ngee ann polytechnic

MAKING A GREEN IMPACT

Environmental Sustainability Disclosure
Financial Year 2023

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> Ngee Ann Polytechnic is committed to nurturing talent who have the vision and skills to navigate the 3Ps of People, Planet and Profit to create sustainability solutions that make an impact.

Mr Lim Kok Kiang
Principal & CEO

Principal & CEO's Message

Situated amid lush greenery, Ngee Ann Polytechnic (NP) is proud of our green campus that attests to our unwavering commitment to environmental sustainability.

Over the past decade, we have made significant strides by reducing our carbon footprint and setting new benchmarks in sustainable practices. We also launched our Sustainability Education & Ecosystem Development (SEED) initiative in March 2024 to embed environmental sustainability across our curriculum, partnerships and operations.

Simultaneously, the SEED framework outlines our threefold green strategy which encompasses the development of sustainability-intelligent graduates, spearheading of industry partnerships to drive sustainability innovation, and the greening of our campus. Through concerted efforts to work with the members of our community and partners to advance each of these areas, we are confident that we will reach greater heights.

Climate change is indeed the biggest challenge of our lifetime, yet it offers us the greatest opportunity to make a lasting impact on our world. NP is committed to nurturing a generation of learners with the vision and skills to navigate the 3Ps of People, Planet and Profit to create sustainability solutions that advance Singapore's green goals.

Focused on NP's efforts in caring for our Planet, our inaugural Environmental Sustainability Disclosure encapsulates our sustainability journey and future plans. We invite you to take a peek into how we are making a green impact.

A Decade of Milestones

2013 - 2023

1st Poly

To offer a **Minor in Sustainability**

To **install solar panels** to harness renewable energy

With an **intelligent Integrated Ops Centre**

To pioneer retrofitting a building with a **Distributed Pumping System for Chilled Water Plant**

Impact

Ranked #1 among Polys & ITEs for the lowest Energy Utilisation Index (EUI)

Biodiverse campus with **>1,000 trees 100 species**

Achieved **19% reduction** in water consumption against baseline 2013

15% increase in green softscape diversity with more vertical green walls erected and roads converted into gardens

Awards

PRESIDENT'S AWARD FOR THE ENVIRONMENT

Recipient of **President's Award for the Environment 2014**, Singapore's highest environmental accolade

ENERGY EFFICIENCY NATIONAL PARTNERSHIP

Recipient of **Energy Efficiency National Partnership Awards 2021**

BCA GREEN MARK

Achieved **Green Mark Certification** for 35 NP Buildings

GREEN LIVING @ NORTH WEST

Green Living Award 2023 (Silver) by North-West Community Development Council

We strive to shape a Green and Sustainable Community through education and research, and by harnessing smart technology in managing our built environment, adopting sustainable solutions and promoting environmental awareness in our community.

OUR COMMITMENT

Our Environmental Sustainability Framework

NP's Greenprint for a Sustainable Future

Our Framework

Pillar 1: Developing Sustainability-Intelligent Graduates

Our students will graduate with sustainability literacy to add value to businesses and communities through green solutioning. They will also gain skills to contribute to the green economy.

100% Full-time Learners undergo Eco-Sustainability foundational module

25 Full-time Courses or about 70% of NP Diplomas include sustainability modules

19 CET Programmes with sustainability focus for Adult Learners

Since April 2024, every first-year NP student has undergone sustainability education as part of an interdisciplinary programme to help them develop a set of sustainability lens through which they can engage in community-based solutioning. This provides them with a firm foundation and the confidence to tackle sustainability-centred industry projects in their final year.

We are progressively incorporating industry-specific ESG (Environmental, Social & Governance) skills and knowledge into the curricula of our 36 diploma courses, where relevant.

NP's Continuing Education & Training Academy (CETA) has also introduced programmes designed for adult learners to equip them with in-demand skills to drive sustainability across industries.

Our Framework

Pillar 2: Spearheading Industry Partnerships

NP is driving sustainability innovation and talent development through strategic alliances and new ecosystems via our Centre for Environmental Sustainability.

>1000 Collaborations with Industry Partners

>50 MOU Agreements signed

Winner of the Jurong Lake District Innovation Challenge

Our Centre for Environmental Sustainability (CfES) collaborates with industry partners and academic schools to develop sustainability solutions and provide our students with practical experiences in applying these in real-world contexts.

NP is forging strategic alliances to drive sustainability innovation and talent development. For instance, it inked partnerships with 15 organisations, including Johnson Controls, Meinhardt, Sodexo and Surbana Jurong to establish the NP Built Environment Ecosystem (BEE). Supported by JTC Corporation, the BEE offers advanced training in smart facilities management.

NP won the Jurong Lake District Innovation Challenge with our innovative Human Thermal Comfort Controller that automatically adjusts the air temperature to deliver thermal comfort based on environmental factors, including convection, evaporation and radiation, unlike conventional thermostats. The system is being developed with our built environment ecosystem partners and will be piloted on campus to drive energy savings while ensuring cooling comfort.

Our Framework

Pillar 3: Greening Our Campus

Since 2013, we have pioneered many green initiatives and made significant strides in sustainability. We remain committed to transforming our campus into a living laboratory for sustainability innovations, retrofitting our buildings and implementing green practices to make NP a model of environmental responsibility. The following pages capture our journey in the four key areas of energy, water, waste and green buildings.

Energy

2013	2014	2015	2016	2017	2018	2021	2023
Replaced energy inefficient air-conditioning equipment	Incorporated natural ventilation space for new developments and renovations	Established mini-cooling districts to enhance building energy efficiency	Piloted a distributed pumping system, achieved 20% energy savings and expanded the concepts to more buildings	Transitioned to LED lighting in classrooms, labs, and studios	Implemented smart lighting system for remote office light control via mobile app	Installed solar panels on 15 campus buildings	Replaced and consolidated standalone air-conditioning systems

Our Framework

Pillar 3: Greening Our Campus

Water

2013
Installed water efficiency fittings for all washrooms

2015
Recycled air-conditioning condensate for cooling towers and landscape irrigation

2016
Upgraded to more efficient cooling towers

2016
installed water meters in all buildings

2017
Automated landscape irrigation to reduce water consumption

2023
Replaced aged main campus water mains

2023
Decommissioned cooling towers through chiller plant consolidation

Our Framework

Pillar 3: Greening Our Campus

Waste

2015

Eliminated the use of styrofoam boxes in all NP food courts, replacing them with biodegradable packaging

2017

Started collaboration with NEA to collect and convert 18.5 tonnes of food waste annually from 3 NP food courts

2019

Launched "Wednesday is NO Straw Day"

2019

Encouraged NP community to bring their own tumbler for cold beverage

2020

Removed straws from all NP F&B outlets

2020

Leveraged digitalisation to cut paper usage by nearly 40%

Our Framework

Pillar 3: Greening Our Campus

Green Building

2015

Started to incorporate green walls into our building facade

2019

Set up NP's Integrated Operations Centre, a control hub for managing the campus' key operations

2021

13 offices in NP received the Eco-Office Certification endorsed by the Singapore Environment Council

2022

35 blocks in NP were Green Mark certified by the Building and Construction Authority

Our 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

- Steers NP's overarching sustainability strategy

Council Sub-Committee

Chaired by CBRE's Chairman of South East Asia

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

Principal & CEO

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

Environmental Sustainability Steering Committee

Led by NP Chief Sustainability Officer

- Oversees NP's Sustainability initiatives
- Leads in the integration of environmental sustainability across curriculum, operations and partnerships

Environmental Sustainability Working Committee

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

Introducing Our Environmental

SUSTAINABILITY DISCLOSURE

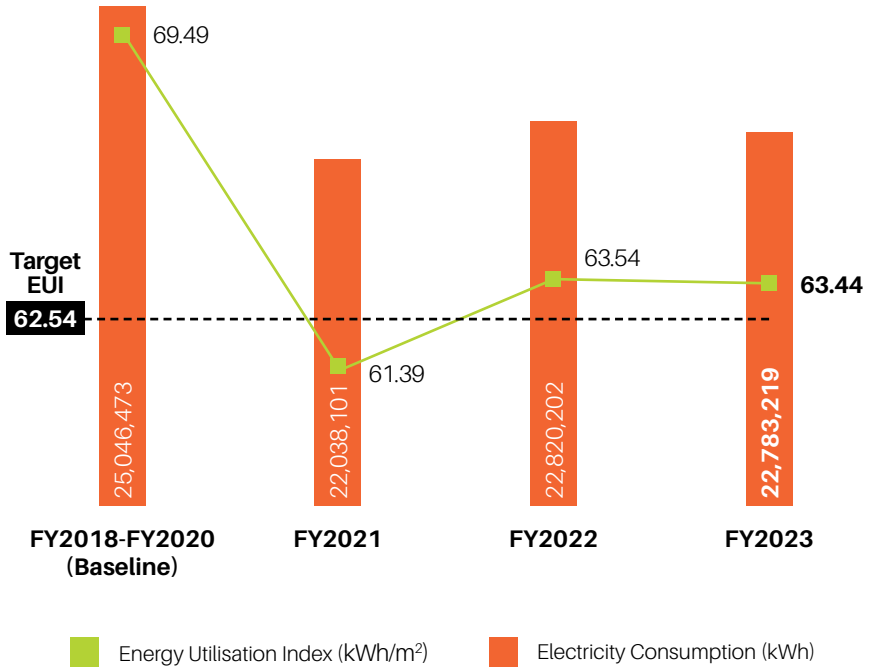
NP's disclosure provides a transparent account of our sustainability strategies, goals and progress, covering our performance from 1 April 2023 to 31 March 2024. It reflects NP's ongoing commitment to environmental stewardship, which aligns with the Singapore Green Plan 2030 sustainability framework.

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. Key environmental sustainability indicators, including Greenhouse Gas (GHG) Emissions, Electricity Consumption, Solar Capacity, Water Consumption, Waste Generation, and Green Buildings were selected for reporting based on GreenGov.SG requirements.

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

Energy

Disclosure



Energy Utilisation Index (EUI)

The FY2023 EUI is reduced by 8.7% against the EUI baseline (FY2018-2020 average). There is a marginal decrease of 0.1% in FY2023 EUI when compared with FY2022 EUI (63.54 kWh/m^2), despite more students and staff returning to the campus following the relaxation of COVID-19 restrictions.

Our target EUI is 62.54kWh/m^2, a 10% reduction by FY2030 against FY2018-2020 average levels as baseline.

Energy

Key Actions

Greater Energy Efficiency

New chillers installed with most of them featuring dual compressors for better operational performance and achieving a 15% better energy efficiency than GM requirements.

Optimised Ops & Monitoring

Chiller plants fully integrated with our Building Management System for optimised monitoring and operations.

Renewable Energy

Installed 1.5 MW peak solar generation capacity

Lower GHG Emissions

>90% of our standalone AC systems meet NEA's 5-tick standards and use eco-friendly refrigerants with lower GHG emissions.

Switched Off Aircon

Air conditioning is switched off in low-use areas like study zones and the library during vacation periods.

Smart Lighting Upgrades

Upgraded to smart lighting systems with individual user-controlled settings for offices.

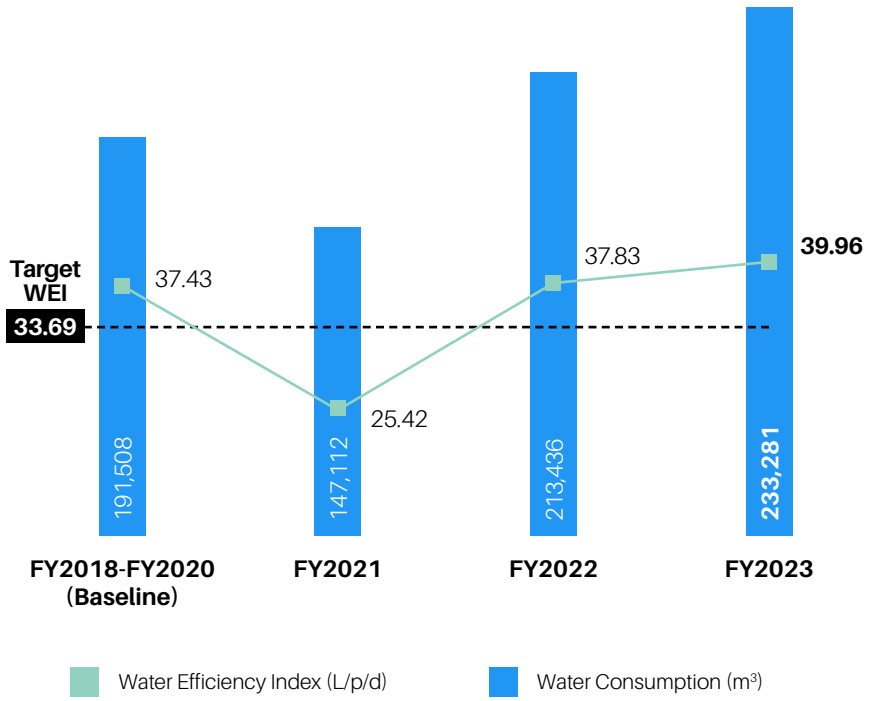
Replaced all energy intensive high-mast lighting at sports facilities with energy-efficient LEDs.

Forward Plans

We are committed to doubling our renewable energy harvesting by expanding solar panel coverage across our rooftops. In addition, we will explore advanced solutions, such as building-integrated photovoltaics, to achieve our goal of 10% Energy Use Intensity (EUI) reduction by 2030.

Water

Disclosure



Water Efficiency Index (WEI)

The Water Efficiency Index (WEI) for FY2023 is 39.96 L/p/d. This reflects an increase by 5.6% when compared with FY2022 WEI (37.83 L/p/d).

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

Water

Key Actions

Recycling Water

Using rainwater and air conditioning condensate for irrigation and cooling tower make-up.

Cooling Tower Optimisation

Rationalising campus chiller plants and cooling towers by decommissioning older units and upgrading the remaining ones to meet Green Mark water efficiency standards.

Smart Monitoring

Automated leak detection systems installed for prompt leak resolution.

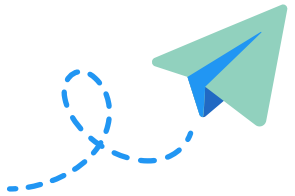
Regular **water audits** are conducted to monitor for inefficiencies.

Upgrading Water Infrastructure

Retrofitted washrooms to comply with WELS guidelines, upgraded fittings to a minimum of 3-tick ratings and installed water-saving devices like self-closing taps.

Replaced underground mains over 50 years old to reduce water wastage from pipe bursts.

Forward Plans

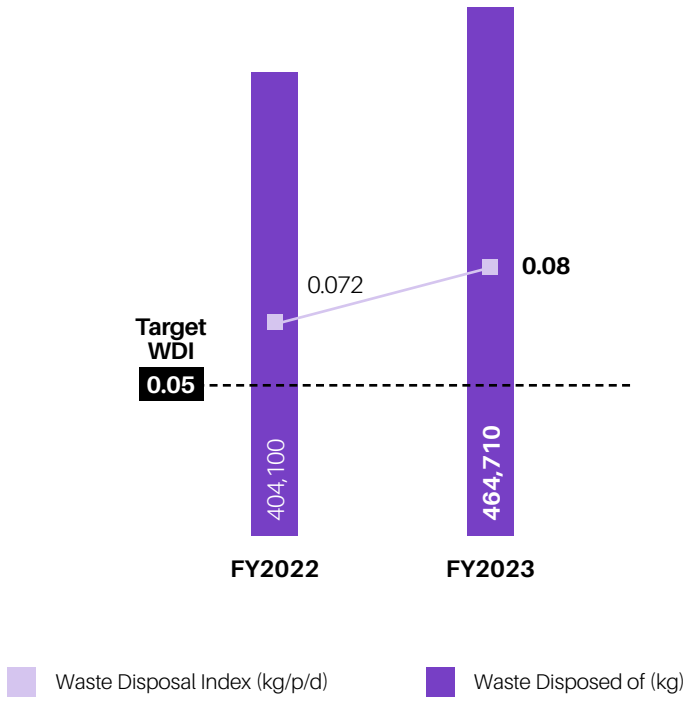


Upon the completion of water mains replacement in November 2023, AI-powered sensors are now fully integrated to allow detection of anomalies such as leaks or burst pipes across our extensive campus network.

This enhancement will enable us to address water issues promptly, reduce water leakage and work towards our 10% Water Efficiency Index (WEI) reduction target.

Waste

Disclosure



Waste Disposal Index (WDI)

The Waste Disposal Index (WDI) for FY2023 is 0.08 kg/p/d. There is an increase of 11.1% in WDI when compared with FY2022 WDI (0.072 kg/p/d). Waste generation was not tracked in FY2021, hence there was no data for reporting and comparison.

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

Waste

Key Actions

Community Efforts

Piloting student initiatives such as a 9-month collaboration with Cloop, a circular fashion enterprise by School of Business & Accountancy students, which diverted 1,339 kg of textile waste from disposal.

Digitalisation

Minimising paper usage through digitalisation efforts.

Waste to Energy

Collecting and transporting 3,378 kg of food waste from NP canteens to the Ulu Pandan Water Reclamation Plant for co-digestion with used water sludge to generate energy. This effort supports NEA and PUB's national initiatives for sustainable waste management and resource recovery.

Waste Recycling & Diversion

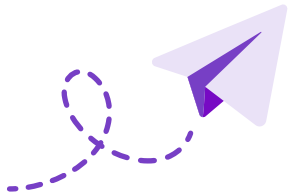
Partnering on projects to divert waste from disposal with NEA-F&N and ALBA. Initiatives included e-waste recycling bins, Reverse Vending Machines (RVM) for plastic bottles, and paper recycling bins.

Recycling or diverting from disposal 6,369 kg of generated waste:

Paper	Plastic bottles	E-waste
2,136 kg	3,971 kg	262 kg

We also work with our Facilities Management vendor to segregate recyclable items like blown fluorescent tubes for recycling.

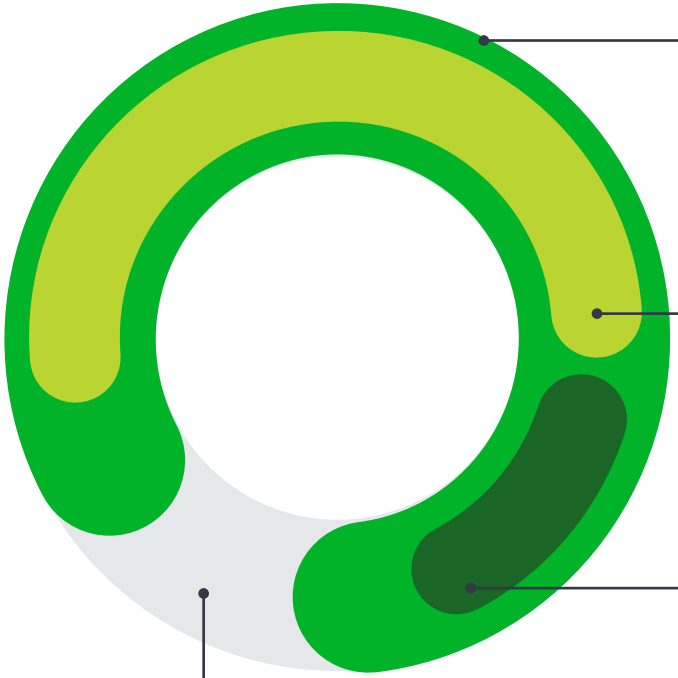
Forward Plans



We will intensify our waste reduction efforts through partnerships with industry to pilot innovative solutions on campus. These initiatives will drive both operational and behavioural changes, helping us achieve our reduction targets.

Green Building

Disclosure



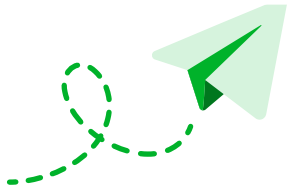
92.1%
Green Mark-certified buildings:
35 out of 38 buildings

78.9%
Green Mark Gold PLUS buildings:
30 out of 38 buildings

13.2%
Green Mark Platinum buildings:
5 out of 38 buildings

7.9%
To be Green Mark certified

Forward Plans



We will be obtaining Green Mark certification for the remaining 3 buildings at the next major retrofitting.

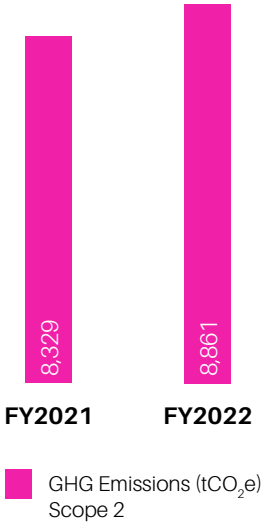
Greenhouse Gas (GHG) Emissions

Disclosure

FY2023

Total GHG Emissions: Scope 1 & 2

9,629 tCO_2e



GHG Emissions

Total GHG emissions (Scope 1 and 2) are recorded as 9,629 tCO_2e, with 92% from Scope 2 and the remaining 8% from Scope 1.

Scope 1 GHG emissions originate mainly from diesel consumption in our power generators and fugitive emissions from air-conditioning units and chiller plants.

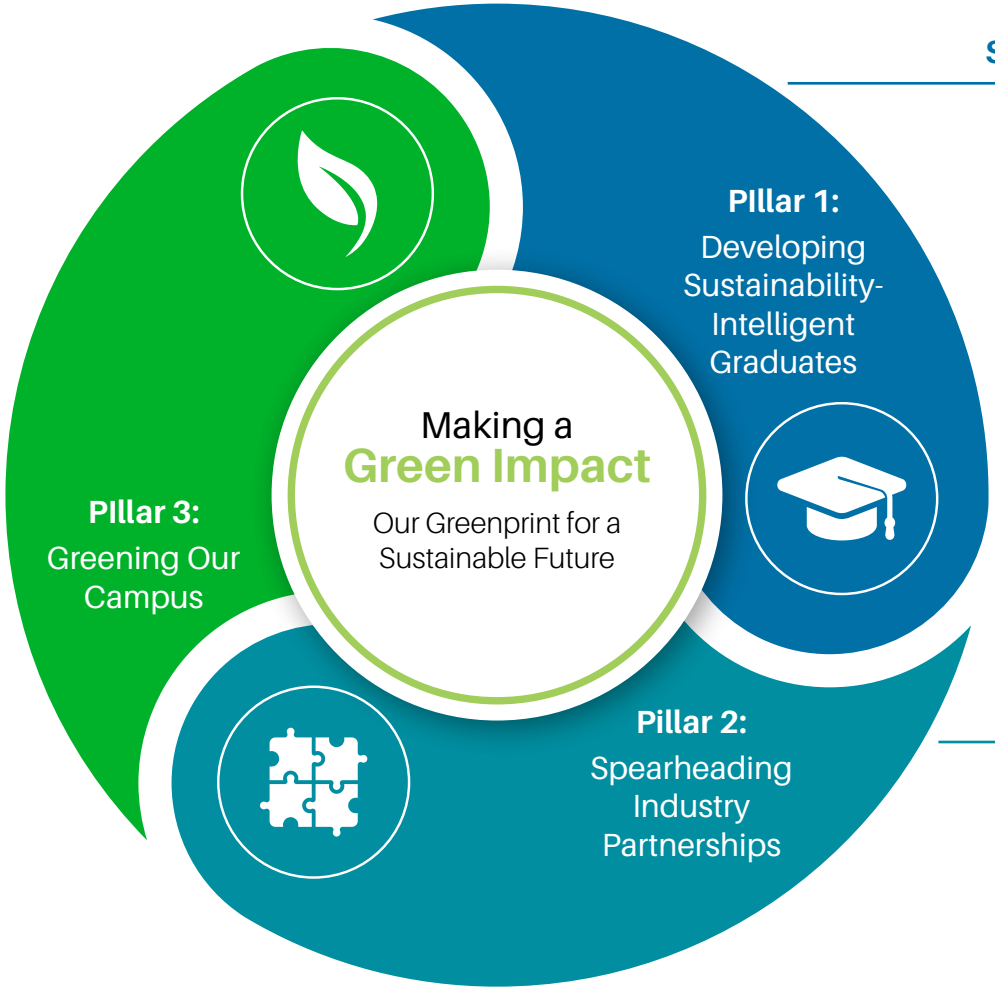
The main source of Scope 2 GHG emissions is purchased electricity for our operations. The Scope 2 GHG emissions for FY2023 is 8,833 tCO_2e. A marginal decrease of 0.3% Scope 2 GHG emissions is noticed against FY2022.

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 FY2023.

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

Looking Ahead: Making a Green Impact

Through NP's environmental sustainability framework, outlined in the following three pillars, we will continue to advance our green goals:



Greening Our Campus

- We will embed environmental sustainability into the core of our institution through active **student and staff engagement**.
- We will continue to harness **green technologies and built environment designs**, including the use of renewable energy and smart technology solutions, to reduce our carbon footprint.
- We will roll out **green leases** and engage with tenants to improve environmental sustainability performance.

Sustainability-Intelligent Graduates

- New and enhanced curriculum offerings will include the **Minor in Environmental Sustainability** (previously known as Minor in Sustainability) and an **Environmental Impact Scholarship** aimed at nurturing green talents.
- We will broaden our overall sustainability commitment by championing social sustainability through the **Centre for Organisational Resilience and Inclusion** launched in August 2024.

Industry Partnerships

- We will upskill up to 1,000 professionals with **advanced smart facilities management training** through the cutting-edge Integrated Operations Centre in collaboration with partners in the NP Built Environment Ecosystem.

Technical Annex

DEFINITON OF ENERGY UTILISATION INDEX (EUI)

Aligned with GreenGov definition, i.e.

$$\frac{\text{Total amount of electricity consumed in Year}_n \text{ (kwh)}}{\text{Total gross floor area in year}_n \text{ (m}^2\text{)}}$$

Baseline EUI is calculated using the following formula:

$$\frac{\sum \text{Total amount of electricity consumed in between 2018 to 2020 (kwh)}}{\sum \text{Total gross floor area between 2018 to 2020 (m}^2\text{)}}$$

- NP's Gross Floor Area (GFA) used in this formulae is 359,149 m^2 (FY2023).
- 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 2022, (revised 2023 GEF is not available) i.e. 0.4168 $kgCO_2e/kwh$
- 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

DEFINITON OF WATER EFFICIENCY INDEX (WEI)

Aligned with GreenGov definition, i.e.

$$\frac{\text{Total amount of water consumed in Year}_n\ (L)}{\text{Operation days in Year}_n \times ((\text{number of staff and students}) + (0.25 \times \text{number of visitors}))\ \text{in Year}_n}$$

Baseline WEI is calculated using the following formula:

$$\frac{\sum \text{Total amount of water consumed in between 2018 to 2020 (L)}}{\sum [\text{Operation days} \times ((\text{number of staff and students}) + (0.25 \times \text{number of visitor}))] \text{ between 2018 to 2020}}$$

- 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.

* 2020 data is based on MOE reporting of daily footfall during the COVID-19 pandemic Safe Management Measures (SMM).

DEFINITON OF WASTE DISPOSAL INDEX (WDI)

Aligned with GreenGov definition, i.e.

$$\frac{\text{Total amount of waste disposed of in Year}_n\ (L)}{\text{Operation days in Year}_n \times ((\text{number of staff and students}) + (0.25 \times \text{number of visitors}))\ \text{in Year}_n}$$

- 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.

* 2020 data is based on MOE reporting of daily footfall during the COVID-19 pandemic Safe Management Measures (SMM).

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