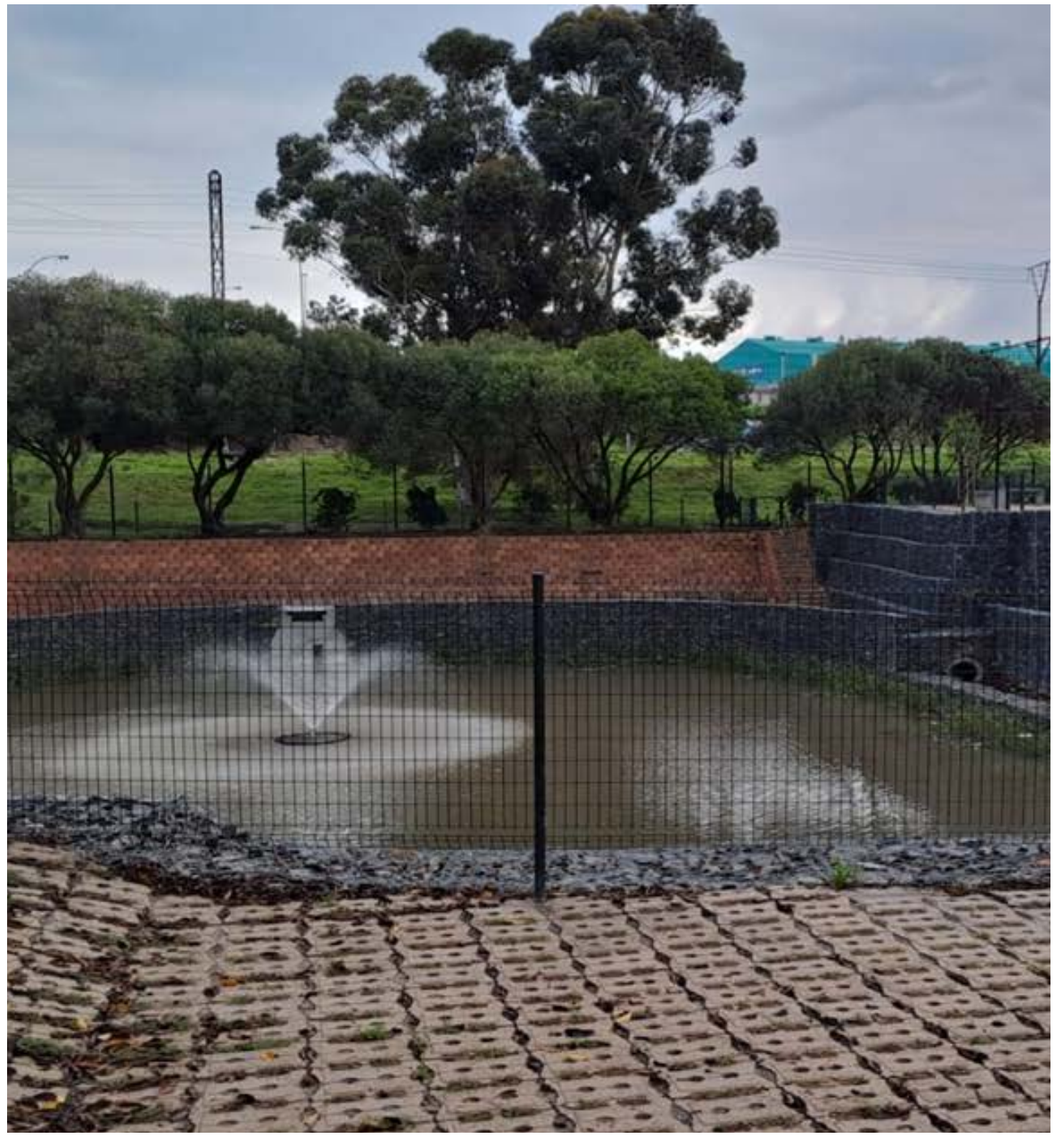

Photo: *Storm water collection*

Wastewater discharge

Great care is taken to protect the municipal sewer facility where the University is located. The effluent generated is discharged to municipal sewer systems directly or indirectly via sewerage systems and is treated by a third party. As University, we follow municipal guidelines for water effluent quality, and operating procedures and water safety plans are in place to prevent pollution and hazardous substances from entering the municipal wastewater systems. The municipal by-laws recommend a concentration limit of 5 000 milligrams/litre (mg/L) of COD/ effluent discharged to the wastewater. SU ensures that it complies with the water quality standards for the quality of effluent discharge established by national legislation and municipal by-laws on each of the campuses where it operates. This includes wastewater from the kitchens, RO plant, filtration plants, research labs and other infrastructure.

Water withdrawal

Table 4: *Stellenbosch University's municipal and borehole water consumption in kilolitres*

Water withdrawal	2022	2023
Municipal	621 114	528 856
Borehole	11 891	25 615
Total - KL	**633 004**	**554 471**

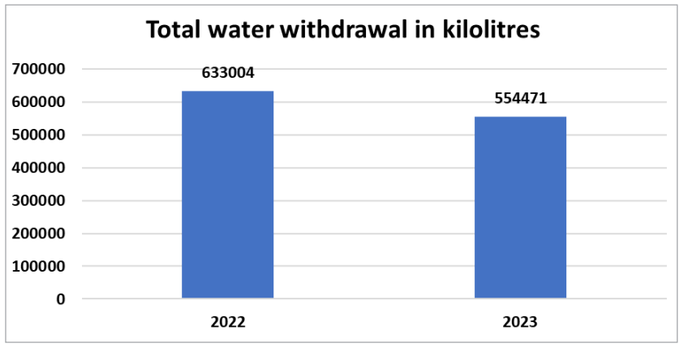

Figure 3: *Total water withdrawal from the municipality and borehole*

WATER INITIATIVES

Water-reduction initiatives

There was a 52% reduction in the consumption of water from the municipality against the 2015 baseline year. This was achieved by implementing water-efficient fittings, conservation efforts and infrastructure changes. Water-efficient fittings include reducing the pressure in taps on campus and installing tap aerators, tap restrictors, water-saving shower heads, changing to six-litre water-saving toilet cisterns, and introducing hand sanitisers, to name a few. Drastic measures had to be undertaken, e.g. removing the taps from baths, stopping car washes, restricting events that use water and switching most of the irrigation systems from potable water to alternative water. SU introduced alternative water sources, such as the filtering of lake water to be used as potable water and water for HVAC cooling and heating purposes. The University launched a War on Leaks programme, installing electronic meters to detect leaks. Many campaigns and awareness programmes have also been undertaken that have helped change the behaviour of students and staff. Behaviour change contributed to 30% of the total savings by staff and students.

Smart water metering

A project has been implemented together with the municipality to reconcile the municipal accounts with the present municipal and smart electronic meters and assure correct billing. The metering of water continued, and many more meters were installed. An agreement was reached with the municipality through Ikapa and SMEG to replace faulty municipal meters. About 480 meters were installed in 2023 and data is displayed on the dashboard.

Photo: *Grey water measuring*

Photo: *Water meter*

Water-efficient toilets

Plumbing specifications are aligned with specifications in a design criteria document (DCD) developed by Property Services. This includes using water-saving devices everywhere. Toilets are limited to six-litre cisterns, using grey water where possible.

The Selection of sanitary fittings and fixtures is matched to the specific location and functioning of the facility, subject to design review and approval by Stellenbosch University Facilities Management, Planning and Development. Preference is given to South African manufacturers or quality suppliers supporting the South African industry and economy.

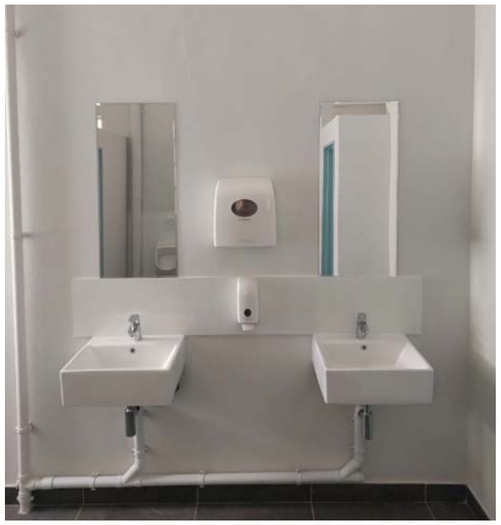

Photo: *Water efficient taps*

Photo: *Water efficient toilets*

Grey water

The greywater system at Stellenbosch operates at optimum capacity and contributes significantly to the saving of potable water, by 1,3 m litres/month. The greywater system at Tygerberg is now fully operational, delivering an average of 24 000l/month. This includes Water Safety Plans and it operates as a Water Services Intermediary.

Photo: *Grey water filtration plant*

Photo: *Grey water separator*

Groundwater

Water-use (WULA) licences were received for all boreholes on all campuses after 3,5 years of data gathering, applications, motivations and queries. This is a massive achievement, and many hours were invested in this process. A formal system with quotes for sport, landscaping and agriculture were developed using GIS and explained to all parties. Water use is also highlighted as a risk and registered, as SU has now reached its ecological limit of water from natural resources.

Having received a borehole licence from the Department of Water and Sanitation (DWS), SU needs to comply with the borehole management guidelines to ensure that the boreholes operate within sustainable yields to ensure that the quality and chemical composition do not change so much that it becomes hazardous. The internal audit is done by a designated person in Facilities Management (FM) and the audit includes filling in a compliance report and submitting documents to the Department of Water and Sanitation.

The external audit is done by an external professional borehole company (GEOSS), which will integrate the internal audit with the external audit. These audits are submitted twice yearly to the DWS.

Water safety plans were compiled for the Tygerberg borehole and filtration system and the Bellville Park Quarry and filtration system. The purpose of these safety plans is to ensure that Stellenbosch University complies with and meets the regulatory standards according to the World Health Organization (WHO). This is a requirement of the City of Cape Town to assure the safety standards of the water supplied.

Dams

Work was done on both the Welgevallen and Ertjieskloof dams in 2023. Work on the Welgevallen Dam included a study by one of SU's consultants, WML Coast and comprised a dam study to assess the possibility of enlarging the dam in relation to SU's water-use licence. This study is still in process and will look at highlighting an optimum solution to store more water for irrigation purposes.
Work on the Ertjieskloof Dam included adding three safety buoys, along with two demarcation buoys to mark the entry point of the dam. The dam entranceway was upgraded to add a formal staired entrance that included stone pitching. Two new entrance points were added to alleviate traffic into the dam during peak season. The new entrance points were made with chip stone gabions. In terms of maintenance, the dam wall was treated for moles and termites to protect its structural integrity as per DWS standards.

Photo: *Ertjieskloof dam construction*

Photo: *Bystanders overlooking Welgevallen dam*

Water dispenser

A water dispenser was installed in the Neelsie (Student Centre) to provide clean drinking water for all staff and students. Stellenbosch tends to get extremely hot and dry, and students can stay hydrated by filling their water bottles at the dispense instead of continually purchasing water from a shop. This also encourages a reduction in the use of plastic and coffee cups, as students rinse and fill their reusable water bottles and cups instead of using and disposing single-use items. This therefore benefits SU's waste statistics.

Photo: *Reusable mug rinsing station and water fountain*

BIODIVERSITY

Background and boundary

The University acknowledges the critical importance of biodiversity and that it is also the key to the continued provision of ecosystem services that serve both humans and the systems. The conservation, restoration and sustainable use of terrestrial ecosystems is essential for sustainable development.

The list of services performed by ecosystems for the University is extensive and includes clean air and water, climate regulation, decomposition and cycling of organic matter, pollination, suppression of pest and diseases, passive cooling of spaces and resilience against structural disasters, etc. For the University, biodiversity includes conservation and management of natural areas, such as the institution's reserves, rivers, landscapes and pockets of forests. However, the institution's human impact leads to a decline in biodiversity and the extinction of rare species. Great care is taken to monitor and reduce impacts on biodiversity to maintain ecosystem services and reduce the negative effects related to biodiversity loss and ecosystem degradation, as most of the campuses are located in natural biodiversity areas. To protect biodiversity and ecosystems, the University also uses Forest Stewardship Council (FSC)-certified goods and paper, specifically for printing. The aim of using FSC-certified paper is primarily to reduce deforestation, protect biodiversity, reduce energy usage, waste problems and air pollution, and reduce the amount of carbon dioxide released into the atmosphere.

Approach and targets

The Environmental Sustainability Plan outlines SU's commitment to environmental sustainability, as all aspects of the University's projects and development are conducted in an environmentally responsible manner. The ESP contains requirements for the integration of environmental considerations, including those related to biodiversity. This plan also sets out SU's environmental sustainability targets across key areas of energy, water, mobility, goods and services, and waste – all of which have an effect on biodiversity. The University's targets include converting 90% (m^2) of new landscaping to vegetation that is resilient to environmental change and improves biodiversity, designating 5% (m^2) of total landscapes as green areas and greenbelts, and designating all new and upgraded landscapes in accordance with sustainable urban drainage (SUD) principles. In addition, managing waste and the greener construction of buildings ease the demand for the production of raw materials – by extension land-use change – which is a key driver of biodiversity loss.

Habitat loss due to invasive species, overexploitation, pollution, climate change,

and the conversion of land cover for other uses, such as in wetlands and other natural habitats, are the key drivers of biodiversity loss. At SU we increase biodiversity through conservation, restoration, and landscaping methods to reduce the impact on the environment. To achieve this goal, SU has developed environmental management plans (EMPs) for its campuses to guide its operations.

Measurement and evaluation

Stellenbosch University tracks parameters such as endemic species, indigenous species and species richness, etc., as its campuses are located in biodiversity-sensitive areas. The work done to protect biodiversity across the campuses is evaluated by the efforts made and approach taken to preventing, monitoring, and managing biodiversity loss. SUFM manages all SU's reserves, as well as natural and recreational areas, on a continuous basis using specialist teams. The University is also in the process of creating an environmental monitoring and measurement tool on ArcGIS to capture all operational work. This tool will aid SU in terms of performance monitoring, auditing, benchmarking, etc. The University's dedicated environmental sustainability team monitors and evaluates monthly progress against environmental sustainability targets using various software systems and measurements. SU also participates in work groups and meetings with local communities and relevant stakeholders to tackle the issue of biodiversity conservation and management. This is to ensure transparency and sustainable practices outside of the property boundaries of SU.

Operational sites owned, leased, managed in or adjacent to protected areas and areas of high biodiversity value outside protected areas.

Table 5: *Operational sites with high biodiversity owned by SU.*

Geographical location	Area name	Site owned, leased, or managed	Position of owned, leased or managed land relative to SU - Adjacent to/ contains portions of	Type of operation - office, residence, manufacturing or production, or extractive	Size of operational site in km²	Habitat type	Protected status	IUCN category
Western Cape	Tygerberg	Owned	Adjacent to	Residence	126	Terrestrial	Habitat or species management area	Category IV
Western Cape	Stellenbosch	Owned	Adjacent to	Sport field and offices	0,47	Terrestrial	Habitat or species management area	Category IV
Western Cape	Stellenbosch	Owned	Adjacent to	Agricultural	0,55	Terrestrial	Habitat or species management area	Category IV
Western Cape	Stellenbosch	Owned	Adjacent to	Residence	0,065	Terrestrial	Habitat or species management area	Category IV
Western Cape	Stellenbosch	Owned	Adjacent to	Educational faculty	0,013	Terrestrial	Habitat or species management area	Category IV
Western Cape	Bellville	Owned	Adjacent to	Educational facility	0,17	Terrestrial	Habitat or species management area	Category IV

Significant impacts of activities, products, and services on biodiversity

Table 6: *SU biodiversity value sites*

Geographical location	Subsurface and/or underground land that may be owned, leased or managed	Position in relation to the protected area (in the area, adjacent to, or containing portions of the protected area) or the high biodiversity value area outside protected areas	Type of operation (office, manufacturing or production, or extractive)	Size of operational site in km²	Biodiversity value characterised by: 1) the attribute of the protected area and high biodiversity value area outside protected area, and 2) listing of protected status	Biodiversity value characterised by listing of protected status (such as IUCN Protected Area Management categories, Ramsar Convention, national legislation).
Stellenbosch	Owned	Containing portions of high biodiversity area	Preventative maintenance, recreational activity	Approximately 2.3	IUCN category IV	IUCN category IV
Bellville Park	Owned	Containing portions of high biodiversity area	Maintenance	Approximately 0.24	IUCN category IV	IUCN category IV

Habitats protected or restored

Certain parts of the University land contain protected areas and habitats. These areas are the Duthy Reserve, the Botanical Garden, the Coetzenberg conservation area and Bellville Park. Habitats in these areas are the rich Cape fynbos and renosterveld that SU does its best to protect and restore.

Table 7: *Areas for conservation*

Location	Operated asset	Within operational site area		
		Area Protected (ha)	Area Restored (ha)	Status
Stellenbosch	Owner ERF	230	4,27	Closed
Bellville	Owner ERF	24	2,05	Closed

IUCN Red List species and national conservation list species with habitats in areas affected by operations.

There are species that are on the red list and managed with the utmost care according to the EMPs. The number of species are listed below:

Table 8: *List of red data species*

Location	IUCN listed species				
	Critically endangered	Endangered	Vulnerable	Near threatened	Least concern
Stellenbosch	0	3	8	5	244

BIODIVERSITY INITIATIVES

Alien invasive clearing

Three sites in Stellenbosch were addressed for invasive species management in 2023. The first site is situated between the Eerste River and the foot of the Stellenbosch Mountain next to Lanzerac Estate. The size of the area covered is ± 14 900 m², with invasives covering roughly 1.5% of the total area. The method used for control was the cut stump method, and the herbicide used was Garlon with blue dye. No rehabilitation measures were put in place, as the sites cleared were natural fynbos sites to which fynbos vegetation will eventually move back. The second site that is the area behind Danie Craven rugby field. The site covers ± 3 600 m². The species removed were *Pinus* spp., *Acacia saligna* and *Eucalyptus* spp. The coverage of invasive species in relation to the total area was roughly 3%. The method used for control was the cut stump method with the active herbicide being Garlon with blue dye. No rehabilitation measures were put in place, as the sites cleared were natural fynbos sites into which fynbos vegetation will eventually move back.

The third site treated was the "tikbos", which covers 14 800 m², and the species removed was an invasive climber species. The method used was cutting and hand pulling climbers out of the olive forest. The biodiversity area on Bellville Park Business campus was also addressed for invasive species removal. The area of the site is 59 500 m², and the species treated were *A. saligna*, *A mearnsii* & *Eucalyptus* spp. The method used was the cut stump method and the herbicide used was Hatchet with red dye.
A plan and programme were developed by SU and approved by Department of Forestry, Fisheries and the Environment (DFFE) as a guide for the removal of alien plant species on the campus and replacing them with indigenous species within a time span of five years.

Road maintenance

Stellenbosch University undertakes annual gravel road maintenance of the Stellenbosch Mountains at the end of the year. The areas to be graded, watered and compacted include all SU gravel roads. The area of all roads that will be maintained is ± 49 300 m². All drainage infrastructure is maintained and most of the surface water captured flows to two dams for storage and irrigation use, preventing erosion. Emergency repair work due to flood damage that occurred in the winter equated to 12 500m² purely due to heavy rains. The area most affected was the road along the Eerste River and the cricket club, and the overspill of the Eerste River contributed to heavy erosion of this area.

Photo: *Civil contractor filling eroded gravel roads in the Stellenbosch Mountain.*

Erosion control

Three sites were rehabilitated in 2023 in terms of erosion control. Two of these sites are hiking trails/footpaths on Stellenbosch Mountain and the other is the Ertjieskloof embankment. The running meterage of the first site equals 1 400 m and is a hiking trail to the peak of Stellenbosch Mountain. The erosion control measures that were put in place were the construction of water bars, repairs to steps, filling of laterite in eroded areas and removal of lateral growth on the paths. The second site is the breakaway footpath that links the top hiking trail and the fire break. The site equals 315 running metres and the work conducted includes repairs to steps, filling with laterite, installing water bars and cutting open lateral growth. The erosion control on the Ertjieskloof embankment included adding geotextile and topsoil, the installation of breaks, adding hessian for stabilisation and planting indigenous vegetation. The size of the site is ± 500 m².

Recreation

SUFM manages all recreation areas, incorporating ecological standards. In terms of the open recreational areas at Coetzenberg mountain, SUFM regularly cuts back plantation in these areas, equating to 84.84 ha per annum. Furthermore, SUFM cuts and rakes and maintains walking, running and cycling trails and road verges, equal to ± 19 200 running metres per annum. The rehabilitation and maintenance of all the MTB trails are outsourced to a specialist who is one of the event organisers of the Cape Epic MTB race. Quarterly dam safety inspections are conducted of both Ertjieskloof Dam and Welgevallen Dam.

Photo: *Overview of Stellenbosch Mountain fynbos and SU research plantations.*

Tree planting and restoration

In 2023, SUFM held two-tree planting ceremonies in the conservation areas (Stellenbosch Mountain). As part of reforestation, awareness and restoration at the University, a total of 20 trees were planted in the two sessions.

Photo: *Students helping to plant some of the 20 trees in the conservation areas*

Collaboration on rivers

Two rivers, the Eerste and Krom, are managed within the river collaboration programme along with other stakeholders, and local and national government to restore rivers to being healthy ecosystems. At Tygerberg, the Elsieskraal River is managed in collaboration with the City of Cape Town.

Environmental management plans

In compliance with the National Environment Management: Protected Areas Act (NEM: PAA) (Act No. 57 of 2003), SU is required to develop environmental management plans (EMP) for each campus. The objective of an EMP is to ensure the protection, conservation and management of the species concerned in a manner that is consistent with the objectives of the NEM: PAA. SUFM appointed Cornerstone Environmental Consultants as the principal consultant in the drafting of the EMP for all the University's conservation areas.

Rehabilitation to natural vegetation

In 2023, SUFM addressed four sites on Stellenbosch Mountain for rehabilitation purposes. The sites included a two-hectare old compost site that was infested with *Eucalyptus* spp. The *Eucalyptus* species have been felled gradually over the years and the site has been rehabilitated to form a natural park area with indigenous trees.

Another site that was rehabilitated was an illegal footpath located along the slope above the cricket fields. The path equates is ±105 running metres long. The path was filled with topsoil and planted with indigenous vegetation, such as wild olive, sand olive, wild rosemary and bitou bush.

The last site rehabilitated in 2023 was the Ertjieskloof embankment, as already mentioned under erosion control. The size of the site is ± 500m^2. The vegetation that was planted includes wild olive, sand olive, wild rosemary and bitou bush.

Fire prevention

High temperatures, strong winds and dry vegetation in the summer months contribute to the high risk of fires. All the aspects of fire prevention are therefore practised to minimise the risk of assets being burnt. Fire breaks of 7 km are prepared and maintained annually.

Photo: *Main fire break within the Stellenbosch Mountain.*

Landscaping

The river abstraction pipes from the Eerste River feeding the irrigation system were replaced after they were washed away in the floods of 2023. Underground water from the boreholes supplements the surface water for irrigation in the different seasons.

Several landscaping projects were undertaken, including gardens that were redesigned, soil being rejuvenated with compost, new irrigation installed, and areas replanted with water-hardy species. These areas are along Suidwal Road, along Joubert Street, around the art museum, and at the JC Smuts building in Merriman Road.

The removal of invasive tree species continued along the Eerste River, with several large poplar, pine and eucalyptus trees being removed in late summer, when the river was low. The removal of trees infected with polyphagous shot hole borer continues, and eight trees have been lost thus far, most of these being box elders (*Acer negundo*), which are considered super spreaders of disease and pests.

Ground and Gardens also joined a local contractor and nursery to add plants to the gardens of a local school, and to teach the learners about nature and how to care for a garden.

Photo: *New inlet pipes for irrigation system*

Photo: *Recreational space on Rooiplein*

Photo: *Indigenous waterwise plants*

Photo: *Establish community garden*

EMISSIONS

Background and boundary

The University is committed to environmental sustainability, as reflected in its Environmental Sustainability Plan and policy to reduce the impact of its operations on the environment. This is measured using the United Nations Greenhouse Gas (GHG) Protocol, which measures the emissions from the University's operations, commonly called the organisation's carbon footprint. The goal is to reduce the institution's carbon footprint, reaching carbon neutrality and net zero emissions, and to not exceed a two degree increase in the earth's temperature, thereby reducing severe climate change.

Emissions are defined in terms of three scopes and limited by boundaries. The scope 1 greenhouse gas (GHG) emissions produced by the University are generated directly by the use of stationary fuels (diesel generators), air conditioning, fire suppressants, medical gas, mobile fuels, and renewables, etc., indirectly purchased electricity (scope 2), and a range of other activities that occur across the University. These include purchased goods and services, purchased goods paper, purchased water, transmission and distribution (T&D) losses, waste, flights, car rental, and leases for scope 3. These emissions contribute to climate change and the associated negative impacts on the environment. SU reports on all aspects of scope 1 and 2, and only certain aspects of scope 3.

Image: *SU Carbon Footprint Report for the financial year of 2022.*

Approach and targets

The Stellenbosch University Environmental Sustainability Plan and programme focus on reducing emissions from the institution's operations and across its value chain, with the goal of achieving net zero emissions by 2050. In trying to achieve net zero emissions, the plan is to reduce scope 1 vehicle emissions by 30% by 2026, and scope 2 electricity consumption emissions by 20% by 2029, both when compared to 2019 values.

There is engagement with staff and students on this critical issue, since everybody has a role to play. In 2023, SU continued to build awareness through a series of information-sharing training sessions and workshops across the campuses to gather information and gain a better understanding of the sources of emissions and they can be reduced. The University also introduced a net zero campaign, making students and staff aware of reducing SU's footprint. In 2023, the Toco initiative incentivised staff and students to work towards a significant reduction in emissions. This programme focused on carbon storing through absorption schemes, rewarding students and staff for taking up these measures.

The University has driven a reduction in its emissions through behavioural change and focusing on student and staff awareness engagements, energy efficiency, walking, carpooling, cycling, waste reduction, renewable energy sources, and green buildings. These elements continue to be primary levers of the reduction strategy. Together with SU's operations staff, the institution continues to develop means to achieve its decarbonisation plan for both its 2050 target and long-term net zero objective. In support of these goals, SU has developed guidelines and strategies to prioritise projects and initiatives that will help it achieve its climate targets.

Scope 3 represents the most significant part of the University's emissions, and more information is being gathered from the institution's suppliers to improve the quantification of these indirect emissions. This exercise will provide a clearer understanding of the contribution made to SU's footprint by category, and the crucial areas for action that will support the achievement of the scope 3 target.

Measurement and evaluation

The dedicated management team reviews climate-related performance across SU's operations and provides an internal platform for the dissemination of best practice and actions in terms of emissions and sustainable innovation. The GHG emissions are measured continuously, with data being collected and analysed and compiled into a report annually. Based on the data, initiatives and projects are implemented to reduce the carbon footprint.

Disclosures 305-1, 305-2 and 305-3

Overall, SU achieved a 9% reduction in scope 2 electricity consumption emissions in 2022 against the 2019 baseline. The scope 1 and 3 do not have biogenic CO_2 emissions.

Table 9: *Comparison of Stellenbosch University's emissions between years*

Category	FY2019 baseline year	FY2020	FY2021	FY2022
Stationary fuel	378.24	463.10	404.43	1 679.18
Fugitive and medical gas	753.78	948.68	856.38	942.25
Mobile fuel	848.85	521.75	718.29	874.51
Total scope 1	**1 980.87**	**1 933.53**	**1 979.10**	**3 495.95**
Total scope 2 – purchased electricity	**67 931.03**	**50 258.56**	**66 329.22**	**61 491.66**
Total scope 1 and 2	**69 911.90**	**52 192.09**	**68 308.32**	**64 987.61**
Purchased goods and services	773.98	427.43	649.34	726.03
Fuel and energy activities	6 589.31	4 975.60	8 098.67	7 634.14
Waste generation	828.92	519.66	424.15	445.30
Business travel	6 053.47	1 441.62	1 650.88	8 463.06
Leased assets	186.73	Not evaluated	Not evaluated	Not evaluated
Employee commuting	Not reported	5 066.09	2 763.08	2 736.92
Total scope 3	**14 432.42**	**12 430.38**	**13 586.13**	**20 005.45**
Outside of scopes	**108.60**	**251.59**	**253.40**	**247.97**

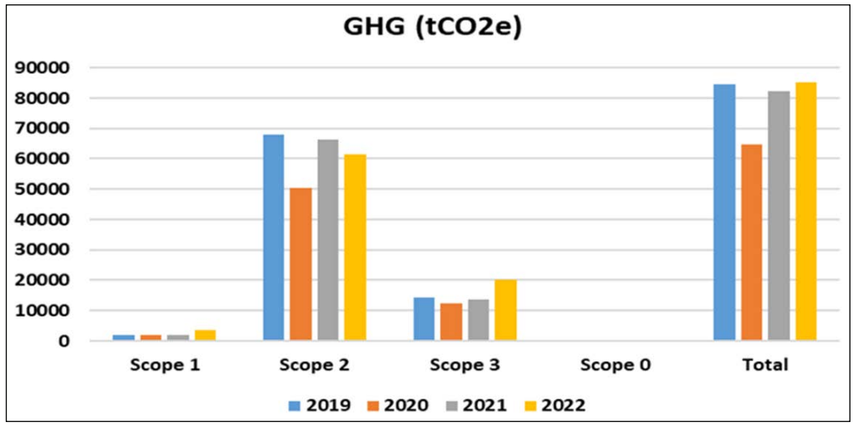

Figure 4: *Stellenbosch University's comparative emissions between years (FY2019-FY2022) by scope.*

GHG emission intensity

The intensity ratio of scope 1 and 2 emissions in 2022 was 1.771 tCO_2e/FTE employees in 2021 and 1.876 tCO_2e/FTE employees in 2021. In 2022, the carbon emission per square metre was 0.082 tCO_2e/m^2 (2021: 0.087 tCO_2e/m^2).

Table 10: *Comparison of Stellenbosch University's emissions and intensity between years*

Intensity indicators	FY2019 baseline year	FY2020	FY2021	FY2022
Scope 1 & 2 (tCO_2e)	69 911.90	52 192.09	68 308.32	64 987.61
Scope 1 & 2 (tCO_2e/m^2)	0.094	0.068	0.087	0.082
Scope 1 & 2 (tCO_2e)/population	1.965	1.486	1.876	1.771
kWh/m^2	87.561	64.363	80.071	74.770
kWh/person	1 835.557	1 402.953	1 718.284	1 611.255
Kilolitres/m^2	0.637	0.416	0.678	0.787
Kilolitres/person	13.353	9.065	14.557	16.964

Reduction of GHG emissions

The University has implemented several initiatives to reduce its energy and water consumption, reduce its waste to landfill, promote non-motorised transport (NMT) and create awareness of behaviour change to reduce its GHG emissions.

A decarbonisation project was introduced to reduce GHG emissions, which was a focus point in 2023.

Emission of ozone-depleting substances (ODS) and 305-7 nitrogen oxides (NOx), sulphur oxides (SOx) and other significant air emissions

Man-made ozone-depleting substances (ODS) destroy the protective ozone layer, counter to the guidelines of the EU Ozone Regulation. The latter contains information on ozone-depleting substances, which need to be phased out. The protocol covers substances with a high ozone-depleting potential (ODP), including chlorofluorocarbons (CFCs), halons, carbon tetrachloride (CTC), 1,1,1-trichloroethane (TCA), hydrochlorofluorocarbons (HCFCs), hydrobromofluorocarbons (HBFCs), bromochloromethane (BCM) and methyl bromide (MB), all of which are referred to as 'controlled substances. Five additional 'new substances' are halon 1202, methyl chloride (MC), ethyl bromide (EB), trifluoroiodomethane (TFIM) and n-propyl bromide (n-PB) have been added. The use of these substances is reduced and replaced with more friendly options at SU, where alternatives are measured, analysed and introduced, especially in terms of paint, gas, and cleaning and building materials.

EMISSION INITIATIVES

Decarbonisation plan

Systemic sustainability is one of the key attributes of SU's Vision and, together with the ESP, affirms its commitment to a sustainable future. A project to develop a strategy and plan for net zero carbon emissions to decarbonise SU's campuses has been approved. Investigations to reduce emissions and establish scientifically based targets for SU to reduce its current 68 688 tCO_2e to carbon neutrality by 2030 and net zero by the middle of the century started in 2023. Many initiatives and projects were implemented in 2023 contributing to the reduction of GHG emissions.

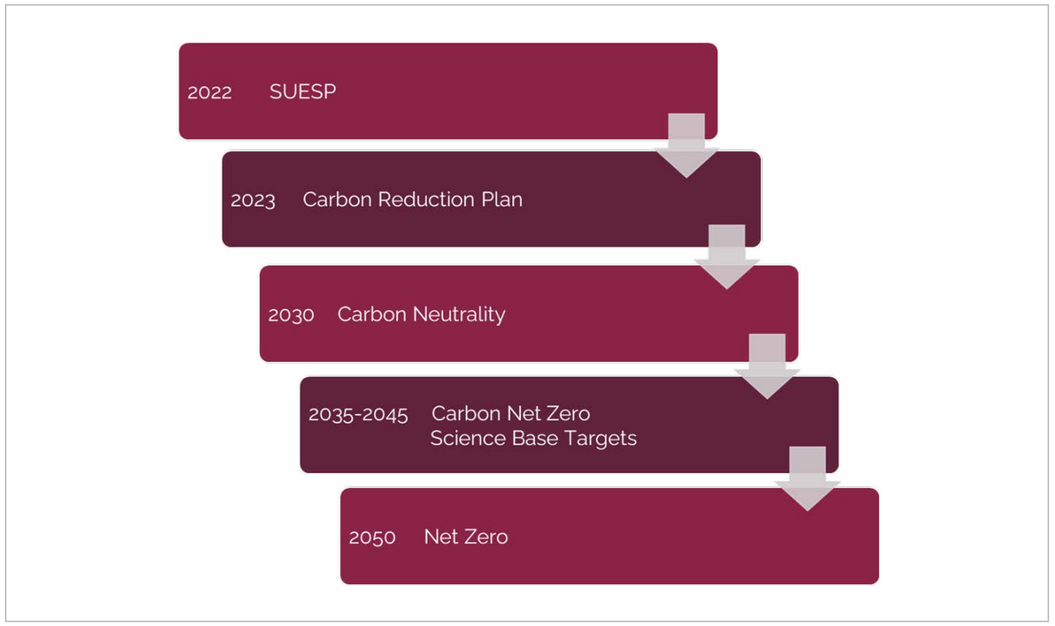

Image: *Roadmap to Net Zero*

Utilities

Energy-, water- and waste-measuring systems have been implemented and many efficiency, conservation and behavioural initiatives have been implemented to reduce the consumption of these utilities.

Green buildings

Nineteen green buildings were certified with strategies to reduce utilities in these buildings. New buildings and upgrades need to conform to 4-star GBCSA-rated principals.

Gas reporting system

The gas register system captures and records the reporting requirements of greenhouse gas (GHG) data and other relevant information during the installation and replacement of gases from equipment around the University. The register provides accurate record-keeping of the SU carbon footprint and assists in reducing greenhouse gas emissions. Preventing greenhouse gases from entering the atmosphere is a very effective way of reducing climate-related emissions and negative environmental impacts.

Carbon tax

SU was registered and licensed for carbon tax as per the regulations in 2020. This was because SU exceeded the thermal threshold of 10 MW thermal from diesel generation. The University gathered information on generators and calculated the amount of emissions generated, including carbon tax. This was submitted to SARS for 2021, at R134/ton CO2e, and for 2022 at R144/ton CO2e. This information is uploaded to the SAGERS (South African Greenhouse Gas Emissions Reporting System) website to be visible to the public.

WASTE

Background and boundary

Stellenbosch University produces different waste types as a result of activities that take place on its campuses. The University supports

the sustainable use of natural resources and the promotion of a culture of diverting waste from landfills amongst students, staff and its service providers. The University's commitment to environmental sustainability and the circular economy is documented in the Environmental Sustainability Plan. This initiative is an integrated development plan that details the strategies for managing a sustainable campus and reducing waste. It aligns SU with the national and international focus on preventing, reducing, reusing and recycling waste materials. The University introduced a sorting-at-source system into three bins and disposing of the waste responsibly. This adds value by reducing the impact and risk of harming the environment and reducing resources, as well as the costs associated with waste management.

Photo: *Waste management truck with a full load from campus, transporting waste to the waste facility.*

Approach and targets

Because of the accumulation of waste material in landfills and in the natural environment, SU is exploring ways to prevent and reduce the generation of waste and to recover materials for re-use and recycling. Clear goals are set in the University's waste inventory as part of its ESP. These include a target of 80% of general waste diverted from landfill, 100% sorting of all general waste, 95% food and other organic waste diverted from landfill, 20% reduction in general waste generated compared to the 2018 baseline, and a commitment to diverting 100% of the institution's waste from landfill.

The approach used is to measure the waste streams through weighing, analysing the data and actively reducing the volumes by infrastructure initiatives, awareness campaigns and training of the campus community. A service provider manages the waste, which includes the centralised materials recovery facility (MURF). Material specifications were compiled to eliminate single-use items, with only reusable and recyclable items remaining on campus.

Measurement and evaluation

Waste of many different types is generated on campus, sorted into streams, measured, and displayed on an electronic dashboard. The data is analysed monthly and reported, and initiatives are implemented to improve efficiencies to reach the targets as set in the EMP. Regular meetings are held with industry, waste experts and local government to generate and adopt new ideas, systems, and recommendations to improve operations.

Waste generation and related impacts

Waste generated can be categorised into eleven different streams at SU. These are recyclables, landfill, organic, white paper, hazardous food, chemical, biological, e–waste, light bulbs, broken furniture and construction waste. All these streams have severe effects on the environment at manufacturing and disposal. Initiatives to reduce the impact are investigated and implemented continuously. Centralising the general waste resulted in most of the waste being diverted away from landfills. A new market has been created by CRDC Global, for non-recyclable plastics (chip packets) that are used for aggregate in cement bricks. Investigations into chemical waste were done to start with recycling and reducing chemical disposal.

Reducing waste impacts

Material handling (waste) is a big part of the University operations and is done with the necessary responsibility to comply with regulations, be sensitive to the environment and people, reduce costs and enhance environmental sustainability. Therefore, a strong focus and management control are implemented in relation to hazardous materials.

Waste generated

The total weight of non-hazardous waste was 1 073,39 tonnes, with 156,71 tonnes of hazardous waste, which includes biological, chemical and e-waste (bulbs and electronics). A total of 230,22 tonnes came from food waste, making a total of 1 460,33 tonnes of waste generated in 2023.

Table 11: *Total waste generated in 2022 and 2023.*

Waste composition - in metric tonnes	2022	2023
Non-hazardous waste (general and garden) – kg	1 391 862	1 073 394
Hazardous waste – kg	130 349,1	156 712,7
Food waste – kg	314 700	230 220
Total waste – kg	**1 836 911**	**1 460 327**
Total - tonnes	**1 836, 91**	**1 460,33**

Waste diverted from disposal

In 2023, the total weight of non-hazardous waste was 767,71 tonnes, with a disposal method for re-use of 420,99 tonnes, recycling (composting) 344,58 tonnes and 2,133 tonnes recovered. Only 10,49 tonnes of hazardous waste (bulbs and electronics) were prepared for reuse in 2023.

Table 12: *Stellenbosch University waste diversion methods.*

Non-hazardous waste - Waste diverted from disposal - in metric tonnes	2022	2023
Preparation for reuse (general)	425 118	420 994
Recycling (downcycling, upcycling, composting, anaerobic digestion) – garden waste	634 265	344 580
Other recovery operations – CRDC	0	2 133
Total - kg	**1 059 383**	**767 707**
Total - tonnes	**1 059,38**	**767,71**

Hazardous waste - Waste diverted from disposal - in metric tons	2022	2023
Preparation for reuse – Bulbs and electronics	21 737	10 487,87
Recycling (downcycling, upcycling, composting, anaerobic digestion)	0	0
Other recovery operations	0	0
Total - kg	**21 737,28**	**10 487,87**
Total - tonnes	**21,74**	**10,49**

Waste directed to disposal

Only 305,69 tonnes of non-hazardous waste were directed to disposal at the landfill, and 39,73 tonnes of hazardous waste was incinerated (without energy recovery) in the year 2023.

Table 13: *Non-hazardous and hazardous waste directed to disposal.*

Non-hazardous waste - directed to disposal.	**2022**	**2023**
Incineration (with energy recovery)	0	0
Incineration (without energy recovery)	0	0
Landfilling	332 479	305 687
Other disposal operations.	0	0
Total – kg	**332 479**	305 687
Total - tonnes	**332,48**	**305,69**

Hazardous waste - directed to disposal.	**2022**	**2023**
Incineration (with energy recovery)	0	0
Incineration (without energy recovery) – biological	72 740,85	39 731,23
Landfilling – chemical	35 871	87 413
Other disposal operations – biological	0	19 080,58
Total - kg	**108 612**	146 224,81
Total - tonnes	**108,61**	**146,22**

JSE - Waste intensity: Total general waste per square meter and FTE (excluding hazardous waste)

Only the general waste was considered to calculate the waste intensity ratios. In 2022, FTE represented 36 036 kg and 37 397 kg in 2023, and 790 780 m^2 in 2022 and 801 399 m^2 in 2023.

Table 14: *Total waste intensity from general waste*

Stellenbosch University	**2022**	**2023**
Waste intensity (kg/FTE)	38,62	28,70
Waste intensity (tonne/FTE)	0,04	0,03
Waste intensity (kg/m^2)	1,76	1,34
Waste intensity (tonne/m^2)	0,001	0,001

Table 15: *Total waste intensity including food, non-hazardous, and hazardous waste*

Stellenbosch University	**2022**	**2023**
Waste intensity (kg/FTE)	59,97	39,05
Waste intensity (tonne/FTE)	0,05	0,04
Waste intensity (kg/m^2)	2,23	1,82
Waste intensity (tonne/m^2)	0,002	0.001

WASTE INITIATIVES

Food waste

In 2023, 230,22 tonnes of food waste was used for composting, compared to 314,70 tonnes that was composted in 2022. Reducing food waste determines the achievement of various sustainable development goals (SDGs), such as SDG 1 (no poverty), SDG 2 (zero hunger), SDG 12 (sustainable consumption and production), and SDG 13 (climate action). The University's approach to reducing food waste has focused on engaging with service providers, staff and students of the University on the role they can play to reduce food losses and waste. Food waste from the residences and kitchens is mixed with bogashi, stored temporarily at Lentelus and then transported to Nun Waste for composting.

Photo: *Collection method of SU food waste.*

Single-use items

With regard to single-use items, Stellenbosch University Facility Management (SUFM) held several meetings with vendors and clients on campus encouraging and educating them to utilise re-usable and recyclable items. Certain single-use plastic items are being phased out by vendors. There are conversations with the director of commercial services to incorporate a materials strategy into the vendors' lease to enforce strict adherence to the banning of certain single-use items.

Photo: *Recyclable materials being baled to increase storage capacity*

Non-recyclables to aggregate

In terms of offsetting single-use plastics, SUFM and its waste management service provider, Wasteplan, have partnered with CRDC Global to incorporate all non-recyclable plastics into CRDC Global's waste-to-aggregate project. Sorters are trained to identify non-recyclable and single-use plastics that previously went to landfill because there was no recycling market, they were soiled, or the material was non-recyclable. Sorters separate these items and bail them for delivery to CRDC Global, which processes and treats them to be utilised as aggregate in building concrete.

SUFM has drafted a zero-waste-to-landfill events document that event organisers use to mitigate non-recyclable material and single-use plastics from all campus events. The document acts as a guideline for event organisers to specify which materials are allowed on campus and provides substitutes for non-recyclable and single-use plastic items. The document also guides event staff to separate items at source to increase recycling and prevent the contamination of materials as far as possible. All event waste undergoes secondary sorting through an established waste management company. SUFM aims to conduct all campus events as zero-waste-to-landfill events.

SUFM is rolling out a tote bag system in all the residences, which are provided with 10 reusable tote bags that students can use free of charge when they do their shopping. The bags have to be returned to allow all students to benefit from this. This project is focused on reducing the number of plastic bags on campus and in the environment as a whole. The rollout will be accompanied by SUFM advertising this project on its website. The student engagement specialist will also inform the environmental heads of each residence about this project and request them to filter it down to all residence students. The tote bags will be accompanied by a poster informing students about the initiative.

Bins

In 2023, SUFM added 135 bins to campus that focus on separation at source. Bins are placed in groups of three receptacles that are meant to store recyclable, food and landfill waste. This method reduces the risk of contamination of recyclables and food waste. The aim is to continue the rollout until all concrete bins (± 560) are fitted with lids.

Photo: *3-bin Recycling station*

Photo: *Placed in a cage, ready for collection*

Materials recovery facility (MRF)

During 2023, SUFM added more resources to the materials recovery facility (MRF). A conveyor belt was installed for sorting, and this assists staff in waste-picking and streamlines the process. A bailing machine was installed to help optimise space and transport costs, thus reducing carbon emissions. The next plan is to install a weighbridge for the facility and extend the loading area to house more waste and improve the flow of operations.

Photo: *Bailed recyclables*

Photo: *Sorters next to the conveyer belt*

Image: 3-bin Recycling station signage

Restricting materials on campus

As part of the zero-waste-to-landfill strategy, a list of "allowed" materials, mainly packaging, has been shared with the food vendors on campus as part of addressing the general waste produced on campus. This list has been updated with the collaboration of Wasteplan and will be shared with commercial services. The image below is a screenshot of SU's new three-bin waste signage that was updated to actual images instead of words and silhouettes. The feedback that has been received from students has been positive, as they feel that it is more informative, and the items are easier to identify. Students and staff will have to sort their waste items at source by using the new signage as guidance.

ENVIRONMENTAL COMPLIANCE

Background and boundary

For SU, environmental compliance means complying with environmental laws, regulations, standards and other requirements, such as site permits. In recent years, environmental concerns have led to a significant increase in the number and scope of compliance imperatives across all global regulatory environments. Being an environmentally responsible organisation, SU is increasingly aligning its environmental concerns and compliance activities and integrating them into its operations on all campuses.

Compliance with the above requirements and obligations requires meeting certain conditions and incorporating many new compliance needs. This is done by managing monitoring programmes, schedules and reports, and ensuring that the requirements in the legislation, permits and licences are met, e.g. water licences, WULAs, waste permits and environmental conditions.

Measurement and evaluation

The University's legal department keeps the institution informed continuously of new regulations and legislation. This is used together with information sessions with industry and local government networks to update the required systems and information to comply with necessary regulations.

Table 16: *Non-compliance*

INDUSTRY NAME	Sample date	COD (mg/l)
Neelsie	13/09/2023	10 439

The COD upper limits as stated in the by-law are 5 000 milligrams/litre (mg/L) of COD/effluent levels.

Generating routine compliance reports for authorities

The management of the above is complex and time-consuming, leading to an increasing uptake of software systems designed to manage environmental compliance. These are referred to as 'Environmental Data Management Systems' (EDMS), which have been incorporated as a system. The necessary criteria must be considered when selecting environmental compliance software, such as proven capability, high performance, transparency, traceable data handling, a robust calculation engine, advanced factor handling, simple integration, automated workflows and QA, and flexible reporting and data extraction.

ENGAGEMENT

Background and boundary

As the world grapples with challenges such as climate change, resource depletion and biodiversity loss, it is becoming evident that the adaption of sustainability practices and behaviours is essential for mitigating these issues. Inspiring the adoption of sustainable lifestyles and fostering a sense of ownership and responsibility amongst individuals and the University community remain a complex undertaking. That is where sustainability engagement comes into play, with several initiatives that enable stakeholders to identify opportunities for creating lasting positive change.

The Environmental Sustainability Plan outlines staff and student engagement as a key route to achieving its targets and objectives. It goes beyond passive awareness. It encompasses the active participation by and involvement of individuals in promoting and adopting sustainable practices. This approach seeks to raise awareness, train, inform, encourage action, and motivate individuals to genuinely integrate sustainable behaviours into their daily lives.

Approach and targets

The University strategies for student and staff engagement include a focus on engaging all students and staff to pursue environmental sustainability on all campuses. The plan is to report on all sustainability goals by 2024 and empower students, staff and faculty to be agents of change who collaborate and share knowledge in concrete ways. SUFM and other stakeholders drive sustainable engagement by equipping and students with tools, information and motivation to take action to reduce their environmental impact. The six distinct levels of engagement implemented at SU are awareness, individual behaviours, community participation, organisational participation, advocacy, and activism. These are aimed at achieving the goals and targets in the Environmental Sustainability Plan.

Measurement and evaluation

The SU Annual Report has to report on all sustainability goals by 2024 against the previous year to evaluate the progress made and success achieved through engagement. The Environmental Sustainability team engages with the organising team after each event to discuss its effectiveness. Engagement surveys are also carried out after every information training session to gather feedback from the students and staff to ensure that the specifics of each session are well received and sufficiently considered. The University measures its carbon footprint annually and encourages improvement through positive change.

ENGAGEMENT INITIATIVES

Sustainability calendar

The Environmental Sustainability Calendar forms the basis of SU's communication strategy, focusing on specific themes for engagement each month, and is shared via social media messaging. The calendar also highlights specific international and national awareness days around which the institution tries to collaborate with internal and external parties to create broader awareness and emphasise that the topics are of global importance.

Image: *The Engagement Calendar for 2023*

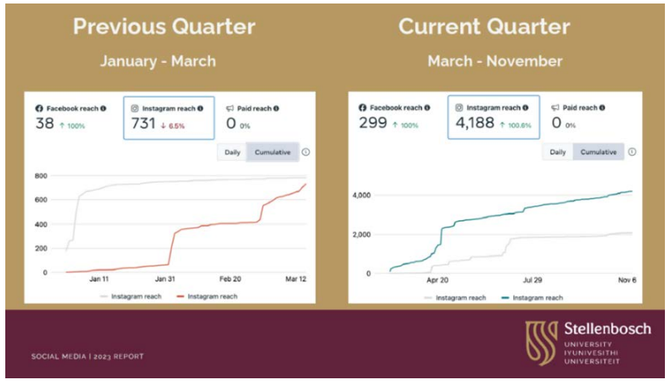

Image: *Graphs showing the increase in followers on social media*

Social media

A social media manager was appointed in April to develop the different social media platforms and create a brand identity. The Instagram page (@su.environmental.sust) has seen a significantly consistent increase in traffic.

Welcoming programme engagements

During the welcoming programme at the start of the year, each new student was given a reusable water bottle and encouraged to use it instead of buying single-use plastic bottles to help reduce waste on campus. The handing out of the bottles was part of the individual residence and PSO programmes, encouraging students to have sessions on how to live, work and study in a sustainable manner.

To further encourage new students to move away from single-use items, a waste-sorting game formed part of the Dream Fair stalls, with reusable thermal mugs as prizes for the correct sorting of waste.

Photo: *The water bottles given to newcomers.*

Photo: *Staff and students manning the waste sorting game stall at the Dream Fair with reusable mugs as prizes.*

Environmental Sustainability Expo

In April, as part of awareness for Earth Week, the Environmental Sustainability Expo was hosted in the Jan Mouton Learning Centre. The purpose was to showcase what is happening behind the scenes and create awareness about the SU Environmental Sustainability Plan and the journey to net zero. Nineteen groups from within the University, and external partners who are helping SU on the road to net zero, were invited to exhibit as part in this two-day event. The exhibits ranged from the University's waste management project to the company that is doing the LED refitting project and the promotion of electric scooters. Since the exhibits were in the foyers of the building during active academic times, more students were able to engage with the exhibit information than would otherwise have been the case. A conservatively estimated 1 000 students moved through the exhibition space over the two days. The programme also combined a lunchtime lecture by Prof Guy Midgley, Acting Director for the School for Climate Studies and the Centre for Invasion Biology at SU, and a discussion panel by young professionals on research and work in the climate change space.

Photo: *Expo exhibitor Orbit X engaging some of our students.*

Photo: *Expo exhibitor FM Waste project with Wasteplan.*

Earth Week

This annual celebration of Earth Week is a collaboration between various student groups (Ecomaties, UNASA, SRC), the SDG/2063 Impact hub and the Environmental Sustainability team. Plans for the future are to collaborate with more internal and external parties to expand the current programme. Continuing on the theme of the Expo mentioned above, the programme included a panel discussion on climate issues, a lunchtime lecture by Prof. BU Qingxiu of the University of Sussex on China's transition to decarbonisation, a carbon-capture competition with Toco, a community cleanup, information stalls on the Rooiplein, a quiz night, a clothing swop, a tour to the campus garden project and a workshop on climate justice.

On Tygerberg Campus, the programme included foyer exhibits, a campus eco tour, a discussion on the impact of climate change on health care, a DIY herb garden workshop, waste-sorting competitions, a climate-themed quiz and games night, and a zero waste and eco-friendly twilight market.

Photo: *The Earth week foyer exhibit in the clinical building on Tygerberg campus.*

Staff and student workshops

Green X hosted an energy-saving workshop attended by 16 student leaders from the student community division. Another student workshop was held on how to report for the Green Living Awards.

In May, staff from the Environmental Sustainability team facilitated workshops for 268 first-year medical students on environmental stewardship as part of the new medical curriculum. The workshops focused on reducing utilities on campus.

Photo: *1st year medical students in the Waste reduction workshop.*

Another student workshop was held towards the end of the year, focusing on creating a sustainable welcoming for 2024. It was attended by 30 students from the Stellenbosch and Tygerberg campuses.

Photo: *Staff members of Centre for Health Professionals Education on Tygerberg campus who attended the Sustainable office workshop.*

Sustainable office workshops for staff were piloted on the Tygerberg Campus with support from the dean, Prof Elmi Muller. Nine context-specific small group workshops were held, reaching over 94 staff members who work in the clinical building on the campus. The response has been very positive, with specific savings behaviours already implemented, and more workshops scheduled for the rest of the year.

Staff and student information-sharing sessions

During the January/February welcoming period, three information-sharing sessions were held as part of individual residence or PSO programmes. These included tours to the Neelsie waste room as part of waste-sorting awareness, and general sustainable campus interaction talks.

A talk on energy saving was held at a weekly Toolbox talk for 38 of the FM workshop staff and contractors to encourage them to be an "Energy Hero" to help reduce energy consumption on campus.

As part of the Centre for Student Communities' leadership training in September, 46 students who form part of the new leaders' cohort attended a session in which information was shared about the SU Environmental Sustainability Plan and the role students can play in reducing the carbon footprint of the campus operations.

Information-sharing session for cleaning supervisors

Three information-sharing sessions were held to introduce the new Green Cleaning Plan to the 29 cleaning supervisors on campus. These initial information sessions will be repeated next year to also get feedback from the supervisors to understand what the challenges are to implementing the plan.

Science faculty information-sharing session.

Sharing the basic information on the SU Environmental Sustainability plan with the 14 Science Faculty technical staff members showed that these sessions must be followed up by context-specific workshops to help staff negotiate challenges in raising awareness and implementing the actions needed to reach the targets of the plan.

Campaigns

The net zero poster campaign was supported by social media messages during the year, with special focus during the April Earth Week programme.

Creating awareness of behaviour that supports the greywater system in Stellenbosch residences was done by putting up posters in the bathrooms of residences whose shower outlets supply the system with water. The posters explain the basic functioning of the system and address behaviour that causes problems in the system. It also incorporated a three-minute video about the whole process and the behaviour addressed in the posters.

Photo: *Grey water signage*

Photo: *The staff of the Language Center, 7 Bosman Street, with the Valse Olive or Buddleja tree they planted.*

Photo: *Staff from the Africa Centre for HIV/Aids Management around the White pear (apodytes dimidiate) they helped to plant.*

Tree-planting events

In collaboration with the landscaping team on the Stellenbosch, Tygerberg and Worcester campuses, tree-planting sessions were held during the year and staff and students were invited to help with the physical activity of planting the trees. The purpose of these events was to encourage staff and students to join in taking care of the campuses. Nine events engaged around 70 people and resulted in the planting of 36 trees. On the Tygerberg Campus, the annual Remembrance Day planting combines planting trees with commemorating staff and students who passed away during the year. On the Worcester campus, it is now an annual event to plant a tree for the final-year group.

The annual tree planting to create awareness of Nature Conservation Day again took place on the slopes of Coetzenburg mountain, where 10 indigenous trees were planted and around 30 staff and students were involved.

Tours

Five tours to the MRF and Neelsie waste room were instrumental in educating about 90 staff and students about the waste sorting process on campus.

The only PV tour hosted this year was for the rectorate.

3 sustainable campus tours were held on Tygerberg showing about 100 people the interventions to make the campus more sustainable.

A pilot Champion Tree walk was introduced as part of awareness for Arbor Week, with participants being told stories about champion and historic trees on the Stellenbosch Campus and in town.

Photo: *Piloting the Champion Tree Walk*

A green building tour was hosted together with the GBCSA as part of the Green Living Awards event, during which SU received awards for certifying 19 buildings using the portfolio precinct tool, and a certificate for the 1000th building in SA to be certified. Thirty industry professionals joined this tour of the Jan Mouton Learning Centre, the underground library, and the Visual Arts Building (which was the 1000th building to be certified by the GBCSA in SA).

Photo: *GBCSA members on the Green Building Tour in the Library.*

Competitions

As part of creating awareness about how individual action can affect climate change, a carbon capture competition was launched with Toco as sponsor in February. The competition encouraged residents and PSOs to host discussions on carbon capturing and to sign up students to use TOCOS, virtual money based on carbon, giving an example of how entrepreneurial businesses can also play a role in carbon capturing. The residence and PSO that signed up the most students won R4000 worth of Tocos to be distributed amongst the students, and the individual student won R1000 worth of Tocos.

Photo: *Winners of the Toco competition: Eendrag, Vesta PSO and Schalk Smith*

To give staff and students an opportunity to show how they view environmental sustainability, a photo competition, running from May until the beginning of August, was held, and 27 entries were received.

The Green Living Awards is an annual competition to reward student communities (residences and PSOs) who encourage and work towards changing behaviours that will reduce utilities and raise awareness about environmental sustainability. A total of 25 entries were received. The winners were eNkanyini in the residence category, winning R15 000 and R5 000 worth of Tocos, and Vesta in the PSO category, winning R13 000 and R4 500 worth of Tocos.

Community engagement

As a kick-off event for Arbor Week, an eco-treasure hunt was held on 1 September in collaboration with Stellenbosch Municipality. This two-hour event was held in the Jan Marais Park, during which 30 SU student volunteers facilitated the treasure hunt with participants from 12 primary schools in town. The aim was to introduce the park as a free resource to teachers, to market it as a social space to learners, and to encourage environmental stewardship. Each school planted a tree in the park as part of the activities. The

municipality donated a “friend of the park” medal to each participant, and each school was given a food tree as part of the event.

A collaboration between the Faculty of Medicine and Health Sciences, Greenpop and the Western Cape Department of Health restored about 100 m² of indigenous fynbos to a barren parking area island at the Helderberg Hospital in Somerset West. This was the second phase of a three-year project.

Photo: *Volunteers repopulating the parking area islands at Helderberg Hospital with indigenous fynbos.*

Photo: *Some of the student volunteers for the Eco Treasure Hunt. Photo by Natasha Sibanda.*

TRANSPORT

Background and boundary

Sustainable transport refers to low- and zero-emission, energy-efficient and affordable modes of transport, including hybrid, battery and alternative-fuel vehicles. It also includes planning and implementation of public transport, parking and NMT routes.

Photo: *Promoting the use of bikes.*

Image: *The call to use bikes and not cars on social media for World Car Free day*

Approach and targets

As part of the University’s decarbonisation project, a transport strategy for all campuses will be developed by 2024 to reduce emissions. The University already measures transport emissions from students and staff commuting, air travel and the vehicle fleet, and calculates the carbon emissions. The target is to reduce GHG emissions.

An initiative to design and incorporate NMT and end-of-route facilities into the urban plan to optimise sustainable transport has also started. To this end, low-emission modes of transport are being investigated, promoted and introduced, such as walking, cycling, and electric vehicles. Mobility planning is also being worked on to support the targets of the Sustainable Development Goals.

Measurement and evaluation

The 2019 footprint, survey and measurements are used as the basis and the annual figures for 2023 are evaluated against these.

ENGAGEMENT INITIATIVES

Awareness

An awareness campaign was undertaken with Transport Services in September to promote walking, the use of bicycles and the campus shuttles to reduce the use of vehicles on campus. Social media was used, as well as an information stall on the Rooiplein.

Carbon-reduction strategy

As part the decarbonising study, an investigation was undertaken into the use of electric vehicle ZIMI car chargers for the Jan Mouton Learning Centre. Battery scooters as a mode of transport were also investigated and tested. The NMT route in Victoria Street is used extensively and provides a peek into the possible future of NMT routes on campus.

Goods and Service

The sustainable production of goods and services entails the creation of goods and services using systems and processes that are non-polluting, conserve energy, water and natural resources, are economically viable, and safe and healthy for consumers. Operationally, Stellenbosch University

engages with procurement and service providers to achieve a reduction in utilities, also for any new and renovation projects. This will be done by developing sustainable procurement criteria and including these in procurement policy by 2024, committing to a monitoring system to measure progress with and the impact of procurement processes on society and the environment, and procuring 70% of all goods and services from local suppliers that meet the sustainable procurement guidelines by 2024.

As part of the green building certification, sustainable procurement guidelines were developed, approved, and implemented at the University.

Green Buildings

Construction and operations of building contribute to 75% of the carbon measured on campus, which means that there is a need for more environmentally friendly buildings to be constructed. Sustainability is a core principle that permeates all aspects of campus life and is deeply integrated into the operations and core business of the institution. Stellenbosch University uses sustainable design principles aimed at reducing the environmental impact of construction and refurbishment operations on its campuses.

Photo: *Jan Mouton Learning Centre*

The process of certifying the University's buildings ensures a more environmentally sustainable institution, which will be more resilient, reduce operational costs and greenhouse gas emissions, and ultimately reduce the institution's carbon footprint. The campus spaces will be healthier, cleaner, and more productive, while biodiversity will improve. Multiple building certifications form part of the University's Environmental Sustainability Plan to ensure SU achieves carbon neutrality by 2030 and net zero by 2050. The annual savings resulting from the 1 000 GBCSA certifications in SA, when compared to 'business-as-usual' buildings, equates to 1 320 000 MWh of energy, 1 590 million kg of CO_2 emissions, and 1 220 million litres of water saved. With savings like these, the benefits of green buildings become substantial. According to GBCSA, it also contributes to financial sustainability.

Photo: *BMRI building at Tygerberg*

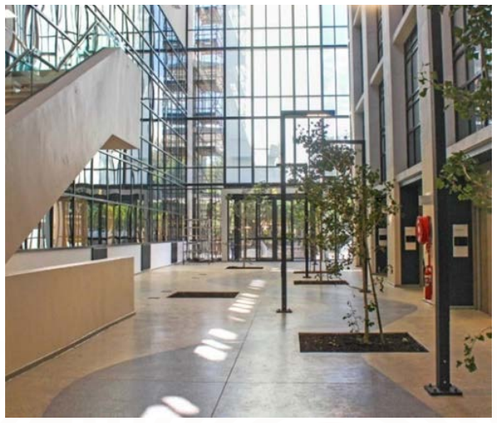

Photo: *Atrium at BMRI entrance*

Portfolio precinct

A precinct of 19 buildings was identified from which data was collected and audits completed over three years to receive a green-star portfolio rating. This certification includes measuring the effects of all heating, ventilation, and air-conditioning systems, indoor quality of spaces, lighting, noise and temperature in the precinct's buildings. Plans and regulations have been developed to regulate behaviour and operations in these buildings.

The 6 731 m² Visual Arts Building of Stellenbosch University received a six-star rating from GBCSA, a milestone that reflects a growing appetite for sustainable and resilient green buildings in the South African built environment. Notably, the certified structure is a heritage building constructed in 1905, making it a special award. Prof Stan du Plessis, SU's Operating Officer, said the University strongly supports the Green Building Council of South Africa's initiative to certify green buildings and mentioned that SU now has 19 buildings certified by the GBCSA.

In his address, Prof du Plessis said that, as a public research-intensive university, SU has various roles to play in mitigating climate change. "Our research is aimed at finding solutions and we use our campuses to model solutions to our society that can be scaled up. We also have an agenda of advocacy for behaviour change on and off campus."

Prof du Plessis said the certification of SU's buildings was an example of modelling solutions and of advocacy. "The annual savings resulting from the Stellenbosch University certified buildings, when compared to 'business-as-usual' buildings, is very considerable in terms of energy saved, carbon emissions reduced, and water saved.

GBCSA rating of new buildings

The BMRI Building was certified as a GBCSA four-star rated building using the new build tool and is operated as an environmentally sustainable building. A training manual and programme for behaviour change have been developed in a bid to operate the building accordingly to its rating.

Cillar performance audit

The GBCSA existing building performance (EBP) rating tool was used to audit the performance of 50 buildings. This tool allows buildings to be rated according to performance using a scientific methodology. These buildings are benchmarked against other buildings of similar size and usage.

Green building specialist

A green building specialist has been appointed to help SUFM to ensure that all new projects and major upgrades are designed and constructed within a minimum of four green-star principles. Projects that were evaluated in 2023 were The Hub and STIAS extension. This is part of SU's drive to achieve net zero carbon.

Photo: *Visual Arts 6-star GBCSA rated and 1000th certified building.*

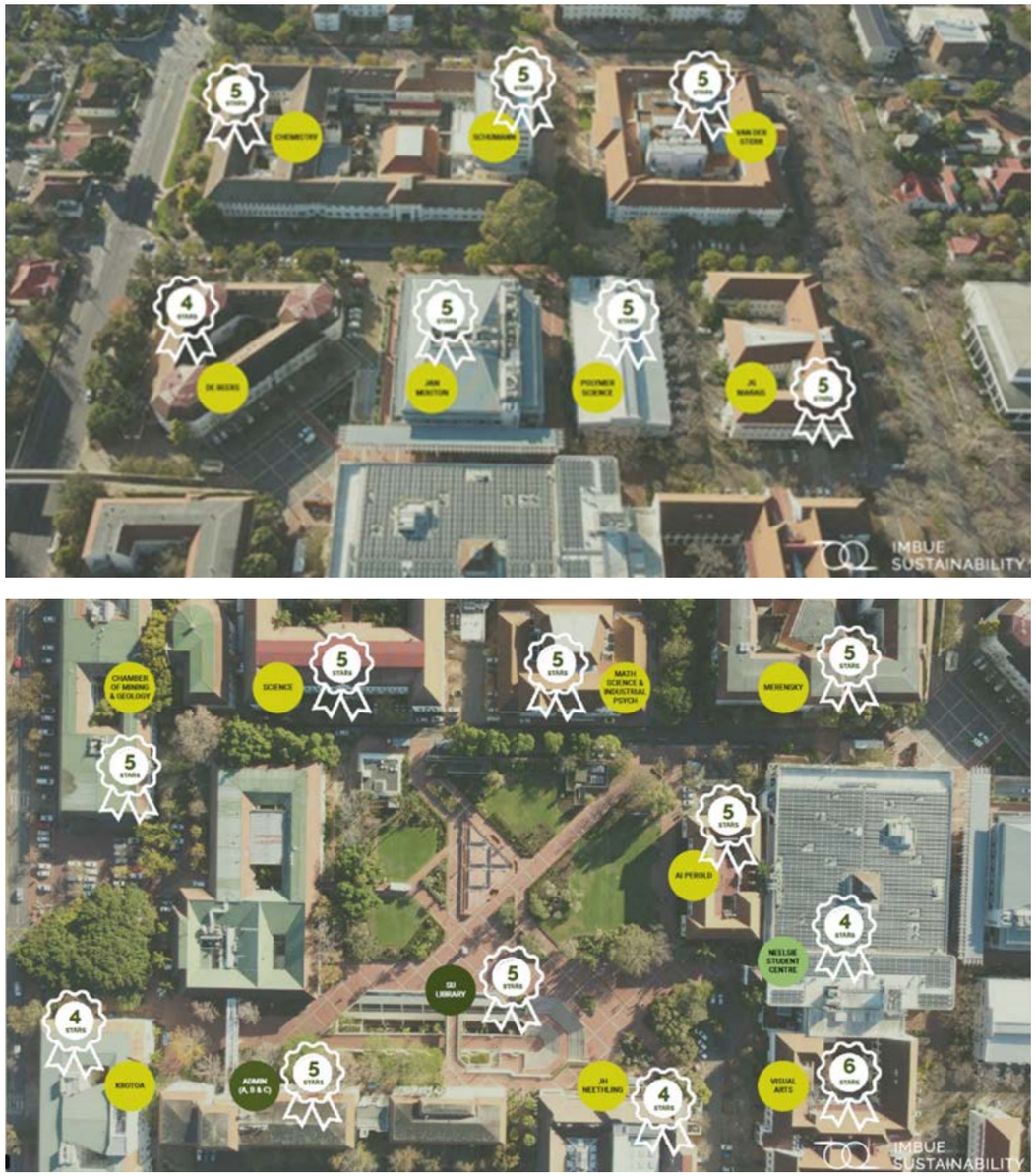

Photo: *Precinct 19 buildings Green Building Council South Africa (GBCSA) ratings*

WAY FORWARD

The environmental sustainability plan is the key driver and guide towards sustainable future of the university. This report has shown and provided opportunities for benchmarking as well as ensuring that we continue reporting based on our targets where possible. Some of activities that we will be focusing on for the year of 2024:

- Carbon Footprint for 2023
- Renewable energy and specifically solar projects investigations and implementation
- Decarbonization of all campuses
- Green Building Training
- Formalised Training
- Awareness campaigns for behavioural change

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Environmental Sustainability Report - 2023