

Singapore Polytechnic

ENVIRONMENTAL SUSTAINABILITY DISCLOSURE

FOR FINANCIAL YEAR 2022

April 2024

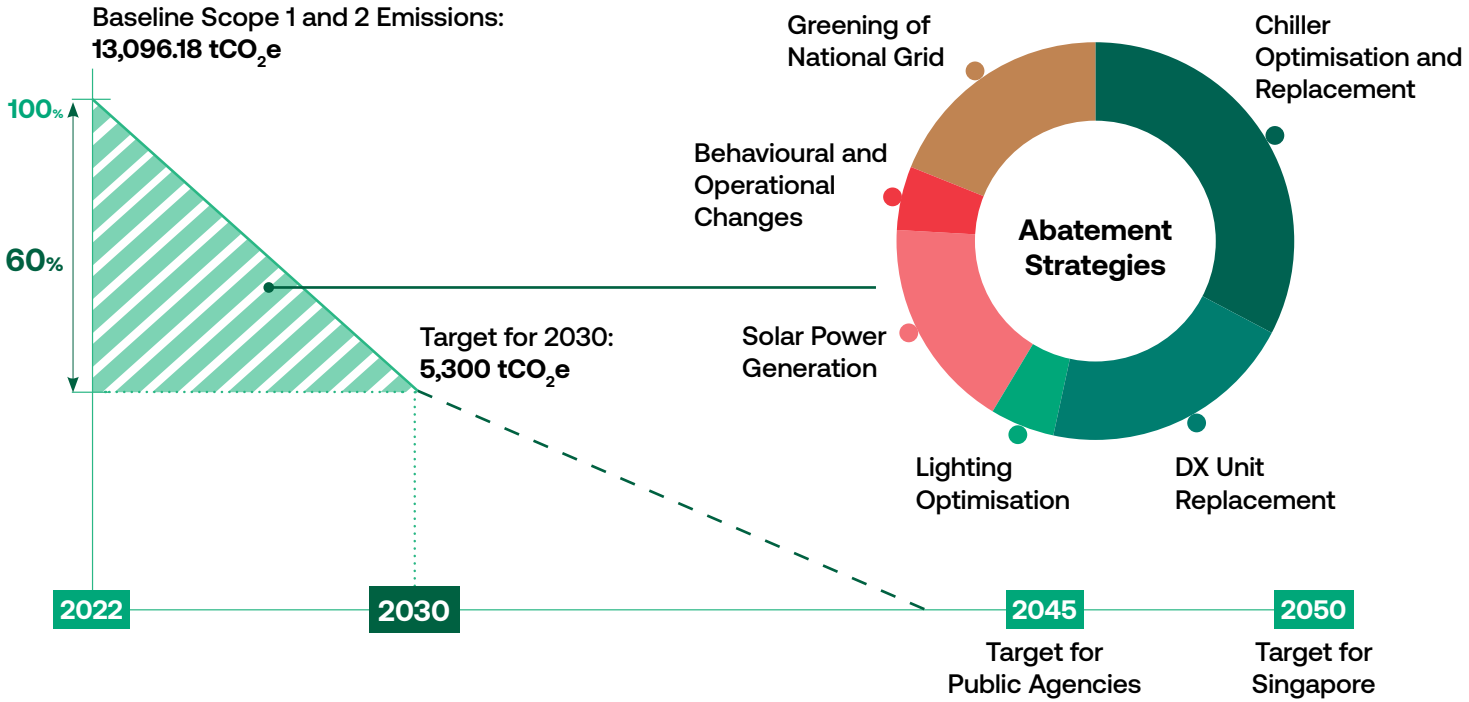
EXECUTIVE SUMMARY

Our 60-30 Vision

Our combined Scope 1 and 2 greenhouse gas (GHG) emissions for FY2022 was 13,096.18 tCO_2e. About 60% is attributable to electricity consumption from air-conditioning, and another 10% is due to refrigerant gases from air-conditioning units.

We aim to reduce our emissions by 60% by FY2030. We will take bold steps to overhaul our campus infrastructure, focusing on cooling and lighting infrastructure. These works will be dovetailed with other required renovation works, to ensure that our facilities remain fit for purpose and conducive to learning.

We will supplement these renovations with the introduction of on-campus solar power generation as well as efforts to encourage the campus community to adopt behavioural and operational changes aimed at reducing electricity consumption.



SP Singapore Polytechnic

EXECUTIVE SUMMARY

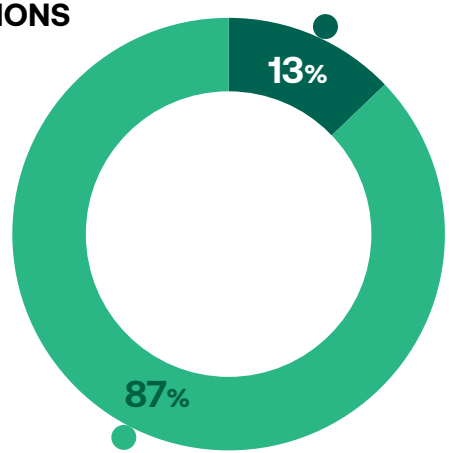
Summary of FY2022 Disclosures

SCOPE 1 AND 2 GHG EMISSIONS

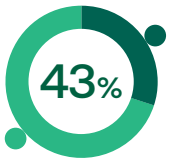
Scope 1 and 2 GHG Emissions:
13,096.18 tCO_2e

Scope 1:
1,673.73 tCO_2e

Scope 2:
11,422.45 tCO_2e



GREEN BUILDINGS



Green Mark-certified buildings:
23 out of **53**



Green Mark Platinum Super Low Energy (SLE) buildings:
1 out of **53**

ENERGY

Energy Utilisation Index:
103.3 kWh/m²



WATER

Water Efficiency Index:
49.7 L/p/d



WASTE

Waste Disposal Index:
0.075 kg/p/d

Proportion of waste generated that is diverted or recycled: **15.9%**

SP Singapore Polytechnic

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SP Singapore Polytechnic

PRINCIPAL & CEO'S MESSAGE

Singapore is committed to reaching net-zero GHG emissions by 2050, with public agencies targeted to do so around 2045.

As an educational institution, particularly one responsible for about 10% of the country's birth cohort, SP should do more and reach net-zero emissions even earlier. We will set an example with our 60-30 Vision—**our goal is to reduce our GHG emissions by 60% by 2030, taking 2022 as the baseline year.**

We are able to commit to this vision after conducting a consultancy study which identified various emissions abatement initiatives. We anticipate that these initiatives will become self-sustainable over time, as they help us avoid expected increases in electricity costs.

The 2045 target to reach net-zero emissions may seem far away. Some may think there is time and defer the necessary measures to the next generation.

SP takes a different view. We hope that our 60-30 Vision will show that **it is possible to make significant progress in just a few years and do more than half the work in less than half the time remaining.**

In publishing this disclosure using FY2022 data, ahead of the government requirement for statutory boards to publish disclosures using FY2023 data, we hope it will serve as a useful reference for other statutory boards and organisations. We see this as fulfilling our calling as one of Singapore's leading Institutes of Higher Learning.

Soh Wai Wah
Principal & CEO
Singapore Polytechnic

SP Singapore Polytechnic

ABOUT SP

Established in 1954, Singapore Polytechnic has been a trailblazer in Singapore's educational landscape. As a polytechnic for all ages, we prepare our learners to be life ready, work ready and world ready for Singapore's transformation.

Today, our ten schools offer 30 full-time diploma courses and four Common Entry Programmes to almost 12,500 students. Our alumni network comprises over 230,000 graduates who have excelled in various fields, including successful entrepreneurs, top executives in multi-national and public-listed corporations, industry leaders and professionals across various industries, and government leaders.

Continuing Education & Training (CET) is a core part of SP's education model. Through our CET offerings, SP plays an integral role in enterprise transformation, workforce upskilling and reskilling for the future economy.

SP is committed to sustainability, and we have integrated eco-conscious practices across our curriculum and operations. Through our schools and industry centres, we collaborate with enterprises to develop innovative solutions to address society's sustainability challenges. Our diploma curriculum now includes essential sustainability modules, and all diploma students undertake at least one Sustainability Innovation Project during their studies.

ABOUT THIS DISCLOSURE

Disclosures are for Financial Year 2022, i.e. 1 April 2022 to 31 March 2023. No external assurance has been sought for this disclosure.

We welcome suggestions or feedback to help us improve our subsequent disclosures. You can reach out to SP's Sustainability Office at sustainability_office@sp.edu.sg.

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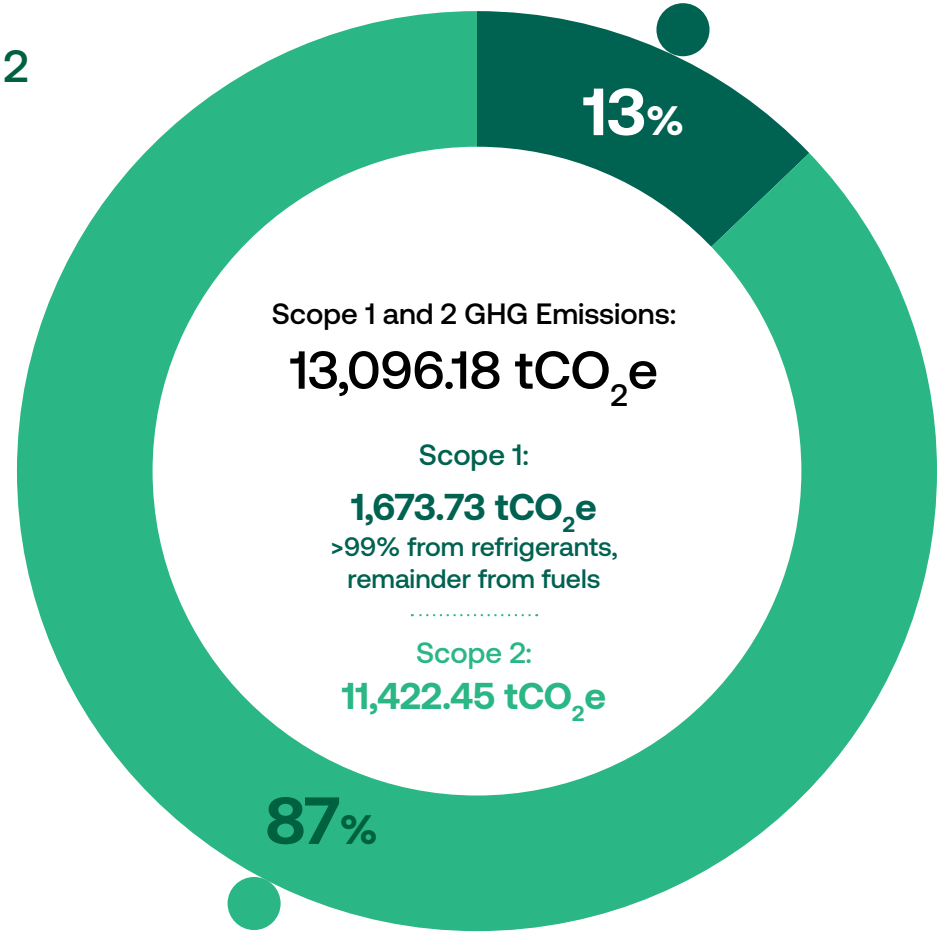


OUR SUSTAINABILITY VISION

SP Singapore Polytechnic

OUR SUSTAINABILITY VISION

Scope 1 and 2 Baseline



In 2023, we embarked on a consultancy study with KPMG Singapore to determine our Scope 1 and 2 GHG emissions for FY2022. This was the first step to understanding our starting point and guiding the development of our medium- to long-term sustainability plan.

In FY2022, our combined Scope 1 and 2 emissions was 13,096 tCO_2e. Our organisational boundary is defined using the operational control approach, with reference to the GHG Protocol's Corporate Accounting and Reporting Standard. It covers SP's Dover Campus and Poly Marina but excludes entities outside SP's operational control, such as our subsidiaries, tenants and vendors.

Further details can be found in the "GHG Emissions" section of this disclosure.

Beyond their own operations, organisations have a responsibility to tackle emissions arising from upstream and downstream activities, such as the purchase of goods and services. Indirect emissions from such activities constitute an organisation's Scope 3 emissions and often contribute significantly to its carbon footprint.

At this initial stage of SP's sustainability journey, we have intentionally confined our efforts to Scope 1 and 2 emissions. We are committed to addressing Scope 3 emissions in the coming years, through efforts like green procurement.

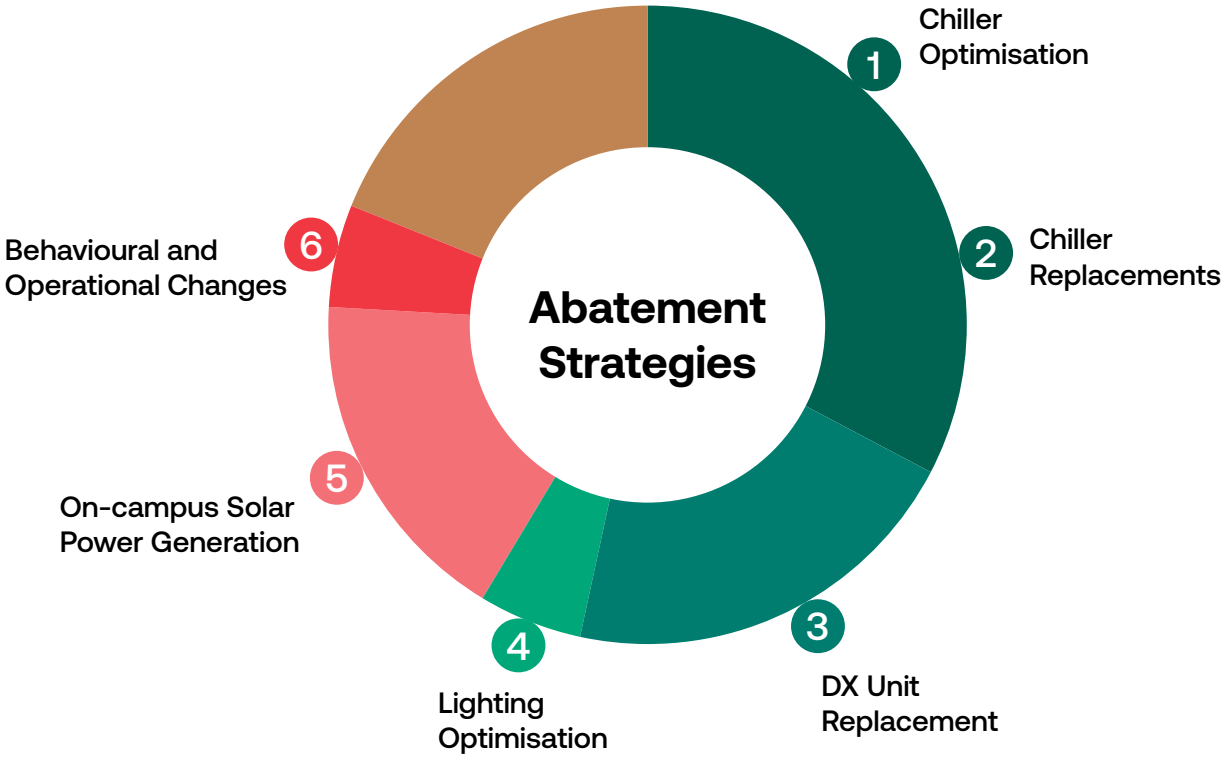
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OUR SUSTAINABILITY VISION

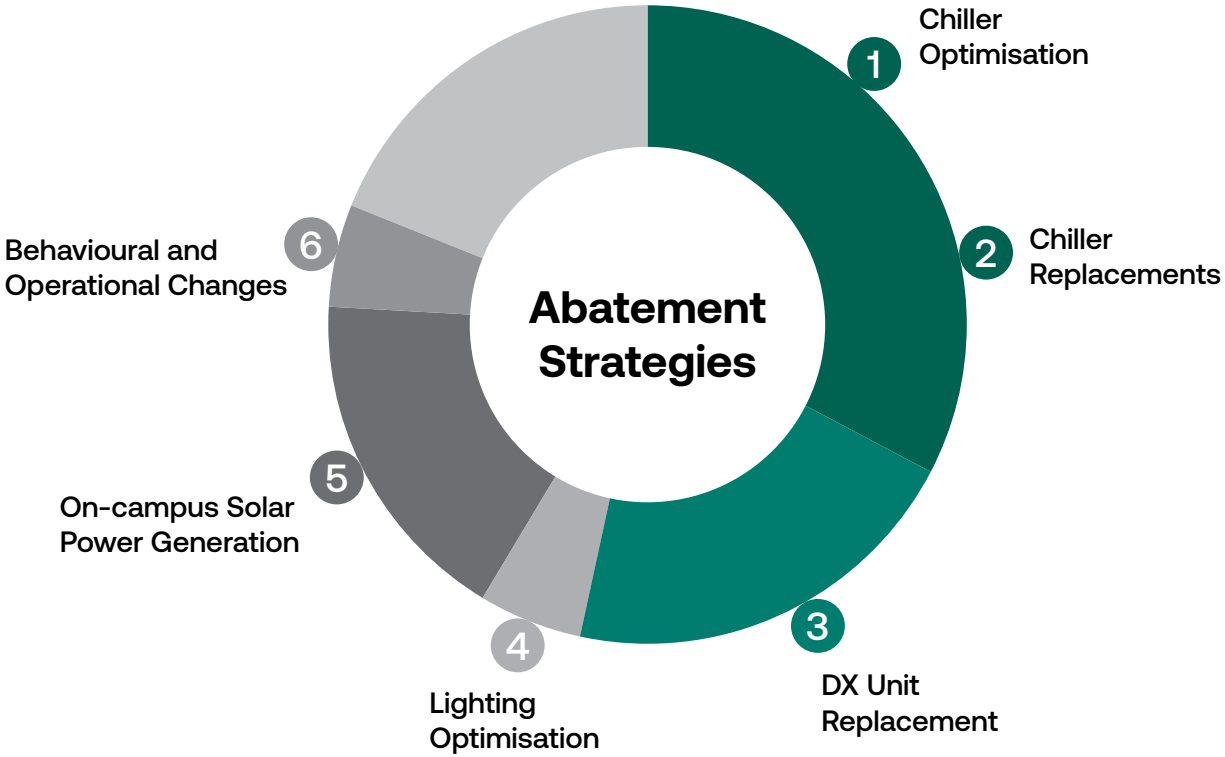
Emissions Abatement Strategies

Through our consultancy study with KPMG Singapore, we determined that (a) almost all of our Scope 1 emissions were associated with refrigerants from air-conditioning units, and (b) ~60% of our Scope 2 emissions were associated with air-conditioning.

We have identified six key strategies to focus on in the near to medium term. These strategies are collectively estimated to reduce annual GHG emissions by 55%.



SP Singapore Polytechnic



1 CHILLER OPTIMISATION

While most of SP's campus is already cooled through chilled water systems, air-conditioning still accounts for ~60% of our Scope 2 emissions.

We will install sensors, meters and control systems to improve the efficiency of our air-conditioning, taking into account real-time changes in ambient conditions.

2 CHILLER REPLACEMENTS

SP's chillers are ageing, with some almost 30 years old.

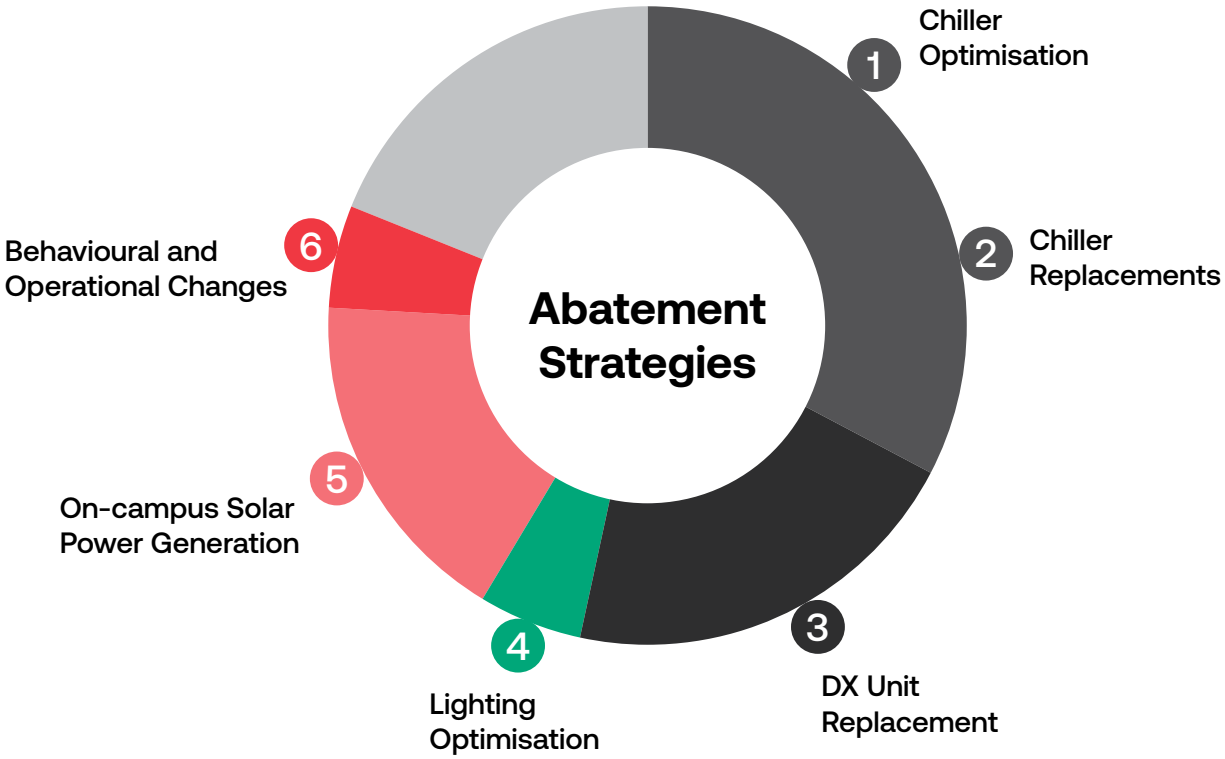
Given that the efficiency of chiller systems deteriorates over time, we will upgrade our ageing chillers to newer models with better efficiency.

3 DIRECT EXPANSION (DX) UNITS

DX air-conditioning units use refrigerants instead of chilled water to cool the air. GHG emissions from these refrigerants account for ~10% of SP's overall emissions.

We will retire some of our DX units and connect the facilities they serve to the chiller network instead. Where it is not practicable to do so—such as for facilities with 24/7 cooling needs like wafer fabrication laboratories—the DX units will be replaced with newer models that use lower-emissions refrigerants.

SP Singapore Polytechnic



4 LIGHTING OPTIMISATION

Fluorescent bulbs and tubes account for most of the lighting fixtures in SP currently.

We will progressively upgrade all our lighting fixtures to LED units, which have better energy efficiency and a longer lifespan.

This will be coupled with the installation of occupancy sensors wherever practicable, to further optimise electricity consumption by automatically switching off or dimming the lights when there is no human traffic.

5 ON-CAMPUS SOLAR POWER GENERATION

SP is participating in SembCorp's SolarNova initiative, which at steady state is expected to yield at least 4.2M kWh of green energy per year, or ~14% of SP's baseline annual electricity consumption.

6 BEHAVIOURAL AND OPERATIONAL CHANGE

We are optimistic about achieving significant emissions reductions through behavioural and operational changes that do not rely solely on infrastructural upgrades.

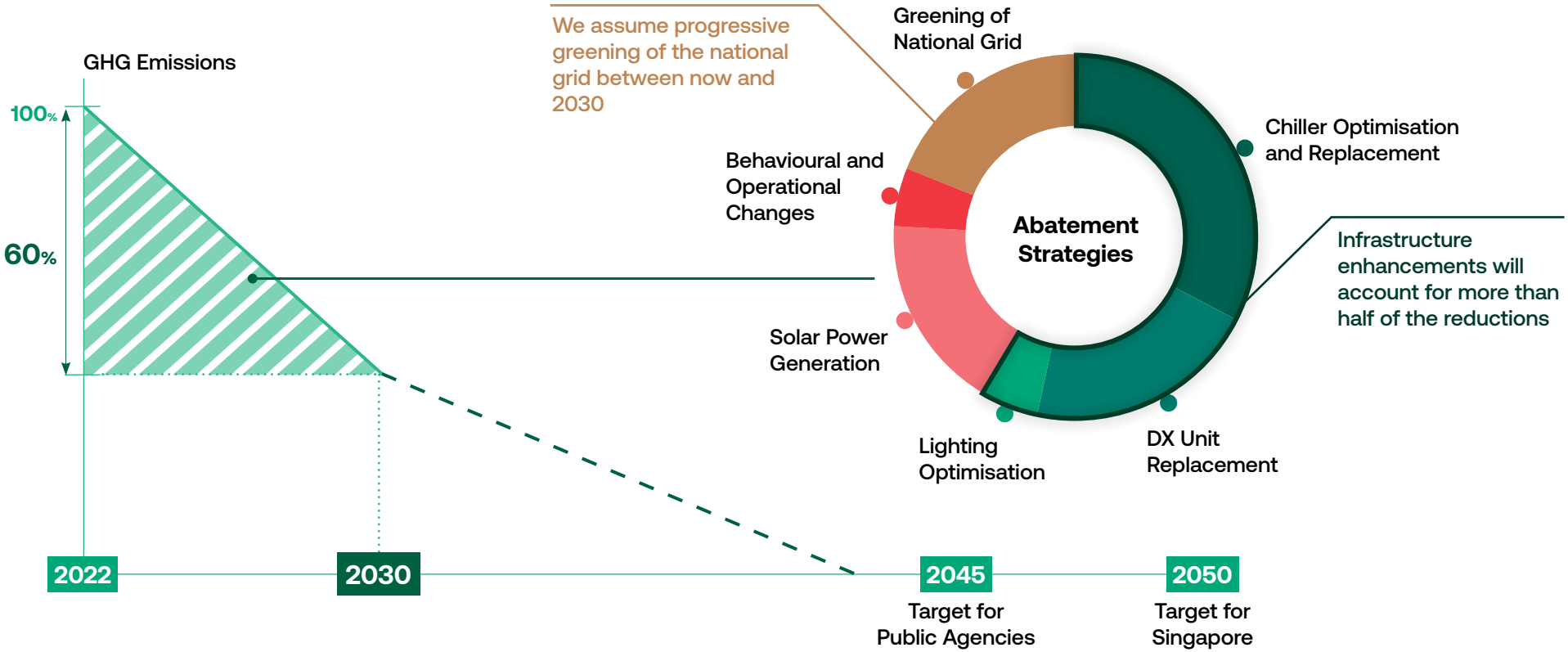
We have embarked on the 5% Challenge, aimed at rallying the campus community to support SP's sustainability initiative and signalling that sustainability is a collective responsibility.

SP Singapore Polytechnic

OUR SUSTAINABILITY VISION

Putting It Together – Our 60-30 Vision

Factoring in expected reductions in Singapore's Grid Emission Factor (GEF) arising from the greening of the country's energy grid between now and 2030, we expect these strategies to result in a combined ~60% reduction in annual GHG emissions.



SP Singapore Polytechnic

OUR SUSTAINABILITY VISION

Looking Ahead

Our inaugural disclosure focuses on Scope 1 and 2 GHG emissions. We are cognisant of our responsibility to address emissions arising from our upstream and downstream activities, such as the purchase of goods and services. We are committed to addressing Scope 3 emissions in the coming years, through efforts like green procurement.

We also know that sustainability is a multi-faceted issue, cutting across the Environmental, Social and Governance domains. We are reviewing our policies and practices with this ESG philosophy in mind, and aim to include disclosures in the Social and Governance domains in subsequent years.



SP Singapore Polytechnic



OUR JOURNEY SO FAR

SP Singapore Polytechnic

HIGHLIGHTS FROM OUR JOURNEY SO FAR



2010

OCTOBER

SP is the first polytechnic to receive the President's Award for the Environment. This is Singapore's highest accolade that recognises individuals, organisations and companies for their contributions to environmental sustainability.

2019

JANUARY

SP deployed chargers for electric vehicles on campus, as part of national grid operator SP Group's first wave of public charging points. SP's chargers also serve as an education and research platform for our engineering curriculum.

2022

AUGUST

SP launched the Centre for Environmental Sustainability & Energy Efficiency (ESEE), which serves as a "one-stop shop" for enterprises looking to embark on green transformation. To date, ESEE has partnered with over 50 companies and delivered customised training for 80 of these companies' staff.

SP Singapore Polytechnic

HIGHLIGHTS FROM OUR JOURNEY SO FAR



SP held our inaugural Go Green SP event involving over 2,000 staff, students and industry partners, where we announced our commitment to attain net-zero GHG emissions before 2045, ahead of the timeframe for public agencies. SP's senior management led staff and students in the SP Green Pledge to advance sustainable development and contribute to the global fight against climate change.

2022

NOVEMBER

SP launched Singapore's first solar photovoltaics recycling line, with a target capacity of 80 panels and a recovery rate of up to 95% per day.

2023

APRIL

SP rolled out the Common Core Curriculum across all 30 of our diploma programmes. Using the United Nations' Sustainable Development Goals and Singapore Green Plan 2030 as an overarching frame, students explore critical local and global issues culminating in a Sustainability Innovation Project where they are challenged to develop solutions that benefit the community.

2023

JULY

SP Singapore Polytechnic

HIGHLIGHTS FROM OUR JOURNEY SO FAR



2023 NOVEMBER

SP launched the 5% Challenge, which aims to galvanise staff to reduce electricity consumption through behavioural and operational changes that are not reliant on infrastructural upgrades.

2024 MARCH

SP's Singapore Maritime Academy became the first in the Asia-Pacific region to conduct training in handling methanol as ship fuel.

2024 APRIL

SP published our inaugural Environmental Sustainability Disclosure and announced our 60-30 Vision.

SP Singapore Polytechnic



HOW WE ARE ORGANISING OURSELVES

SP Singapore Polytechnic

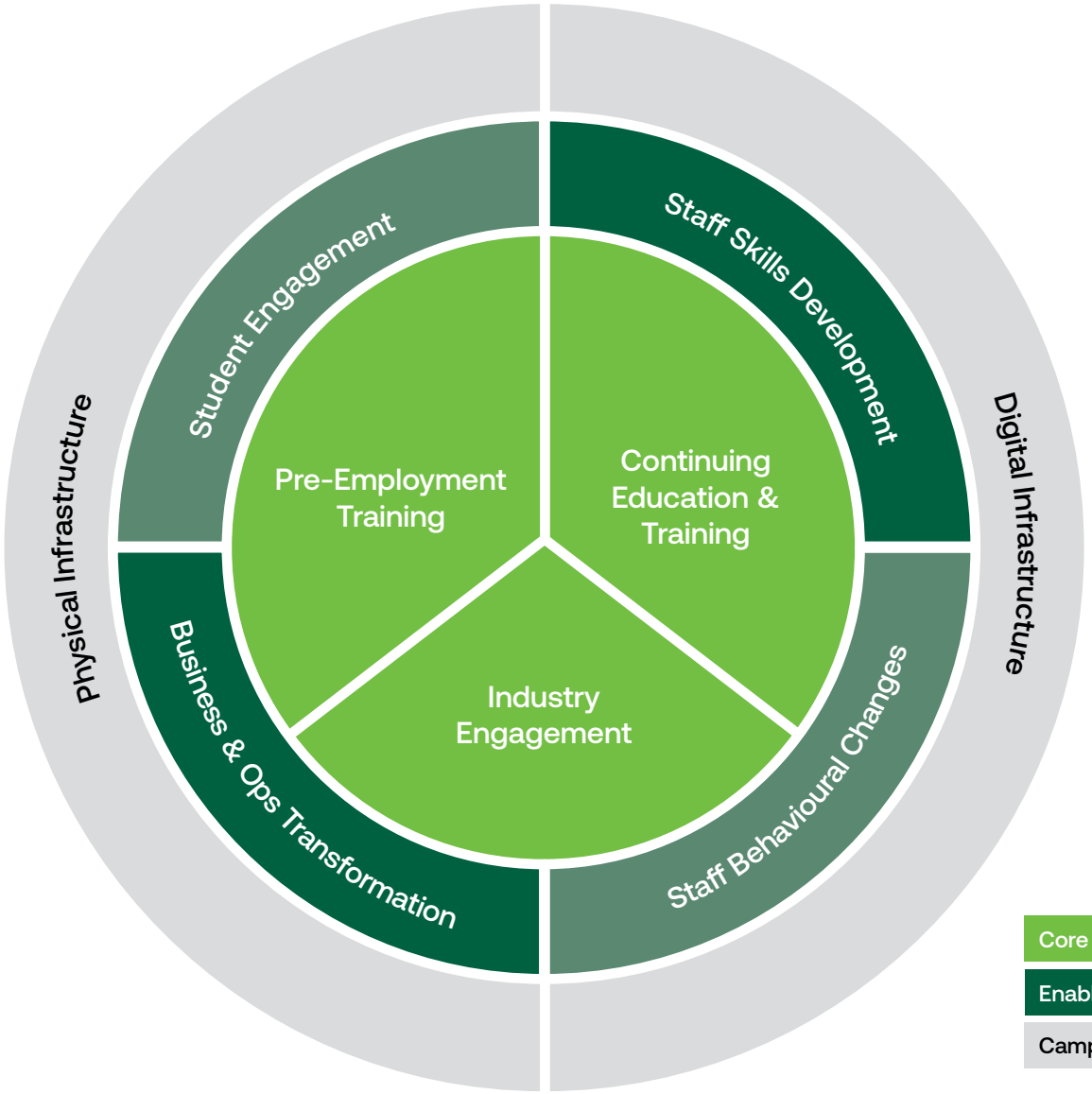
HOW WE ARE ORGANISING OURSELVES

Focus Areas

Our sustainability strategy is anchored on our core mission of Pre-Employment Training, Continuing Education & Training and Industry Engagement.

As an educational institution that enrols one in ten Singaporeans from every age cohort, alongside our roles to uplift local enterprises and upskill the adult workforce, we must take proactive steps to instil sustainability mindsets and behaviours in all our learners.

Our people are our biggest asset. Therefore, we have emphasised rallying both staff and students to participate in our campus sustainability initiatives. Our staff and students are key enablers; they are critical to the success of our efforts to transform our business and operations in support of our net-zero ambition.



SP Singapore Polytechnic

HOW WE ARE ORGANISING OURSELVES

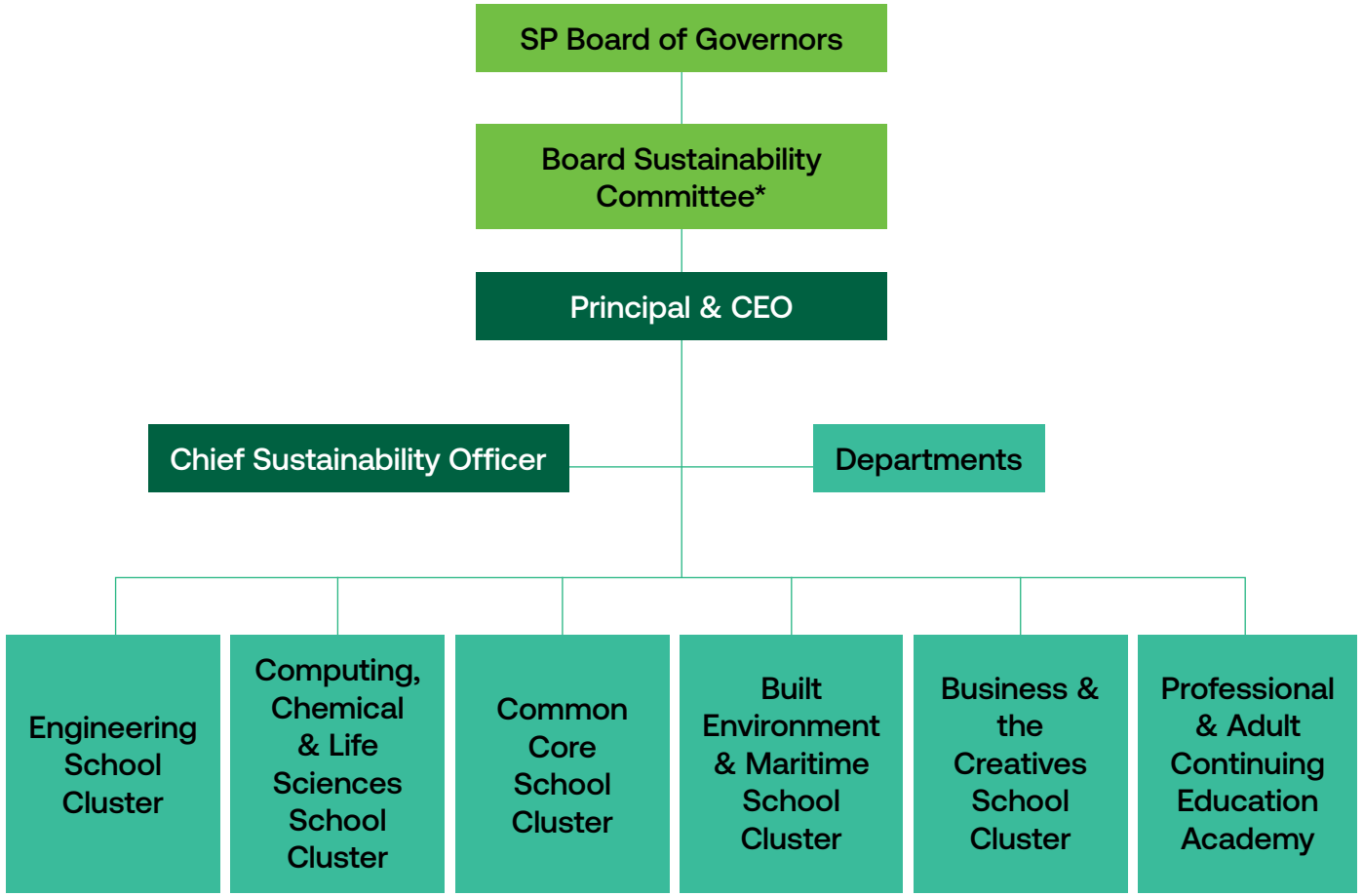
Governance Structure

Our governance structure reflects our commitment to integrate sustainability into all areas of SP's business that align with our PET, CET and Industry Engagement mission.

Sustainability is a key concern of SP's Board of Governors and features regularly as an agenda item in its meetings.

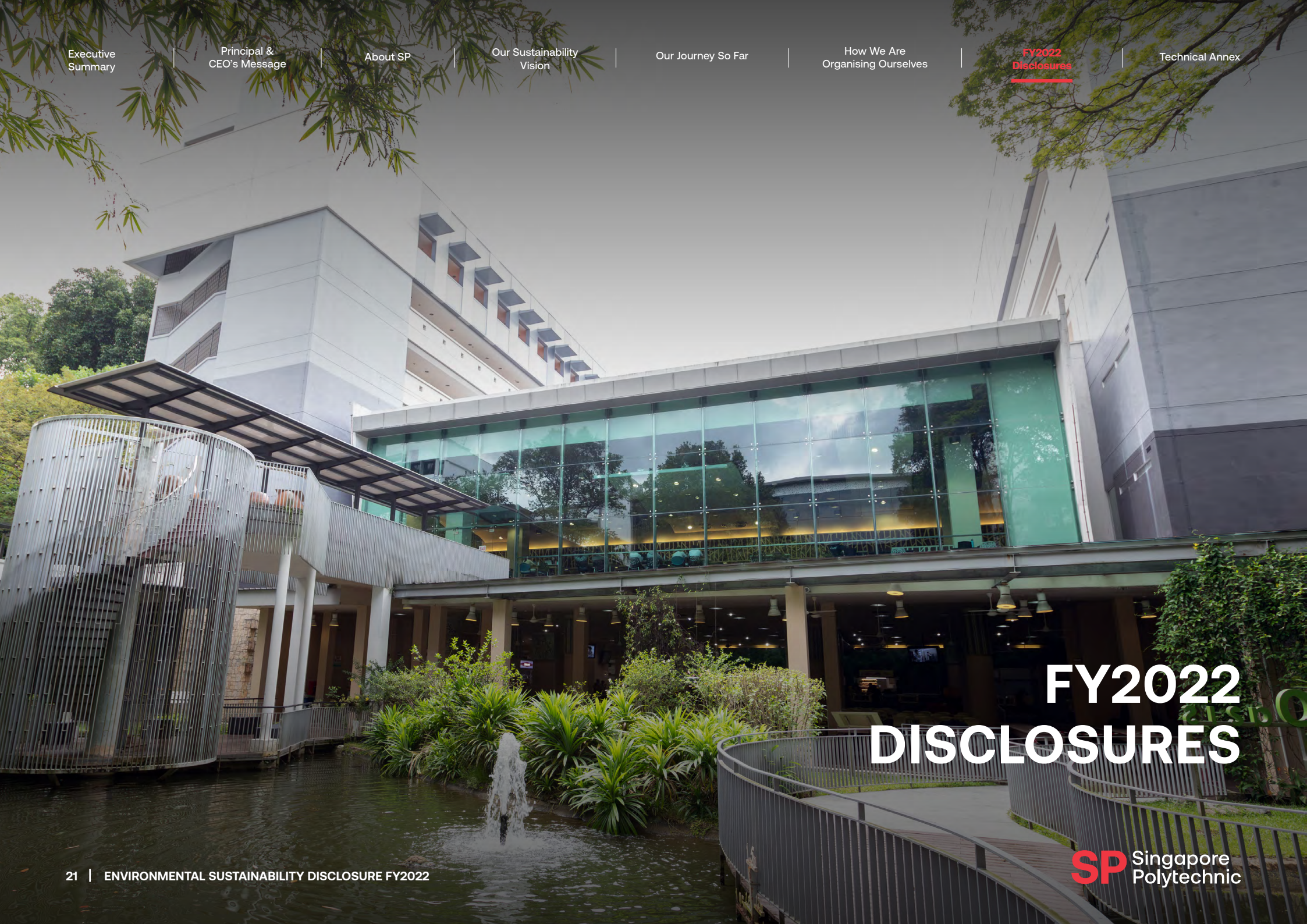
SP's Principal & CEO chairs SP's monthly Sustainability Committee Meeting, which is attended by senior management, with every school and department represented.

SP's Director of Planning, Organisational Development & Sustainability, who is responsible for strategic planning, resource allocation and culture change, also serves as Chief Sustainability Officer and Secretary to both committees.



*Effective 1 May 2024

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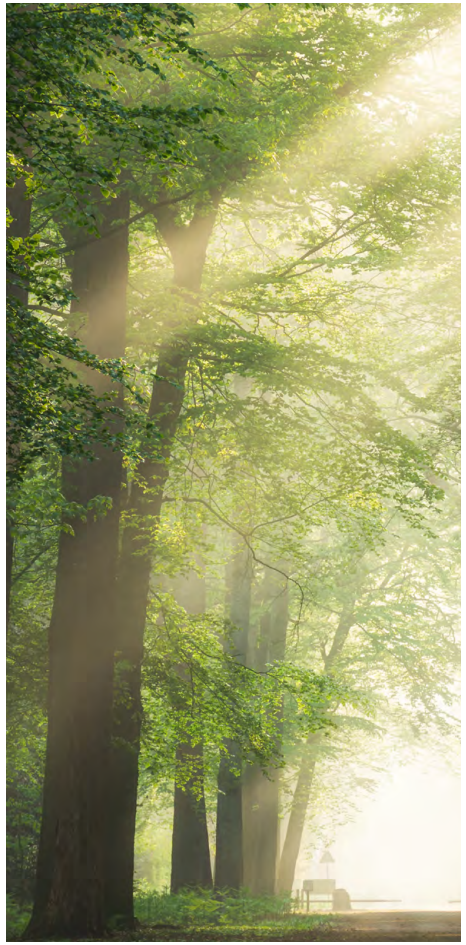


FY2022 DISCLOSURES

Singapore Polytechnic

FY2022 DISCLOSURES

GHG Emissions



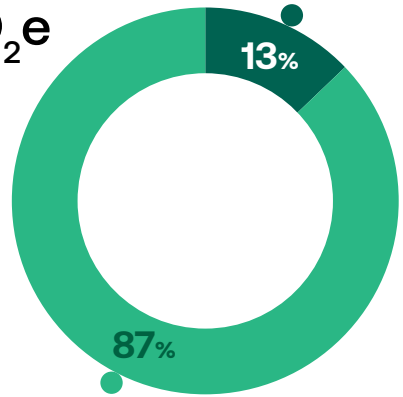
FY2022 DISCLOSURE

Scope 1 and 2 GHG Emissions:

13,096.18 tCO_2e

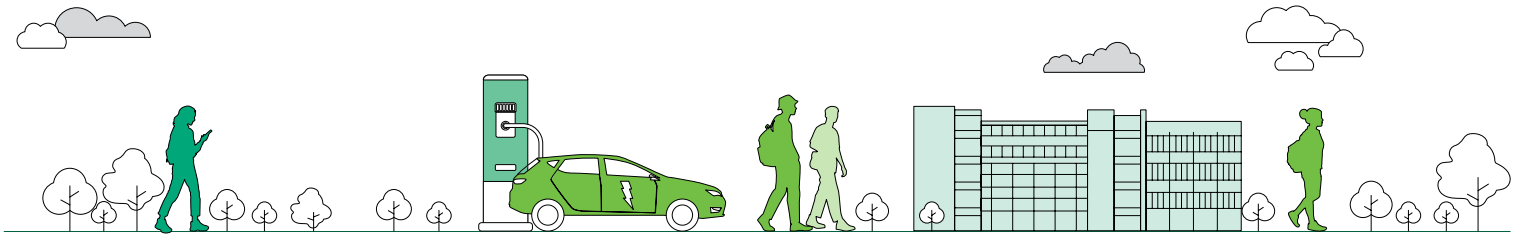
Scope 1:
1,673.73 tCO_2e
>99% from refrigerants, remainder from fuels

Scope 2:
11,422.45 tCO_2e



OUR TARGET

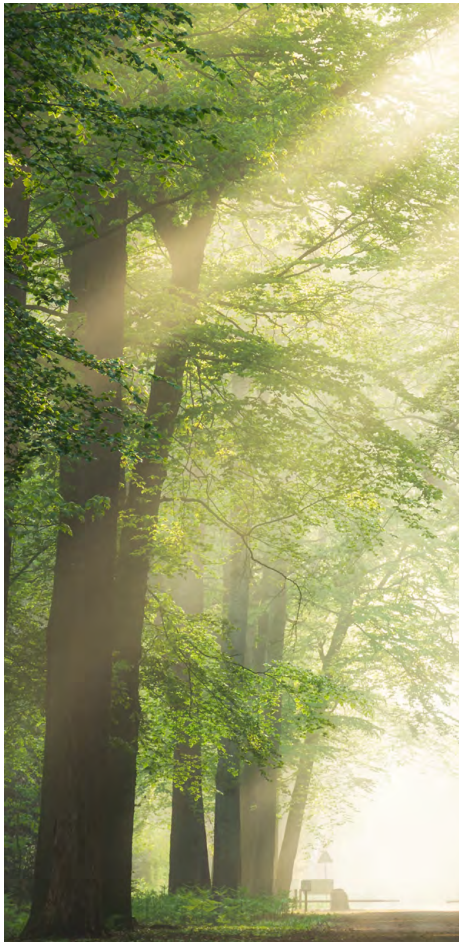
- 60% reduction from FY2022 by FY2030 – i.e. **5.3K tCO_2e by FY2030**
- In the longer run, we hope to achieve net-zero Scope 1+2 emissions before 2045



SP Singapore Polytechnic

FY2022 DISCLOSURES

GHG Emissions



OUR JOURNEY SO FAR

- In 2022, we replaced 12 ageing DX air-conditioners with more energy-efficient models that use refrigerants with a lower Global Warming Potential. This is approximately 3% of the DX units on campus.

OUR FORWARD PLANS

- As part of the 60-30 Vision, we are embarking on a comprehensive review of our existing campus cooling infrastructure to arrive at a more efficient way of cooling our campus.
- The plan includes the replacement of ageing and inefficient chillers and the optimisation of existing chillers to achieve better cooling efficiency. We will also retire some of our DX units and connect the facilities they serve to the chiller network instead.



SP Singapore Polytechnic

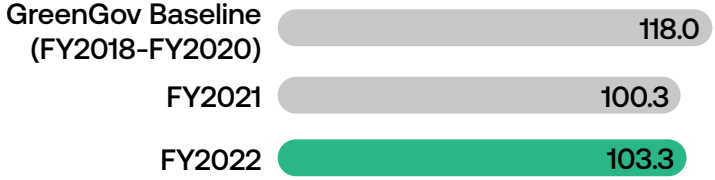
FY2022 DISCLOSURES

Energy



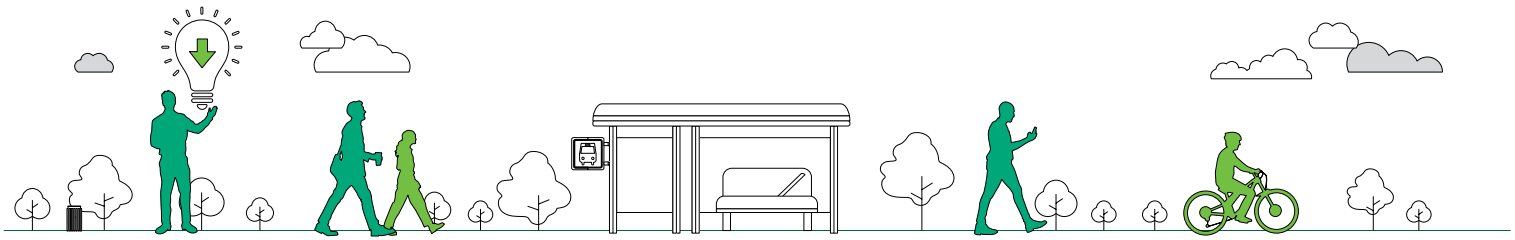
FY2022 DISCLOSURE

Energy Utilisation Index: **103.3 kWh/m²**



OUR TARGET

- 5% improvement in EUI from FY2022 level by FY2025 – i.e. **98.1 kWh/m² by FY2025**
- We have already met the GreenGov target of 10% improvement in EUI from FY2018-FY2020 level, by FY2030 – i.e. **106.2kWh/m² by FY2030**



SP Singapore Polytechnic

FY2022 DISCLOSURES

Energy

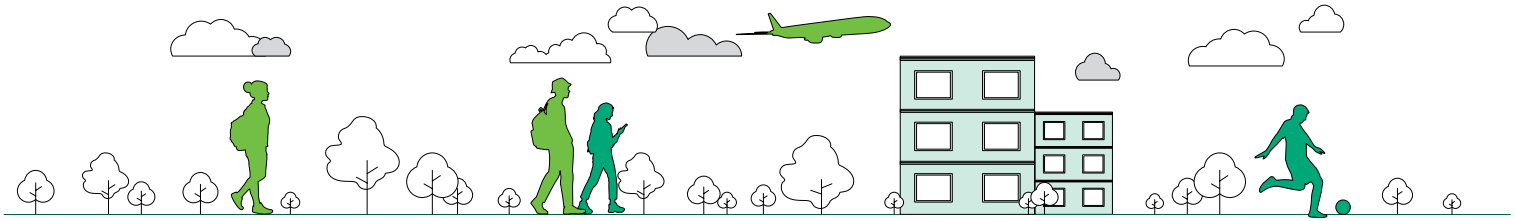


OUR JOURNEY SO FAR

- Air conditioning accounts for a significant proportion of our total electricity consumption. To that end, centrally-controlled air-conditioners have been set at 25°C since April 2023.
- We have also installed temperature sensors across 600 offices with standalone air-conditioners as of February 2024. The intent is to empower office occupants with ambient temperature data as a nudge to set the thermostat at 25°C.
- In November 2023, we launched the 5% challenge to galvanise staff into making behavioural and operational changes to reduce electricity consumption.
- Starting in January 2024, we have published electricity consumption data monthly to support schools and departments in measuring the impact of their electricity consumption initiatives.

OUR FORWARD PLANS

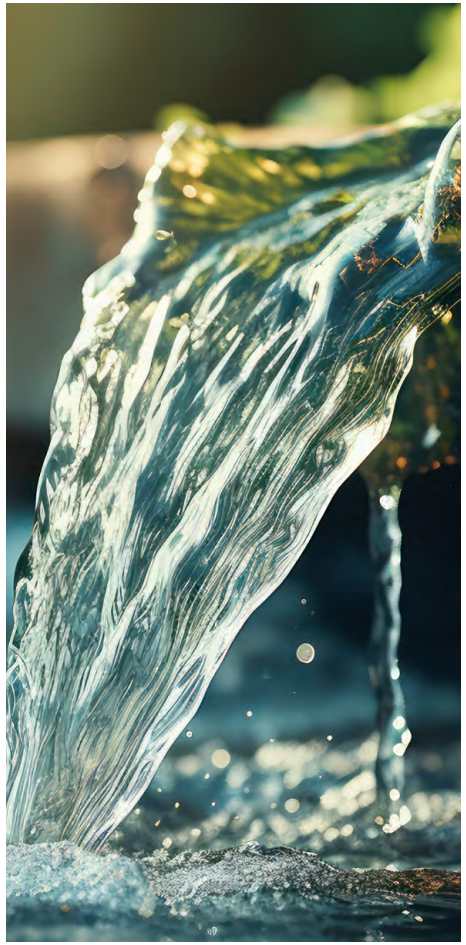
- We will continue to refine our data dashboard in consultation with staff. The idea is to develop a user-friendly dashboard accessible to all staff to strengthen engagement and ownership.
- We will scale best practices across SP. For example, we successfully concluded a pilot on hybrid cooling in a classroom setting, where we deployed fans in conjunction with air-conditioning. We will progressively deploy hybrid cooling in other classrooms in the coming years.



SP Singapore Polytechnic

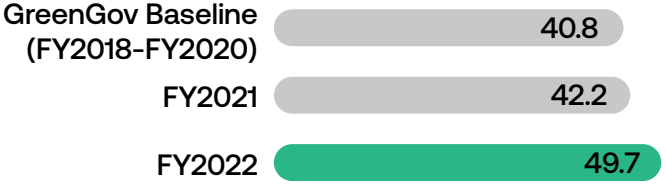
FY2022 DISCLOSURES

Water



FY2022 DISCLOSURE

Water Efficiency Index: **49.7 L/p/d**



OUR TARGET

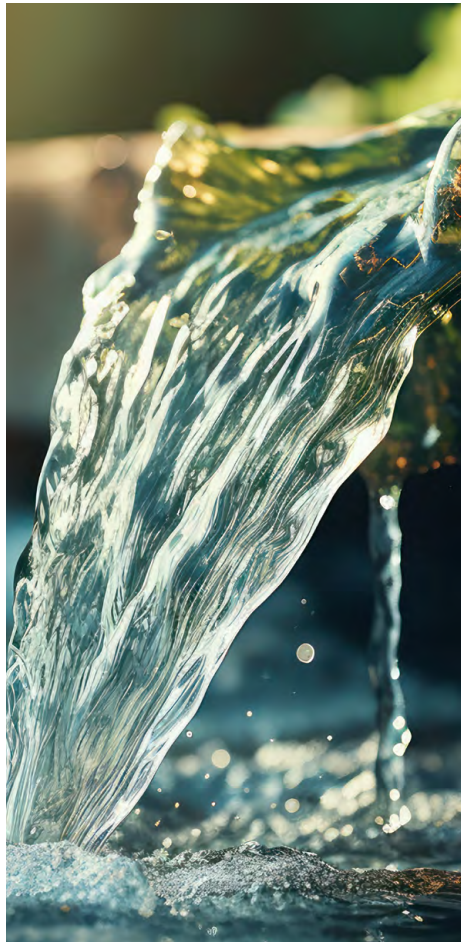
- 10% improvement in WEI from FY2018-FY2020 level, by FY2030 – i.e. **36.7 L/p/d by FY2030**



SP Singapore Polytechnic

FY2022 DISCLOSURES

Water

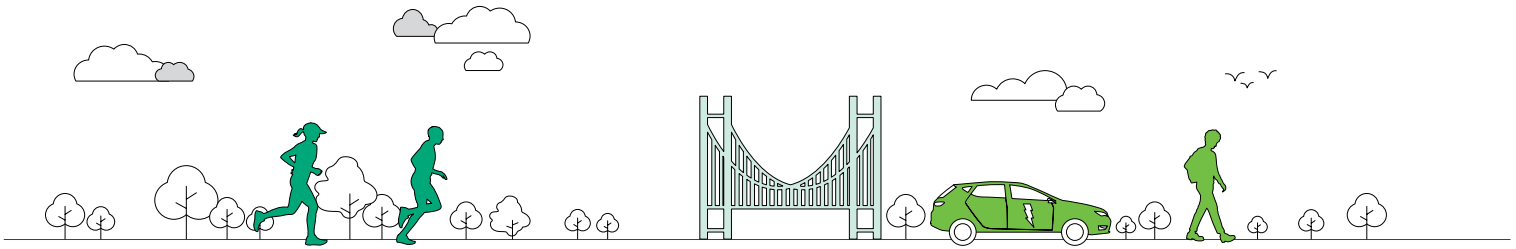


OUR JOURNEY SO FAR

- We have progressively upgraded our water fittings to be at least 3-ticks efficiency under the Water Efficiency Labelling Scheme. As of end-2023, about 90% of our fittings are compliant, and we plan to upgrade the remainder over the next few years.

OUR FORWARD PLANS

- We will engage a contractor in 2024 to conduct a water usage audit and identify strategies to reduce water consumption. These could include condensate recovery from our air handing units' cooling towers to meet a portion of our water needs.
- We are working with student groups to identify water reduction initiatives that students could play a part in, as part of our broader strategy to involve the larger campus community in sustainability efforts.



SP Singapore Polytechnic

FY2022 DISCLOSURES

Waste



FY2022 DISCLOSURE

Waste Disposal Index:

0.075 kg/p/d

Proportion of waste generated that is diverted or recycled: **15.9%**

OUR TARGET

- 30% improvement in WDI from FY2022 level, by FY2030 – i.e. **0.053 kg/p/d by FY2030**



SP Singapore Polytechnic

FY2022 DISCLOSURES

Waste

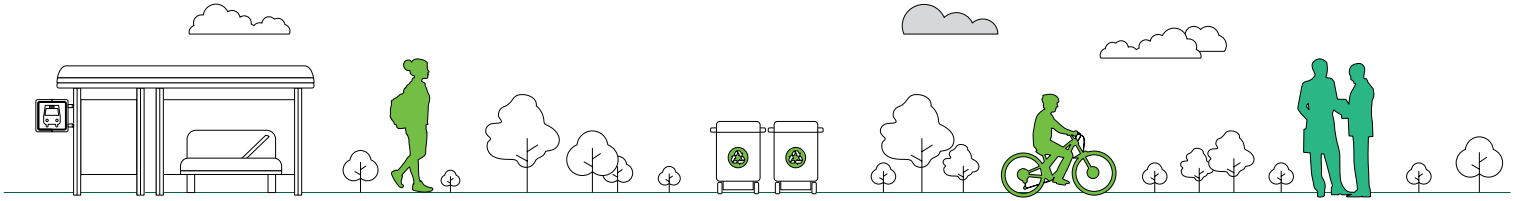


OUR JOURNEY SO FAR

- We have implemented processes to segregate food wate at our food courts and currently have four food digesters to process food waste on campus. In FY2022, these food digesters diverted about 8,500 kg of food waste from disposal, or about 9% of total waste diverted that year.
- We have installed 39 multi-channel recycling bins across campus as part of our effort to encourage recycling of plastic, paper and metal.

OUR FORWARD PLANS

- We will conduct a waste audit in 2024 to identify strategies and opportunities to reduce the amount of waste generated, and increase the proportion of waste that is either recycled or diverted from disposal.
- Concurrently, we have commissioned a staff project team to evaluate how staff could play a part in waste management as part of our efforts to involve the larger SP community in our sustainability initiatives.



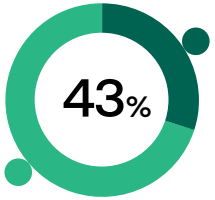
SP Singapore Polytechnic

FY2022 DISCLOSURES

Green Buildings

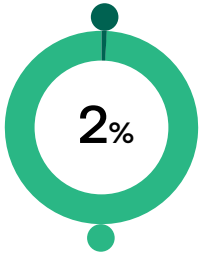


FY2022 DISCLOSURE



Green Mark-certified buildings:

23 out of **53**

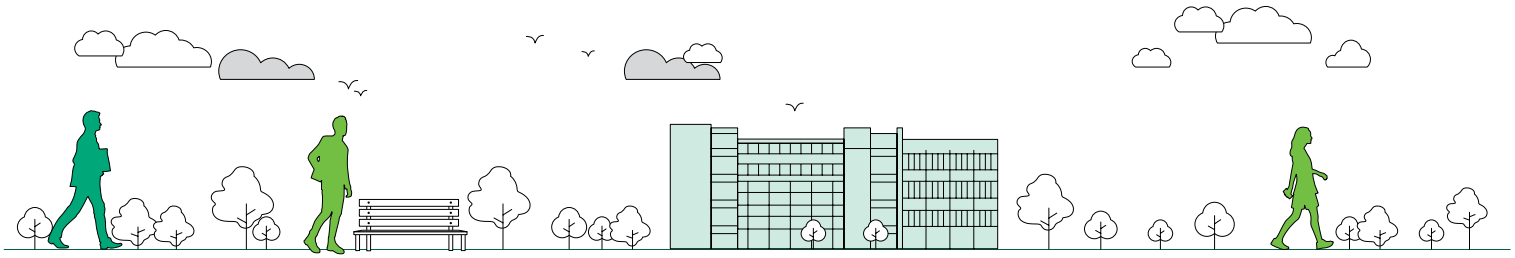


Green Mark Platinum Super Low Energy (SLE) buildings:

1 out of **53**

OUR TARGET

- All buildings to be Green Mark certified by FY2030
- At least 20% of our buildings at Platinum SLE or equivalent – i.e. **11 buildings**



SP Singapore Polytechnic

FY2022 DISCLOSURES

Green Buildings



OUR JOURNEY SO FAR

- We have commenced work on our first Green Mark Zero-Energy Building and hope to attain certification by FY2026.

OUR FORWARD PLANS

- We will engage a consultant to develop a comprehensive Campus Green Masterplan.
- The consultant's recommendations will inform infrastructural works across SP in the coming years to ensure that all renovations and retrofits comply with Green Mark Platinum SLE requirements.



SP Singapore Polytechnic

TECHNICAL ANNEX

GHG Emissions CO_2

ORGANISATIONAL BOUNDARY

- It is based on the operational control approach, with reference to the GHG Protocol's Corporate Accounting and Reporting Standard.
- It covers SP's Dover Campus and Poly Marina but excludes entities outside SP's operational control, namely SP International, SP Graduates' Guild, SP Staff Apartments as well as on-campus vendors and tenants such as food court operators.

EMISSION FACTORS FOR SCOPE 1

- Emission factors for Scope 1 are taken from the UK Department for Environment, Food & Rural Affairs' (DEFRA) 2023 framework. The emission sources that are included in SP's Scope 1 computation are:

Emission Source	Emission Factor (kg CO_2e/Unit)	Unit
Diesel	2.66	L
Kerosene	2.54	L
Petrol	2.35	L
Propane	2,997.63	Metric tonnes
Methane	2,562.57	Metric tonnes
Natural Gas	2.04	m^3
Refrigerant (R134a)	1,300	kg
Refrigerant (R410a)	1,924	kg
Refrigerant (R22)	1,760	kg

TECHNICAL ANNEX

GHG Emissions CO_2

EMISSION FACTORS FOR SCOPE 2

- Emission factor for Scope 2 is the Energy Market Authority's (EMA) published Grid Emission Factor (GEF) for 2022, correct as at June 2023 – i.e. **0.4057 $kgCO_2e/kWh$.**
- Since then, EMA has revised the GEF for 2022 to 0.417 $kgCO_2e/kWh$, largely due to an increase in diesel consumption as natural gas markets worldwide tightened in 2022. We will update our Scope 2 computation to reflect the revised GEF in subsequent years' disclosures.

TECHNICAL ANNEX

Energy

DEFINITION OF ENERGY UTILISATION INDEX

- Aligned with GreenGov definition, i.e.

$$\frac{\text{Total amount of electricity consumed in Year}_n \text{ (kWh)}}{\text{Total Gross Floor Area in Year}_n \text{ (m}^2\text{)}}$$

- SP's Gross Floor Area (GFA) for FY2022 is 289,060 m^2.
- This figure is aligned with our organisational boundary; i.e. it covers SP's Dover Campus and Poly Marina, but excludes entities outside SP's operational control, namely SP International, SP Graduates' Guild, SP Staff Apartments and on-campus vendors and tenants such as food court operators.

TECHNICAL ANNEX

Water

DEFINITION OF WATER EFFICIENCY INDEX

- Aligned with GreenGov definition, i.e.

$$\frac{\text{Total amount of water consumed in Year}_n \text{ (L)}}{\text{Operational days in Year}_n \times \text{Daily campus footfall in Year}_n}$$

- Our estimate of daily campus footfall comprises staff, students enrolled in full-qualification programmes and ad-hoc visitors.
- Recognising that some on-campus activities do take place on weekends and term vacations, we have not excluded weekends and vacations from the number of operational days.

TECHNICAL ANNEX

Waste

DEFINITION OF WASTE DISPOSAL INDEX

- Aligned with GreenGov definition, i.e.

$$\frac{\text{Total amount of waste disposed of in Year}_n \text{ (kg)}}{\text{Operational days in Year}_n \times \text{Daily campus footfall in Year}_n}$$

- Our estimate of daily campus footfall comprises staff, students enrolled in full qualification programmes and ad-hoc visitors.
- Recognising that some on-campus activities do take place on weekends and term vacations, we have not excluded weekends and vacations from the number of operational days.

DEFINITION OF WASTE RECYCLED OR DIVERTED

- Refers to the proportion of waste generated that is recycled or diverted from incineration, i.e.

$$\frac{\text{Total amount of waste diverted in Year}_n \text{ (kg)}}{\text{Total amount of waste generated in Year}_n \text{ (kg)}}$$

- The categories of waste that SP currently recycles and/or diverts are:

Food | Plastics | Horticultural waste | E-waste | Metal | Paper | Fluorescent tubes

TECHNICAL ANNEX

Green Buildings

DEFINITION OF GREEN BUILDINGS

- Aligned with the Building & Construction Authority's (BCA) Green Mark Standards (2021 edition).
- Certifications attained are valid as at end-FY2022, i.e. March 2023.

SP Singapore Polytechnic

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