



ENVIRONMENTAL SUSTAINABILITY DISCLOSURE

NP's disclosure provides a transparent account of our environmental sustainability strategies, goals and progress, covering our performance from 1 April 2024 to 31 March 2025. It reflects NP's ongoing commitment to environmental stewardship, which aligns with the Singapore Green Plan 2030 sustainability framework.

This report is prepared in accordance with the Accountant-General's Guidelines for Environmental Sustainability Disclosure Requirements and aligns with the Whole-of-Government GreenGov.SG initiatives and targets.

This disclosure covers NP's campus but excludes entities outside NP's operational control, such as on-campus vendors and tenants.



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PRINCIPAL & CEO'S MESSAGE

At Ngee Ann Polytechnic (NP), our commitment to sustainability continues to guide the way we learn, live and lead.

Thanks to our resolve to embed sustainable practices across every part of NP, each one of our key environmental sustainability indicators – electricity and water consumption, solar capacity, waste generation, green buildings, and greenhouse gas emissions – showed year-on-year improvements.

Our standout achievement was water conservation. With consumption cut by nearly half compared to 2023, we not only met the Singapore Green Plan 2030 Water Efficiency Index target five years ahead of schedule, but also surpassed it by over 30%. This milestone was made possible through our smart monitoring, infrastructure upgrades, and reimagining how we care for our green spaces.

We are broadening our impact by driving sustainability innovation through strategic partnerships. A prime example is the work of NP's Centre for Environmental Sustainability, which is tackling urgent demands to cut energy use at data centres and improving technologies for water treatment. By collaborating closely with industry,

we have made significant headway in turning our technological know-how into real-world, scalable solutions.

Beyond gaining core sustainability knowledge, our students learn through real-world industry projects, and build green skills through a curriculum anchored in sustainability principles and practices. Besides being the first polytechnic to launch a Minor in Sustainability in 2023, NP also took the lead to create a new Environmental Impact Scholarship to give students passionate about sustainability exposure to areas such as climate risk assessment and renewable energy adoption. Through these efforts, we are creating a vibrant learning environment to nurture sustainability-intelligent graduates.

We are proud of the strides we have made as part of our Sustainability Education & Ecosystem Development (SEED) initiative, which integrates sustainability across our curriculum, operations and partnerships, but there is more to be done. As we look ahead, we believe our shared purpose and collective efforts stand us in good stead to pave the way for a greener future.

Mr Lim Kok Kiang Principal & CEO



COUNCIL

Steers NP's overarching sustainability strategy

GOVERNANCE STRUCTURE

NP's governance structure aims to strengthen strategic goal-setting, decision-making and accountability on all matters pertaining to environmental sustainability in NP.

The committees' collective efforts ensure that NP's environmental sustainability strategies are effectively implemented across all aspects of our operations, reinforcing our leadership in the shaping of a greener future.

COUNCIL SUB-COMMITTEE

Chaired by Ms Pauline Goh, Chair of Southeast Asia at CBRE

Members: Ms Isabel Chong, Senior Vice President, Head of Digital Industries (ASEAN) at Siemens,

Ms Lyn Lee*, Former Chief DEI Officer at Shell *w.e.f. 01 Apr 2025

- Leads the development and execution of NP's sustainability strategy
- Assumes responsibility for the meeting of sustainability-related goals and targets

ENVIRONMENTAL SUSTAINABILITY STEERING COMMITTEE

Chaired by Mr Lim Kok Kiang, NP Principal & CEO

- Defines the vision and tone for NP's sustainability strategy, initiatives, and policies
- Ensures sustainability is integrated across curriculum, operations and partnerships, and is aligned with the priorities of all stakeholders

ENVIRONMENTAL SUSTAINABILITY WORKING COMMITTEE

Ensures effective implementation of environmental sustainability operations such that performance indicators and goals are assessed and met

GREENING OUR CAMPUS

SUSTAINABILITY EDUCATION & ECOSYSTEM DEVELOPMENT (SEED)

NP's Greenprint for a sustainable future

PILLAR 2

SPEARHEADING INDUSTRY PARTNERSHIPS PILLAR 1

DEVELOPING SUSTAINABILITY-INTELLIGENT GRADUATES



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GOVERNANCE STRUCTURE

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INFUSING SUSTAINABILITY INTO NP'S CURRICULUM

Pre-Employment Training (PET) 100% cohort taking foundational sustainability modules

Sustainability-related PET modules and electives

>60

Full-time learners who attained a Minor in Sustainability*
*Now renamed Minor in Environmental Sustainability

Sustainability-related Continuing Education & Training (CET) courses

101.9 Sustainability-related CET training hours

DEVELOPING SUSTAINABILITY-INTELLIGENT GRADUATES

Foundational Sustainability Curriculum

Every NP student will develop a green lens for their domain area. They are first introduced to the core principles of sustainability and the United Nations Sustainability Development Goals. By their final year, students may choose to tackle real-world sustainability challenges through interdisciplinary green projects.

INFUSING SUSTAINABILITY INTO NP'S CURRICULUM

Sustainability-focused Modules, Specialisations & Electives

NP offers these to equip students with green skills, leading to more targeted career paths.

Refer to next page for details.

Minor in Environmental Sustainability

Students take sustainability-focused units to explore environmental issues and how businesses, communities and governments are responding to them, and can earn a Minor in Environmental Sustainability.

Green Projects & Internships

Students collaborate on domain-specific green projects with industry partners and gain real-world experience through internships at companies leading sustainability efforts.

Environmental Impact Scholarship

This scholarship offers students exclusive final-year internship and mentorship opportunities at organisations pioneering sustainability efforts in their fields.

PILLAR 1 **DEVELOPING SUSTAINABILITY-INTELLIGENT GRADUATES**

TRANSPORT

Cleaner Energy Vehicles

The Diploma in Electrical Engineering offers energy sustainability-related electives and a specialisation in Sustainable Power Engineering which includes the electrification of land transport.

The Diploma in Offshore & Sustainable Engineering* offers core modules in maritime decarbonisation and offshore topside systems that feature the use of low-carbon and sustainable marine fuels and electrification.

WASTE

Waste Management (Recycling & Minimisation)

Key focus areas in the Diploma in **Environmental Science & Sustainability**# include resource management & circularity, which covers food, plastic & electronic waste management.

Circular **Economy**

The Diploma in Business Studies offers a **Business Sustainability & Digitalisation** specialisation that covers the circular economy, carbon management for businesses, and corporate governance in sustainable business.

EXAMPLES OF ENVIRONMENTAL SUSTAINABILITY IN NP'S CURRICULUM

BUILDINGS

Super Low Energy Buildings

Key focus areas in the Diploma in Hotel & Leisure Facilities Management include smart facilities management and sustainable building solutions, such as managing energy demand with smart, innovative technologies.

RENEWABLE ENERGY

Energy Storage Systems

The Diploma in Electrical **Engineering offers electives Diploma in Solar** and specialisations in Smart **Energy Systems and** Sustainable Power Engineering.

Solar PV Operation & Maintenance

The part-time Specialist Photovoltaic (PV) **Engineering & Monitoring** trains solar and power engineers in the design, operation and monitoring

of solar PV systems.

Offshore Wind

The Diploma in Offshore & **Sustainable Engineering*** offers a module on offshore wind that features renewable and sustainability concepts in naval architecture.

^{*}Previously known as Diploma in Marine & Offshore Technology (MOT)

^{*}Previously known as Diploma in Environmental & Water Technology (EWT)



DEVELOPING SUSTAINABILITY-INTELLIGENT GRADUATES

INAUGURAL GREEN CAREERS NETWORKING FAIR

The inaugural Green Careers segment at NP's Careers Networking Fair drew over 500 students exploring sustainability-focused roles. Twenty organisations, including Frasers Property Limited, Energy Market Authority and Mandai Wildlife Group, offered students opportunities in sustainable hospitality, environmental management and green energy.

SMART, SUSTAINABLE POND CARE

A team of Engineering students partnered with NParks to tackle aquatic weed overgrowth at the Singapore Botanic Gardens. Targeting invasive species like *Hydrilla* and *Cabomba*, the weed harvester they designed offers a sustainable way to manage aquatic weeds while protecting the native ecosystem.

HARNESSING DATA FOR GREEN IMPACT

Data Science students partnered with social enterprise TinkerThings Global to develop AI-based software applications aimed at optimising compost fertility and solar energy in urban farms. By using data-driven tools, they showed how communities can be empowered to effectively manage resources and promote greener, smarter cities.

REIMAGINING SPACES FOR MIGRANT WORKERS

Our Design (Architecture) students partnered with the Dormitory Association of Singapore Limited and Westlite Dormitory to reimagine eco-friendly migrant worker housing. Their modular, prefabricated designs use low-carbon materials, with energy-efficient and touchless systems to enhance comfort and foster a sense of home.



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PILLAR 2 SPEARHEADING INDUSTRY PARTNERSHIPS



Dr Jason Tang, NP's Chief Sustainability Officer & Director of CfES and Dr J Antony Prince, Founder & Chairman of Memsift Innovations exchanging the agreement

GROUNDBREAKING MEMBRANE TECHNOLOGY

NP's Centre for Environmental Sustainability's (CfES) advanced graphene ultrafiltration and nanofiltration membrane technologies used in the water treatment process were acquired by Memsift Innovations in October 2024.

The next-gen membranes deliver up to 50% energy savings, has a lifespan that is twice as long as that of standard membranes, and offer superior anti-fouling properties. When integrated with Memsift's TS-30™ and GOSEP™ systems, the membranes boost industrial liquid waste treatment by enabling precise molecular separation, chemical recovery, and zero liquid discharge. This technology partnership has the potential to reduce water treatment costs, marking a significant step forward in sustainable water treatment.

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As the Centre driving industry partnerships for green solutions and talent development at NP, we are committed to engineering cutting-edge innovations that positively impact the environment.

The graphene oxide membrane technology we developed is groundbreaking, reducing energy consumption by up to 50% and has a lifespan twice as long as conventional membranes. We are excited to enhance the sustainability of industrial water treatment.

Dr Jason Tang
NP's Chief Sustainability Officer
& Director of CfES



SPEARHEADING INDUSTRY PARTNERSHIPS

NEXT-GEN DATA CENTRE COOLING

The Data Centre Sandbox, developed by CfES and Hyprcool with support from EMS Wiring Systems, Datwyler, Grundfos, Supermicro and YiTac, is a breakthrough in cooling technology that achieves over 90% energy savings and drives the growth of green data centres in Singapore.

BREWING A BETTER TOMORROW WITH SPENT COFFEE GROUNDS

CfES has collaborated with circular design and furniture innovators Sam & Sara and Ipse Ipsa Ipsum to transform this biowaste into biodegradable composites which can be used in packaging, consumer goods, and construction.

| MAINTAINING A | WORLD-CLASS GARDEN

NP partnered NParks' Centre for Urban Greenery and Ecology and Penn State University to study how visitors use the Singapore Botanic Gardens. The research provides insights to enhance green recreation while preserving the Gardens' biodiversity and will guide future facilities and programming.

SMART ENERGY MONITORING

YiTac, with CfES, launched a real-time, high-precision system to track Variable Refrigerant Flow (VRF) in air-conditioning, cutting energy use. Developed under the BCA Green Buildings Innovation Cluster Grant, it advances smarter, energy-efficient building monitoring.



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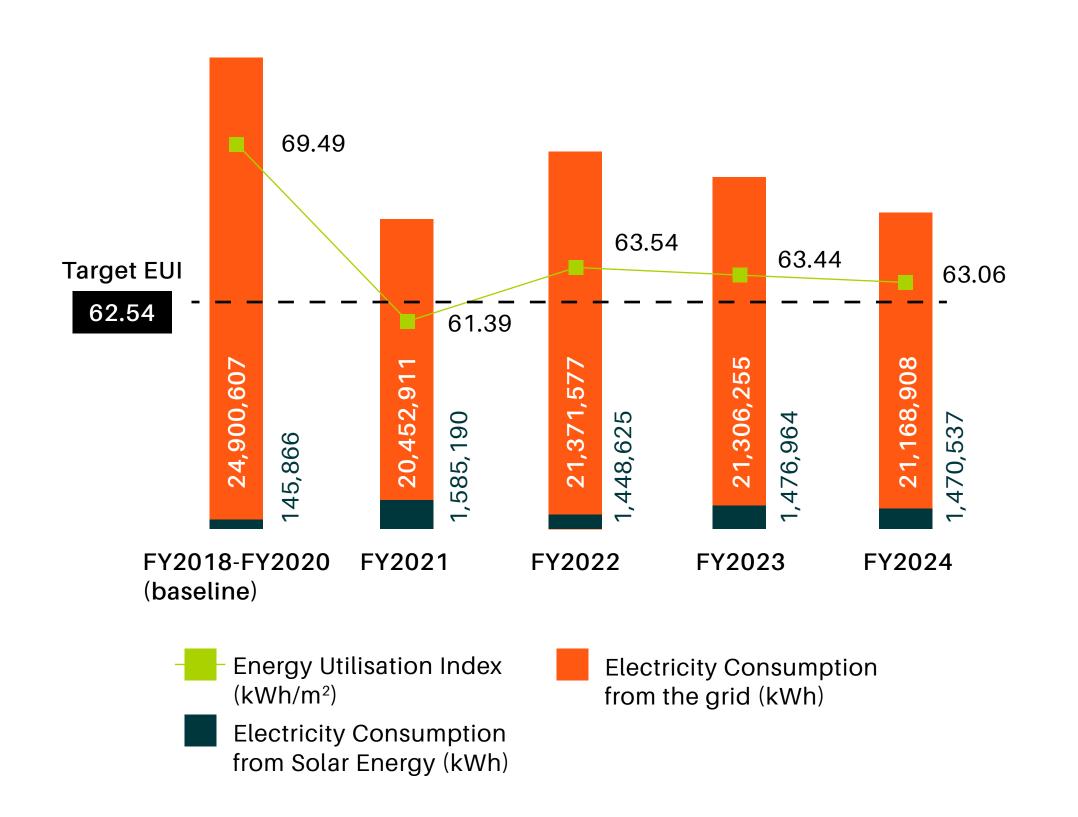
FY 2024

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ANNEX



DISCLOSURE



ENERGY UTILISATION INDEX (EUI)

The FY2024 EUI is reduced by 9.3% against the EUI baseline (FY2018-2020 average).

It saw a marginal decrease of 0.4% compared to FY2023 (63.44 kWh/m²), potentially attributed to NP's upgrades to more energy-efficient air-conditioning systems and lighting.

Target EUI is 62.54kWh/m², a 10% reduction by FY2030 against FY2018-2020 average levels as baseline.



NP was ranked #1 among polytechnics & ITE for the lowest EUI in FY2023 with a baseline that is up to 47% lower than the sector average.



KEY ACTIONS

NP has implemented key upgrades to our air-conditioning systems and lighting infrastructure to further enhance energy efficiency.

We have installed energy-efficient chillers, Air Handling Units (AHUs), Fan Coil Units (FCUs), and Variable Refrigerant Volume/Direct Expansion (VRF/DX) systems that are expected to further reduce energy consumption while maintaining optimal indoor comfort levels.



Optimised High Mast Lighting

Newly installed lighting systems enable users to operate lights and adjust brightness levels anytime, anywhere, via a web-based platform. This results in energy savings of approximately 68% per annum, or around \$26,500 annually*.

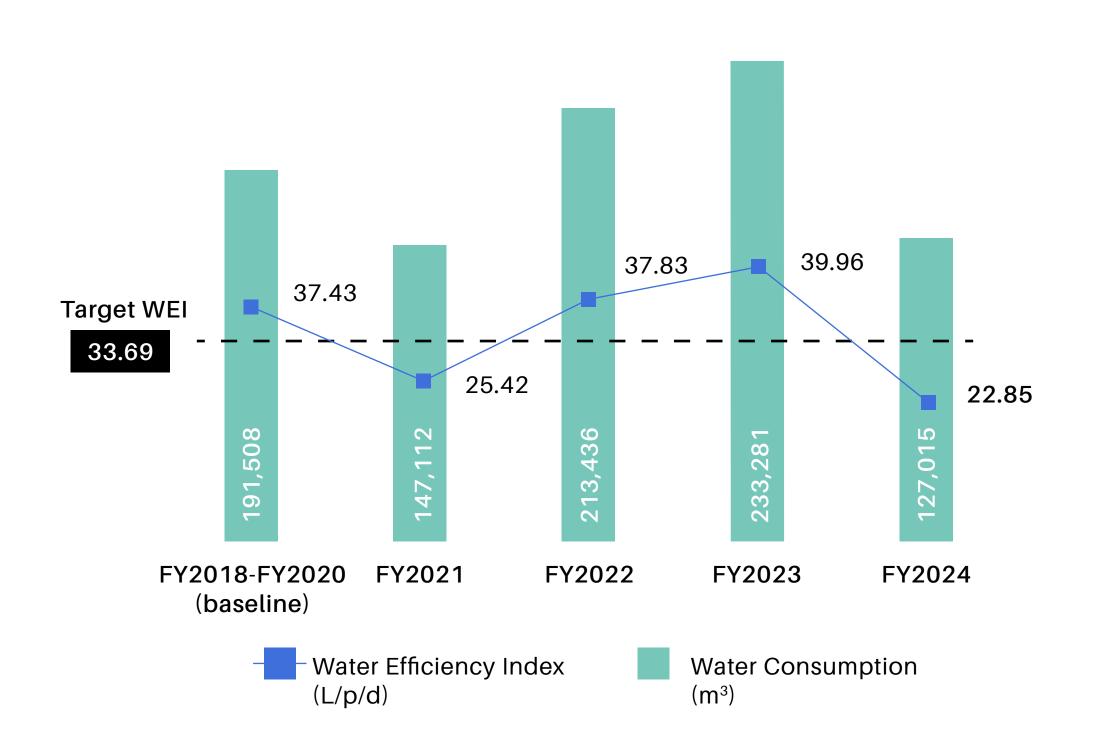
*Based on 50% usage load

FORWARD PLANS

To achieve our goal of a 10% EUI reduction by 2030, we are piloting advanced solutions, including hybrid cooling systems.



DISCLOSURE



WATER EFFICIENCY INDEX (WEI)

The FY2024 Water Efficiency Index (WEI) of 22.85L/p/d reflects a significant 42.8% decrease from FY2023's 39.96L/p/d, and a 38.9% reduction against the baseline average (FY2018–2020).

Smart monitoring and underground main replacement have reduced water wastage. The removal of cooling towers and targeted landscaping irrigation have reduced overall water consumption.

Target WEI is 33.69 L/p/d, a 10% reduction by FY2030 against FY2018-2020 average levels as baseline.



NP has achieved this goal five years ahead of the GreenGov target.

ANNEX

GREENING OUR CAMPUS

KEY ACTIONS



IOT-BASED WATER LEAK MONITORING

Frequent bursts in our aging water main caused major water loss. We resolved this by replacing it and installing an IoT system for real-time leak and pressure monitoring, thereby reducing water loss and improving reliability.



SMART IRRIGATION SYSTEM

Manual irrigation often resulted in overwatering and waste. To improve efficiency, we introduced a data-driven, closed-loop system using soil sensors and flow meters to monitor real-time conditions and prompt need-based watering.



SMART WATER TANK MONITORING

Previously, unmonitored water tank top-ups caused overspills and water wastage. Our IoT-based monitoring system now provides real-time alerts for overfill and low levels, enabling timely intervention, preventing overflow and improving efficiency



AHU CONDENSATE WATER RECOVERY & REUSE

About 81% of our Air Handling Units (AHUs) are equipped with condensate recovery systems. The water collected is reused to top up cooling towers, irrigate landscapes, and replenish the Eco Pond.

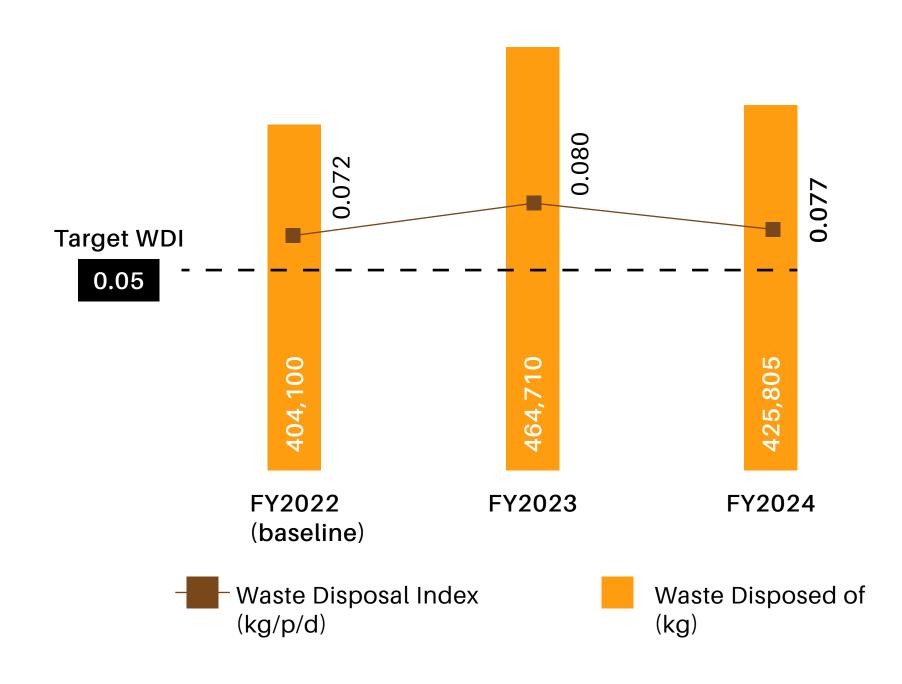
FORWARD PLANS

The following plans will enable us to maintain our position and continue staying ahead of GreenGov's target:

- Apply for ISO46001 Water Efficiency Management Systems Certification.
- Pilot tracking water leaks by monitoring the operations of water pumps after office hours.
- Pilot using soil moisture sensors to activate irrigation.
- Review operations such as water jet washing and cleaning procedures.



DISCLOSURE



WASTE DISPOSAL INDEX (WDI)

The FY2024 WDI is 6.9% higher than the FY2022 baseline.

In FY2024, the WDI stands at 0.077 kg/p/d, reflecting a moderate 3.7% reduction from FY2023's 0.080 kg/p/d.

This improvement stems from regular waste audits, and increased community engagement. In addition, we diverted and recycled approximately 18.6 tonnes of waste in FY2024, an estimated threefold increase over the 6.4 tonnes recycled in FY2023. The highest recycling rates were achieved for carton boxes, followed by dry leaves and paper.

Target WDI is 0.05 kg/p/d, a 30% reduction by FY2030 against FY2022 as baseline.

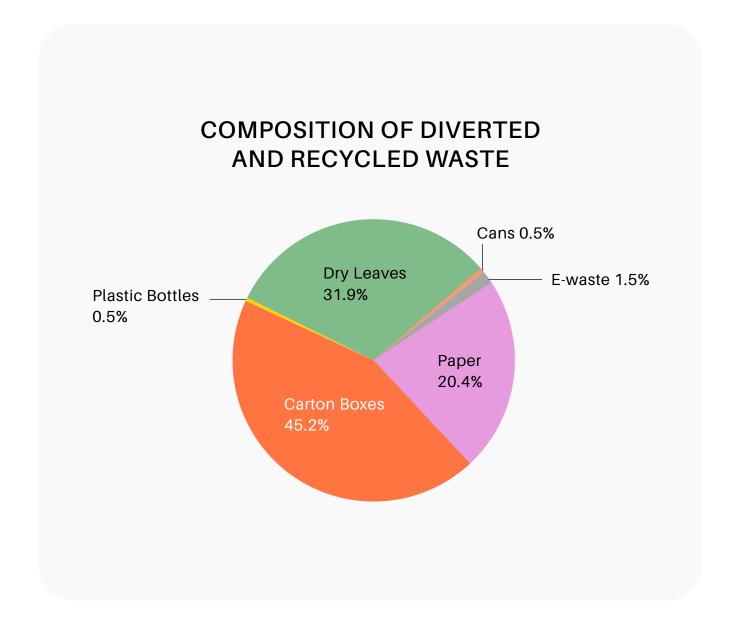
WASTE

PILLAR 3 GREENING OUR CAMPUS

KEY ACTIONS

NP has strengthened its waste management efforts through initiatives such as conducting a waste audit to analyse the source, type, and composition of campus waste. Insights from the audit informed the development of a waste dashboard to support data visualisation, and more effective, data-driven waste management across our campus.

Plus, our dried leaf segregation programme within just three months, diverted nearly 6 tonnes of waste from landfills and was sent for composting.



FORWARD PLANS

- Dried leaf segregation and composting will continue as a permanent initiative.
- Digesters will be installed at all food courts to treat food waste.
- We will install two smart recycling stations at key spots on campus.
- We will pilot a project with industry partners using innovative solutions to analyse waste data.
- We will continue our work to identify and divert a greater volume of recyclable waste from the general waste stream.



KEY ACTIONS

GREEN EVENT GUIDELINES

We developed green event guidelines outlining best practices for organising eco-friendly events. These include encouraging waste reduction, reusables, and sustainable sourcing. Piloting these at select outreach events, canteens offered dining-in with reusable crockery and cutlery, cutting packaging waste and setting a new standard for sustainable events.

TEXTILE RECYCLING

Students and Lecturers from the School of Business & Accountancy (BA) collaborated with Cloop, a circular fashion enterprise, and recycled over 1,100 kg of textiles.

SUSTAINABLE CONSUMPTION & WASTE REDUCTION

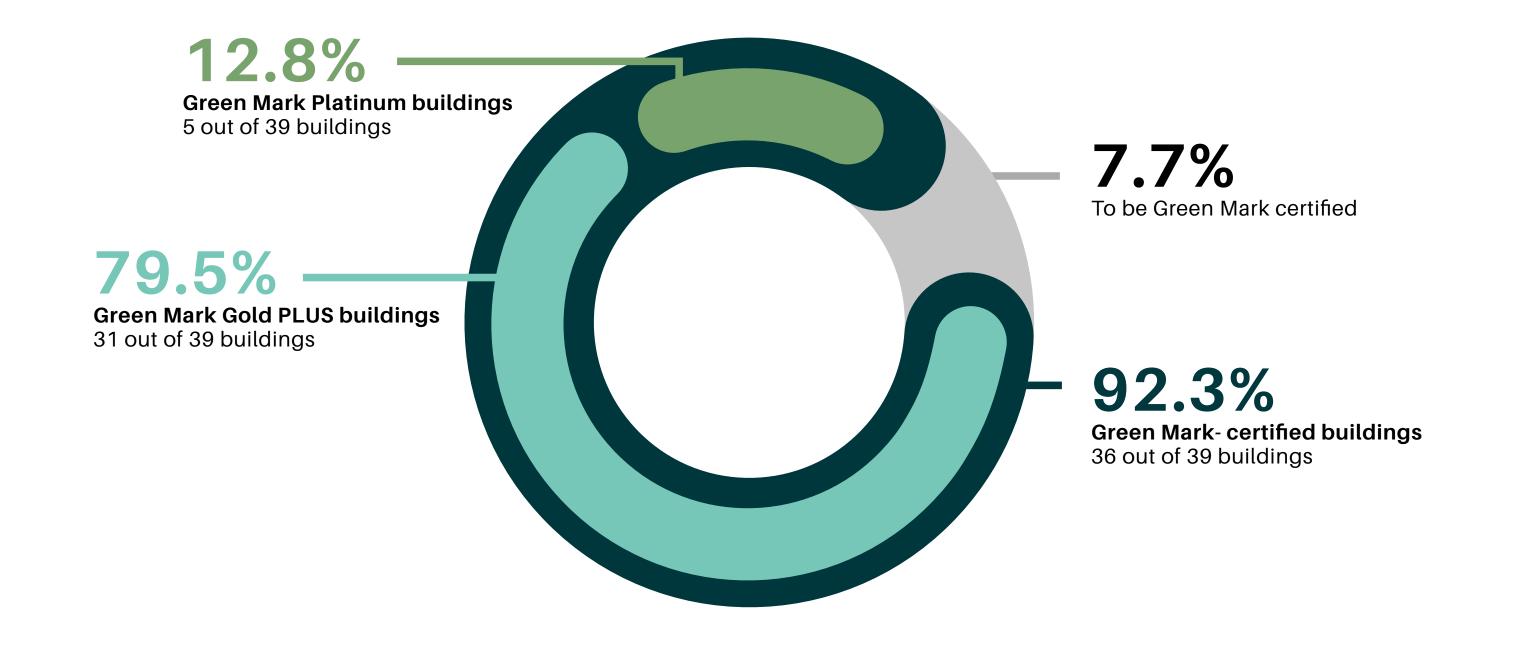
NP strengthened waste education through campus-wide campaigns, combining Green Ambassadors' (GAs) peer advocacy, digital outreach, and community engagement with cleaners and canteen operators. Initiatives included TikTok campaigns on food waste and promoting reusables and mindful dining.



FORWARD PLANS

- We will continue our efforts to enable our GAs to conduct more educational campaigns to promote responsible consumption.
- BA will pilot a research study leveraging behaviourial science to nudge environmentally friendlier decisions and actions.
- We will continue to engage NP community and tenants towards less waste practices.
- We will implement green event and green procurement guidelines aimed at further waste reduction.

DISCLOSURE



FORWARD PLANS

We will obtain Green Mark certification for the remaining 3 buildings at our next major retrofit.

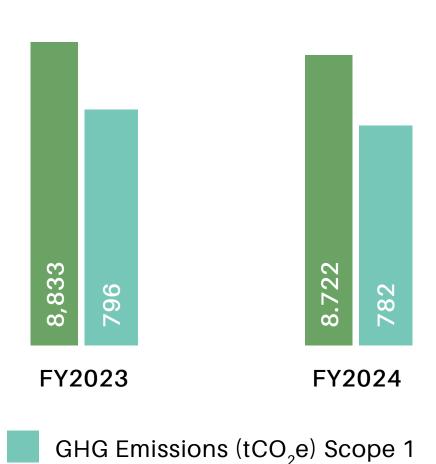
GREEN BUILDING



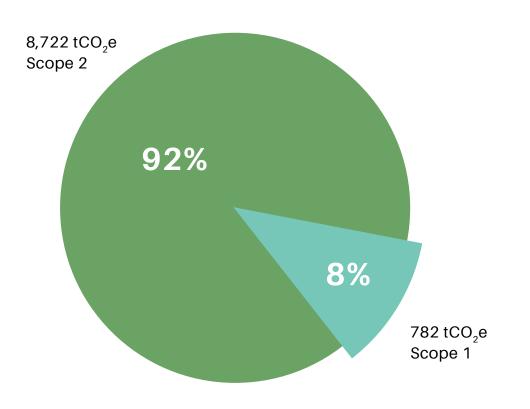
GREENING OUR CAMPUS

DISCLOSURE





GHG Emissions (tCO₂e) Scope 2



GREENHOUSE GAS (GHG)

Total GHG emissions (Scope 1 and 2) are recorded as 9,504 tCO₂e, with 92% from Scope 2 and the remaining 8% from Scope 1.

Scope 1 GHG emissions originate mainly from diesel and fuel consumption in our power generators and shuttle buses, as well as fugitive emissions from air-conditioning units and chiller plants. The main source of Scope 2 GHG emissions is purchased electricity for our operations.

Marginal decreases of 1% in Scope 2 and 1.8% in Scope 1 GHG emissions were observed compared to FY2023.

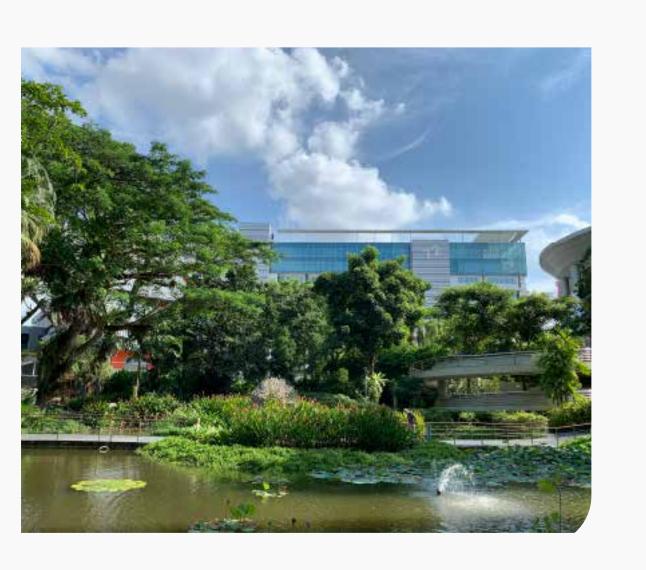
As part of EDB's SolarNova programme, NP generates about 1,500 MWhr of solar energy annually, accounting for 7% of NP's energy consumption in FY2024. We will increase solar capacity through more solar panel installation on the remaining rooftops.

Our target is to achieve net zero GHG emissions by 2045.

COLLECTIVE ACTION THROUGH COMMUNITY ENGAGEMENT

We work with our campus community to raise environmental awareness and inspire collective action. In support of Earth Hour 2025, NP dimmed or switched off non-essential lights, saving approximately 20 kWh of energy and encouraging participation in this global movement.

The School of Health Sciences and the Centre for Environmental Sustainability each achieved at least a 3-Leaf rating under the SEC's Eco-Office certification, recognising their efforts in reducing environmental impact and promoting resource efficiency.



Green Campus Trail

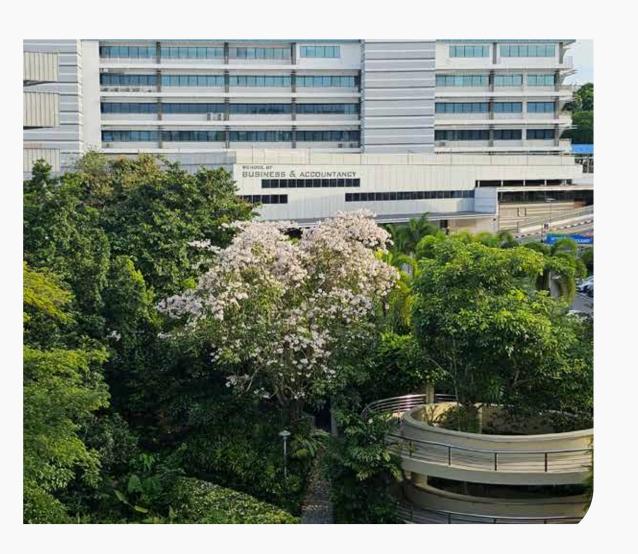
Our Green Campus Trail offers staff and students a hands-on way to engage with sustainability. Featuring key stops like the Rain Garden and two Eco Ponds, the trail highlights how NP integrates smart technologies and green infrastructure into campus life. This immersive experience not only showcases our environmental solutions but also reinforces the importance of sustainable living through everyday practices.



OUR BIODIVERSE CAMPUS

NP continues to celebrate and protect campus biodiversity through interactive initiatives and conservation efforts.

The *Birds of NP* Challenge engaged the community in spotting and identifying native bird species. It drew over 50 correct entries. NP also adopted four palm trees donated by Gardens by the Bay. These trees are classified as endangered by the International Union for Conservation of Nature. This marks another step in our ongoing commitment to environmental conservation.



Trees of NP

With over 1,000 trees across 100 species, NP's green campus is home to iconic varieties like the Trumpet tree. To further enrich our landscape, the NP community was invited to suggest new tree, plant, and flower species for future planting. Selected ideas will be incorporated into upcoming campus greening projects, reflecting our shared commitment to create a thriving, biodiverse environment. There are plans to plant more than 40 new trees in the next year.

LOOKING AHEAD

We will roll out a green playbook to guide academic schools in contextualising curriculum planning and development, aligning industry needs with our goal of nurturing sustainability-intelligent graduates.

We will introduce additional environmental sustainability awards to recognise and inspire students who lead and champion green initiatives.



LOOKING AHEAD

With air-conditioning being a key contributor to building energy consumption, we will work closely as a technology enabler with partners to develop and promote energy-efficient air conditioning solutions.

We will embark on Phase 1 of our collaboration with Keppel to retrofit NP's Smart34 building to become more sustainable.



LOOKING AHEAD

We remain committed to energy-efficient buildings by piloting advanced solutions.

We will improve water
 management systems
 and strengthen
 conservation efforts.

We are deepening our commitment to a circular economy by working toward a low-waste campus.

We will foster sustainable daily operations through active partnerships with our campus community.



IPAL 8

TECHNICAL ANNEX

DEFINITION OF ENERGY UTILISATION INDEX (EUI)

Aligned with GreenGov definition, i.e.

Total amount of electricity consumed in Year_n (kwh)

Total gross floor area in Year_n (m²)

Baseline EUI is calculated using the following formula:

Σ Total amount of electricity consumed in between 2018 to 2020 (kwh)

∑ Total gross floor area between 2018 to 2020 (m²)

NP's Gross Floor Area (GFA) used in this formulae is 359,014 m² (FY2024).

EUI calculation is aligned with our organisational boundary. It covers NP's Campus but excludes entities outside NP's operational control, namely on-campus tenants and food court operators.

GHG EMISSIONS

Emission factor for Scope 2 is the Energy Market Authority's (EMA) published Grid Emission Factor (GEF) for 2023, (revised 2024 GEF is not available) i.e. 0.412 kgCO₂e/kwh.

GHG emission (Scope 2) reported is aligned with our organisational boundary; it covers NP's Campus but excludes entities outside NP's operational control, namely on-campus tenants and food court operators.

Organisational boundary is based on the operational control approach, with reference to the GHG Protocol's Corporate Accounting and Reporting Standard.

TECHNICAL ANNEX

DEFINITION OF WATER EFFICIENCY INDEX (WEI)

Aligned with GreenGov definition, i.e.

Total amount of water consumed in Year_n (L)

Operation days X in Year, ((number of staff and students) + (0.25 x number of visitors)) in Year,

Baseline WEI is calculated using the following formula:

Σ Total amount of water consumed in between 2018 to 2020 (L)

Σ [Operation days X ((number of staff and students) + (0.25 x number of visitors))] between 2018 to 2020

Our estimate of daily campus footfall, except in 2020*, comprises staff, students enrolled in full-qualification programmes and ad-hoc visitors. Operational days includes school vacations.

The total amount of water consumed covers NP's campus but excludes entities outside of NP's operational control, namely on-campus tenants and food court operators.

DEFINITON OF WASTE DISPOSAL INDEX (WDI)

Aligned with GreenGov definition, i.e

Total amount of waste disposed of in Year, (kg)

Operation days X in Year, ((number of staff and students) + (0.25 x number of visitors)) in Year,

Our estimate of daily campus footfall, except in 2020*, comprises staff, students enrolled in full-qualification programmes and ad-hoc visitors. Operational days includes school vacations.

The total amount of waste disposed of includes NP's campus and all on-campus tenants and food court operators.



