REPUBLIC POLYTECHNIC

ENVIRONMENT SUSTAINABILITY DISCLOSURE

FY2023

Greening Our Campus:
Our Commitment to a Sustainable Campus

Contents

Overview

Republic Polytechnic (RP) embarked on its sustainability journey in 2006 with the move to Woodlands and has made steady progress since. In 2023, RP took a significant step to support the Singapore Green Plan and GreenGov.SG, responding to the urgent call for climate action with ambitious targets.

As an educational institution, RP is well-positioned to address environmental sustainability challenges within our community and shape young minds, ensuring graduates have the knowledge, skills, and mindset to build a sustainable world. RP is guided by four pillars: Campus, Education, Industry, and Community. On campus, we implement sustainable practices to reduce our environmental footprint. Through education, we integrate sustainability into our curriculum to prepare students for the future. In industry, we collaborate with partners to drive sustainable innovations and practices. Within the community, we engage and inspire others to join our sustainability efforts, creating a ripple effect beyond our institution.

Reporting Standards

This inaugural report follows the Accountant-General’s Guidelines for Environmental Sustainability Disclosure Requirements and aligns with GreenGov.SG initiatives and targets. It also references the United Nations Sustainable Development Goals (UN SDGs) and highlights key issues significant to RP and our stakeholders.

External Assurance

The FY2023 Environmental Sustainability Disclosure summarises the efforts and contributions of our staff and students from 1 April 2023 to 31 March 2024. To ensure accuracy, independent reasonable assurance was obtained for FY2023 and baseline years, reflecting our commitment to transparency and accountability.

Overview

- RP’s Sustainability Journey
- FY2023 Sustainability Highlights
- Message from Chairman and Principal & Chief Executive Officer

RP'S SUSTAINABILITY JOURNEY

1 **2006**

Sustainable Foundation

Our Woodlands Campus was constructed with sustainability at its core, featuring design principles & practices aimed at reducing environmental impact from the outset

2 **2009 - 2012**

Green Certification

Achieved key environmental certifications for the campus, demonstrating our commitment to green building standards & sustainable practices

3 **2012 - 2018**

Early Initiatives

Introduced a series of sustainability initiatives focusing on energy efficiency & water conservation e.g. variable speed drives installation for air-conditioning and mechanical ventilation

4 **2018**

Peak Emissions

Peak in Scope 1 & 2 carbon emissions, prompting a reassessment of our environmental impact & sustainability strategy

5 **2019 - 2022**

Enhanced Initiatives

Implemented targeted measures to address peak emissions, including advanced energy management systems & enhanced sustainability practices

6 **2021**

BCA Green Mark Platinum

7 **2024**

RP Green Plan

BCA Green Mark Platinum SLE Certification

FY2023 Sustainability Highlights

ENVIRONMENTAL

30 GWh of cumulated energy savings from 2018

1348 Solar panels generating **1,096,051** kWh of solar energy

278,500 m³ of cumulated water savings from 2018

117 tonnes of recycled waste collected in FY2023

1st Polytechnic and the **largest** organisation in Singapore by gross floor area to achieve **Green Mark Platinum Super Low Energy (SLE)** certification as of Jan 2024

EDUCATION

50% Diplomas incorporated with sustainability-themed modules across seven schools

>4,700 Training hours for staff (sustainability-related courses)

40 students graduated with a **Minor in Sustainability**

INDUSTRY

696 Sustainability-related funded projects with 2 projects that received the Public Sector Transformation Awards

>75,000 Training Hours for sustainability-related courses

6 New CET courses related to sustainability

Close to **$800K** of sustainability-related research grant

COMMUNITY

1585 students and **170** staff contributed more than **32,300** hours at **38** Sustainability-related student activities / events

31 Sustainability Champions across all departments

1st **IHL*** to attain **External Reasonable Assurance** for its **Environmental Performance** as of Jun 2024

* Institute of Higher Learning

Message from
Chairman and Principal & Chief Executive Officer

"Sustainability initiatives not only reduce our environmental impact but also make our campus operations more efficient and resilient."

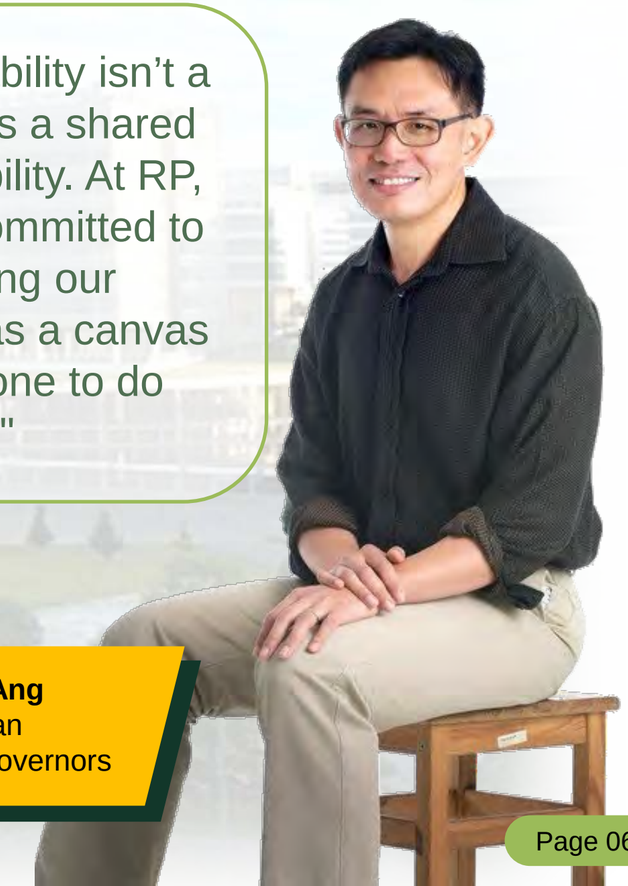
Ms Jeanne Liew
Principal &
Chief Executive Officer
(P/CEO)

Since relocating to Woodlands in 2006, sustainability has been an integral cornerstone of Republic Polytechnic (RP). Our campus, designed with the "Campus in the Park" theme by DP Architects and renowned Japanese architect Fumihiko Maki, integrates natural landscapes with educational spaces. This design not only enhances the campus's aesthetic appeal but also promotes holistic development and environmental stewardship.

In 2023, RP established the RP Green Plan to align our sustainability strategy with GreenGov.SG and the Singapore Green Plan. We are dedicated to creating a sustainable campus that reduces our carbon footprint and promotes environmental stewardship among students, staff, and the community.

Our initiatives include adopting energy-efficient technology, improving waste management, and integrating sustainability into our curriculum and operations. By fostering a culture of sustainability, we aim to make our campus a model of environmental responsibility and innovation.

"Sustainability isn't a choice; it's a shared responsibility. At RP, we are committed to showcasing our campus as a canvas for everyone to do their part."



Mr Abel Ang
Chairman
RP Board of Governors

Sustainable Design and Environmental Assurance

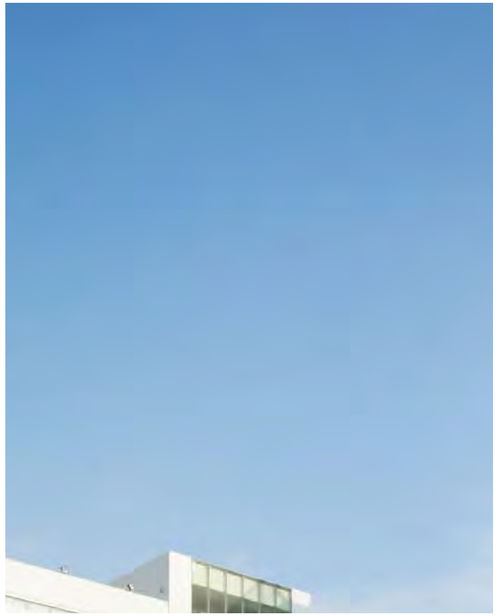
Our commitment to sustainability is reflected in our 20-hectare campus, which received the Green Mark Platinum Award from the Building and Construction Authority (BCA). Key features include over 4.2 hectares of green roofs, green walls, and lawns that help lower building temperatures. Shading devices, high ceilings with full-height glass panels, eco-friendly construction materials, and photovoltaic solar panels further enhance our sustainability efforts.

RP is the first Institute of Higher Learning (IHL) to achieve independent reasonable assurance for our environmental sustainability performance. We proactively pursued data verification for both our FY2023 performance and baseline years, underscoring our commitment to maintaining high standards of transparency and accountability in our sustainability disclosure.

Leveraging Technology for Continuous Improvement

RP continually enhances its sustainability efforts through the innovative use of Internet of Things (IoT) technology. Our Smart Campus Management System plays a crucial role by meticulously tracking energy and water usage, identifying leaks, and monitoring critical systems in real time.

These cutting-edge innovations are vital to our strategy, significantly reducing both energy and water consumption. By leveraging IoT, we improve operational efficiency and uphold our commitment to environmental responsibility. This proactive approach not only underscores our dedication to sustainability but also demonstrates our commitment to excellence and responsible resource management.



Recognising Our Achievements

RP's commitment to sustainability has been recognised with prestigious awards, including the BCA Green Mark Platinum Award, PUB Friends of Water, and achievements in the ASEAN Best Practices for Energy Efficient Buildings Competition (see Figure 1). Between 2018 and 2023, our initiatives saved approximately 30 GWh of energy and 278,500 m^3 of water, equating to S$ 9.5 million in cost savings. These accomplishments reflect our proactive approach to environmental stewardship and our commitment to impactful change.

We are particularly honoured to be the first polytechnic and the largest organisation in Singapore by gross floor area to receive the Green Mark Platinum Super Low Energy (SLE) Award in 2024. This milestone underscores our dedication to sustainability and our role in creating a greener future.

Progressing Towards Our Goals

As we work towards our 2030 sustainability targets in the RP Green Plan, we are committed to closely monitoring our environmental and community impact. These targets are key milestones on our journey to achieving net zero emissions around 2045, aligning with GreenGov.SG's goal to lead the public sector to net zero emissions five years ahead of the national target.

Our dedication to these objectives highlights our commitment to positive environmental and community outcomes. The RP Board and Management sincerely thank our campus community and stakeholders for their support as we strive for a sustainable future.

Figure 1 – RP's Sustainability Achievements

Sustainability Approach

- RP’s Sustainability Framework
- Goals and Progress
- Supporting SDGs

RP's Sustainability Framework

RP is committed to delivering sustainable value and positive impact for all stakeholders. By integrating environmental sustainability and climate action into our operations, we aim to create a more liveable and sustainable world for future generations.

We promote the growth and development of our employees, enhance the lives of our students and the broader community through innovative education, and foster a positive social and environmental impact through our programmes, services, and operations.

Key Environmental Sustainability Targets and Performance

Our key environmental sustainability targets and performance metrics, such as carbon emissions, electricity consumption, water usage, and waste generation, align with GreenGov.SG (see Table 1).

Besides meeting these targets, we have set more ambitious interim goals for FY2030 under our RP Green Plan, supporting GreenGov.SG's aim for net zero emissions around 2045 for the public sector.

Our reporting includes Scope 1 and Scope 2 emissions but excludes Scope 3 emissions. However, we are committed to advancing our efforts and plan to explore Scope 3 reporting in the future. We remain dedicated to refining our framework to reduce emissions further and enhance our tracking and reporting capabilities.

Table 1 – Environmental Indicators

Category	Environmental Indicators	Baseline Year
Carbon Emissions	• GHG Emissions (Scope 1 & 2) • Carbon Emissions Intensity (CEI)	FY 2018
Electricity Consumption	• Annual Total Electricity Consumption • Energy Utilisation Index (EUI)	Average of FY 2018 to FY 2020
Water Consumption	• Annual Total Water Consumption • Water Efficiency Index (WEI)	
Waste Generation	• Annual Total Waste Disposed • Waste Disposal Index (WDI)	FY 2022

Stakeholder Engagement

In July 2023, RP formed an Environmental Sustainability Steering Committee to create a strategic plan and lead sustainability initiatives, incorporating feedback from RP Board members, management, staff, and students. Moving forward, we plan to involve external stakeholders, including vendors, through surveys and feedback forms to enhance our sustainability efforts.

Stakeholders were consulted on various topics to ensure our sustainability strategy and programmes addressed important issues and had a significant community impact. We conducted in-depth discussions and used feedback channels like the RP Discovery Forum, Student Leaders' Dialogue, and RP's Carbon Discovery Journey to gather valuable insights and make meaningful improvements.

Co-Creation

In April 2023, around 30 staff members took part in brainstorming ideas for RP to support GreenGov.SG and the Singapore Green Plan.

01

Education & Engagement

In May 2023, RP Management attended a Leadership Forum and a Sustainability 101 Training. The workgroup also consulted the P/CEO and Directors to gather their thoughts on a proposed approach on Environmental Sustainability at RP.

02

Co-Creation

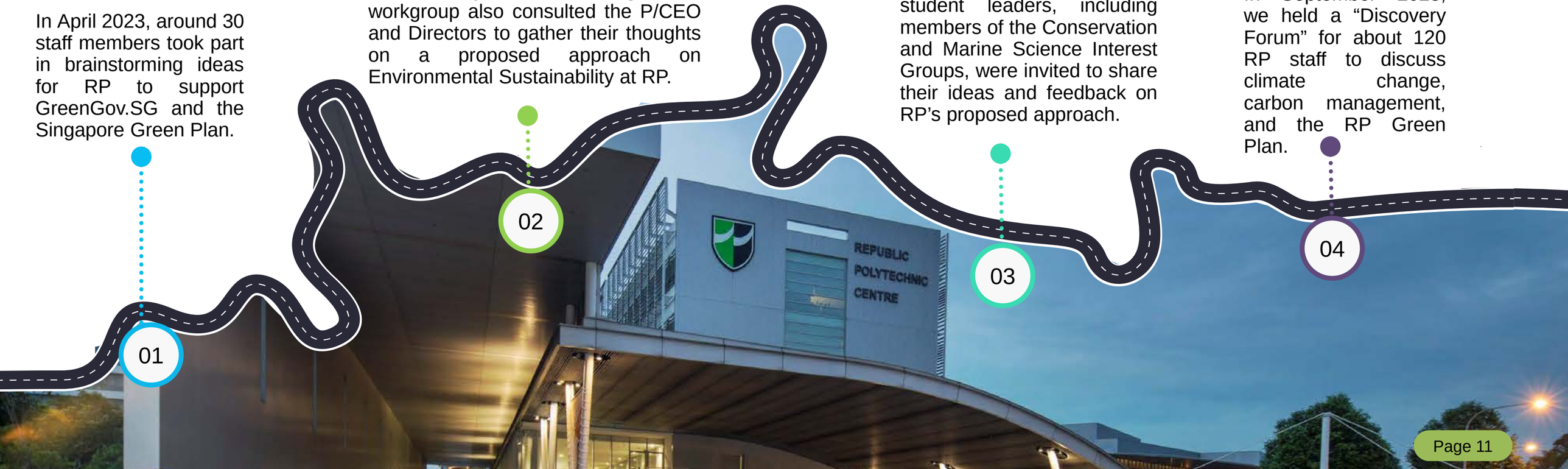
In June 2023, around 80 student leaders, including members of the Conservation and Marine Science Interest Groups, were invited to share their ideas and feedback on RP's proposed approach.

03

Awareness

In September 2023, we held a "Discovery Forum" for about 120 RP staff to discuss climate change, carbon management, and the RP Green Plan.

04



Materiality Assessment

Identifying critical sustainability issues is essential for our strategy's effectiveness, encompassing economic, environmental, and social dimensions influenced by RP's operations. From April to October 2023, RP engaged key stakeholders, including Board members, management, staff, and students, to gather insights and feedback on significant environmental concerns relevant to RP and determine how the polytechnic can contribute to the Singapore Green Plan.

Through a comprehensive internal assessment, RP evaluated our primary sustainability priorities, drawing on feedback from a wide range of stakeholders. This process identified nine material topics crucial for RP under the RP Green Plan. These topics are vital for integrating sustainability throughout our operations, practices, initiatives, and curriculum.

Our main objectives are organised under four pillars: Campus, Education, Industry, and Community, as shown in Figure 2. This inclusive approach ensures our sustainability efforts align with both internal goals and external expectations, driving significant impact across all areas of our institution.

Figure 2 – RP Green Plan

Reduce carbon emissions

Reduce energy and water utilisation

Reduce waste generated and increase recycling efforts

CAMPUS

EDUCATION

go green RP

You can make a difference

INDUSTRY

COMMUNITY

Expand environmental sustainability coverage in curriculum

Integrate sustainability in all aspects of campus life

Encourage community initiatives on sustainability

Uplift companies on environmental sustainability

Strengthen R&D efforts on environmental sustainability

Imbue Sustainability Mindset & Literacy

Governance Structure

RP's governance framework underscores its commitment to integrating sustainability across all operations, aligning with its missions in Pre-Employment Training (PET), Continuing Education and Training (CET), and Industry Engagement.

Led by a Senior Director, the Environmental Sustainability Committee (ESSC) oversees sustainability initiatives involving senior management and representatives from relevant schools and departments.

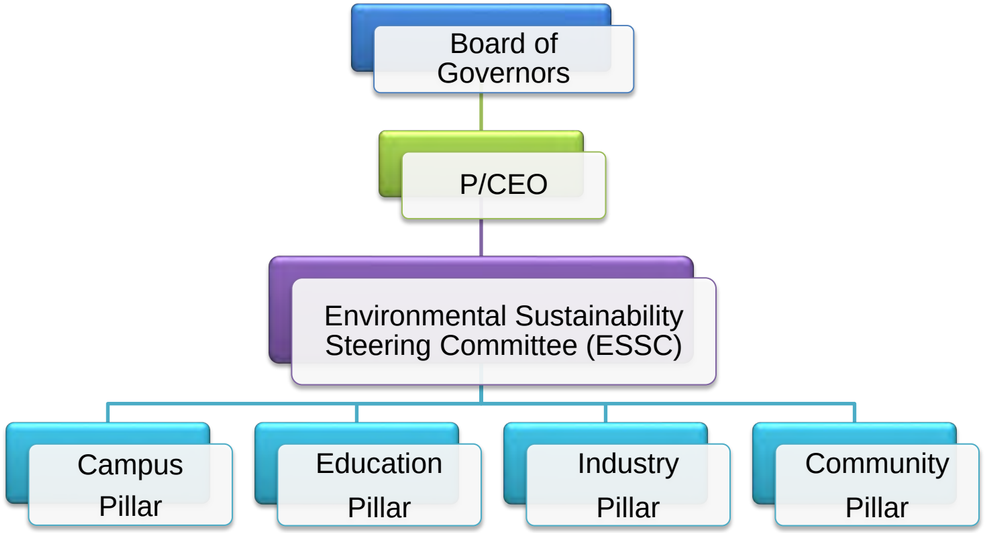
The ESSC secretariat reviewed sources of greenhouse gas (GHG) emissions, GHG-related activities, and environmental performance indicators (EPIs), working closely with data owners to ensure accurate and complete reporting as part of the RP Green Plan (see Figure 3).

Additionally, the ESSC, guided by our Board, provided valuable input on the RP Green Plan and FY2030 targets (see Figure 4). The ESSC also manages sustainability-related risks and opportunities and implements sustainable practices in RP's operations.

Figure 3 – Key objectives of ESSC

- Oversee the implementation of RP's sustainability strategy, ensuring alignment with long-term GreenGov.SG goals and tracking progress toward these objectives.
- Evaluate the effectiveness of RP's sustainability strategy, policies and initiatives, as well as to assess their impact.
- Review and approve all external sustainability and climate-related disclosure, including the sustainability sections of the Annual Report and the Sustainability Disclosure.

Figure 4 – RP's Governance Structure for Sustainability



Board-Level Commitment to Sustainability

Sustainability is a key priority for the RP Board of Governors and is regularly addressed in meetings. The Board receives updates from the ESSC and reviews comprehensive reports during key meetings. Additionally, sustainability updates are discussed at least once every two months in various other meetings, ensuring it remains central to our strategic planning and operations.

Management Competencies

RP places great importance on continuous professional development for its management team. To ensure that all Directors are equipped with the knowledge and skills needed to lead sustainability initiatives effectively, we provided targeted training on sustainability during the Leadership Forum. This approach has helped to foster a culture of environmental stewardship and continuous improvement throughout our organisation.

Compliance and Risk Management

Internal audits are essential for maintaining accountability and applying our environmental principles rigorously. Since 2003, the ISO 14001 standard has helped RP establish and uphold an effective environmental management system (EMS), a key component of our environmental strategy.

In 2023, RP transitioned from ISO 14001 to ISO 14064 in 2024 to attain external reasonable assurance for our environmental sustainability data. This shift allowed for more detailed and transparent evaluations of our environmental performance. Engaging external assurance for our FY2023 and baseline data enhanced credibility and demonstrated our dedication to accuracy and transparency. The independent reasonable assurance statement (Pages 52 - 55) can be accessed here.

Our rigorous verification processes improve the reliability of our environmental reporting and ensure our sustainability practices meet the highest standards for transparency and accountability. We are proud to announce that there were no environmental-related audit findings during the year, reflecting our continuous efforts to uphold high standards of environmental compliance and stewardship.

Continuous Improvement and Accountability

Promoting continuous improvement and accountability is essential for achieving our strategic objectives and maintaining high operational standards. Through regular reviews and updates of our policies and practices, we strive to enhance effectiveness, address emerging challenges, and support ongoing progress.

Looking ahead, we are committed to integrating climate risk into our enterprise risk management framework in the coming year. This will strengthen our approach to continuous improvement by ensuring climate-related risks are systematically identified and addressed. We will also continue to seek external assurance for our environmental data, reinforcing our dedication to transparency and accuracy as we strive to meet and exceed our environmental goals while adapting to new developments.

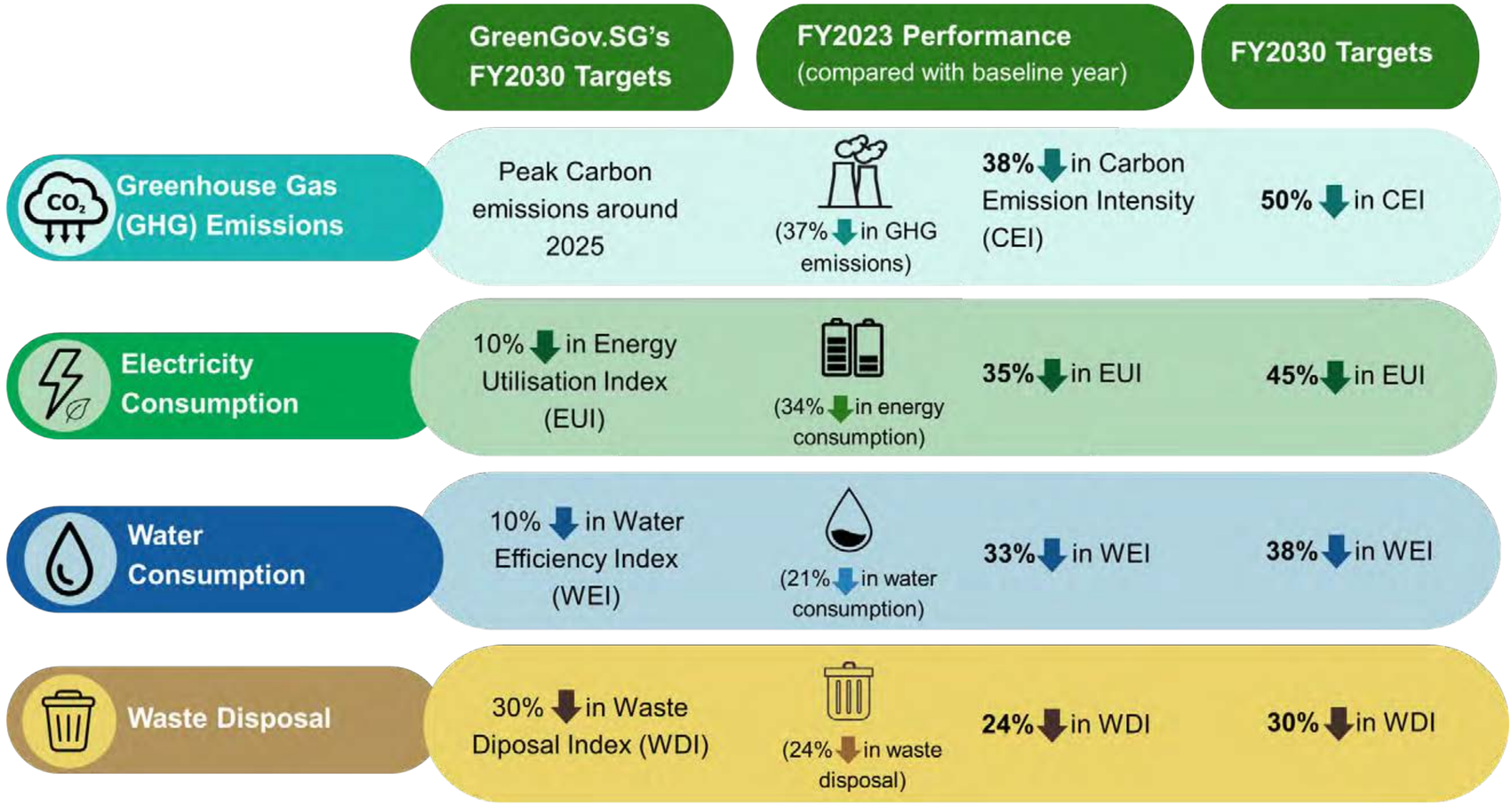
Goals and Progress

RP has made significant progress in sustainability, focusing on four key environmental indicators: Carbon Emissions Intensity, Energy Utilisation Index, Water Efficiency Index, and Waste Disposal Index.

These indicators are central to the interim targets in the RP Green Plan for FY2030, supporting GreenGov.SG's goal of net zero emissions around 2045. We also track other environmental indicators as required by GreenGov.SG for comprehensive sustainability management.

RP has surpassed three of the 2030 targets set by GreenGov.SG. Our FY2023 performance metrics are shown in Figure 5. Consequently, we have set more ambitious goals. This progress supports GreenGov.SG's initiative for the public sector to advance the national agenda on sustainable development by achieving net zero emissions five years ahead of the national target. For detailed information on these metrics, formulas, and additional data, please refer to Page 51 and Page 56.

Figure 5 – RP's FY2023 Performance and FY2030 Targets



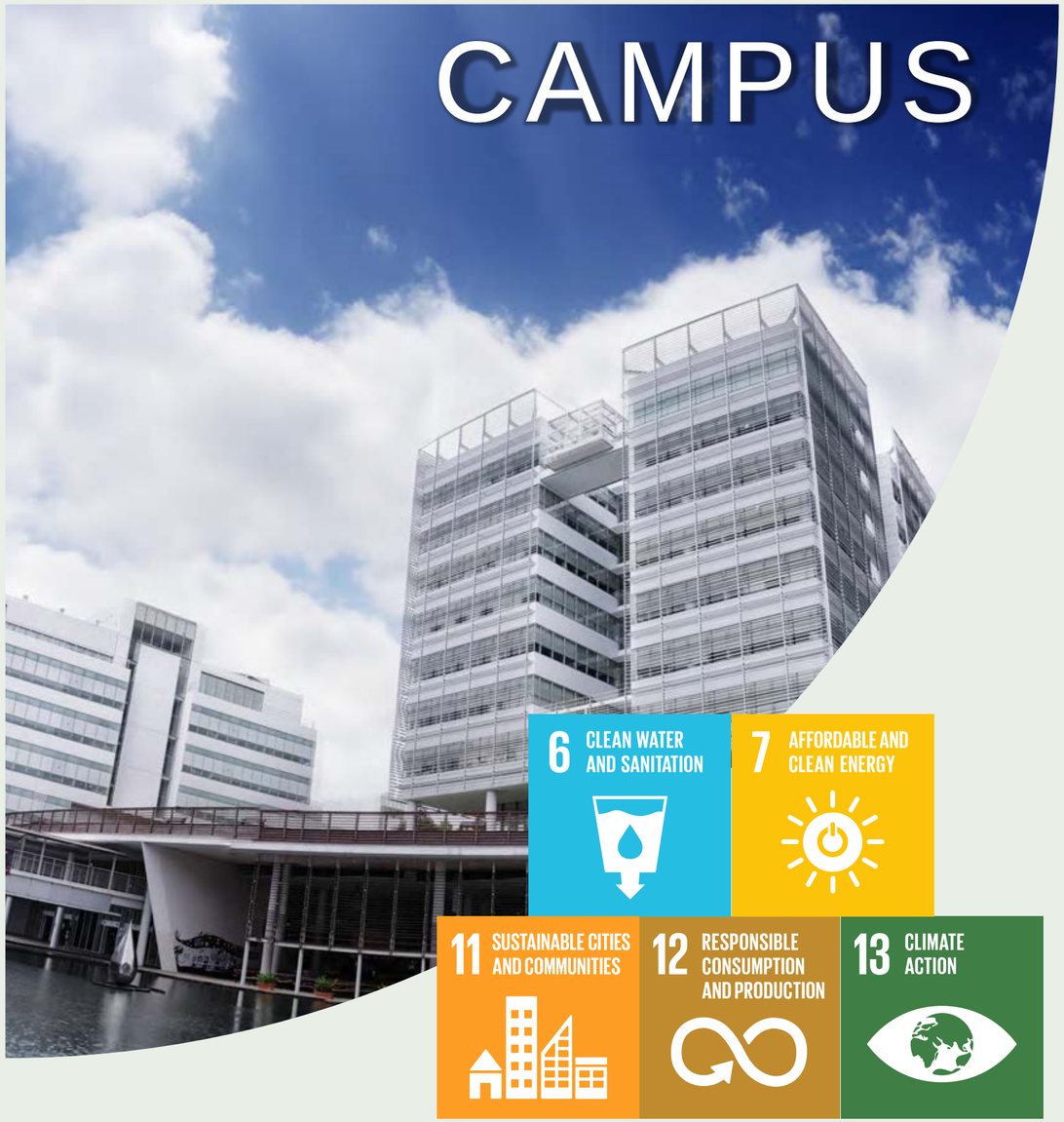
Supporting SDGs

The Sustainable Development Goals (SDGs) are 17 global objectives set by the United Nations to address various challenges and promote sustainable development. RP views the SDGs as a unified framework guiding our efforts and has identified seven priority SDGs (see Table 2) that align with our core focus areas, where we can make the most significant contributions and impact.

Table 2 – Seven Priority SDGs for RP

UN SDGs	Description	Relevance to RP
4 QUALITY EDUCATION	**Goal 4: Quality Education** Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	Central to RP's mission of providing high-quality, inclusive education and lifelong learning opportunities (refer to Pages 33 – 36)
6 CLEAN WATER AND SANITATION	**Goal 6: Clean Water and Sanitation** Ensure availability and sustainable management of water and sanitation for all	Ensures access to clean water and sanitation on campus, promoting health and well-being for students and staff (refer to Pages 25 – 28)
7 AFFORDABLE AND CLEAN ENERGY	**Goal 7: Affordable and Clean Energy** Ensure access to affordable, reliable, sustainable and modern energy for all	Aligns with RP's commitment to energy efficiency and the use of renewable energy sources (refer to Pages 20 – 24)
11 SUSTAINABLE CITIES AND COMMUNITIES	**Goal 11: Sustainable Cities and Communities** Make cities and human settlements inclusive, safe, resilient and sustainable	Supports the development of a sustainable, resilient campus environment and community (refer to Pages 19 – 32 and 42 – 47)
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	**Goal 12: Responsible Consumption and Production** Ensure sustainable consumption and production patterns	Encourages sustainable practices and waste reduction within campus operations and curriculum (refer to Pages 29 - 32)
13 CLIMATE ACTION	**Goal 13: Climate Change** Take urgent action to combat climate change and its impact	Drives RP's initiatives to reduce carbon footprint and incorporate climate education into programmes (refer to Pages 20 – 24)
17 PARTNERSHIPS FOR THE GOALS	**Goal 17: Partnerships for Goals** Strengthen the means of implementation and revitalise the global partnership for sustainable development	Facilitates collaboration with local and global partners to enhance sustainability efforts and impact (refer to Pages 37 – 41)

Our Pillars



Greening our Campus

The Campus Pillar initiatives advance several Sustainable Development Goals (SDGs) by promoting sustainable building design, green space management, and efficient technology adoption. These efforts contribute to SDG 6, SDG 7, SDG 11, SDG 12, and SDG 13 by reducing carbon emissions, energy and water consumption, and waste generation.

In January 2024, RP received the Building and Construction Authority's Green Mark Platinum Super Low Energy certification for our main campus, making us the largest organisation in Singapore by gross floor area to achieve this recognition.

Carbon and Energy

As part of our commitment to sustainability, RP focuses on reducing our campus's carbon footprint. Energy consumption accounts for about 97% of our total greenhouse gas (GHG) emissions, mainly from Scope 2 emissions due to purchased electricity. This highlights the need for effective energy management in our sustainability strategy.

To address this, we have undertaken various energy conservation initiatives, such as upgrading to LED lighting, retrofitting Air Handling Units (AHU), and using smart building technology to monitor and reduce energy consumption. RP has integrated an Internet of Things (IoT) system into our Building Management System (BMS) to collect and analyse power consumption data for each building, helping us identify issues and areas for improvement. We have also adjusted operational schedules to enhance energy efficiency.

Additionally, RP has utilised solar power to further reduce our reliance on non-renewable sources.

These efforts not only help reduce carbon emissions but also lead to long-term cost savings, improve operational efficiency, and promote a campus-wide culture of sustainability.

GHG Emissions and Energy Consumption

In FY2023, RP reduced its Carbon Emissions Intensity (CEI) for Scope 1 and Scope 2 emissions by 38%, from 0.053 tonnes CO_2e/m^2 to 0.033 tonnes CO_2e/m^2, as shown in Figure 6. Total greenhouse gas (GHG) emissions decreased by 37% compared to FY2018, from 11,876.79 tonnes CO_2e to 7,473.35 tonnes CO_2e. Between FY2022 and FY2023, there was an 11% drop in total GHG emissions.

Scope 1 emissions rose by about 29% between FY2022 and FY2023, mainly due to higher refrigerant usage and increased laboratory activities, driven by increased campus footfall after COVID-19 restrictions were lifted in February 2023. To address this, RP is committed to replacing refrigerants and products with lower Global Warming Potential (GWP) and, where feasible, redesigning processes to further reduce greenhouse gas emissions.

Conversely, Scope 2 emissions, attributed to purchased electricity, decreased by 11% compared to FY2022.

Figure 6 – Total GHG Emissions and CEI

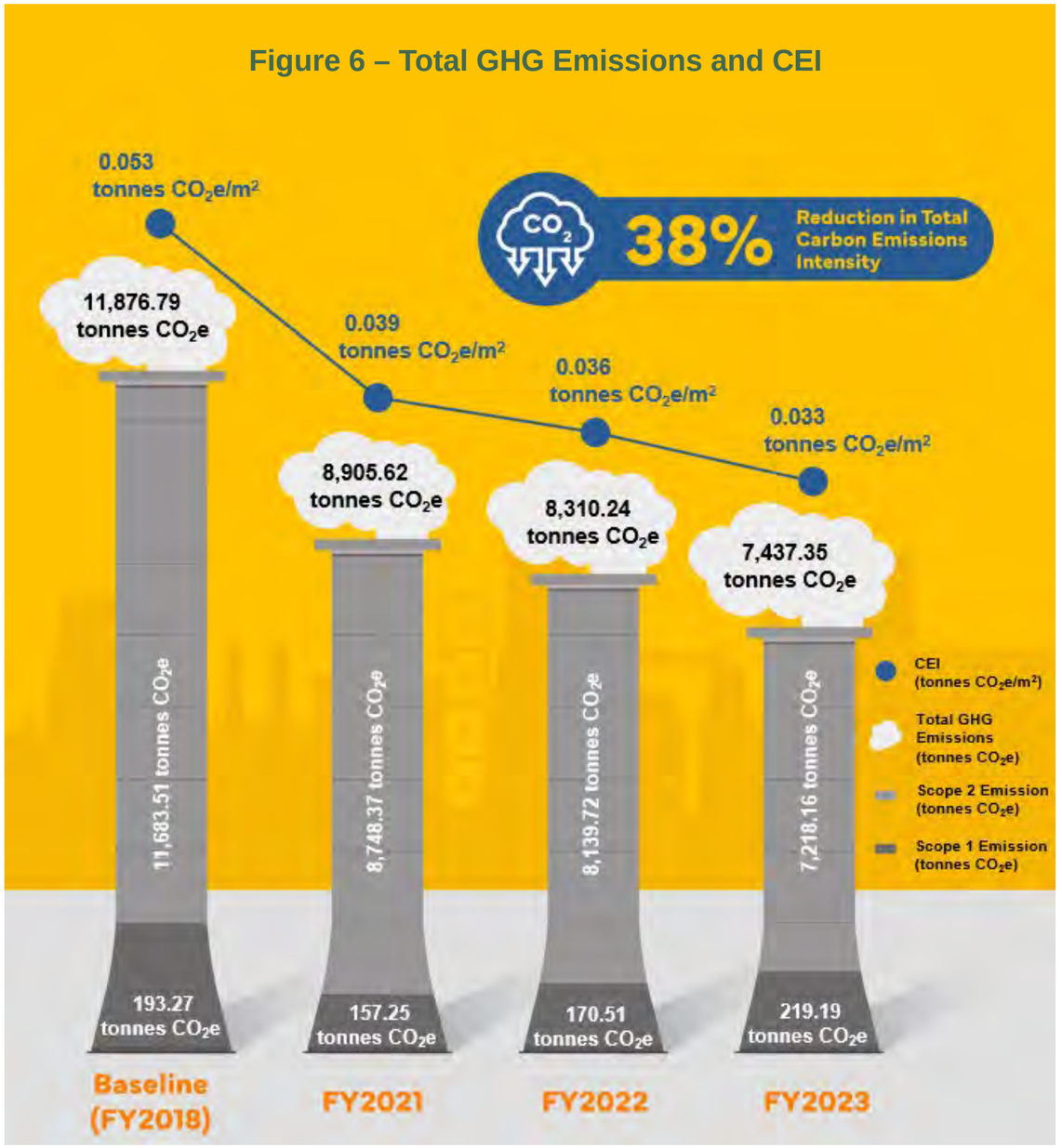
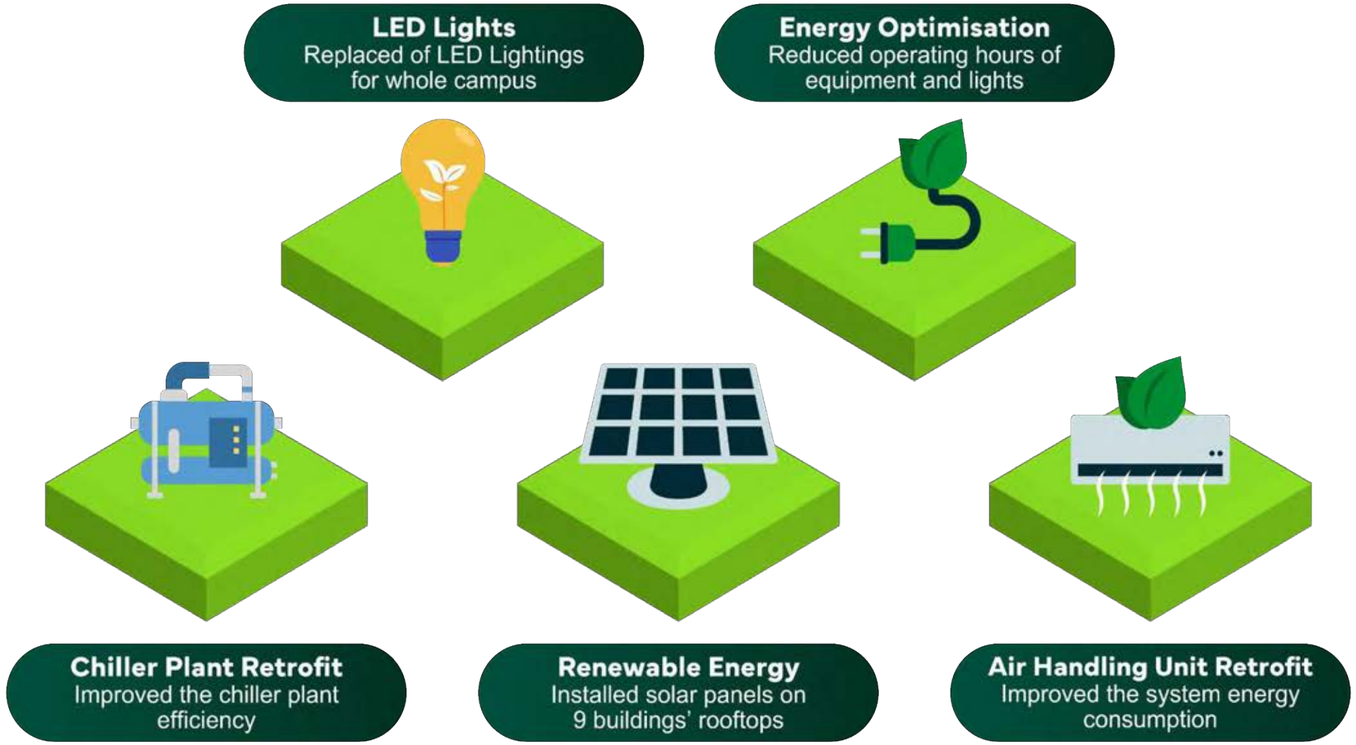


Figure 7 – Comparison of Annual Electricity Consumption and EUI

Figure 8 – Initiatives to Reduce Scope 2 Emissions



Our Energy Utilisation Index (EUI) fell by 35% from 117.04 kWh/m² to 75.98 kWh/m² in FY2023, as shown in Figure 7. This reflects a 34% drop in total energy consumption compared to FY2018. This significant decrease aligns with our ongoing energy optimisation initiatives to improve efficiency. These initiatives, as shown in Figure 8, have consistently reduced energy consumption over recent years.

Since 2018, energy optimisation initiatives have saved over 30 GWh, equivalent to powering more than 7,300* four-room Housing & Development Board (HDB) flats per year.

** Source: Singapore Energy Statistics 2023*

Solar Panels

RP undertook a solar energy initiative to reduce our environmental impact. By the end of FY2023, we had installed 1,348 solar panels across nine buildings on our campus, generating 1,096,051 kWh of solar energy. This resulted in an approximate annual solar generation of 1 GWh, covering around 5% of our total Scope 2 electricity consumption in FY2023.

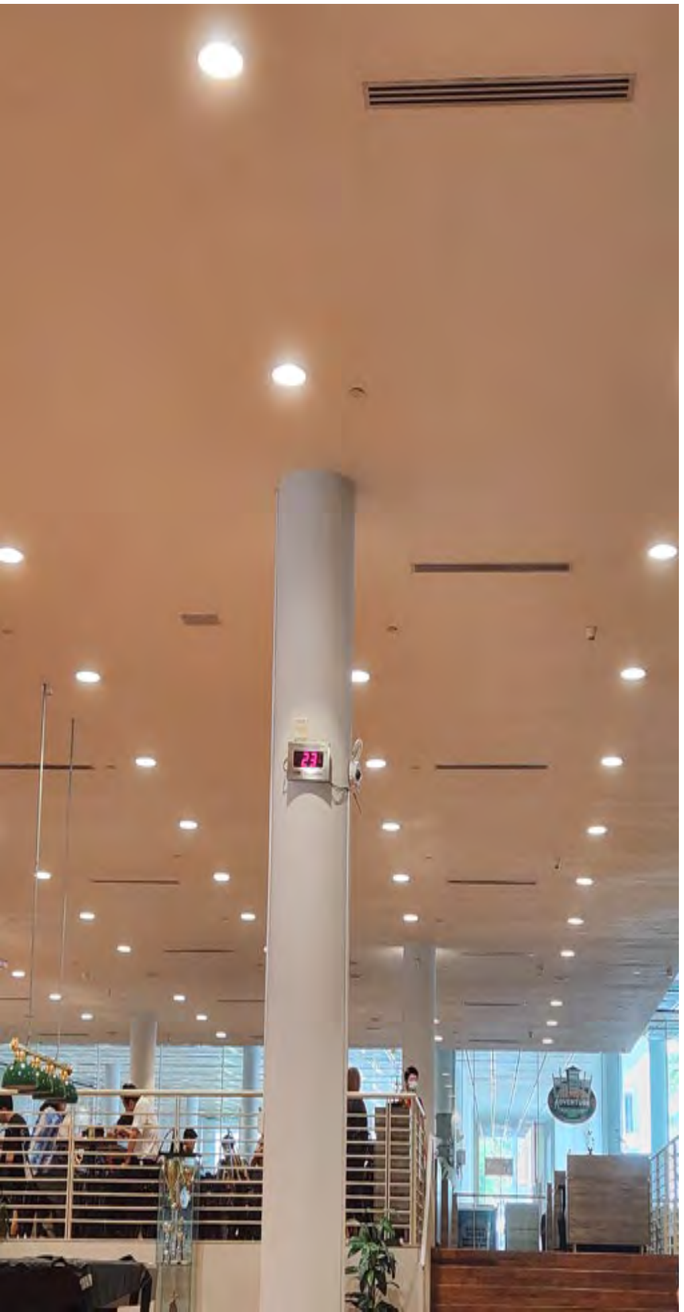
RP recognised that the energy generated by our solar panels was not sufficient to completely offset our energy consumption. However, we remain committed to expanding our solar capacity and reducing our dependence on non-renewable energy sources. This initiative is part of our ongoing efforts to minimise environmental impact and enhance energy efficiency across our campus.

Air Handling Unit (AHU) Retrofit

RP took steps to reduce energy consumption and operational costs. An assessment revealed that the AHUs across the campus were major energy consumers, with outdated units contributing to higher electricity costs and increased greenhouse gas emissions.

In collaboration with energy auditors, local contractors, and suppliers, the Office of Estates implemented an AHU retrofit project. This involved replacing outdated AHUs with energy-efficient models equipped with Electronically Commutated (EC) motors and advanced control systems. These upgrades have optimised airflow and reduced energy consumption throughout the year.

As a result, RP achieved an annual saving of 0.85 GWh from the AHU retrofit project, enhancing the overall efficiency of the campus.



Light-emitting Diode (LED) Lighting Replacement

RP upgraded the campus lighting by replacing fluorescent and incandescent fixtures with energy-efficient LEDs. This upgrade offers several benefits over traditional lighting, including significantly reduced electricity consumption, a longer lifespan, and lower heat emission.

The LED upgrade project aimed to reduce electricity usage and enhance illumination across the campus, creating a safer and more welcoming environment for students, staff, and visitors.

As a result, the upgrade achieved an estimated annual energy saving of approximately 3 GWh. This substantial reduction in energy consumption led to lower utility costs and a decreased carbon footprint. Additionally, the extended lifespan of the LEDs significantly reduced maintenance needs and costs, while the improved light quality contributed to better working and learning conditions.

Chiller Plant Retrofit

RP carried out a Chiller Plant Retrofit project, replacing old chillers with new ones under a Guaranteed Energy Savings Performance Contracting model. This initiative aimed to enhance cooling system efficiency and achieve energy savings.

The new chillers reduced energy consumption from 0.928 kW/Rton to 0.61 kW/Rton, reflecting a 30% improvement in system efficiency.

The retrofit is estimated to save around 3 GWh per year. The chiller system was designed to handle part-load conditions due to part-time class schedules (7:00 pm to 10:30 pm) and the continuous operation of essential 24/7 equipment, ensuring effective performance and energy savings.

Water Conservation

RP implemented several key sustainability initiatives across our campus. We introduced Air Handling Unit (AHU) condensate recovery systems in Buildings E1, E4, E5, and E6, and connected the rainwater tank at Building E6 to the cooling tower to reduce NEWater consumption. Additionally, wireless meters were installed to monitor and detect water leaks, and rain sensors were deployed to optimise irrigation water usage. These measures collectively saved 278,500 m^3 of water since 2018, equivalent to nearly 111 Olympic-sized swimming pools, supporting our resource conservation and operational efficiency efforts.

RP Main Campus has held the Water Efficient Building (WEB) certification since 2008, demonstrating our long-term commitment to water efficiency. More recently, our Republic Polytechnic Industry Centre (RPIC) and Singapore Institute of Technology (SIT) buildings received WEB certification in 2021, further highlighting our ongoing dedication to water conservation.

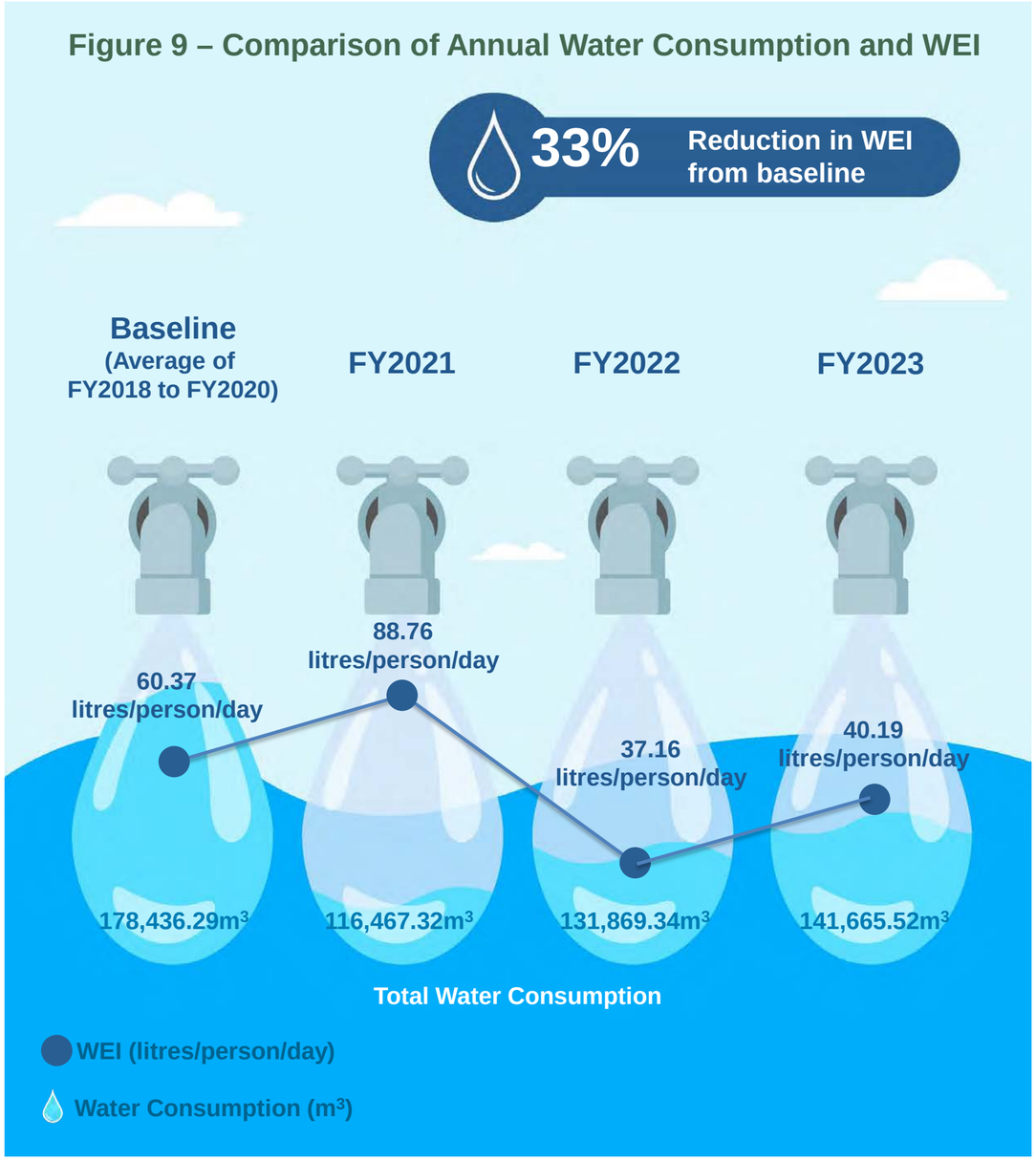
Water Conservation

RP closely monitors water usage as part of its sustainability efforts. The baseline average from FY2018 to FY2020 showed a total water consumption of 178,436.29 m³ and a Water Efficiency Index (WEI) of 60.37 litres per person per day.

In FY2023, our WEI decreased by 33% from the baseline to 40.19 litres per person per day, as total water consumption fell by 21% to 141,665.52 m³.

Compared to FY2022, water usage in FY2023 increased by 7% due to drier weather, higher footfall, and more student activities on campus. Despite this, our focus on water efficiency has significantly reduced overall water consumption compared to the baseline.

Figure 9 – Comparison of Annual Water Consumption and WEI



Enhanced Water Conservation Initiatives

At RP, we improved water conservation through several initiatives. We installed rainwater harvesting systems on Buildings E1 and E6 to capture runoff, which was treated and used as makeup water for our cooling tower systems. This reduced our reliance on potable water and NEWater, decreasing dependency on PUB water supplies and lowering environmental impact.

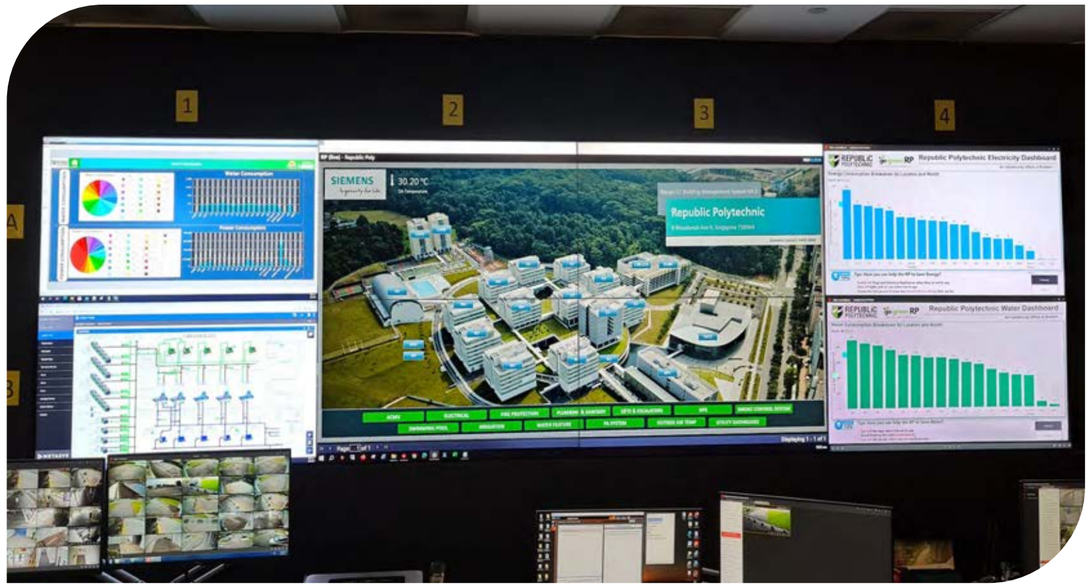
Additionally, we implemented a rainwater recovery system for the E6 irrigation tank, using harvested rainwater to refill the cooling tower and minimise the need for additional water sources. By installing system controls, sensors, and piping, we effectively managed and directed the rainwater, preventing overflow into drains and achieved an estimated annual water saving of 3,000 m^3, supporting our campus-wide water reduction goals.

Furthermore, we introduced an Air Handling Unit (AHU) condensate recovery system that captures condensate water for use in washing bin centres and watering nearby plants, achieving an estimated annual water saving of 900 m^3. These initiatives have enhanced our water management practices and aligned with our commitment to sustainability.

Wireless Water Metering System

RP has implemented a smart IoT system with Wireless Water Metering to monitor and record water consumption in individual buildings. This allows us to track usage patterns, detect anomalies, and identify areas for improvement.

The system also features an algorithm that triggers SMS alerts for water leaks, helping to minimise wastage and ensure timely intervention.



Installation of Rain Sensor at Energy Center Multi-Storey Carpark (ECMC) Building

Since 2020, RP has installed a rain sensor at the ECMC building to optimise irrigation. This sensor automatically stops scheduled irrigation cycles when it rains, preventing unnecessary water use.

This proactive approach has saved an estimated 3,800 m^3 of water annually, demonstrating our commitment to water efficiency and sustainable resource management.

Waste Management

RP strengthened its waste management strategy by focusing on the 3Rs (Reduce, Reuse, and Recycle) and educating students, staff, and vendors.

To promote waste reduction, RP minimised the use of single-use disposables and encouraged the adoption of reusable items like water bottles and containers.

RP also introduced programmes to facilitate material reuse, including donation drives to extend their lifecycle and promote circularity.

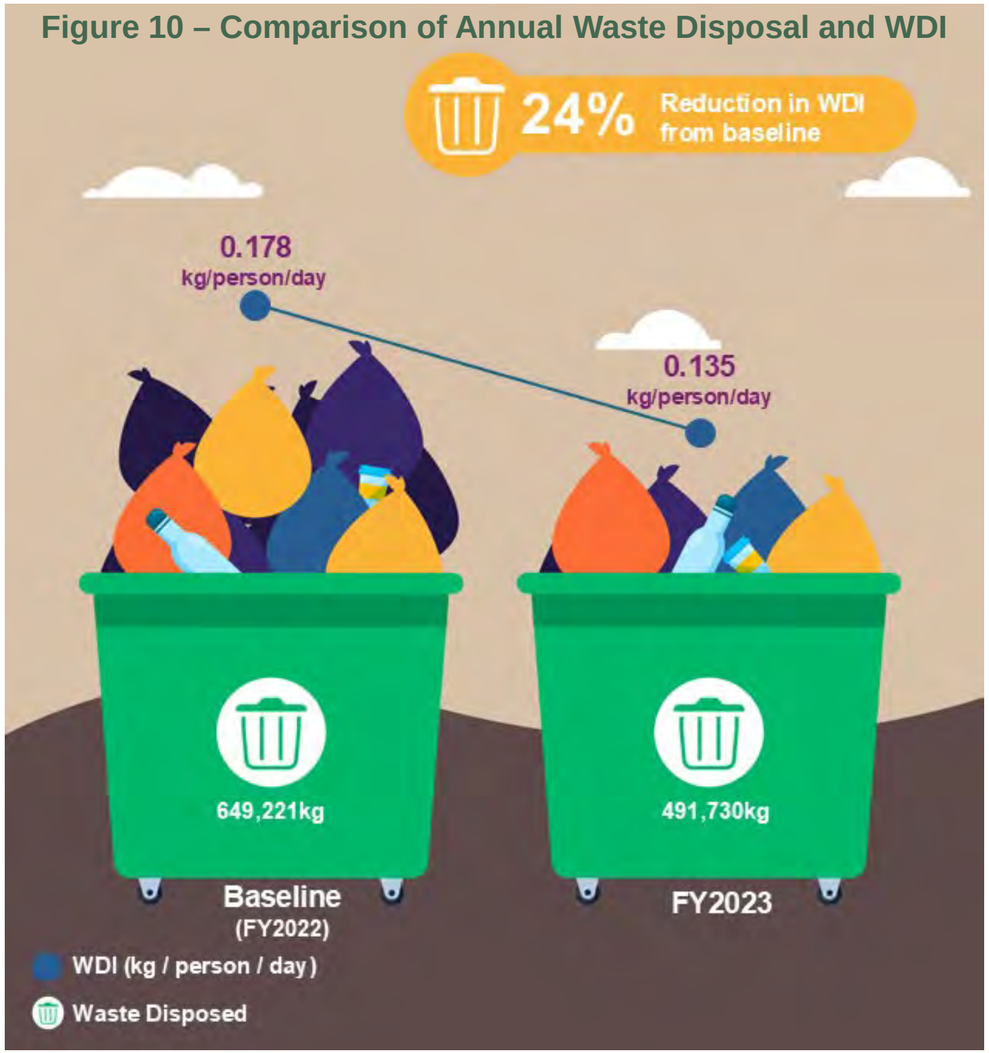
RP's recycling initiative involved installing food waste recycling bins in food court areas, recycling stations across all buildings, and a central recycling point at South Agora. This approach encouraged proper waste sorting and ensured the responsible disposal of e-waste and clean recyclables.

Through these efforts, RP fostered a culture of environmental responsibility, empowering the campus community to contribute to a more sustainable future.

In FY2023, RP managed 491,730 kg of waste, achieving a 24% reduction in total waste disposal compared to FY2022.

The Waste Disposal Index (WDI) also decreased by 24%, from 0.178 kg to 0.135 kg per person per day. These results underscored our ongoing commitment to improving waste management practices and reducing waste generation across the campus.

Figure 10 – Comparison of Annual Waste Disposal and WDI



Reduce: Minimise Paper and Single-Use Disposables

From the onset, RP has operated as a paper-less campus, conducting all academic and administrative activities online. This approach reduced paper use and strengthened our commitment to sustainability.

Building on these efforts, RP took proactive steps to address beverage waste and reduce single-use plastics. Since October 2019, we have been phasing out single-use plastics, such as bottled water, from our campus. RP completely transitioned away from the use of bottled water in meetings, promoting reusable bottles and mugs at designated water stations.

Additionally, plastic straws are no longer provided at canteens and cafes, successfully decreasing plastic waste.

To further support these initiatives, RP launched a campaign in November 2023 to eliminate straws in all campus food courts. The campaign was promoted through email communications and prominent signage, encouraging the use of reusable alternatives and reducing reliance on single-use disposables.

Reuse: Food Waste Management

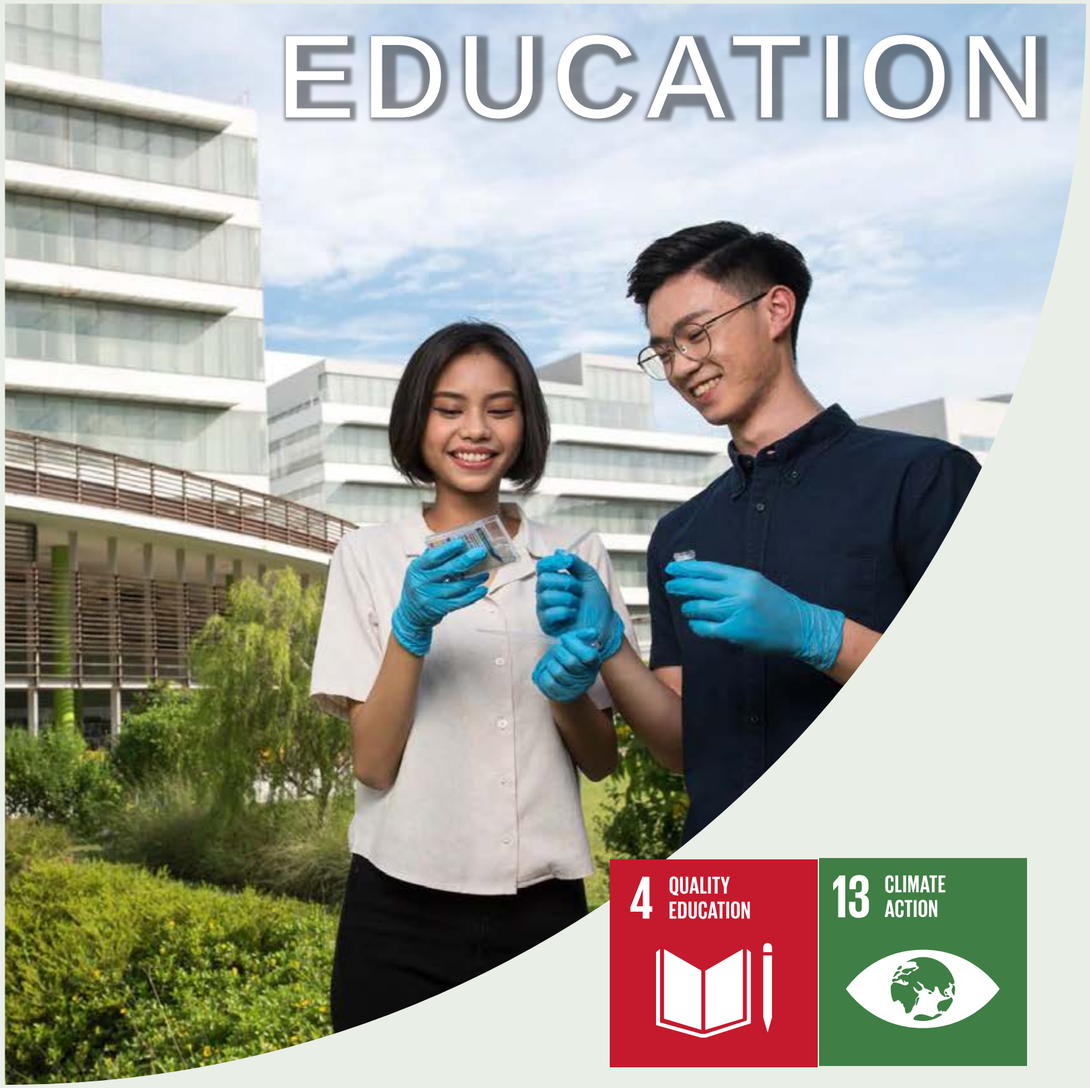
RP introduced food waste sorting in all food courts since April 2016 and extended the programme to cafés and training restaurants in July 2023. The initiative aims to reduce landfill waste by leveraging waste management technology to handle leftover food.

Additionally, RP has installed food waste digesters to convert organic waste into greywater, and composters to turn food scraps into compost for campus gardens and green spaces. These initiatives support sustainable use of organic materials and align with RP's environmental goals.

Recycle: E-Waste and Ink Cartridge Recycling

Since 2022, RP has introduced Clean Stream collection bins across the campus to facilitate the responsible disposal and recycling of electronic waste, such as old computers and mobile devices. This initiative prevents harmful materials from polluting landfills and aids in the recovery of valuable resources through proper recycling.

In March 2024, RP launched an ink cartridge recycling programme with the Singapore Environment Council. This programme focuses on collecting and recycling used ink cartridges, diverting them from landfills and promoting a circular economy. Through this partnership, RP has enhanced its recycling initiatives and strengthened its commitment to sustainable waste management.



Education for a Sustainable Future

Education is crucial in shaping values, attitudes, and behaviours. Promoting sustainability requires instilling responsibility, empathy, and ethical considerations towards the environment and society.

The Education Pillar supports this vision by nurturing advocates and providing them with the knowledge, values, and skills to care for the environment and contribute to the green economy. Initiatives under the Education Pillar align with SDG 4 and SDG 13.

Sustainability was systematically woven into the curriculum with new courses and diploma programmes in environmental science, sustainable engineering, and green business practices. Staff training was also enhanced, providing employees with the knowledge to support and drive sustainability initiatives.

RP integrated sustainability topics into 75 modules across various schools. All Year 1 Pre-Employment Training (PET) students received a 10.5-hour foundational introduction to sustainability as part of their General Modules. Over 50% of diplomas across all seven schools included sustainability-themed modules. Additionally, students from other diplomas interested in sustainability could choose Freely Chosen Modules (FCM) with related themes, such as A003 Towards a Greener Planet and B007 Powering Business towards Sustainability.

In 2023, we welcomed the first batch of 40 students who graduated with a Minor in Sustainability. This programme offered an extensive study of sustainable practices and principles, reinforcing our commitment to environmental stewardship and preparing students for careers in the green economy. By specialising in sustainability, these graduates complemented their primary fields of study and gained the expertise needed to drive positive environmental change.

Sustainability in Curriculum

Lecturers integrated sustainability into their disciplines to prepare students for the green economy. This approach equipped students with the skills and knowledge to address sustainability challenges and seize career opportunities.

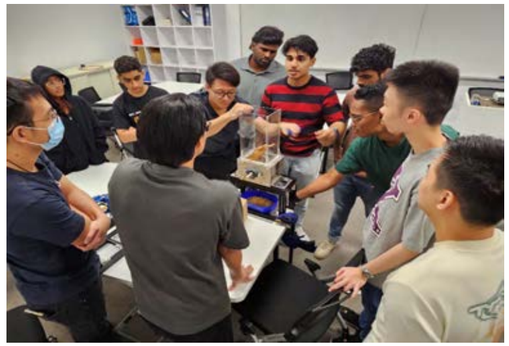
This year, the Food Innovation and Sustainability module offered students a unique opportunity to work with industry partners on innovative solutions. Throughout both semesters, students applied sustainability principles to product development with companies like Simply Made Foods and Frutti Sugar, resulting in prototypes such as plant-based ice cream, healthier snacks, and naturally sweetened beverages.

This hands-on experience allowed 30 students from the Food and Agrotech specialisation track in the Diploma in Biotechnology to apply their knowledge in real-world settings, while also allowing industry partners to explore new retail ideas. The success of the module has paved the way for future collaborations, with plans to expand these partnerships into the food manufacturing and services sectors to drive further innovation and sustainability.

Sustainability through Real-World Learning

Students from the School of Engineering (SEG) visited Ground-Up Initiative (GUI), a non-profit organisation promoting sustainability awareness, as part of the Quality and Reliability Engineering module's lesson on "Reliability Concepts and System Reliability". The visit, from July to August 2023, emphasised the importance of Quality and Reliability Engineering in sustainable industries.

During the visit, students assessed the reliability of shredder equipment used for processing dried leaves to improve compost yield. This hands-on experience included Interactive Seminars (IS) and Problem-Based Learning (PBL) methodologies. The visit also paved the way for potential collaborations between SEG and GUI, with plans to work together on future projects and explore opportunities in areas such as 3D printing through SEG Additive Manufacturing Laboratories and RP Makerspace.



Integrating Sustainability into FYP

Students working on their Final Year Projects (FYPs) partnered with industry professionals to address key sustainability issues. This collaboration enabled students to apply their theoretical knowledge and gain valuable experience with real-world problems.

These hands-on projects not only deepened students' understanding of sustainability but also enhanced their ability to contribute meaningfully to the field. Working with industry partners gave students insights into current trends and practices, preparing them to lead sustainable initiatives and innovations in their future careers. As a result of these impactful projects, these projects have produced well-rounded professionals ready to address complex sustainability challenges.

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Showcasing Sustainable Innovations

Students from the Diploma in Applied Chemistry (DAC) and Diploma in Environmental and Marine Science (DEMC) showcased their commitment to sustainability at the Green Wave Environmental Care Competition 2023. They showcased prototypes developed during their final year projects, offering innovative solutions to promote environmental responsibility.

This competition fosters creative thinking about sustainability, enabling students to apply their academic knowledge to real-world challenges and gain industry recognition. Notable projects included "Upcycling and Development of Food Waste Foam", "Sustainable Packaging Material with Potential Antimicrobial Activity", and "Valorisation of Okara Food Waste Using Black Soldier Fly". These initiatives highlight the students' creativity and contribute to significant progress in sustainable practices.

Model for Analysing Energy Efficiency

The Final Year Project (FYP) used digital twins to model and analyse energy efficiency in a real-world facility, marking a significant advancement in sustainability practices. By integrating Digital Twins, Building Information Modelling (BIM), and 3D modelling technology, the project created a sophisticated digital representation of an indoor agricultural laboratory.

This innovative approach identified energy-intensive processes and optimised energy usage, potentially saving up to 35% in costs. Completed in 2023, the project drew insights from various modules in the Diploma in Sustainable Built Environment (DSBE) and was prominently featured at the Singapore International Energy Week (SIEW) 2023, highlighting its relevance and impact in the field of energy efficiency.

Ongoing Learning and Support

RP acknowledged that sustainability is ever-evolving and offered continuous learning opportunities for its staff. By providing regular updates and refresher courses, employees stayed informed about the latest advancements and best practices in sustainability. This ongoing support kept staff engaged with current trends and innovations, enhancing their ability to contribute to the organisation's sustainability goals.

Impact on Sustainability Goals

RP's enhanced staff education programmes significantly contribute to its broader sustainability goals. By equipping employees with relevant knowledge and skills, RP fosters a more informed and proactive workforce. This supported the institution's overall sustainability strategy, empowering staff to advance environmental initiatives and achieve long-term sustainability objectives.

In FY2023, 626 individuals participated in environmental sustainability courses, totalling 4,744 training hours. These courses covered topics such as decarbonisation, sustainability reporting, and governance. Additionally, in-house training on the Go Carbon Management Programme (goCMP) was provided for 11 key staff members, enhancing their skills for managing all three scopes of carbon emissions, including future responsibilities related to Scope 3.

Innovating for a Greener Future

Tackling environmental sustainability challenges demands innovative solutions and strong industry partnerships. By enhancing its research and development (R&D) capabilities and focusing on sustainability, RP aspires to contribute significantly to global efforts.

RP is committed to advancing sustainable practices by increasing sustainability-focused projects and engaging industry partners through consultancy and CET programmes. This pillar supports SDGs 13 and 17 by fostering innovative solutions, advancing sustainability research, and enhancing collaborations with industry partners to address key challenges.

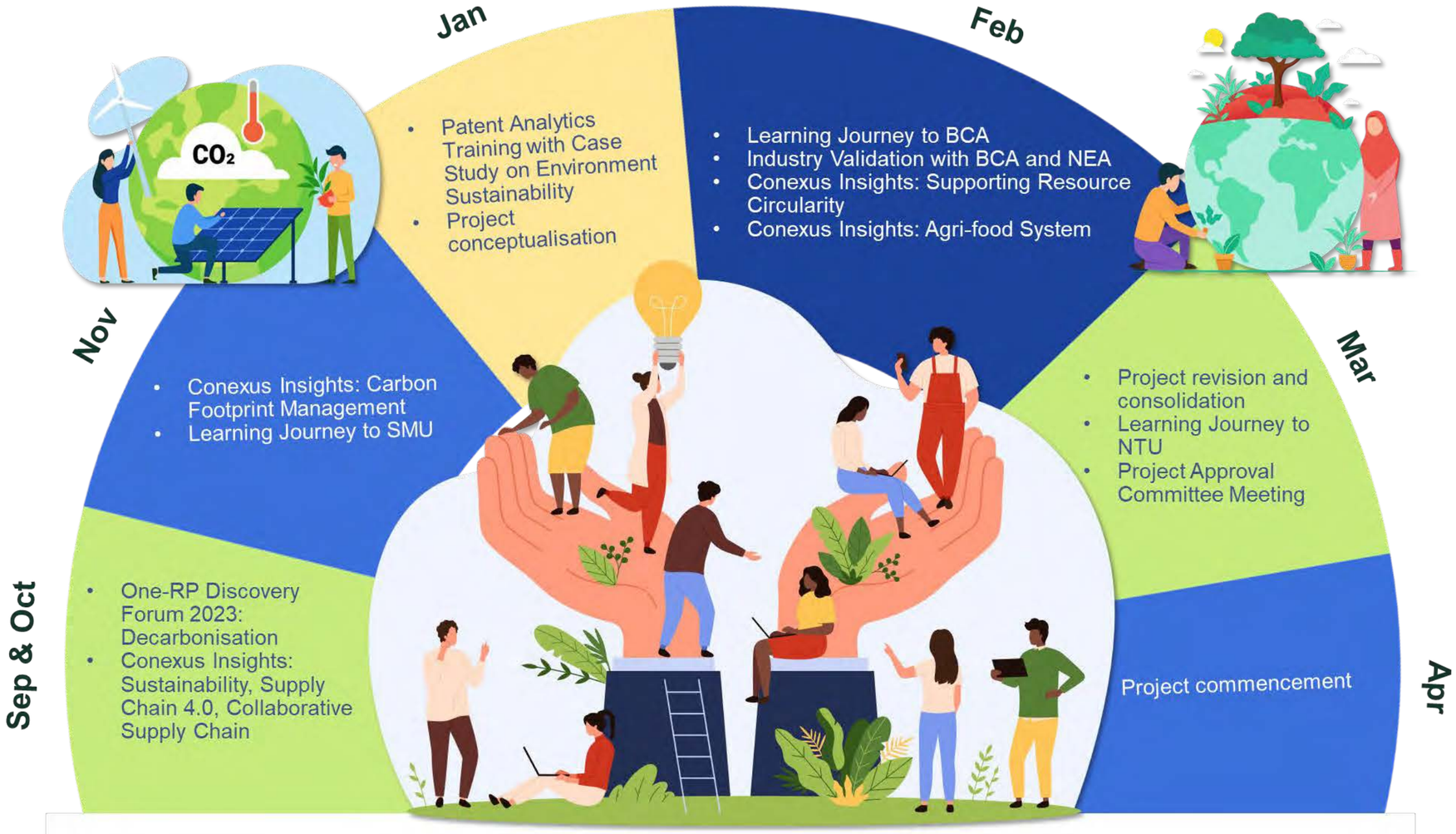
RP initiated industry projects to develop sustainability solutions and empower companies to improve their environmental practices. Through targeted CET training programmes, RP provided our industry partners with the knowledge and tools to drive climate action. This approach strengthened the essential partnerships needed to achieve broader environmental objectives.

Raising Awareness and Building Capability

Last September, RP launched the R&D Grand Challenge in Environmental Sustainability to enhance R&D capabilities and address key issues like resource circularity, energy efficiency, and sustainable packaging. Introduced at the RP Discovery Forum on Decarbonisation, the initiative featured keynote speakers from Singapore Management University (SMU) and Changi Airport Group (CAG).

From October 2023 to February 2024, over 300 staff attended the monthly Conexus Insights sessions. These sessions covered topics such as the circular economy, waste valorisation, and sustainability reporting. The Grand Challenge concluded on 26 February 2024, with an industry validation session where The National Environment Agency (NEA) and BCA shared their insights on the sustainability project proposals. As a result of the Grand Challenge, seven R&D sustainability projects were developed.

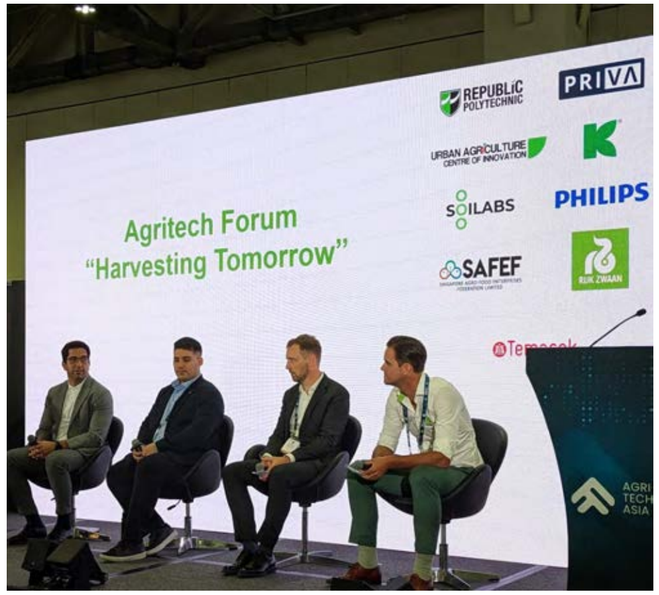
Figure 11 – R&D Grand Challenge on Environmental Sustainability



Developing Industry Solutions

In FY2023, RP completed 696 industry projects, including 46 on sustainability. RP leads the Urban Agriculture Centre of Innovation (UACOI) and the Centre of Innovation for Supply Chain Management (COI-SCM) and is a member of the Centre of Innovation in Built Environment – Advanced Materials. These centres support development in key sustainability areas such as food security, waste valorisation, energy efficiency, and carbon footprint management.

RP showcased its agritech capabilities at the Agri-Food Tech Expo Asia 2023 from 31 October to 2 November 2023, highlighting themes such as Food Safety & Security, Food Waste Management, and Smart Farming. Additionally, the UACOI hosted the Agrifood Research and Innovation Showcase on 28 February 2024, focusing on "Biowaste Management in the Agri-food Sector." This event featured expert insights and promoted collaboration on managing biowaste in the agri-food sector.



Project Highlights

Soilabs Private Limited, a start-up from Hafnium Ventures, is commercialising soy okara into high-value products by licensing RP's intellectual property. They developed functional food ingredients and biostimulants to boost crop yield and promote sustainable agriculture. Additionally, they secured significant seed funding to develop bioactive ingredients for the nutraceutical and cosmetic sectors.


Soy story: Singapore start-up reveals commercialisation and partnership plans for upcycled foods from soy waste

By Si Ying Thian
03-Apr-2023 - Last updated on 03-Apr-2023 at 03:09 GMT

Another key project involved collaboration between the School of Applied Science (SAS) and EnGro Corporation Limited. They developed the GO-IBA technology to treat incineration bottom ash for use as green construction aggregates. This process substituted natural aggregates in non-structural concrete applications, making it eco-friendlier and more sustainable. The project was funded by NEA's Closing the Waste Loop R&D Initiative and led to EnGro acquiring the IP rights for commercialisation in 2022. Both projects received the prestigious Public Sector Transformation Award.

Continuing Education and Training (CET) in Sustainability

In FY2023, RP advanced its sustainability efforts through CET in six full qualification programmes including a new Specialist Diploma in Environmental and Corporate Sustainability to foster environmental stewardship and industry innovation. We introduced 108 modules and 35 short courses that are designed to address diverse sustainability challenges and opportunities, dedicating over 75,000 training hours to these initiatives. Additionally, RP signed an MOU with the Institution of Engineers Singapore and other IHLs to launch the Micro-Credentials leading to Chartered Engineer in Sustainability (CEng (SG) (Sustainability)). This collaboration underscores our commitment to advancing sustainability education and professional development.

Introduction of the CCP-S Programme

As global sustainability efforts intensify, businesses are increasingly adopting sustainable practices, leading to numerous new "green roles," especially in carbon management. The CCP-S, offered by RP prepares the workforce for these opportunities through comprehensive training and reskilling initiatives.

Samuel Wang, a notable participant from the CCP-S programme, was recently featured in Workforce Singapore’s "The Business Case for Career Conversion Programme." From May to July 2023, Samuel successfully transitioned from being a Digital Marketer to become a Sustainability Analyst. In his new role, he is responsible for evaluating his company’s e-waste recycling initiatives and driving the development of sustainable, environmentally responsible strategies.

Introduction of Carbon Management Training

In response to Singapore's planned carbon tax increase to $50 - $80 per kiloton of CO_2e by 2030, companies must manage and reduce their greenhouse gas (GHG) emissions effectively. The goCarbon Management Programme (goCMP) provides essential guidance for developing comprehensive GHG emissions inventories in line with the GHG Protocol Corporate Accounting and Reporting Standard. This training equips participants with the skills to adopt the GHG Protocol Standard, enabling accurate measurement and accounting of carbon emissions across various organisational scopes.

In FY2023, RP completed 17 goCMP projects with industry partners, demonstrating its commitment to advancing carbon management practices. The GoCMP covers critical areas for effective carbon management, including understanding GHG sources and impacts, applying metrics for Scope 1, 2, and 3 emissions, defining organisational and operational boundaries for GHG accounting, and developing strategies for managing, monitoring, and reporting on carbon emissions.

National Electric Vehicle Specialist Safety (NESS) Certification Course

As part of its dedication to sustainability within the Industry Pillar, RP collaborated with industry partners to enhance workforce skills in emerging green technology. The NESS Certification course, introduced by the Land Transport Authority, provided professionals with essential skills for EV repair and maintenance, preparing the workforce for the growing demand for EV-related services and supporting Singapore's environmental goals outlined in the Singapore Green Plan 2030.

Additionally, RP collaborated with ChargEco to install electric vehicle chargers in our basement and multi-storey car parks, promoting green transportation and further demonstrating our commitment to sustainable practices. Through these partnerships and specialised training, RP played a crucial role in advancing sustainable practices and raising industry standards.

Fostering Community Sustainability

RP has expanded its sustainability initiatives beyond campus, engaging both internal and external communities through various impactful programmes. These initiatives support SDG 11, SDG 12, and SDG 13. By implementing a wide array of initiatives, RP is significantly contributing to a greener future.

This year, we organised 38 sustainability-related events and activities through our student interest groups, dedicating over 32,300 volunteer hours.

RP made significant efforts to foster a culture of sustainability by instilling values, attitudes, and behaviours that promote responsibility, empathy, and ethical considerations towards the environment and society. Through these efforts, RP encouraged and empowered ground-up involvement, ensuring every member actively contributed to this shared vision.

External Engagement

RP's external engagement in sustainability encompassed various initiatives to raise environmental awareness and boost community involvement. We collaborated with community partners, secondary schools, and industry partners to promote sustainability education and inspire proactive environmental action.

These collaborations were crucial in advancing environmental consciousness, with diverse stakeholders implementing impactful programmes and fostering a sustainability mindset. Through these efforts, RP significantly enhanced environmental awareness and contributed to a more sustainable future.

Clothes Collection Drive and Project Reweave

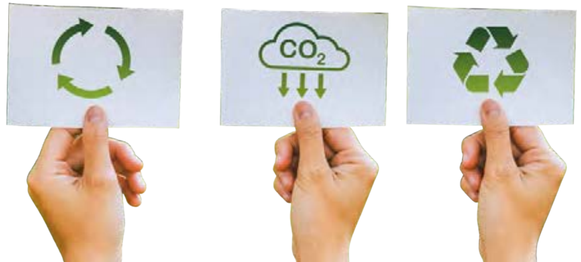
Between May and July 2023, RP organised a clothes collection drive, gathering around 3,732 items. Of these, 479 pieces were donated to the THK Home for the Disabled, and 2,477 pieces were given to Swapaholic for redistribution. Items found unsuitable for redistribution were repurposed: 776 pieces were used by LittleSkoolHouse @ RP for costumes and workshops, and the remainder were provided to Whooper Crafts for crafting. This initiative earned RP the "Vanda Miss Joaquim" Award and the "Best 3R Award" at the Singapore Environmental Council School Green Awards.

In April 2023, RP launched Project Reweave, partnering with the National Library Board and New Econ Holdings to upcycle discarded polypropylene sacks.

The project transformed these sacks into grocery bags and stationery pouches. Workshops and a webinar in August and September 2023 engaged the community, with the upcycled pouches donated to Maison Chance in Vietnam. These efforts showcased RP's commitment to sustainable practices and fostering environmental responsibility.

Supporting the School Green Awards 2023

This year, RP hosted the 22nd School Green Awards, recognising the outstanding contributions of students across Singapore in promoting sustainability. Organised by the Singapore Environment Council (SEC) and supported by Keppel, the event celebrated the innovative projects of around 300,000 students and teachers from over 300 schools. The initiative reached 800,000 community members, underscoring its significant impact on environmental stewardship and fostering a culture of sustainability within the community.



Learning Journey to The Greenhouse and RP Green Campus Tour

In FY2023, RP hosted 7 RP Green Campus Tour sessions for 246 secondary school students, led by the School of Engineering's Diploma in Sustainable Built Environment team. The Green Tour showcased the sustainable design features of the RP campus and RP's contributions to a greener future, in line with the SG Green Plan.

RP also organised 21 learning journeys to The Greenhouse for over 2,100 participants, including external partners such as the National Library Board (NLB) and the Federation of Hong Kong Agricultural Associations, as well as secondary schools such as CHIJ St Nicholas Girls' School and Boon Lay Secondary School. These tours featured our naturally ventilated greenhouse and climate-controlled glasshouse, demonstrating our advanced agricultural systems and remote monitoring technology. By showcasing our sustainable practices, we aimed to inspire our partners to adopt similar approaches in their own sustainability initiatives.

Service-Learning Club (SLC) Trekking with a Purpose

The SLC, one of our student interest groups, launched the Trekking With A Purpose (TWAP) programme to boost environmental awareness and promote a healthy lifestyle.

Students participated in trekking and litter-picking expeditions across parks such as Chestnut Nature Park, West Coast Park, Sembawang Park, and East Coast Park. The programme educated participants on wildlife protection and the impact of litter on wildlife and communities.

By extending their cleaning efforts to nearby HDB blocks, students showed a strong commitment to environmental sustainability and community service. This experience provided valuable insights into sustainable practices while helping to preserve Singapore's natural parks and enhancing the city's environmental quality.

Internal Engagement

RP also focused on internal engagement through various eco-friendly initiatives involving students and staff. These efforts promoted environmental stewardship and fostered a culture of sustainability, integrating sustainable practices into all aspects of campus life.

Go Green RP

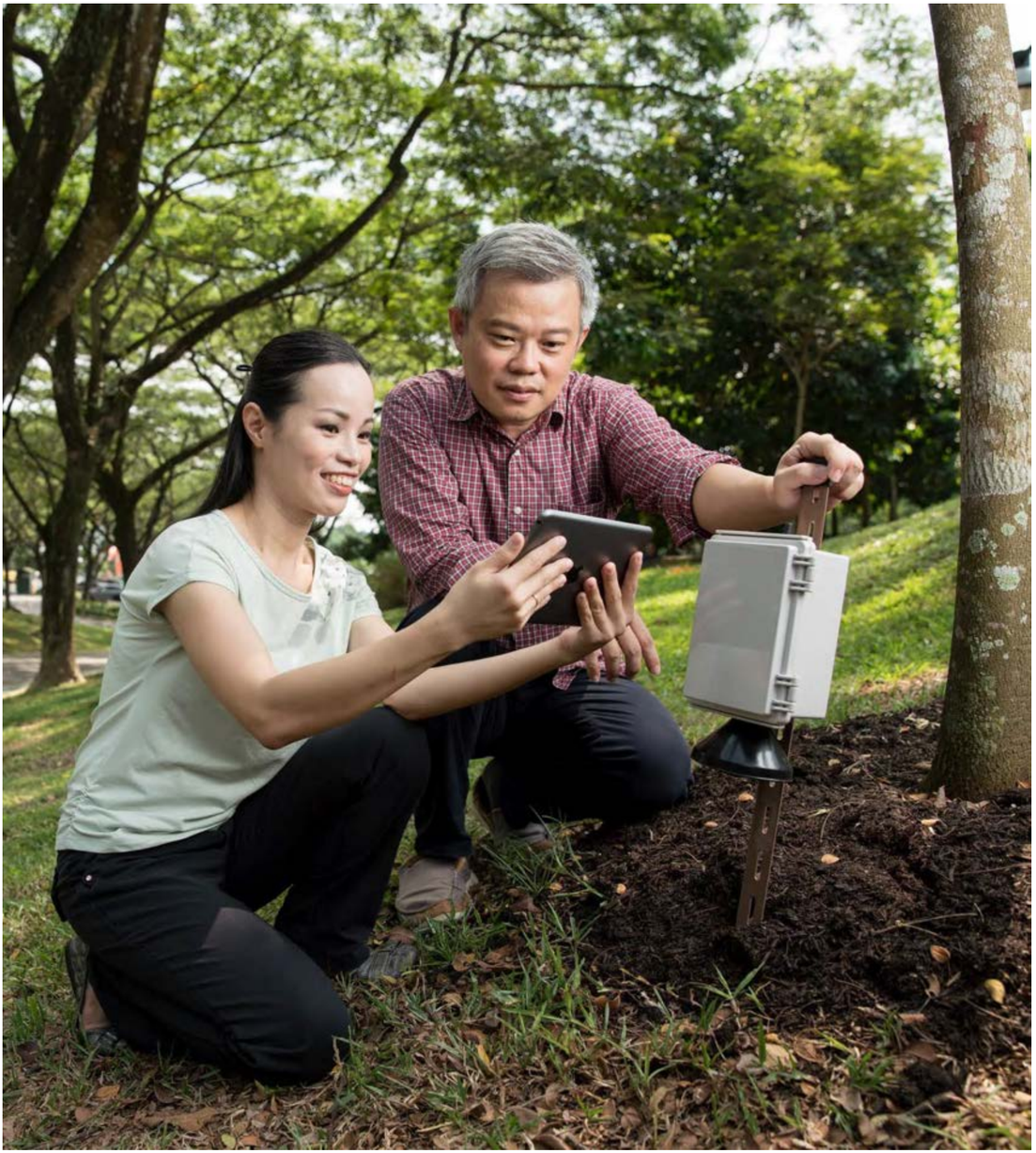
Go Green RP is a year-round initiative that promotes greener lifestyles and habits within our community. By leveraging national campaigns and environmental sustainability calls-to-action, this movement encourages the RP community to embrace joint responsibility and collective action for a sustainable future.

Through ground-up initiatives, Go Green RP fosters environmental stewardship, urging everyone to contribute to a greener campus. Activities included Earth Hour, where RP turned off campus lighting to reduce energy consumption, and Conservation Fortnight, supporting Clean and Green Singapore with a focus on Sustainable Fashion.

Additionally, RP supported Singapore World Water Day with the "City Turns Blue" initiative to raise water conservation awareness. In March, RP engaged staff and students with in-house quizzes, water-saving tips in the HR e-newsletter, and a waterways clean-up.

Bring Your Own

RP promoted a "Bring Your Own" approach, encouraging the use of reusable utensils, mugs, and containers for shared or catered meals. This initiative significantly reduced disposable waste and reinforced our efforts to cut down on single-use plastics.



Sustainability Champions

RP's 31 Sustainability Champions across various departments led and advocated for sustainability initiatives. They promoted environmental stewardship within their teams, driving resource efficiency and cost savings.

For example, the Office of Student and Graduate Affairs repurposed old trophies for staff awards, conserving resources and extending the lifespan of existing items. They also introduced a flea market concept for gift exchanges, where team members swapped pre-loved or unused items, reducing waste and eliminating the need for new purchases.

These activities celebrated the team's achievements and demonstrated how small, thoughtful actions could contribute to a more sustainable future.

Chinese New Year Recycling Workshop

In celebration of Chinese New Year, RP hosted a recycling workshop to highlight our commitment to circularity and upcycling. Staff learned to repurpose everyday items, creating vibrant flowers from egg cartons and hanging ornaments from used red packets.

This hands-on experience allowed participants to transform simple, recyclable materials into festive decorations, including personalised cherry blossom wall decoration.

Conservation Fortnight

Conservation Fortnight 2023 focused on ‘Sustainable Fashion’ to raise sustainability awareness among students and staff. The programme included six talks—one virtual and five face-to-face—engaging 274 participants. Additionally, a mini exhibition of Sustainable Fashion was displayed near South Agora. This event highlighted our commitment to environmental stewardship and provided valuable insights into sustainable practices within the fashion industry, furthering our goal of educating the campus community on sustainability.

RP Green Campus Tour

The RP Green Campus Tour, part of our staff engagement and induction programme, offers an in-depth exploration of our campus's sustainable practices. New employees are encouraged to join, and the tour is periodically available to all staff.

This initiative showcased how RP merges nature with infrastructure, featuring solar panels on rooftops, full-wall windows that optimise natural light while reducing heat transmission, and a vertical green wall on the multi-storey carpark that acts as a natural air purifier.

The tour also took a comprehensive look at our advanced greenhouse facilities, including a naturally ventilated greenhouse, a climate-controlled glasshouse, and laboratories designed for precise micro-climate control. These elements, combined with our water-saving measures and sustainable design features, aimed to cultivate a sustainability mindset among staff. By deepening their understanding of these practices, the tour reinforced our commitment to environmental stewardship and encouraged staff to integrate sustainability into their everyday work and interactions.

Moving Forward

MOVING FORWARD

As we look to the future, RP is committed to enhancing sustainability across all operations. Our strategic plans for the upcoming year reflect our dedication to continual improvement and alignment with the Singapore Green Plan 2030. We recognise that the pursuit of sustainability is an ongoing journey, offering ample opportunities for improvement. Our commitment is demonstrated through initiatives across four pillars: Campus, Education, Industry, and Community.

Integrating Sustainability Across Operations

RP is committed to achieving our sustainability targets through strategic measures. We will integrate climate risk assessments into our Enterprise Risk Management framework to address and mitigate climate-related impacts. Additionally, we plan to pilot hybrid cooling systems to optimise energy use and reduce campus energy consumption. We will also expand sustainability topics within RP's curriculum to align our educational offerings with our commitment to environmental stewardship. These steps demonstrate our dedication to promoting sustainability and achieving our environmental goals.

Innovative Programmes and Community Engagement

RP's forward-looking approach includes strengthening engagement with industry partners and the local community. We will encourage local involvement in sustainability efforts through initiatives that foster active participation and drive positive change.

To promote a culture of sustainability, we will introduce comprehensive e-learning modules for staff, focusing on sustainability principles and practices. These online courses will equip staff with the knowledge and tools to integrate sustainability into their daily work and decision-making processes.

Additionally, we will implement a training programme that takes business partners to key overseas hubs to gain insights into advanced sustainability practices. We will also conduct activities such as "Go Green Commute Week" to promote sustainable commuting and reduce emissions. By scaling these efforts, RP aims to set high standards in environmental stewardship and inspire widespread adoption of sustainable practices across all sectors.

Appendix

APPENDIX

Management of GHG Emissions and Formulas for Environmental Performance Indicators

GHG Organisational Boundary

RP compiled our GHG emissions in accordance with Greenhouse Gas (GHG) Protocol (Corporate Accounting and Reporting Standard). We employed operational control approach, which accounts for emissions from our campus operations but excludes tenants and leased facilities that fall outside of our operational control.

GHG Global Warming Potential Values and Emissions Factors for Scope 1 and 2

To calculate our GHG emissions from the use of fuel, electricity, and gases, we converted the usage into carbon dioxide equivalent (CO_2e) units. This was done using conversion and emissions factors, including the Emissions Factors (EF) and Global Warming Potential (GWP) values.

The GWP for Scope 1 emissions were obtained from the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6).

The EF for Scope 1 emissions were based on the following references:

a) IPCC 2006 Guidelines for National Greenhouse Gas Inventories Chapter 2: stationary combustion
b) IPCC 2006 Guidelines for National Greenhouse Gas Inventories Volume 2 (Energy) Chapter 3: mobile combustion

The EF for Scope 2 emissions were obtained from the Singapore Energy Statistics published by Energy Market Authority (EMA).

Formulas for Environmental Performance Indicators

Carbon Emissions Intensity (CEI)

$$\text{CEI in Year}_n = \frac{\text{Total GHG Emissions (Scope 1 and 2) in Year}_n}{\text{Total Gross Floor Area (GFA) in Year}_n}$$

Energy Utilisation Index (EUI)

$$\text{EUI in Year}_n = \frac{\text{Total amount of electricity consumption in Year}_n}{\text{Total Gross Floor Area (GFA) in Year}_n}$$

Water Efficiency Index (WEI)

$$\text{WEI in Year}_n = \frac{[\text{Total amount of water consumed in Year}_n \times 1000]}{(\text{operational days in Year}_n) \times [(\text{number of staff per day}) + (0.25 \times \text{number of visitors per day})]}$$

Waste Disposal Index (WDI)

$$\text{WDI in Year}_n = \frac{[\text{Total amount of waste disposed in Year}_n \times 1000]}{(\text{operational days in Year}_n) \times [(\text{number of staff per day}) + (0.25 \times \text{number of visitors per day})]}$$

APPENDIX

Independent Reasonable Assurance of Environmental Sustainability Disclosure for FY2023 and Baseline Years

Our FY2023 Environmental Sustainability Disclosure summarises the efforts and contributions made by our staff and students from 1 April 2023 to 31 March 2024. External assurance was sought from SGS International Certification Services Singapore Pte Ltd to ensure the accuracy and reliability of our disclosure.

The assurance of the disclosure had been conducted according to the following Assurance Standards:

Table 3 – Assurance Standard

Assurance Standard Options		Level of Assurance
A	ISAE 3000 (Revised), Assurance Engagements Other Than Audits or Reviews of Historical Financial Information	Reasonable
B	ISO 14064-3: 2019: Specification with Guidance for the Verification and Validation of Greenhouse Gas Statements	Reasonable

Scope of Assurance and Reporting Criteria

The scope of the assurance included the evaluation of quality, accuracy and reliability of specified performance information as detailed below and the evaluation of adherence to the following reporting criteria and guidance for the quantification approach:

Table 4 – Reporting Criteria/ Guidance

Reporting Criteria/ Guidance	
1	Singapore Green Gov Guidance (for EUI, WEI and WDI)
2	WRI/ WBCSD GHG Protocol - Corporate Accounting and Reporting Standard (for GHG Scope 1 and 2)

This engagement, specific to GHG emissions data, covers assurance of emissions from anthropogenic sources of greenhouse gases included within the organisation's boundary and is based on ISO 14064-3:2019.

APPENDIX

Assurance Materiality

The materiality required for the assurance of GHG emissions was considered by SGS to be 5%.

Specific Performance Information and Disclosure included in the Scope

Table 5 – GHG Emissions and Environmental Performance Indicators

	Performance Indicators (FY 2023 and respective baseline years)
1	Total GHG Emissions (Scope 1 and 2) per FY (tonnes CO_2e)
2	Total Electricity Consumption per FY (kWh)
3	Total Gross Area *(excluding tenanted area)* (m^2)
4	Total Water Consumption per FY (m^3)
5	Total Amount of Waste Disposed of per FY (kg)

	Performance Indicators (FY 2023 and respective baseline years)
6	Total Daily Population (pax)
7	Number of Operational days per FY (days)
8	Carbon Emissions Intensity [CEI] per FY (tonnes CO_2e/m^2)
9	Energy Utilisation Index [EUI] per FY (kWh/m^2)
10	Water Efficiency Index [WEI] per FY (litres per pax per day)
11	Waste Disposal Index [WDI] per FY (kg per pax per day)

APPENDIX

Assurance Methodology

SGS's approach is risk-based, drawing on an understanding of the risks associated with the reporting specified performance information, disclosure and the controls in place to mitigate these.

The assurance comprised a combination of:

- Pre-assurance research,
- Planning of site visits and preparation of bespoke checklists for evaluation of data collection processes and accuracy of reported data
- Remote and on-site interviews at Republic Polytechnic with data managers responsible for data collection and reporting databases.
- Evaluation of the disclosure against specified reporting criteria/guidance
- Document review of relevant policies and procedures and
- Understanding, analysing, recalculation and sample testing the key data collection, aggregation, validation and reporting systems, processes, procedures and controls.

Limitations and Mitigation

Where applicable, financial data drawn from independently audited financial accounts has not been checked back to source as part of the assurance process.

In addition, the selected reporting guidance provides flexibility for RP to make value choices when quantifying the total daily population. To improve transparency, RP has documented the details of such value choices in their quantification approach. This document may be shared with intended users as on a case-by-case basis.

Statement of Independence and Competence

The SGS Group of companies is the world leader in inspection, testing and certification, operating in more than 140 countries and providing services including management systems and service certification; quality, environmental, social and ethical auditing and training; environmental, social and sustainability report assurance. SGS affirm our independence from RP, being free from bias and conflicts of interest with RP.

The assurance team was assembled based on their knowledge, experience and qualifications for this assignment. It comprised auditors and sustainability professionals specialising in Environmental, Social and Governance (ESG) and carbon fields.

APPENDIX

Independent Reasonable Assurance Statement

On the basis of the methodology described and the assurance work performed, SGS is satisfied that the performance information included in the scope of assurance is accurate, reliable, has been fairly stated and has been prepared, in all material respects, in accordance with the reporting criteria.

Specific to GHG emissions data, in SGS's opinion, the presented GHG assertion:

- is materially correct and is a fair representation of the GHG data and information
- is prepared in accordance with the Greenhouse Gas Protocol – A Corporate Accounting and Reporting Standard (revised edition) GHG quantification, monitoring and reporting

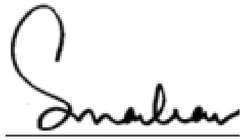
Opportunities for Improvement

- RP can benefit from improved GFA data management to enhance traceability of supporting evidence and control in AutoCAD calculations.
- RP to consider enhancing her inventory quality management system for all environmental performance indicators to continuously improve the timeliness of changes to disclosure.
- RP is recommended to disclose emissions from fertiliser usage in small-scale greenhouse, as well as small-scale onsite food digester.

Good Practices

- RP shows great coordination and teamwork when providing data to support the verification process.
- RP takes initiatives to leverage digital tools as using of shared MST to facilitate the sharing of data effectively and efficiently.
- RP shows strong commitment to green initiatives such as use of energy-saving measures such as a chiller plant to supply cooling; reduction of waste such as use of onsite food digester; water saving measures such as rainwater harvesting and AHU condensate recovery.
- On a whole, RP has shown improvement in data management and control over the years. In particular, evidence to support FY2023 data is easily traceable and verifiable.

Signed:
For and on behalf of SGS International Certification Services Singapore Pte Ltd



Susan Law
Regional Head of Business Assurance, SEAP
SGS International Certification Services Singapore Pte Ltd
19 June 2024

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OUR PROGRESS AND TARGETS

Table 6 - FY2023 Achievements and FY2030 Goals

Indicators	Baseline	FY2021	FY2022	FY2023	2030 Targets
GHG Emissions					**50% CEI reduction**
Scope 1 Emissions (tonnes CO_2e)	193.27	157.25	170.51	219.19	
Scope 2 Emission (tonnes CO_2e)	11,683.51	8,748.37	8,139.72	7,218.16	
Total GHG Emissions (tonnes CO_2e)	11,876.79	8,905.62	8,310.24	7,437.35	
Carbon Emissions Intensity (CEI) (tonnes CO_2e/ m^2)	0.053*	0.039	0.036	0.033 ***37.74% reduction***	
Electricity Consumption					**45% EUI reduction**
Total Electricity Consumption (kWh)	27,976,404.54	21,307,599.09	19,529,090.17	17,318,037.37	
Energy Utilisation Index (EUI) (kWh/m^2)	117.04#	93.21	85.43	75.98 ***35.08% reduction***	
Water Consumption					**38% WEI Reduction**
Total Water Consumption (m^3)	178,436.29	116,467.32	131,869.34	141,665.52	
Water Efficiency Index (WEI) (litres / person / day)	60.37#	88.76	37.16	40.19 ***33.43% reduction***	
Waste Generation					**30% WDI reduction**
Total Waste Disposed (kg)	649,221	508,025	649,221	491,730	
Waste Disposal Index (WDI) (kg / person / day)	0.178^	0.377	0.178	0.135 ***24.16% reduction***	

** From peak in FY2018*

 # Average of FY2018 – 2020

^ FY2022

go green RP
You can make a difference

Find out more about our Sustainability efforts:

RP Sustainability Video
https://youtu.be/S5lPXz57wyc

RP Sustainability Website
https://www.rp.edu.sg/sustainability